Living LAKE MACQUARIE
ph: (02) 4921 0230 www.livinglakemacquarie.org ISSUE 9 APRIL 2005
Working to Revive, Renew and Protect the Ecology of Lake Macquarie NSW

Cockle Creek

Environmental Works A First For NSW

Environmental improvement works are now complete at the mouth of Cockle Creek, down stream of the old Pasminco site. The works were strictly controlled by the first Environmental Management Plan prepared under the Contaminated Land Management Act in New South Wales.

These works included the construction of a 32 metre rock 'finger' groyne to address erosion issues, followed by the removal of the entrance spit.

The Cockle Creek entrance completed in March, was subject to high rates of ongoing erosion of the western shoreline. These problems were further complicated by the fact that sediments are contaminated by heavy metals from nearby industry.

The improvement works will help to decrease erosion and halt the loss of identified wetlands in the area, improve tidal flushing of the Cockle Creek entrance, limit the disturbance of contaminated sediments and improve navigation.

"By limiting the erosion of the shoreline on the western side which formed part of a state significant wetland, the levels of heavy metals entering the lake will be decreased, in turn protecting the wetland," Lake Macquarie and Catchment Coordinator Jeff Jansson said.

"The build up of sediments at the spit had made the Lake difficult to negotiate without running aground or disturbing the bed. There are environmental risks if the contaminated bed sediments are disturbed," he said.

The project forms part of the Lake Improvement Works undertaken by The Office of the Lake Macquarie & Catchment Coordinator.

Cockle Creek groyne construction

Working Together For the Lake's Health

Greg Piper
Chairman, Lake Macquarie Project Management Committee

Welcome to the ninth edition of the Living Lake Macquarie newsletter.

As the current works program draws to a close in June 2005, the Lake Macquarie Project Management Committee has been reviewing the success of the project.

The recent results of the Independent Review of the Effectiveness of The Lake Macquarie Improvemnt Project undertaken by The Australian National University are extremely pleasing. The review found that the Project had been very successful in meeting its objectives and had enabled the cost effective implementation of a large and well focussed works program that can be expected to provide substantial improvements in water quality in Lake Macquarie.

Annual monitoring of seagrass beds in a large number of bays in the Lake has shown a greatly improved coverage with an increase of 3.5 million square metres or 34% over the last 4 years. This includes a significant increase (72%) of the very sensitive seagrass species Posidonia australis. It's great to see some objective data confirming the positive changes already witnessed by the community, such as the increased sighting of seahorses mentioned in this newsletter.

I hope you enjoy this edition of the newsletter.

Greg Piper
Chairman, Lake Macquarie Project Management Committee
Mayor of Lake Macquarie

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Draft Plans **To Improve Village Bay**

Plans have been proposed to remove the build up of organic ooze and create natural sloping beaches to prevent the ooze returning in the future along the foreshore of Village Bay, improving the area for residents and Lake users.

The project forms part of the Lake Improvement Works undertaken by The Office of the Lake Macquarie & Catchment Coordinator. The initial works at Village Bay are estimated at $580,000.

At Village Bay, most of the naturally sloping foreshore has been replaced by vertical seawalls or escarpments due to foreshore filling. So rather than seagrass being washed up onto the foreshore, the wrack accumulates and breaks down underwater in front of the seawalls to form oozy organic sediment.

The works proposed for the public foreshores at Village Bay involve the dredging of nearshore organic sediment, using a long reach excavator, followed by the placement of sand and pebble to re-establish a gently sloping beach foreshore. A sandy beach will be created adjacent to the public reserve off Village Bay Close.

"The initial works will involve rehabilitation at sites only where public access in available. It is hoped that if these trial sites are successful, more widespread rehabilitation can occur in the future along the foreshore at Village Bay," Lake Macquarie and Catchment Coordinator Jeff Jansson said.

"The plans provide environmentally sensitive solutions to address the problems along the nearshore at Village Bay and following a period of public consultation the final design is now underway ," he said.

Lake Improvement Works At Swansea

Lake works are now underway at Swansea Flats, improving the area for residents, lake users and the environment.

Sediment and organic material is being removed along the foreshore near The Esplanade as part of the Lake Macquarie Improvement Project. The environmental improvement works carried out by The Office of the Lake Macquarie & Catchment Coordinator are estimated at $280,000.

