

Guide to Riparian Revegetation Macquarie River, Bathurst



Introduction

This brochure aims to provide a “how to” guide for revegetation projects along the Macquarie River in the Bathurst region.

The guideline provides general advice and is not intended to be mandatory standards or requirements. The information has been based on plant species and techniques that have been successful on Council’s past projects, however it is always recommended to get specific advice for your property if available.

What is the riparian zone?

The riparian zone describes the area of vegetation along the banks of a waterbody.

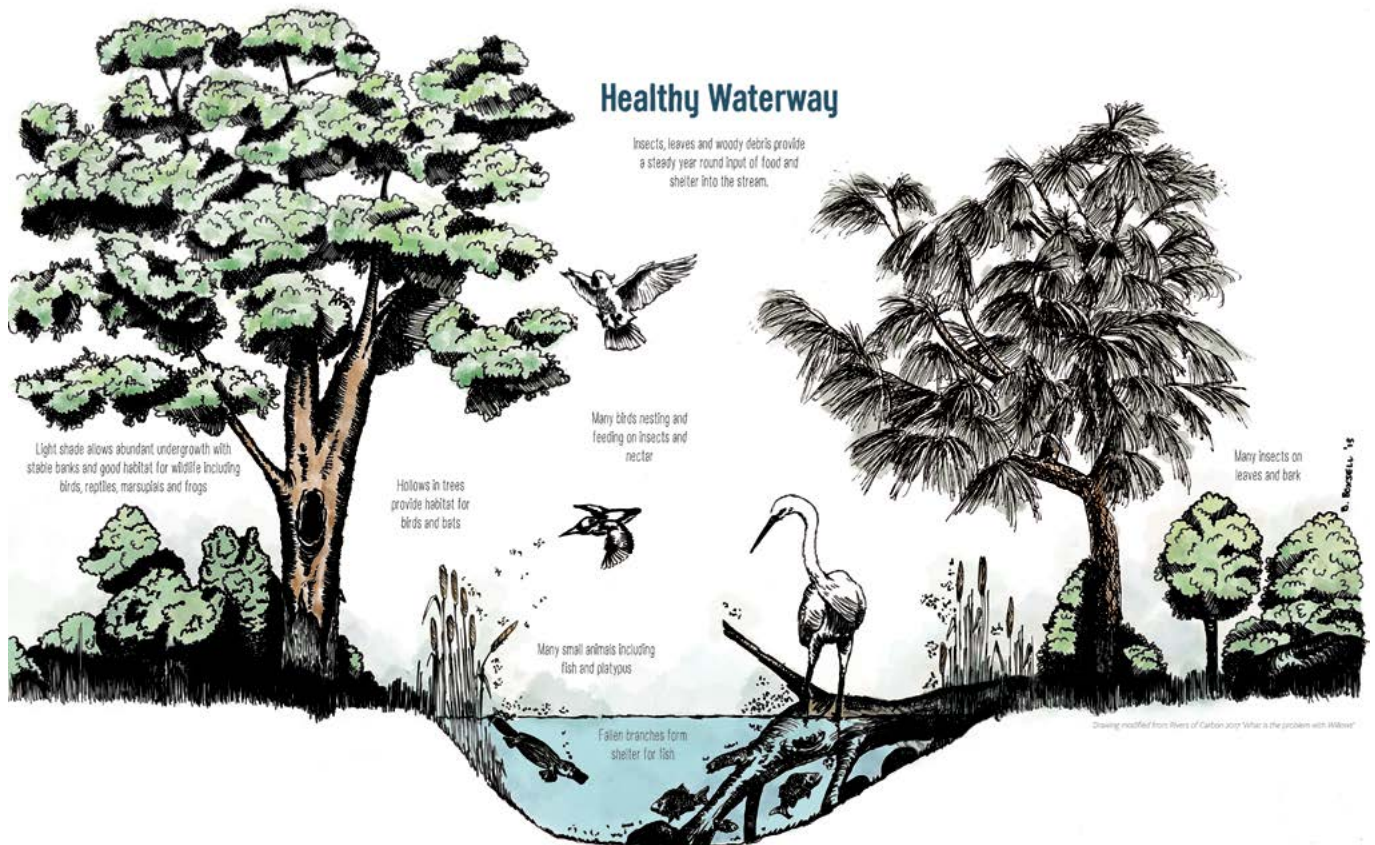
Benefits of native vegetation in riparian areas

Native riparian vegetation provides habitat and food for fish and other aquatic fauna by

dropping fruit, leaves and branches into the water. Overhanging trees and vegetation also shade the river which keeps water temperatures down.

