

Sarina Coastal Sustainable Landscapes Project

Sarina Beach



Protecting and Rehabilitating Sarina Beaches Coastline



Supported by BHP Billiton Mitsubishi Alliance (BMA)





Table of Contents

- 1.0 Introduction
- 2.0 Scope of Works
- 3.0 Site Description
- 4.0 Rehabilitation Treatment
 - 4.1 Weed Management
 - 4.2 Natural Regeneration
 - 4.3 Revegetation
 - 4.3.1 Planting
 - 4.3.2 Planting density
 - 4.3.3 Plant nutrition
 - 4.3.4 Water schedule
- 5.0 Fencing and Beach access
- 6.0 Signage
- 7.0 Turtle Friendly Lighting
- 8.0 Community Involvement
- 9.0 Monitoring and Maintenance
- 10.0 Exclusions



Beach Team
 Supervisor Jack Langdon
 Labourers: Adam Eaton and Manuel Casado

Contact Details

Mackay Regional Council (Sarina depot)
 07 49648000

Sarina Coastal Project Manager
 Tony Ahern 0427026294
 Email tonya@sarina.qld.gov.au

Sarina Landcare Catchment Management Assoc
 Saskia von Fahland 07 49561388
 Email slcma@mcs.net.au

Mackay Whitsunday Natural Resource Management Group
 Matt Bloor 07 49577158
 Email matt@mwnrm.org.au
 Web www.mwnrm.com.au

Sarina Coastal Sustainable Landscapes Project



1.0 Introduction

Coastal management and rehabilitation works will be undertaken by council staff at Sarina Beach from July 2007 to June 2010 as part of the *Sarina Coastal Sustainable Landscapes Project*.

The works will implement, but are not limited to, priority actions identified in the *Sarina Beaches Management Guidelines for Coastal Zones* (Sarina Shire Council, 2006) with the aim to 'improve the environmental condition of the esplanades and dunes associated with each of the populated Sarina Shire beaches'. The recommendations in the guidelines were based on monitoring the condition of the foredunes in the Sarina beaches which found that the environmental condition of most beaches requires urgent improvement. A copy of the guidelines is available at

http://www.sarina.qld.gov.au/SLCMA_COASTAL_MANAGEMENT_GUIDELINES.pdf or follow the links to the project on www.mwnrm.com.au.

Coastal management is defined as 'the protection, conservation, rehabilitation, management and ecologically sustainable development of the coastal zone' under Queensland's *Coastal Protection and Management Act 1995*. This project will implement best management practices to address the key issues of: dune vegetation zonation and complexity; vegetative waste; beach access; weeds and non-native vegetation; erosion; wildlife and turtle nesting.

The project is delivered by Sarina Shire Council (Mackay Regional Council) in partnership with Sarina Landcare Catchment Management Association (SLCMA) & Mackay Whitsunday Natural Resource Management Group (MWNRM) with generous support of BHP Billiton Mitsubishi Alliance (BMA). More information on the project is available by following the links to the project on www.mwnrm.com.au.

2.0 Scope of Works

The rehabilitation and enhancement plan applies to the area between the mouth of Plane Creek at Sarina Inlet and extends north, parallel to the coastline, to a small creek on the Southern end of Campwin Beach (refer to Figure 1 – Zone A). The area outlined in this plan forms the state-owned coastal esplanade reserve which is under the management of Sarina Shire Council.

The aim of this project is to improve ecological values, prevent further erosion aesthetic appearance and address public safety issues.



