

# Managing Coastal Hazards in the Burdekin Dry Tropics

<sup>1</sup> Peter Gibson, <sup>1</sup> Rochae Cameron and <sup>2</sup> Andrew Hannay

<sup>1</sup> NQ Dry Tropics PO Box 1466 Townsville QLD 4810

<sup>2</sup> Townsville City Council PO Box 1268 Townsville QLD 4810

## Abstract

Parts of the Burdekin Dry Tropics coastal strip has a long history of natural and human induced issues and some coastal areas remain very fragile. In many instances, management effort has been hampered by conflict between stakeholders, or poor practice e.g. construction of inappropriate erosion mitigation structures, revegetation at wrong time of year or not using the most appropriate species.

NQ Dry Tropics Sustainable Coast's program aims to ensure any management effort provides every opportunity for the coastal strip to remain resilient into the future and accounts for the additional pressures associated with climate change e.g. more frequent and intense storms. Generally the program works with Local Government to identify priority areas for coastal rehabilitation activities e.g. a site of persistent beach erosion.

One such priority area is Cungulla beach. It has been the subject of persistent beach erosion and was a high priority for Townsville City Council. Some residents had taken action into their own hands building structures in an effort to protect their property. In many instances the structures, built without the necessary approval, accelerated erosion and resulted in waste material being distributed over the beach.

NQ Dry Tropics and Townsville City Council jointly developed the Cungulla Shoreline Erosion Management Plan (SEMP) in consultation with other stakeholders including the Department of Environment and Heritage Protection and other State Government Departments, GBRMPA and the local community of Cungulla.

The Cungulla SEMP provides a long-term solution to the persistent beach erosion problem while taking into account environmental, social and cultural values of the location and in the context of the limited capacity of local government and other stakeholders. It also provides a sound basis for any subsequent funding applications made either by Council, community groups and other stakeholders to implement the recommendations of the plan. A good example is the removal of an environmental weed *Barleria repens* (Coral Creeper) never seen this far North before and the subsequent rehabilitation of the dune by members of the Cungulla community.

## Introduction

The Burdekin Dry Tropics coastline is approximately 560 km in length (excluding islands) and we are extremely fortunate to have some significant natural values in our backyard including the Great Barrier Reef and its Islands and the internationally recognised Ramsar wetlands of Bowling Green Bay. Some of the challenges in managing this coastline include its remoteness, coastal hazards such as cyclones and associated storm surge, duration and extent of the wet season and impacts from beachside development and visitors e.g. destruction of dunal vegetation.

Townsville City Council, Burdekin Shire Council, Whitsunday Regional Council and Hinchinbrook Regional Council are responsible for managing much of this coastline in combination with State Government Departments administering the *Land Act 1994* and the *Coastal Protection and Management Act 1995*. Management effort is often hampered due to limited resources, competing priorities and complexities around the administration of the relevant legislation, i.e. the Department of Environment and Heritage Protection (DEHP) administer new developments in a coastal management district, but have limited powers for existing development. It is the latter, where there is existing development, that managing the coastline becomes even more problematic.

NQ Dry Tropics Sustainable Coast's program aims to work with Local Government to identify high priority coastal issues and then seek opportunities to work with Local Government and other stakeholders to resolve these issues. Beach erosion issues at Cungulla provides an example where coastal management issues have gone unresolved for decades. Townsville City Council recognised these long-standing issues at Cungulla as one of its priorities. NQ Dry Tropics agreed and with the support of Qld Government under the Regional Natural Resource Management Investment Program, set about developing a solution in the form of the Cungulla Shoreline Erosion Management Plan .

## Background

Cungulla is a small beachside and fishing village located at the mouth of the Haughton River in Townsville, North Queensland. Cungulla has experienced erosion of its coastline for decades due primarily to the natural movement of channels and sand in the area. Severe weather has contributed to the problem, stripping tonnes of sand from the beach in one off events. The proximity of houses to the eroding coastline has caused some residents to take matters into their own hands by dumping various items including rocks, concrete rubble, car bodies and tyres on the beach in an effort to protect their properties from beach erosion. In many instances, these unauthorised activities have resulted in accelerating the erosion issues and waste material being distributed over the beach. Complex land tenure arrangements, insufficient evidence to pinpoint particular landholders undertaking illegal activities, inaction against illegal activities, and lack of mitigating solutions to the beach erosion have all contributed further to this ongoing issue i.e. unauthorised activities continue in the absence of a solution or any compliance action.

## Methods

A Shoreline Erosion Management Plan (SEMP) is the State Governments preferred framework to manage priority beach erosion issues. Erosion management options are determined by first gaining a sound technical understanding of the underlying physical coastal processes causing the erosion and then considering the environmental, social and economic values of the location. Input from all the relevant stakeholders on the potential options helps guide any final recommendations.

NQ Dry Tropics role was to facilitate the development of the Cungulla SEMP on behalf of Townsville City Council. At the commencement of the Cungulla SEMP, a working group was formed to help guide its development. It consisted of representatives from various government agencies likely to have a legislative interest in any proposed erosion mitigation activities including:

- Department of Natural Resources and Mines
- Department of Environment and Heritage
- Department of Agriculture, Fisheries and Forestry
- Department of National Parks, Recreation, Sport and Racing
- Great Barrier Reef Marine Park Authority

Following members advice from the initial working group meeting, the following field assessments were undertaken:

- Assessment of human related impacts;
- Coastal dune and foreshore survey;
- Vegetation survey;
- Weed survey; and
- Bird survey.

