Lake Macquarie Landcare

Case Study

Rainforest Site

Fern Creek Gully

Project Partners:

- Fern Creek Gully Landcare Group
- Lake Macquarie City Council
- Australian Government
- NSW National Parks & Wildlife Service
- Hunter Water Corporation
- Charlestown Fire Brigade
- Hunter Central Rivers Catchment Management Authority (now Hunter Local Land Services)
- NSW Department of Planning

Lake Macquarie City Council

Background

Fern Creek Gully Landcare site is located in Dudley within the Lake Macquarie Local Government Area. The site includes the private land of Landcare group Team Leader Peter Dalton, two neighbouring private land holdings and two adjoining Council reserve sections.

This case study is primarily about Peter Dalton's section of the site and draws on information from Peter's publication "Re-creating a Small Rainforest". The full publication is available from the Landcare Resource Centre on request.

Vegetation

Most of the vegetation on the Fern Creek Gully Landcare site is regrowth following the removal of the Spotted Gum and Blackbutt from the 1870s for pit props in Newcastle's coal mine tunnels and, following this in the 1920s to 1940s, mining of much of the site for coal at Fern Creek Gully coal mine.

The Vegetation Community is currently mapped as MU15h Lake Macquarie Spotted Gum Forest, however the deeper gullies of the

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.

site support a community closer to Rainforest.

Dominant species include:

Canopy

Corymbia maculata - Spotted Gum

Eucalyptus pilularis - Blackbutt

Mid-storey

Pittosporum revolutum - Rough-fruited Pittosporum

Glochidion ferdinandi - Cheese Tree

Hymenosporum flavum - Native Frangipani

Lower-storey

Adiantum aethiopicum - Common Maidenhair Fern

Doodia aspera - Rasp Fern

Viola hederacea - Native Violet

Above: Rasp Fern

Below: Native Violet

Fauna

Greatly assisted by regeneration activities, the Landcare site now supports a range of fauna species including Lorikeets, Noisy Minors, Butcherbirds, Currawongs, Kookaburras, Superb Fairy Wrens, Crowned Fruit Doves, Red-belly Black Snakes, Common Tree Snakes, Eastern Water Dragons, Land Mullets, Lace Monitors and Short-beaked Echidnas.

One of the local Echidnas happily turning over the seed bank in the soil in search of food. Photo by Peter Dalton.

Landcare group

The Fern Creek Gully Landcare group formed in 2003 following the encouragement of the Lake Macquarie Landcare Coordinator (then John Hughson) and interest from neighbours in recreating a rainforest gully. Peter Dalton is the Landcare Team Leader and he works with about a dozen neighbours, family and friends on regular seasonally chosen periods based on rainfall and temperature, with autumn, winter and early spring being the preferred times.

An illegal fire lit by rock fisherman for access to the beach in the Awabakal Nature Reserve, inadvertently provided the opportunity for the Landcare works to commence. The low intensity fire burnt much of the Bitou and reduced the Bitou seed, providing the opportunity for the native seedbank to flourish in the burnt area. This showed the group the resilience of the site and what could be achieved.

Projects and achievements

Fire and weeds

Peter Dalton had moved to his property in 2002 and started clearing the Bitou and Lantana surrounding his house to reduce fire risk. He noticed that, of the area he cleared, the section that had been burnt by the fire mentioned above, showed less Bitou regrowth than the section that had not been burnt. To harness this regenerative quality of fire and to deal with the large amount of dead Bitou and Lantana on site, the group worked with contractors to drag the material to the creek gully to be burnt. Due to the total fire ban at the time, a written case was required by the NSW Department of Planning to show that the burn was for Landcare purposes and would be carried out by the Charlestown Fire Brigade. This burn was very successful and eliminated almost all the Bitou seed in the creek line.

Some of the Landcare group with the gully behind. Photo from Peter Dalton.

The burn was courtesy of Charlestown Fire Brigade who were very happy to do a controlled hazard reduction burn. The additional results of initial weed eradication is what helped the Landcare group begin their regeneration works.