Deep-rooted vegetation helps to hold soil in place, reduces erosion, filters out pollutants and keeps excess sediments from entering the waterway. When the riparian zone is cleared of vegetation the banks are more vulnerable to erosion. The sediment from erosion then washes into the water and smothers aquatic plants and fauna, and fills in refuge holes and other habitat.

Weeds in the riparian zone are often highly invasive and outcompete native plants. For instance when willows dominate the river they provide heavy shade which inhibits the growth of understory plants. Willows also drop all of their leaves in Autumn which reduces water quality and does not provide a year round food source for aquatic fauna.



A healthy & diverse range of native plants along the riparian zone provides many benefits for waterways.

Plant Species Selection

Choosing plant species that naturally occur within the Bathurst region are recommended as they are well adapted to the local soils, conditions and are more likely to benefit the local fauna. Using local native species also avoids introducing plants that can become environmental weeds. Fast growing species are recommended as they provide quick coverage of the planting area to outcompete weeds and protect the riverbank.

Generally the riverbank can be split into different zones depending upon the distance from the water's edge and extent of inundation of water (refer to the below diagram). A general guide to some common species suitable for planting in each of the three riparian zones is provided below.

Lower-bank

Plantings of rushes and sedges within the shallow

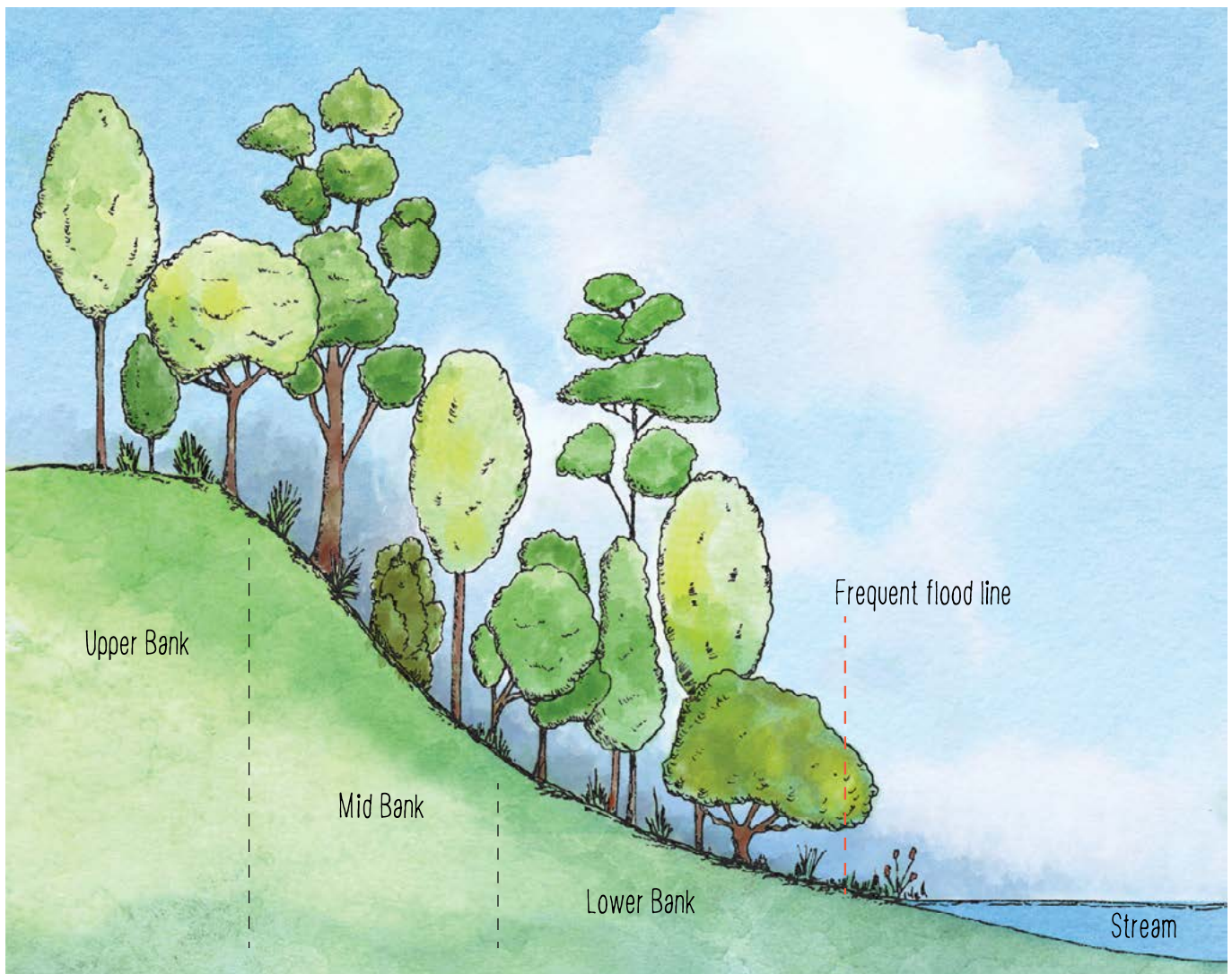
water helps to slow water flow, protect the bank, and provide habitat for fish and other aquatic fauna.