Coastal Engineering Solutions were engaged to investigate the underlying causes of beach erosion at the location and determine potential options for an engineered solution. The dune and foreshore survey provided an accurate assessment of changes to the beach profile as it followed the transects of the long standing dune monitoring program instigated by Townsville City Council in 1996. Other matters considered included: tidal currents, coastal bathymetry, migration of river channels, wave climate, cross and longshore transport, frequency and intensity of cyclone events and accompanying storm surge, and, future climate change. Mitigating options investigated included: do nothing, beach nourishment, armoured sea wall, groyne field and planned retreat (or combinations of these options). As sand nourishment was one of the favoured engineered solutions being considered, different sand sources were investigated including the northern spit and external sources.

As well as guiding the development of the Cungulla SEMP, members of the working group provided specific advice on any potential legislative issues associated with the solutions being considered. NQ Dry Tropics worked closely with the working group and Coastal Engineering Solutions to resolve any identified issues. A good example is the exclusion of the Northern Spit as a sand source due to environmental values. Although from a coastal engineering perspective the sand source was acceptable, the risk to endangered and vulnerable and migrating bird species present at the location was unacceptable.

Upon support of the draft Cungulla SEMP by the Working group and Townsville City Council, the SEMP was released to the Cungulla community and residence of Townsville City for consultation. This included opportunity for improved understanding of the recommendations through direct engagement at community events and for the community to provide input prior to finalising the Cungulla SEMP.

## **Results**

The recommended erosion mitigation solution involves a capital beach nourishment campaign where 15,000 cubic metres of sand will need to be imported to the site to form a new beach over

the central section at most threat (refer Attachment 1 for greater detail). This new beach will provide a suitable buffer between private property and the eroding beach for the 1 in 100 year design event. Smaller annual beach nourishment programs (backpassing from the southern spit) in the order of 1,500 cubic metres would then maintain the newly formed beach. Importantly, the difficult hurdle that previously existed for Government, of what to do with the illegal structures on the foreshore, was overcome by the solution allowing for the burial of the illegal structures.

## Discussion

The collaboration and communication between Townsville City Council and NQ Dry Tropics throughout the development of the SEMP worked well. NQ Dry Tropics provided an independent (from Government) viewpoint to aid in facilitating the involvement of the working group members, and to ultimately provide a feasible and effective long term solution. The SEMP should not be problematic at the development approval stage as all of the issues raised had been resolved through the planning process.

While the Cungulla SEMP provides an agreed solution to the persistent beach erosion issues at Cungulla, Townsville City Council will now look for opportunities to fund the capital beach nourishment works. NQ Dry Tropics and the community of Cungulla will look for opportunities to implement some of the other recommendations of the plan such as revegetation of degraded parts of the dune, or nourished areas of the dune upon implementation of the capital works. The Cungulla community have already shown their interest and commitment to improving their foreshore through their regular maintenance of the dune revegetation sites and by autonomously organising cleanup events along the foreshore, as recently as September 2013.

While the major focus of the project was to find a solution to the long term erosion that had been occurring at Cungulla, other immediate outcomes were realised. During the Vegetation survey, NQ Dry Tropics field officers discovered an infestation of the weed Coral Creeper (*Barleria repens*). Coral creeper is a creeping shrubby plant found mainly in coastal parts of eastern QLD. It grows to less than 70cm tall and is known to scramble over native shrubs. The plant's stems tend to produce roots anywhere they touch the ground, enabling this weed to spread quickly.

The infestation was of particular concern because it was the first reported sighting of Coral creeper in North Queensland. To prevent further spread, management of the infestation was therefore given high priority under the plan. As the infestation was on State-owned land, NQ Dry Tropics and Townsville City Council engaged with the Department of Natural Resources and Mines (DNRM) to develop a control strategy. DNRM sprayed the weed in February and March using Starane, a chemical herbicide which has proven successful in treating Coral creeper infestations in south-east Queensland. Following successful treatment, the local Indigenous natural resource management group, the Gudjuda Reference Group was engaged to clear the area for revegetation.

NQ Dry Tropics and Townsville City Council worked with local community members to organise a community tree planting day to revegetate the area. The event held on 20 April was successful, attracting adults and children from the Cungulla community eager to volunteer their time to plant over 500 seedlings on the dune. Residents adjacent to this area of the dune also agreed to look after the new vegetation and complete regular watering

## **Take Home Messages**

- A Shoreline Erosion Management Plan is an effective means to resolve complex high priority coastal erosion issues.
- Involving a NRM Body (such as NQ Dry Tropics) to facilitate the development of the SEMP provides an independent (of government) viewpoint that works well to resolve any issues. It also provides additional capacity.
- The involvement of a working group with legislative interests helps guide the development of the SEMP towards a workable solution that resolves identified issues through the planning process and ensures it will not be problematic at the development approval stage.
- Involving the community along the way, particularly in achieving real positive on ground outcomes e.g. treatment of Coral Creeper weed and subsequent revegetation, helps build community support, interest and ownership in the development of the SEMP and also just as importantly, community interest in proactive management of this fragile environment.

# Attachment 1