Project activities include:

- Revegetation along esplanade with native species to support dune structure and enhance coastal vegetation buffer against storm events. Emphasis will be placed on thickening areas where coastal vegetation has been cleared in addition to larger plantings on areas of esplanade where there is no adjacent houses.
- Juvenile coconuts will be removed as part of the project to reduce further issues associated with buildup of vegetative waste. Further, council may decide to remove selected mature coconuts where desired, but will not undertake broad-scale removal of mature coconuts
- Coastal fencing will be constructed along the esplanade of Sarina Beach to rationalize public access, protect dunal vegetation and restrict area of maintained lawns
- Interpretive turtle nesting signage will be installed at a walkway on the foreshore.
- Review and modify street and residential lighting to protect turtle nesting areas as nesting turtles and hatchlings can be disturbed and disorientated by lights.
- Throughout the project, ongoing maintenance of the foreshore will be undertaken to minimise weed infestations and facilitate re-establishment of native vegetation.

Figure 1. Sarina Beach esplanade



Figure 1 a) – Southern end of Sarina Beach



Figure 1 b) – Middle of Sarina Beach, Johnsons Beach in background



Figure 1 c) – Northern end of Sarina Beach

3.0 Site Description

The following information for Sarina Beach is from the *Sarina Beaches Management Guidelines for Coastal Zones* (2006) and from subsequent site inspections.

- Extensive mown lawn to dunes areas are preventing natural regeneration to occur and leads to a monoculture of garden couch.
- Natural foredunes should have distinct zones of vegetation. In some areas there is good zonation, however the majority of Sarina Beach has reduced woody vegetation on the landward dune edge and an absence of shrubs.

Sarina Coastal Sustainable Landscapes Project – Sarina Beach

13-Mar-08



- The esplanade is heavily impacted by a high number of weed species which suppress regeneration of native species and dominate areas to the exclusion of native species.
- Lantana (*Lantana camara*) and prickly pear (*Opuntia stricta*) are both present at Sarina Beach and are declared weeds which are targeted for removal.
- Environmental weeds such as Guinea grass (*Panicum maximum*) and couch (*Digitaria eriantha*) are also present and pose a fire risk due to the large flammable fuel loads they create.
- Dense mature coconuts & associated build up of waste impacts on aesthetics and provides habitat for vermin. Some juvenile coconuts are growing on esplanade.
- The narrowness of the vegetation corridor reduces the ability of the system to withstand pressures and thus this area is an extremely fragile zone.

4.0 Rehabilitation Treatment

A number of broad treatments will be used within the Sarina Beach coastal esplanade (Refer to *Table 1* below). Retention and restoration of native vegetation is the most important factor in maintaining dune structure and biodiversity and allows beaches the best protection against erosion under adverse conditions.

Table 1: Restoration techniques to be used at Sarina Beach Coastal Esplanade

Techniques	Comment
Natural regeneration	<i>Encouraging the natural regeneration of native species is the best method for restoration of an area. For this to occur a viable seed bank must be present, and re-growth must include all native plant species from each stratum level. In areas where natural regeneration is to occur, mowing will be stopped and the area clearly marked for exclusion from pedestrians and public. In these areas, ongoing maintenance is required to minimise re-growth of weed species</i>
Revegetation	<i>Where planting, local native vegetation is required due to insufficient cover or re-growth of native species. Local native species will be sourced and replanted within an area as per density guide. Correct soil and bed preparation techniques will be carried out prior to planting and ongoing maintenance of the site will be undertaken.</i>
Staged weed removal	<i>Weed removal will be carried out in a staged approach. Particularly useful in removal of non-native vegetation along the dune scarp. Large woody weeds will be removed slowly to ensure the replaced native vegetation provides sufficient habitat value and protection against erosion before more removal of woody weeds.</i>



Physical weed removal	<i>Physical weed removal, including hand pulling, chipping or cutting weeds is effective in small infestations in environmentally sensitive areas.</i>
Mechanical weed removal	<i>Mowing or brush cutting will suppress weed growth, discourage seeding and spread. This method will be used particularly in areas bordering large infestations. Care will be taken to reduce potential disturbance as excessive mowing and brush cutting can facilitate further weed growth and reduce regeneration of native vegetation.</i>
Herbicide weed removal	<i>The application of herbicides will include foliage or basal spraying, cut/paste & stem injection where applicable. Spraying may be carried out on large or robust weed infestation, particularly to gain initial control of an infestation. However the majority of spraying will be small scale 'spot spray' applications to minimise non-target impacts Roundup Bi-active® will be the most common herbicide used due to its low toxicity to wildlife and humans.</i>

4.1 Weed Management

The esplanade contains numerous environmental weeds and non-native vegetation that is preventing the natural regeneration process to occur. Weeds within the site will be removed through a staged approach, with erosion potential and site fragility being the overriding principles. The strategy is to reduce and contain weed infestations and to facilitate natural regeneration of native species.