Mid-bank

Dense plantings of rushes and sedges with spreading surface roots will help to bind the soil and protect the bank from erosion. Larger trees and shrubs provide shade the water and provide habitat for aquatic organisms.

Upper-bank

Planting larger trees with deep root systems will hold the bank together, as well shade the river to keep water temperatures down. Ground covers and native grasses planted across the banks will help prevent the loss of soil, and trap pollutants in run-off before they enter the waterway.



*Cross-section of a typical planting on a riparian zone
Diagram adapted from DNR River Facts R31, 1998*

Recommended species for lower banks

Scientific Name	Common Name	Description
<i>Eleocharis acuta</i>	Spike Rush	Aquatic plant with a depth range of 0-200mm.
<i>Schoenoplectus validus</i>	Club Rush	Aquatic plant with a depth range of 0-400mm
<i>Baumea rubiginosa</i>	Soft Twig Rush	Aquatic plant with a depth range of 0-500mm
<i>Bolboschoenus fluviatilis</i>	Marsh Club Rush	Aquatic plant with a depth range of 0-300mm
<i>Phragmites australis</i>	Common Reed	Aquatic plant with a depth range of 0-600mm
<i>Typha orientalis</i>	Cumbungi	Aquatic plant with a depth range of 0-1200mm

Recommended species for the mid-banks

Scientific Name	Common Name	Description
<i>Juncus usitatus</i>	Common Rush	Groundcover
<i>Carex appressa</i>	Sword Sedge	Groundcover
<i>Poa labillardieri</i>	Tussock Grass	Groundcover
<i>Leptospermum myrtifolium</i>	River Tea-tree	Shrub 1-3m high
<i>Callistemon sieberi</i>	River Bottlebrush	Shrub to 3m
<i>Acacia dealbata</i>	Silver Wattle	Large shrub or small tree to 30m high
<i>Casuarina cunninghamiana</i>	River She-oak	Tree to 15-35m high

Recommended species for the upper-banks

Scientific Name	Common Name	Description
<i>Carex appressa</i>	Sword Sedge	Groundcover
<i>Poa labillardieri</i>	Tussock Grass	Groundcover
<i>Themeda triandra</i>	Kangaroo Grass	Groundcover
<i>Dianella revoluta</i>	Native Flax Lilly	Groundcover
<i>Lomandra longifolia</i>	Spiny-headed Mat-rush	Groundcover
<i>Lomandra multiflora</i>	Many-flowered Mat-rush	Groundcover
<i>Callistemon sieberi</i>	River Bottlebrush	Shrub to 3m
<i>Callistemon pallidus</i>	Lemon bottlebrush	Shrub to 5m high
<i>Leptospermum myrtifolium</i>	River Tea-tree	Shrub 1-3m high
<i>Bursaria spinosa</i>	Native Blackthorn	Shrub to small tree to 10m high
<i>Kunzea ericoides</i>	Burgan	Shrub or tree to 5m high
<i>Acacia dealbata</i>	Silver Wattle	Large shrub or small tree to 30m high
<i>Acacia vestita</i>	Weeping boree	Shrub 1m-4m high
<i>Eucalyptus viminalis</i>	Ribbon Gum	Tree to 30m high
<i>Casuarina cunninghamiana</i>	River She-oak	Tree to 15-35m high

Planting Guide

Site Preparation

Prior to planting, the site will need to be prepared to reduce soil compaction and weed competition. The amount of site preparation required will depend upon the past landuses and if the existing groundlayer is native or exotic weeds.

