



Lake Macquarie
Landcare

Case Study

Coastal Site

Blacksmiths Dunal Restoration



Regenerated foredune looking South from Awabakal Ave track (2014)

Project Partners:

- Lake Macquarie Landcare
- Blacksmiths Dunecare
- Bahtabah LALC



Background

Blacksmiths Beach is a part of the Nine Mile Beach dune system that stretches from Blacksmiths to Redhead. It is the largest dune system on the Lake Macquarie coastline, extending some 10.4 kilometres in length. The large size, low gradient and absence of headlands and other barriers along the majority of the beach ensure that the Nine Mile Beach dune system is a dynamic environment. Large storm events dramatically erode the beach and during calm weather the beach is fully exposed to the onshore and longshore movement of sand.

Aerial photographs from 1941 indicate that the hind dune at the northern end of Blacksmiths Beach was once at least 10 to 12 metres high. Sand mining activities which commenced in the 1950's greatly decreased the height of the dunes and increased the area of bare sand on the dunes. Increased urbanisation in the area also contributed to erosion of the dunes. Dune reconstruction and revegetation projects undertaken in some areas have assisted in stabilising the dune system.

Lake Macquarie

Lake Macquarie is located on the NSW east coast, It contains mountains, forests, waterfalls, extensive beaches, and a large coastal estuarine lake with an area of approximately 110 square km, and a catchment area of 605 square km.

These areas support a wide range of habitats and uses including nature conservation, recreation, residential and commercial development and rural activities. As a result, the natural environment has suffered a high degree of modification and degradation.

Aboriginal Heritage

Lake Macquarie is rich in Aboriginal cultural heritage dating back tens of thousands of years. The people who lived around Lake Macquarie and Newcastle were known as the Awabakal which means "*the people of the flat surface*" presumably referring to the Lake and its flat surrounds.



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Above: Site locality map (Blacksmitths Landcare site shown in red)

Site Information

The Blacksmitths Beach Dunecare site lies in the coastal zone to the south-east of Lake Macquarie. The site is 10.5 ha in size and encompasses the dunal system between Blacksmitths Beach and Ungala Road, from the Belmont Swansea Surf Lifesaving Club to Awarakal Avenue. The western boundary of the Landcare site is approximately 300 metres inland from the coastline. The site is bound by Awarakal Avenue, a Public Recreation Reserve and land owned by Bahtabah Local Aboriginal Land Council. The area north of the parkland surrounding the Surf Club comprises a restructured dunal system divided into fenced dune paddocks, walkways, and carparks and observation platform.

The site creates a significant habitat link between the coastline and

the flora and fauna reserves on the Lake Macquarie foreshore and provides a representative sample of vegetation communities from the lake to the ocean. The vegetation area is also valued as a buffer protecting the urban areas from coastal processes.

Vegetation

The vegetation units on the Blacksmiths Beach Dunecare site are classified under the LHCCREMS mapping unit system as MU34: Coastal Sand Wallum Woodland – Heath, MU50: Coastal Sand Scrub, and MU53: Beach Spinifex. The foredune area of the site is well vegetated with Spinifex, *Carpobrotus*, and *Acacia*, while the hind dunes are generally a mix of native plant species: *Banksia integrifolia*, *Banksia serrata*, *Leptospermum* spp., *Monotoca elliptica*, *Melaleuca nodosa*, *Allocasurina distyla*. In some cases, the *Acacia sophorae* – *Banksia integrifolia* – *Leptospermum laevigatum* dune thicket has been reconstructed over large areas and Bitou weed control has formed a substantial component of dune maintenance work. To improve biodiversity, the hind dunes have been planted with *Angophora* and *Eucalypt* species and some littoral rainforest species including Tuckeroo and Lillipilly.



Acacia longifolia subsp. *Sophorae* - Coastal Wattle



Carpobrotus glaucescens - Coast Pigface



Diversity of native plants in hind dune (2014)

Fauna

Due to connectivity with an extended dunal habitat zone along the coast, Blacksmiths Landcare site provides important fauna habitat. Fauna sightings in the Atlas of Living Australia for the Landcare site and surrounding area include:

- Short-beaked Echidna
- Little Wattlebird
- Superb Fairy Wren
- White-cheeked Honeyeater

Water birds such as the Sooty Oyster Catcher and Pied Oyster Catcher have also been sighted nearby the site.