These works will be integrated with dredging works carried out underneath boat moorings to minimize the potential for future sediment disturbance and accumulation. This component of works is funded by the NSW Maritime Authority and Lake Macquarie City Council in accordance with the Swansea Flats Mooring Plan.

The removal of organic sediments is being carried out using a long reach excavator and a dredge, with material being transported to Stockyard Quarry. At the quarry, the material will undergo sorting and treatment, before being used for rehabilitation purposes.

Sands dredged from beneath the boat moorings will then be placed into the excavated area created by the removal of organic sediments and profiled to create a gently sloping sandy beach.

Chairman of the Lake Macquarie Project Management Committee, Mayor Greg Piper said the works would improve the area for residents and recreational users of the Lake.

"The creation of a sloping foreshore will help minimise organic sediment returning in the future..."

"The creation of a sloping foreshore will help minimise organic sediment returning in the future," Cr Piper said.

Member for Swansea, Milton Orkopoulos said that the dredging would help limit the impact of boat propellers on bed sediments.

"The removal of the sediments will both improve boating access and safety for people wading in the near shore area," he said.

Swansea Flats, nearshore organic sediment removal and foreshore rehabilitation works.

Community Optimistic About Health Of Lake

Residents of Lake Macquarie are optimistic about the environmental health of the Lake, according to a community survey report recently released.

The findings from the telephone survey commissioned by the Office of the Lake Macquarie & Catchment Coordinator provide a snapshot of local community views towards the environmental health of Lake Macquarie.

Lake Macquarie & Catchment Coordinator, Jeff Jansson said the community is increasingly positive about the health of the Lake.

"Over the past five years there has been an encouraging upward trend in the rating of the current health of the Lake. 68% of respondents rated the overall environment between 5-7 out of 10 and 27% of respondents rated it between 8-10 out of 10," he said.

Mr Jansson stressed that although residents were witnessing improvements that the work is still far from over.

"The improvement in the quality of Lake Macquarie is an ongoing process and there is still work to do. It is important that residents and Lake users ensure that they continue to do their part to limit their impact on the Lake," he said.

Understanding of specific environmental issues has been highlighted as an area that requires further community education.

"Residents continue to place importance on water movement between the Lake and Swansea Channel, yet an understanding of the impact of urban development remains low.

The truth is that while increasing tidal exchange in Swansea Channel would have little effect overall on water quality in the Lake and cause other serious negative consequences, the level of urban development is the major contributor to nutrient and sedimentation loads," Mr Jansson said.

The research project involved a survey of 600 randomly selected respondents within the Lake Macquarie Catchment area. Responses were obtained over a two week period in November and December.

The report was compiled by FordComm Consulting on behalf of the Office of the Lake Macquarie & Catchment Coordinator.

Lake Latest

Recent Projects

- The installation of a constructed wetland adjacent to an existing natural drainage line near Bernie Goodwin Oval, Morisset. *Completed November 2004.*
- The installation of a constructed wetland at Aruma Place, Cardiff. *Completed January 2005.*
- Rehabilitation of priority natural wetlands at Secret Bay, Marmong Point, Balcolyn, LT Creek, Edmunds Bay and Galgabba Point. *Completed by January 2005.*

Current Projects

- The removal of organic sediment and reconstruction of a natural foreshore along the western foreshore at The Esplanade, Swansea.
- The installation of two stormwater treatment devices at Grand Parade, Bonnells Bay.
- Extensive rehabilitation activities at Belmont Lagoon wetland at Belmont South.

Upcoming Projects

- The installation of a gross pollutant trap and vegetated swale adjacent to Tickhole Creek at Cambridge Street, Garden Suburb.
- Rehabilitation activities within an important natural wetland adjacent to Cary Street, Toronto.
- Creek bank rehabilitation activities at Stony Creek, Lake Street, Blackalls Park.
- Partial closure of the southern constructed entrance to Swan Bay and associated maintenance dredging activities in Swansea Channel and Swan Bay northern entrance.
- Removal of nearshore organic sediments and foreshore rehabilitation to public areas fronting Village Bay.
- Installation of a gross pollutant trap near Marie Street, Charlestown.
- Installation of a gross pollutant trap and vegetated swale at The Esplanade, Speers Point.