As a general guide in areas where exotic weeds are dominant the following approach is recommended:

- Cut and paint treatment of woody weeds (e.g. Willows, Elms and Poplars) leaving the stump in place to help stabilise the bank. Remove the cut trunk and branches away out of the flood zone to avoid this material reshooting.
- Brushcut or slash the proposed locations for the plantings. Leave for a period of at least seven days.
- Spray the brushcut planting locations to kill all grasses and germinating seeds. Exercise caution of native species. Only use herbicide that is registered for aquatic use.
- Carry out follow up herbicide spraying of the planting locations a further two times, with the final treatment approximately 2 weeks prior to planting.

Plant Supply

For riparian revegetation it is recommended that the trees and shrubs are supplied as Longstem Tubestock. Longstem plants are grown to be relatively tall for the size of the pots they are

grown in (i.e. approximately 1m tall). The seedlings are planted so that about three quarters of the plant is buried. By planting so deeply, the root ball is cooler and less likely to dry out, the plant can better withstand floods, and additional roots grow from the stem of the plant.

Longstem tubestock will need to be ordered approximately 1 year before planting to allow the plants to be grown to the required size. If longstem tubestock are not available, use standard tubestock which are easier to source.

Timing for planting

In Bathurst, it is recommended that planting occurs in Spring (Late September to November) or Autumn (March-April).

Plant Densities

As a general guide the following densities are recommended:

- Lower riverbank - Rushes and sedges should be planted at approximately 5 plants/m².
- Mid and Upper riverbank - Space trees 4m-5m apart and shrubs 1.5-2m apart, interspersed with native grasses and ground covers. On the outer bank or where there is erosion, plant species closer together at 1-1.5m, interspersed with rushes and sedges for bank protection. For good structural diversity, plant a range of trees, shrubs and ground cover species.



Native tubestock is available from many local nurseries

Planting

The following methodology will assist with the successful establishment of the plants:

- Do not plant in unsuitable weather conditions such as extreme heat, cold or wind.
- Dig holes for the plants. Inspect and remedy all planting holes that are glazed as a result of the auguring process.
- Add native fertilizer and water crystals into the planting holes.
- Pour water into the hole and allow it to soak in.
- Place the plant in the hole and backfill carefully.
- Create a dish-shaped depression around the stem of the plant to assist in catching any rain.
- Install a weed mat, and tree guard (cardboard in high flow area or plastic on the upper banks) with hardwood stakes on each of the plants.
- Water each plant thoroughly within 1 hour of planting.

If using longstem tubestock follow the “The Longstem Planting Guide” prepared by the Australian Plant Society (Central Coast Group) and Gosford City Council. See link in the references section of this brochure.

Mulching

Hardwood mulch can be applied to upper riverbank plantings (recommended depth of

100mm) to retain moisture, suppress weeds, and provide protection of bare soil. For steep slopes, plants can be planted into jute mesh or matting installed across the bank. Follow the manufacturers specifications for installation instructions.

Post Planting Maintenance

It is recommended that weeding and watering of the plantings is undertaken for at least 12 months to allow the plants to establish. Weed control is a crucial part of the establishment phase, as competition from weeds and grasses can result in the failure of revegetation plantings. In addition, soils along riverbanks often dry out quickly, and as such watering is often required for the successful establishment of the plants.

Water plants weekly for the first 4 weeks (or less if there is adequate rainfall).

- Water plants as required for the remainder of the maintenance period (e.g. fortnightly or monthly depending upon conditions).
- Hand weed within tree guards.
- Spray or manually remove weeds from minimum 1m diameter around each plant. Do not spray in windy conditions, and only use herbicide registered for aquatic uses.
- Remove guards from plants when the trees are approximately 1.5m tall or if the plant is being restricted by the guard.



Planting sedges using tree guards and mats



Controlling weeds helps reduce competition for the new plantings

Acknowledgements

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