Landcare group

The Blacksmiths Beach Dunecare Group formed in June 1990 following a public meeting sponsored jointly by the Lake Macquarie City Council (LMCC) and the Dept. of Land and Water Conservation (DLWC). The Group was charged with the task of dune regeneration in the area from Awabakal Avenue in the north to the Swansea-Belmont Surf Club in the south – approximately 1 kilometre in length and 200 metres in width.

The LMCC and DLWC identified the following problems to be addressed by the Group:

- A major infestation of Bitou bush (*Chrysanthemoides monilifera subsp. rotundata*);
- Severe damage caused by vehicles;



Above: Silver Gulls and Pied Oyster Catchers at nearby Grannies Pool (just South of Blacksmiths Beach Landcare site)

- Infestations of other exotic plants eg. Asparagus Fern (*Protasparagus aethiopicus*), Lantana (*Lantana camara*), Yucca plant (*Agave americana*), Madeira Vine (*Anredera cordifolia*), and various succulents such as Mother-of-Millions (*Bryophyllum delagoense*);
- A lack of formal access ways for members of the public to access the beach without further degrading the dunal system;
- The lack of a natural dunal system due to previous mineral mining operations;
- Vandalism (mainly broken glass);
- The lack of new generation native flora being established in the dunal or hind dune zones due to the presence of exotic flora.

Nigel, the Team Leader of Blacksmiths Dunecare outlines how the group has worked to address these issues in the following text box.

The restoration of a degraded dunal system was in its infancy in 1990: there were only 5 Dunecare groups in NSW in 1990 – there are now over 100. Therefore a lot of experimentation to improve the dunes occurred in consultation with the (then) Dept of Land and Water Conservation.

In 1990 over 90% of the dunal zone in NSW was infested with bitou bush. At Blacksmiths it was not possible to walk from Ungala Rd east to the beach unless one of the tracks was used. Bitou was so thick that a machete or like cutting implement was needed to cut a way through. Bitou used vegetation such as *Banksia integrifolia* or *Banksia serrata* as a support and grew to heights exceeding 3 metres in some places.

To overcome this problem the Group obtained the services of unemployed youths over three Commonwealth Government schemes in the early 1990's to help remove the Bitou and other weeds. These groups used manual techniques to remove the majority of the Bitou infestation. They worked during the week and the Dunecare Group worked of a Sunday. Over a period of 24 months about 80% of the

infestation was removed. The remaining Bitou required constant attention over many years using herbicides and manual removal methods. In 2009, 99% of Bitou had been eradicated.

On the beach itself most of the damage was caused by vehicles, destroying any growth of beach Spinifex (*Spinifex sericeus*) that may have been on the dunes, and causing 'wind tunnels',

where the tyre tracks allowed the wind to create channels which blew the sand off the beach towards Ungala Rd. To address this, a treated pine fence was erected along Ungala Rd to stop vehicular access to the beach and LMCC provided signage which advised that vehicles were not allowed on the beach south of Awabakal Ave vehicular access way (which was built by the Group in the early 1990's in consultation with the Newcastle 4WD Club). This was a success from the start. The damage to the beach from vehicles ceased immediately. We now have a very good growth of spinifex on the foredune, which acts as a buffer against storm damage.

The lack of a dunal system was a major problem, as, whenever a major storm occurred, there was nothing to stop the waves from breaching the dunes and flowing through to Ungala Rd. In 1993 the LMCC funded the manual formation of a fore dune and hind dune using heavy machinery from the Swansea Belmont surf club north to Awabakal Ave. The reconstructed dunes were planted out with Marram Grass by the Landcare Group to stabilize the bare sand dunes. To introduce native vegetation, 20 kgs of Acacia seed (*Acacia sophorae*) was scattered over the dunes.