Dealing with the weed seed bank

Following the burn, the site got a surge of other invasive weeds, including Trad, Asparagus Fern, Morning Glory, Vetch, Crofton Weed, Blackberry, Moth Vine, Turkey Rhubarb and Cobblers Pegs. These weeds competed to fill the space previously occupied by Bitou and Lantana and led to a decade-long spraying and hand weeding exercise to eliminate them and their seed bank from the site.

After a 200-300mm thick layer of mulch failed to supress the Trad, the group removed 30 bags of the weed by hand. Trad is a constant challenge for the group as, although the growing rainforest trees help shade out many other weeds like Cobblers Peg, they help create the perfect moist and shady environment for the Trad.

The group are currently planting vegetation barriers of the native species *Lomandra longifolia*, smothering barriers of *Goodenia*

Charlestown Fire Brigade commencing the controlled gully burn. Photo from Peter Dalton

ovata and *Westringia fruticosa*, and shading barriers of *Acmena smithii* on the western and south western edges in the hope that this will prevent weeds from migrating from the suburbia to the west and south. Council is installing stainless steel filtration in the street stormwater culverts which will aim to reduce weed transmission from the road.

Droughts and Harvesting Flooding Rains

Weeds alone were not the only challenge for Fern Creek Gully Landcare site, which was suffering from drought when the group started planting. After a period of rain, Peter Dalton saw the volume of water that discharged from a Council road drain into the creek during a thunderstorm and realised this could be a potential source of water to help the young trees struggling against the sun's desiccation.

In 2006, a 60,000 litre stormwater storage and harvesting system was installed as a result of Commonwealth Community Water Grant and significant contributions by the City of Lake Macquarie, Rocla, Mullanes Engineering, Reece and Lake Macquarie Landcare supported strongly by Councillor Barry Johnstone, Mayor Greg Piper, Federal Member for Shortland, Jill Hall, and Landcare Co-ordinator, John Hughson.

The total investment was approximately $90,000 and has provided sufficient water to ensure a better than 95% survival rate and enhanced growth through the years of drought.

The project allows about 600,000 litres of stormwater to be harvested each year from approximately 100 metres of suburban road. Council engineers that inspected the site prior to the installation concluded that this would not impact the environmental flows of the valley. The stormwater road catchment area where water is collected from is only about 1.6% of the total valley catchment, which is in the order of 9 hectares in size.

A growing rainforest

By the end of 2010 the gully had been re-established as rainforest, with tree growth of up to 7 metres in height, an understorey of tree ferns and sandpaper figs, and a ground cover of ferns.

Construction of the stormwater harvesting tanks and diversion culvert. Photo from Peter Dalton.

The rainforest is now regenerating itself with planted trees producing their own offspring. The Landcare group undertook three sequences of planting to get to this stage. Although many plants from the initial plantings died, due to hydrophobic soils and lack of water prior to stormwater harvesting, the dead plants broke down with the weeds that had been treated by the group, and helped produce a healthy organic soil for future plantings.

The rainforest planting has now been extended from the gully to upper creek line.

Grants from Landcare, Hunter Central Rivers Catchment Management Authority and Hunter Water assisted with ongoing planting.

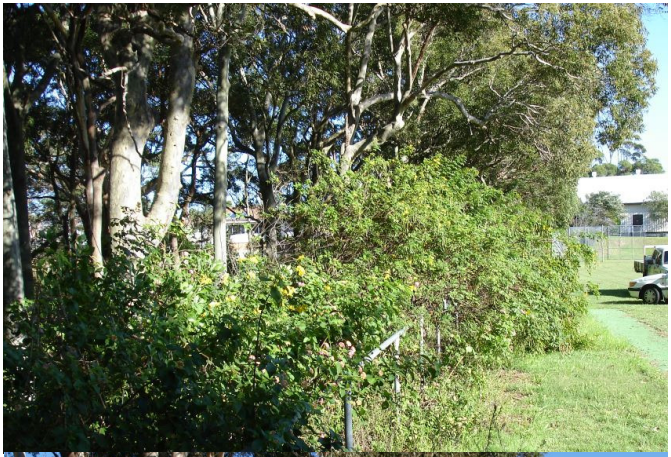
The basis for the extension of the rainforest vegetation on the Fern Creek Gully site came from what was already “pioneering” on site (*Trema aspera* Poison Peach, *Homalanthus nutans* Bleeding Heart, *Myrsine variabilis* Muttonwood, and *Ficus rubiginosa* Port Jackson Fig), and what was growing in the less disturbed/more developed rainforest pockets in the local area. The subtropical rainforest gully