Introduced grasses such as guinea grass are well known for out-competing native species in the ground layer. They are also highly flammable and associated hot fires threaten native habitats, particularly fire sensitive beach scrub rainforest species. These grasses and other weeds, particularly prickly pear and lantana, will be targeted. By restricting fire and managing fuel loads, natural recruitment of canopy trees will result in shading of the ground layer and reduce the dominance of weeds.

Weed control will involve both manual (e.g. hand pulling, brush cutting) and chemical methods until the seed stock is depleted or native vegetation has established to prevent weed re-growth. To reduce the incidences of erosion in dune areas, it is important to maintain vegetative cover. To meet this objective, some treated weeds will be left on site to enhance the regeneration process. No weeds will be removed on the frontal dune scarp without direct replacement with native species.

Chemical control will primarily involve using *Roundup Bi-active*® due to its low toxicity to wildlife and humans and rapid breakdown once applied. As native plants re-establish, the area will be checked for other environmental weeds and treated if necessary.



Weeds will be managed by the Council Beach Team for the duration of the project to ensure sites are well maintained and then by volunteers and Parks and Gardens staff under their operational works schedule.

Dumping of garden waste is an on-going concern at Sarina Beach and can introduce further environmental weeds into sensitive coastal vegetation. Council will enforce local laws prohibiting the dumping of waste and target dumping 'hotspots' to stop the practice.

Table 2. Weed species identified from Sarina Shire Beaches	
Botanical Name	Common Name
Trees	
<i>Cocos nucifera</i>	coconut palm
<i>Mangifera indica</i>	mango
Shrubs	
<i>Euphorbia cyathophora</i>	painted spurge
<i>Lantana camara</i>	lantana – DECLARED*
<i>Leucaena leucocephala</i>	leucaena
<i>Macroptilium atropurpureum</i>	siratro
<i>Protasparagus</i> sp.	asparagus fern
Forbs	
<i>Achyranthes aspera</i>	chaff-flower
<i>Agave</i> sp	yucca
<i>Aloe</i> sp	Aloe
<i>Apocynaceae</i> sp.	periwinkle
<i>Bidens pilosa</i>	cobbler's pegs
<i>Bryophyllum</i> sp	mother of millions
<i>Conyza</i> sp.	fleabane
<i>Gazania</i> sp.	gazania
<i>Gomphrena celosioides</i>	gomphrena weed
<i>Mimosa pudica</i>	sensitive plant
<i>Opuntia stricta</i>	prickly pear – DECLARED*
<i>Sansevieria trifasciata</i>	mother-in-law's tongue
<i>Stachytarpheta jamaicensis</i>	light blue snakeweed
<i>Stylosanthes</i> sp.	
<i>Fabaceae</i> sp. 1	thistle
<i>Wedelia trilobata</i>	Singapore Daisy
Grasses	
<i>Cenchrus ciliaris</i>	buffel grass
<i>Cynadon nlemfuensis</i>	African stargrass



<i>Digitaria eriantha</i>	couch
<i>Panicum maximum</i>	guinea grass
<i>Panicum maximum</i> var. <i>triaglume</i>	
<i>Brachiaria mutica</i>	para grass
Vines	
<i>Passiflora foetida</i>	stinking passion flower
<i>Passiflora suberosa</i>	corky passion flower

Source: Sarina Shire Beach Management Guidelines for Coastal Zones
SLCMA personal communication

* Declared plants under the [Land Protection \(Pest and Stock Route Management\) Act 2002](#)

4.2 Natural Regeneration

Native vegetation plays an important role in the formation and stabilization of coastal areas with the root systems of native species more suited to stabilizing coastal areas.