Bitou was planted as a stabiliser after beaches were mined for minerals up to the 1970's, and it has been recognised for some years that the use of Bitou was a major mistake, with an estimated 80% of the coast now suffering from Bitou infestation. Following the formation of the two dunes we have been able to stabilise the beach, and after several major storms since the dunes were created in 1993, the beach has survived any major



Spinifex sericeus - Spinifex, a part of the revegetation of the dunes

damage, and native vegetation is establishing naturally along the dunes. Once we had removed the Bitou Bush from the hind-dune forest region, the native seedlings were able to establish surprisingly quickly, and the region is now thriving, resulting in the return of many types of birds and reptiles, and even an Echidna has been sighted in the dunes. It is a much healthier system now, and improving year-by-year.

The Landcare Group has planted hundreds of tubestock over the past 20 years, but most of the new growth is natural. We are trying to re-introduce species of trees such as the Tuckeroo *Cupaniopsis anacardioides* and Smooth Barked Apple *Angophora costata* to increase the diversity of the flora population.

Vandalism was a problem in the early years, but has reduced to only minor incidents over the past 10 years as our work has become recognised and appreciated by the public. Broken glass has not been a problem for over 10 years, and our fences are no longer damaged. In 1991 we built formal access ways along Ungala Rd utilising the existing tracks which had been used by beachgoers for many years. By restricting people from the hind-dune area the native plants are able to establish without being damaged.

Our major work is now the removal of the Asparagus Fern, which is done manually. We also continue to remove the Bitou manually, especially on the dunes. Bitou seed remains viable for up to 7 years, so new growth is expected. We continue to maintain the access ways, remove other exotic plants and perform other necessary duties such as rubbish removal (unfortunately a major problem). The Landcare Group has worked closely with the Landcare Resource Office (LRO), funded by the LMCC, providing us with much valued assistance and materials.

In October 2009 a bushfire destroyed the dunal system from Belmont South to Maneela St in Blacksmiths. The Landcare Group has been undertaking remedial works to restore the dunal system with the continued assistance of the LRO. A Community Action Grant (see page 9) has also assisted with the regeneration of the affected dunal system.



Above: A *Banksia integrifolia* - Coast Banksia after the 2009 fire, showing new growth. Banksias survive well in fires, with the heat causing seed pods to open, to release seed.

Recent projects

Community Action Grant

In 2010 to 2011, Blacksmiths Beach Dunecare Landcare Group, with assistance from the LRO, received funding from the Australian Government Caring for Our Country Community Action Grants to assist with the rehabilitation of the Landcare site at Blacksmiths. The grant titled 'Blacksmiths Dunal Restoration and



CAG Field day in March 2010: Participants inspecting the restored Dunal areas with Landcare Vegetation Officer, Carl & Team Leader, Nigel

Demonstration Project' provided \$20,000 over 18 months to protect and enhance the wildlife corridor along the coastal strip. The project included:

- An integrated weed management strategy utilising a bush regeneration team working with the Landcare group and other community volunteers to target Weeds of National Significance Bitou Bush and Asparagus Fern;
- A community biodiversity enrichment planting program using local provenance tubestock in areas of poor resilience;
- Community education via a Case Study, Field Days, and on-site signage;
- The delivery of an Aboriginal cultural community education component through the Bahtahbah Local Aboriginal Land Council.



**Mallawa
Street track
looking west,
before the
bushfire.
Photo: Nigel
McDonnell,
Blacksmiths
Dunecare**



**Mallawa
Street track,
shortly after
the October
2009 fire.
Photo: Nigel
McDonnell,
Blacksmiths
Dunecare**



**Mallawa
Street track
five years on
in 2014**



Above in 2006: Revegetated dunes & observation platform at beach access off Mallowa St.



Above: same area in 2014, showing further establishment of dunal species like Acacia



Above: Foredune in 2010 - note fire damage to hind dune



Above: Foredune in 2014

References and Further Information

Australian National Botanic Garden - www.anbg.com.au

Buchanan, R, 2009, [*Restoring Natural Areas in Australia*](#)

LMCC, 2004, *Lake Macquarie Coastal Planting Guide*, available at www.lakemac.com.au

Weeds Australia - www.weeds.org.au

The Lake Macquarie Landcare website www.lakemacquarielandcare.org provides links to newsletters, environmental programs, grants, Landcare, weeds and trees.

If you wish to know more about this and other projects in Lake Macquarie please contact the Landcare Resource Centre.

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