Channel Challenges

The concept of improving water quality through increased tidal flushing has been the subject of numerous investigations and research points to good reasons why this process doesn't work.

There are two main reasons that increasing the size of the Channel opening is problematic. The first is that it is in fact unlikely to result in significant water quality improvements. The second is that the side effects of such a move would have more serious social and environmental implications than the ones it intended to fix.

Many people incorrectly believe that by increasing the tidal flushing of Lake Macquarie, the issue of poor water quality would be solved automatically. However, because the Lake contains such a huge volume of water, increasing the tidal exchange would have little impact on water quality.

Recent studies have revealed that even if the Lake entrance was increased by 20% the impact on the tidal exchange would only be 0.2%.

However, an increased tidal range between high and low tide within the Lake itself would result and this would cause significant problems such as flooding of low-lying areas around the Lake foreshore, increased channel bank erosion, possible destruction of seagrass beds and increased exposure of mud flat areas at low tide.

The strategy for improving Lake water quality recommended by the Estuary Management Plan and the Premier's Task Force is to ensure that stormwater entering the Lake does not contain excessive sediments, nutrients and other contaminants. We are starting to see some early signs of improvement in Lake health, although it is a long term task and we still have a long way to go.

Foreshore Improvement At Bonnells Bay

Work to remove the build up of sediments and partly decomposed organic ooze along the foreshore of Bonnells Bay has been completed, improving the area for residents and Lake users.

Sediment and organic material was removed along the foreshore of Pendlebury Park, extending approximately 10 – 15 metres offshore.
The removal of organic sediments was carried out using a long reach excavator, with approximately 270 cubic metres of material being placed into sealed trucks and transported to Stockyard Quarry. At the quarry, the material underwent sorting and treatment, before being used for rehabilitation purposes.
The project forms part of the Lake Improvement Works undertaken by The Office of the Lake Macquarie & Catchment Coordinator.
"The works removed the black organic ooze situated just in front of the foreshore, which can be dangerous for lake users, especially small children, and can be generally unpleasant for other users of the foreshore reserve," Jeff Jansson said.

Bonnells Bay, nearshore organic sediment removal and foreshore rehabilitation works.

Seahorse Sighting

Increased seahorse sightings in Lake Macquarie are a positive sign that the health of the Lake is improving.