View into the gully with rainforest establishing well. Photo from Peter Dalton.

at the southern end of Dudley Beach on Cross's Creek provided the baseline Species List (see list on pg. 11).

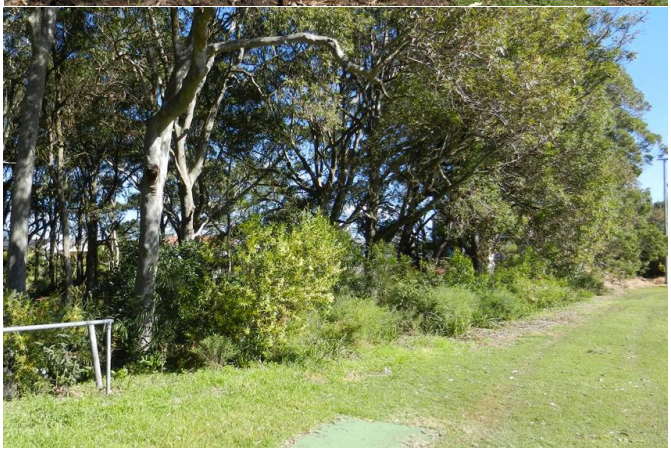
Reducing weed impacts from adjoining land

Fortunately, the Fern Creek Gully Project fitted well with a number of other projects that were taking place in the Dudley area. Dudley has a small but very enthusiastic and dedicated Landcare community that have worked on various sites for many years. Also, LMCC Sustainability Department had gained some funding from NSW Office of Environment & Heritage to engage the professional Landcare bush regeneration team to work on the reserves off Reay Park and Ivy Street to reduce the weed biomass (mainly Bitou and Lantana). This professional input, together with the ongoing volunteer work at local sites like Ivy Street Reserve (Redhead Lagoon), Reay Park and Bimbae Landcare (the Fairy Dell) has seen a marked reduction in weed invasion, and subsequent increase in native biodiversity through natural regeneration and volunteer rainforest planting. The task is ongoing and, without the commitment of the volunteer Landcarers with the support of the Landcare Resource Office (Green Team and bush regeneration team), the Dudley reserves would still be weed-dominated.



Before shot of Cassia, Lantana, and Bitou along fence at Reay Park

Peter Dalton and Landcare volunteers planting at Reay Park in 2011 after weed removal and site preparation by Bush Regeneration team



Reay Park planting in 2016 with established native understorey

Baseline Rainforest Planting list

This list represents species found in local rainforests similar in topography to Fern Creek Gully and likely to have occurred in this area originally. Many of the species have the added benefit of being fire-retardant.