Natural regeneration of *Casuarina equisetifolia* (horsetail she oak) has taken place along some areas of the esplanade and appears to have provided a good seed stock for future establishment.

Targeted weed control is aimed at facilitating the natural regeneration process.

4.3 Revegetation

All of the species selected are local indigenous coastal species, and will follow as close as practical to the natural vegetation succession inherent in this coastal zone.

4.3.1 Planting

Plant species used within this site have been identified from field studies of the native vegetation still remaining within this site and other sites within the local area and as per recommendations in the *Sarina Beaches Management Guidelines for Coastal Zones*. The plants for this site will be a mixture low growing shrubs, groundcovers and trees and will be installed as tube stock.



Table 4: Selected Species for Revegetation

Species Name	Common Name	Numbers
<i>CASUARINA EQUISETIFOLIA</i>	Horsetail she-oak	880
<i>CLERODENDRUM INERMIE</i>	Inermie	440
<i>VITEX TRIFOLIA</i>	Coastal Vitex	180
<i>HIBISCUS TILIACEUS</i>	Native Hibiscus	180
<i>CUPANIOPSIS ANACARDIODES</i>	Tuckeroo	180
<i>PANDANUS TECTORIUS</i>	Pandanus	180
<i>EUGENIA REINWARDTIANA</i>		10
<i>CLERODENDRUM FLORIBUNDUM</i>		150
	Total	2200

4.3.2 Planting Density

The table below will be used as a guide for planting density. Under different circumstances this may be altered to accommodate needs within the site

Table 5: Estimated Planting Density	
Growth Form	Planting Density
Coastal Dunes	1 tree every 4m
	1 shrub every 2-3m
	1 groundcover every 1-2m

Ground covers will be used to run down dune scarp with the purpose of trapping and stabilizing windblown sand. A filtered buffer will be established within this zone using trees and shrubs for the protection of plantings landward of this zone.

Where mortalities of planted tube stock occur, they will be replaced with similar species consistent with the planting tables.

4.3.3 Plant Nutrition

Coastal vegetation does not require a high level of nutrition so a regular fertilizer program is not recommended. Plants will receive *Terracottem*® upon planting (a physical soil conditioner enriched with fertilizers and a root growth starter compound, designed to improve the water and nutrient retention capacity, structure, aeration, quality and performance of growing media).

4.3.4 Water Schedule

Plants will receive adequate water for establishment and monitored by beach team to improve survival rate. Watering will be conducted by Beach Team for *Sarina Coastal Sustainable Landscapes Project – Sarina Beach* 13-Mar-08



duration of the project as needed and by Parks and Gardens staff in accordance with Council water restriction policy.

5.0 Fencing & Beach access

To reduce erosion and destruction of sand dune vegetation the beaches should only be accessed at designated points by appropriately designed tracks and sand ladders.

Bollard fencing (a 600mm high, post and rail fence) will be installed along the esplanade linking to existing fence on the southern end of the beach, and incorporating existing beach access walkways. This will provide a vegetation zone defining the revegetation area, limiting mowing to edge of dune and define pedestrian access through this sensitive area.

Pedestrian accesses will be maintained to provide satisfactory access to the beach. No formalised pathways will be constructed.

6.0 Signage

Interpretive/educational signage regarding marine turtle nesting will be installed in an appropriate position on the Esplanade (figure 2 below).