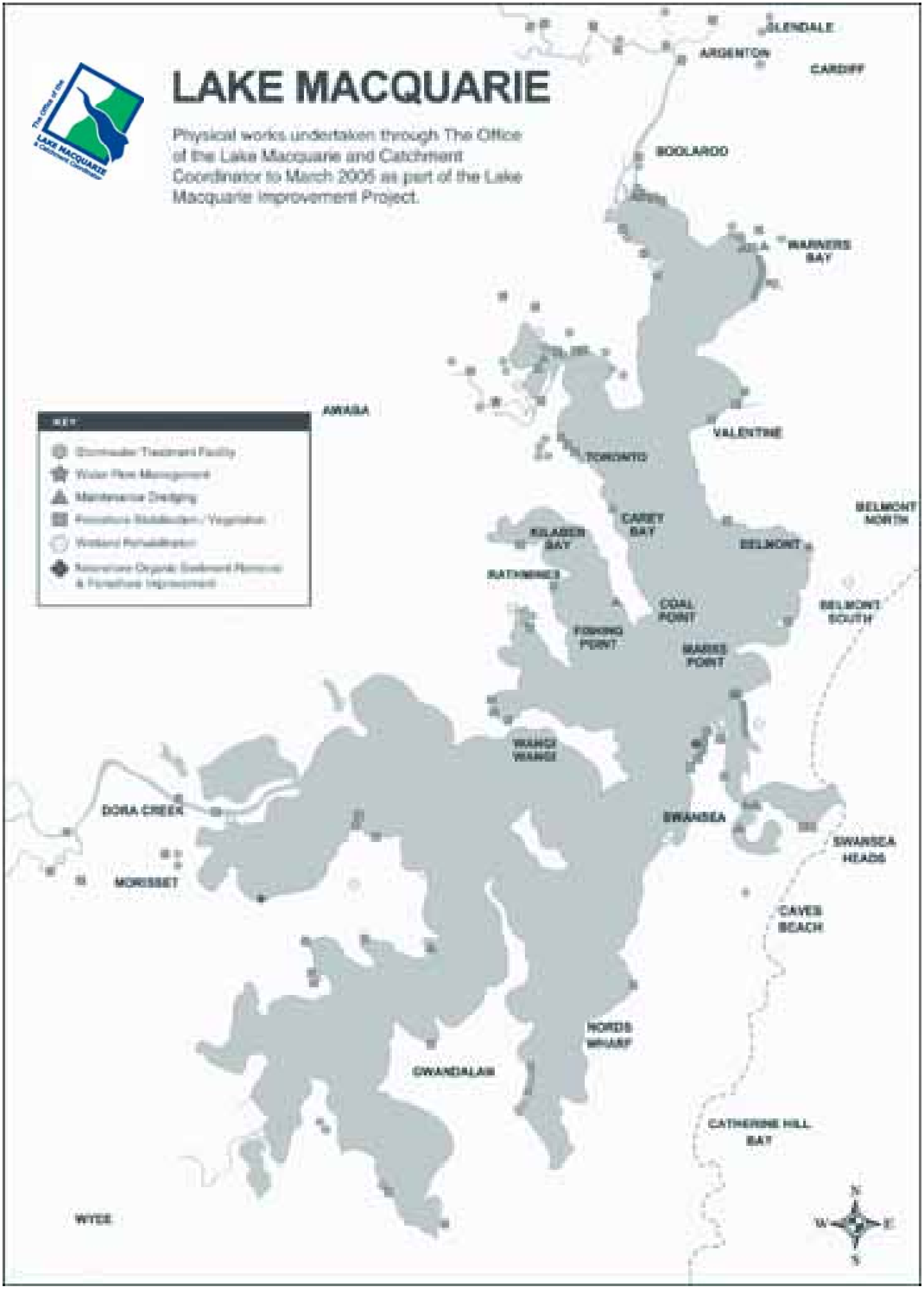
One particular seahorse sighting has left one young Lake Macquarie resident with a tale to tell anyone willing to listen. Nicholas Hughes was exploring the shoreline along Taylor's Bay in Gwandalan, when he spotted the two seahorses swimming by.

Nicholas and his twin sister Laura May have discovered some wonderful sea creatures that the Lake provides a home for including octopus, starfish, sea cucumber, crabs, jellyfish and the elusive seahorse.
The Hughes family is delighted with the improvements to the Lake and the fact that it is supporting such a variety of sea life.

The Office of the Lake Macquarie and Catchment Coordinator has initiated a number of projects in the Gwandalan area including storm water treatment works and foreshore stabilisation.
Among the biggest threats to seahorses and their relatives is the loss or alteration of habitat. Many seahorse inhabit near shore areas which make them vulnerable to human disturbance.
Increasingly coastal developments have the potential to impact on habitats such as seagrasses through pollution, urban run-off, dredging and sewerage. Recreational activities such as boating also have the potential to impact seahorses' habitat through anchoring in seagrass or seaweed beds.

Because of this, in July 2004 all species related to seahorses were listed as 'protected' under the NSW Fisheries Management Act 1994.
"It is a great sign that the health of the Lake, particularly seagrass coverage is now healthy enough to support creatures like seahorses," Lake Macquarie and Catchment Coordinator, Jeff Jansson said.
"Seahorse sightings were more common 40 years ago but as coastal development increased and the Lake progressively got worse they started to decline. It is encouraging that the works being done to improve the health of the Lake is starting to attract these creatures to return to its shores."

"It is a great sign that the health of the Lake, particularly seagrass coverage is now healthy enough to support creatures like seahorses..."


LAKE MACQUARIE
Physical works undertaken through The Office of the Lake Macquarie and Catchment Coordinator to March 2005 as part of the Lake Macquarie Improvement Project.
KEY
Stormwater Treatment Facility
Water Plant Management
Maintenance Dredging
Foreshore Stabilisation / Vegetation
Wetland Rehabilitation
Assistance Organic Sediment Removal & Foreshore Improvement
GLENDALE
ARGENTON
CARDIFF
BOOLAROO
WARNERS BAY
AWABA
VALENTINE
TORONTO
CAREY BAY
BELMONT NORTH
BELMONT
KILAREN BAY
BATHURSTS
COAL POINT
BELMONT SOUTH
FISHING POINT
MARKS POINT
WANGI WANGI
DORA CREEK
SWANSEA
SWANSEA HEADS
MORISSET
CAVES BEACH
NORDS WHARF
CATHERINE HILL BAY
WYEE
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A Legend To The Works Map - Lake Macquarie Works Explained

Stormwater Treatment Facilities

Sediments and nutrients carried by stormwater runoff impacts greatly on Lake water quality and ecosystem health.