Trees and Shrubs

Acacia longifolia- Sydney Golden Wattle
Acacia maidenii- Hickory, Maiden's Wattle
Acacia sophorae- Coastal Wattle
Alectyron subcinereus- Native Quince
Allocasuarina littoralis- Coastal Sheoak
Alphitonia excelsa- Red Ash
Archontophoenix cunninghamiana- Bangalow Palm
Backhousia myrtifolia- Grey Myrtle
Baloghia lucida- Brush Bloodwood
Banksia integrifolia- Coastal Banksia
Breynia oblongifolia- Coffee Bush
Callistemon salignus- Willow Bottlebrush
Citriobatus pauciflorus- Orange Thorn
Commersonia fraseri- Blackfellow's Hemp
Cryptocarya glaucescens- Jackwood
Cupaniopsis anacardioides- Tuckeroo
Diospyros australis- Ebony Myrtle
Diploglottis australis- Native Tamarind
Elaeocarpus obovatus- Hard Quandong, Ash
Elaeocarpus reticulatus- Blueberry Ash
Elaeodendron (Cassine) australis- Red Olive Berry
Eupomatia laurina- Bolwarra
Ficus coronata- Creek Sandpaper Fig
Ficus rubiginosa- Port Jackson Fig
Glochidion ferdinandi- Cheese Tree
Guioa semiglauca- Guioa
Livistona australis- Cabbage Tree Palm
Neolitsea dealbata- White Bollygum
Notelaea sp. - Native Olive
Omalanthus nutans- Bleeding Heart
Pararchidendron pruinosum- Snow wood
Pittosporum undulatum- Sweet Pittosporum
Pittosporum revolutum- Rough-fruited Pittosporum
Pouteria (Planchonella) australis- Black Apple
Myrsine (Rapanea) variabilis- Muttonwood
Rhodamnia rubescens- Scrub Turpentine
Rhodomyrtus psidioides- Native Guava
Sambucus australasica- Native Elderberry
Scolopia braunii- Flintwood
Synoum glandulosum- Scentless Rosewood
Syzygium (Acmena) smithii- Creek Lillipilly
Toona ciliata- Red Cedar
Trema tomentosum- Poison Peach
Wilkiea huegeliana- Wilkiea

Vines/Groundcovers/ Ferns/ Grasses

Adiantum aethiopicum- Common Maidenhair Fern
Adiantum formosum- Giant Maidenhair Fern
Adiantum hispidulum- Rough Maidenhair Fern
Alpinia arundelliana- Native Ginger
Alpinia caerulea- Native Ginger
Aphanopetalum resinosum- Resin Vine
Asplenium australasicum- Bird's Nest Fern
Cayratia clematidea- Slender Grape
Cissus antartica- Native Grape, Kangaroo Vine
Cissus hypoglauca- Native Grape, Water Vine
Commelina cyanea- Scurvy Weed, Creeping Christian
Crinum pedunculatum- Swamp Lily, Creek Lily
Cyathea sp. – Tree Fern
Dianella caerulea- Paroo Lily
Doodia aspera- Prickly Rasp-fern
Embelia australiana- Embelia
Gahnia sp. – Saw Sedge
Geranium solanderi- Native Geranium
Gymnostachys anceps- Settlers Flax
Imperata cylindrica- Blady Grass
Kennedia rubicunda- Dusky Coral Pea
Lomandra longifolia- Mat Rush
Microsorum scandens- Fragrant Fern
Oplismenis spp. - Basket Grass
Pyrrosia rupestris – Rock Felt Fern, Robber Fern
Pellaea falcata- Sickle Fern
Rubus hillii- Native Raspberry
Sarcopetalum harveyanum- Pearl Vine
Smilax australis- Smilax
Smilax glyciphylla- Native Sarsaparilla
Stephania japonica- Snake Vine
Viola hederacea- Native Violet

References and Further Information

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

Bell and Driscoll, 2014, *Vegetation mapping of Lake Macquarie LGA: Stages 1 – 5*, available at www.lakemac.com.au

Buchanan, R, 2009, *Restoring Natural Areas in Australia*

Dalton, P, 2015, *Re-creating a Small Rainforest,* available upon request from the LRC

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.

Produced at the Landcare Resource Centre 2016

Landcare Resource Centre

Cnr Toronto and Five Islands Rds, Teralba, NSW 2284

Postal Address: Box 1906 HRMC NSW 2310

Phone: (02) 4921 0392

Email: lro@lakemac.nsw.gov.au

www.lakemacquarielandcare.org

Lake Macquarie Landcare is proudly supported by Lake Macquarie City Council