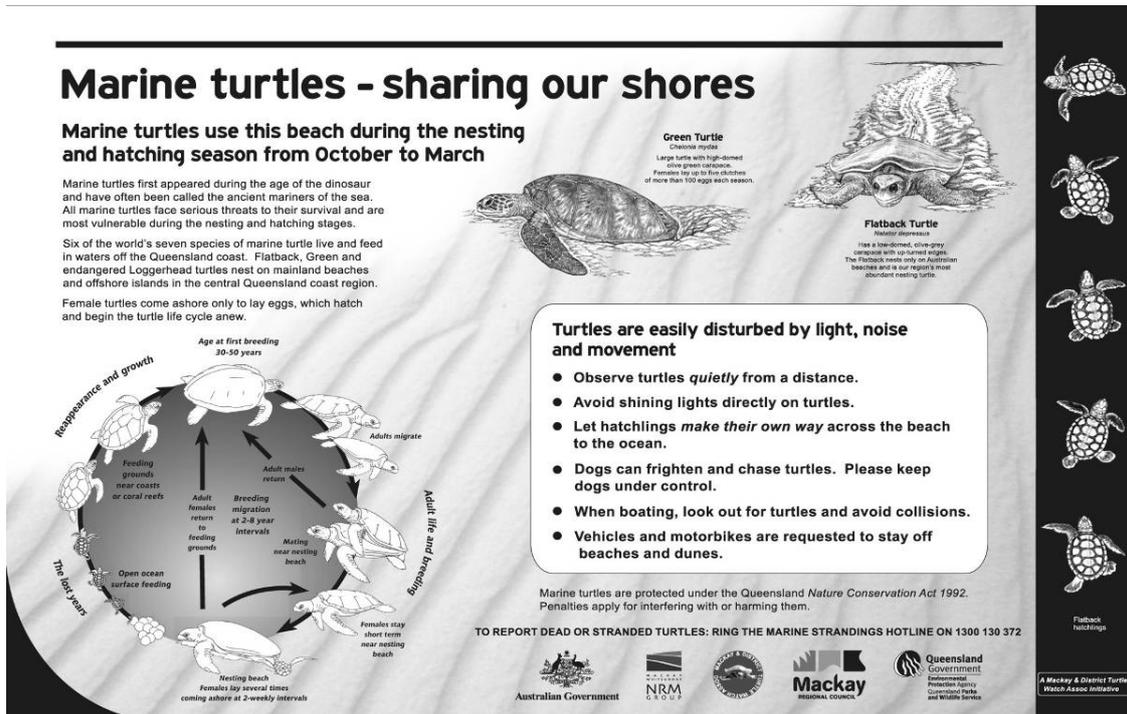


Figure 2 Turtle interpretive sign developed for the project in partnership with Mackay & District Turtle Watch Association Inc.



7.0 Turtle-Friendly Lighting

A monitoring survey of street & residential lighting will be undertaken to identify lighting hazardous to nesting marine turtles & hatchlings. Once identified, consultation with stakeholders will be carried out to identify and implement solutions.

8.0 Community Involvement

It is envisaged that Council will encourage residents (& community groups) at Sarina Beach to become involved with on-ground activities, whether through the development of a community rehabilitation plot, or on areas adjacent to private property.

Sarina Landcare will facilitate formation of a Coastcare volunteer group of local residents and provide support for ongoing vegetation and biodiversity management practices.

9.0 Monitoring and Maintenance

The Beach Team will monitor and maintain the area for the duration of the project with the main focus on vegetation establishment and weed suppression. This site will be maintained by Parks and Gardens Staff under their operational works schedule.

Where mortalities of planted tube stock occur, they will be replaced with similar species consistent with the planting tables.

Monitoring will be undertaken periodically using the methods outlined in the *Sarina Beaches Management Guidelines for Coastal Zones* (Sarina Shire Council, 2006) to assess the effectiveness of on-ground works in improving the condition of esplanades and dunes at the Sarina beaches.

10.0 Exclusions

Park facilities and designated open spaces are excluded from plan.

Large scale mature coconut tree removal is excluded from this plan, however council may decide to remove selected trees.

Council will not provide walkways on inland edge of esplanade to join with all access points.