Stormwater Treatment Facilities aim to reduce the impact of sediment and nutrients by mimicking natural systems and act as filters to ensure cleaner stormwater enters the lake.

There are different types of Stormwater Treatment Facilities which can be used singularly or in combination and include:

- **Constructed wetlands**
- **Sediment or gross pollutant traps**
- **Vegetated swales**
- **Riffle ponds**

Wetland Rehabilitation

Wetlands are an important part of the aquatic ecosystem as they provide a natural filter system for our water, trap sediment and decrease nutrients and pollutant from entering Lake Macquarie and provide habitat, protection and important nursery areas for aquatic animals.

Wetlands are amongst the most threatened ecosystems. Around 35% of Lake Macquarie's wetlands have been lost and 70% of Lake Macquarie wetlands have been found to have reduced in size over the last five years. Rehabilitation works of natural wetlands undertaken by the Office of the Lake Macquarie and Catchment Coordinator has involved weeding, planting and bush regeneration, along with rubbish removal, fencing and signage.

Nearshore Organic Sediment Removal and Foreshore Improvement

Many shallow embayments around Lake Macquarie contain vast seagrass beds. When the plants shed their leaves or fronds they typically wash up onto naturally sloping foreshore as wrack, where it then decomposes rapidly.

Where vertical seawalls or escarpments have replaced most of the naturally sloping foreshore, the seagrass wrack accumulates and breaks down underwater to form oozy organic sediment. The aim of Nearshore Organic Sediment Removal and Foreshore Improvement is to enhance the natural lake processes occurring around the shore and provide a better environment for all. The works involve the removal of nearshore organic sediment using an excavator, followed by the creation of a gently sloping beach foreshore to reduce the likelihood of the organic sediments returning in the future as seagrass wrack can to wash up on the shore and decompose naturally.

Foreshore Stabilisation / Vegetation

Foreshore and creek banks form a key part of the Lake's estuarine environment. These areas provide recreation opportunities for residents and important habitat for wildlife.

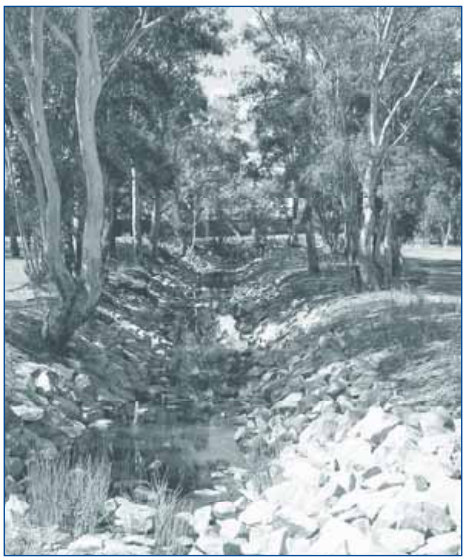
The revegetation of shorelines is important not only to bind the soil and stabilise but also to filter or prevent nutrients from entering the water body. Different techniques are used depending upon the location. Around the lake foreshore a gently sloping beach is created out of small pebbles to both absorb the wave energy and allow dead seagrass to wash out of the water and decompose naturally. Creek banks normally involve some sort of rock protection with fillets or the like, to enable the banks to be revegetated.

Maintenance Dredging

Maintenance dredging is the dredging or removal of bed sediments to return the area to a similar level to what previously existed. It refers primarily to the removal of delta plumes or fans at the end of stormwater lines entering the Lake. This accumulation of sediment smothers and prevents seagrasses from growing. It can also refer to the dredging of shoals in the main navigation channel.

Gross Pollutant Trap and vegetated swale, Macquarie Road, Fennell Bay

Constructed Wetland, Kahibah Street, Morisset



Riffle Ponds, Minmi Road, Edgeworth