

RIPARIAN REVEGETATION

ACHIEVING LONG-TERM OUTCOMES

FACT SHEET

WHY PROTECT AND MAINTAIN YOUR RIPARIAN ZONE

Riparian zones with structurally diverse native vegetation offer a wide range of ecological functions and services which should be protected and maintained to ensure the health and resilience of local waterways. Riparian vegetation is essential to prevent streambank erosion and provides additional benefits such as buffering sediment and nutrient run-off, improving water quality, providing habitat for terrestrial and aquatic species, and regulating stream temperatures and light.

PLANNING A REVEGETATION PROJECT

Prior to any works commencing, a revegetation project needs to be well planned and have a project budget in place. Understanding the costs before the start of any works will ensure that the most suitable and cost-effective options have been explored.

PLANT PROPAGATION AND SPECIES SELECTION

Species selection is extremely important in any revegetation project. Only use local native species sourced from nurseries who propagate using local provenance seed stock. Generally, local provenance tubestock will have a far greater success rate due to being genetically adapted to withstand local environmental conditions. As a minimum, tubestock should be grown to twice the height of the pot and well sun hardened before going out to a revegetation site. The roots should also be developed enough to fill the pot but not to the point where the plant has become root bound.

An on-ground vegetation assessment at the project site will help to identify plant species and where they generally occur within the riparian zone. Where an area has been highly modified or cleared of vegetation, a desktop assessment can be carried out to help determine the site's regional ecosystem (RE). Regional ecosystem mapping is available on Queensland Globe or from the Department of Environment and Science at <https://apps.des.qld.gov.au/map-request/re-broad-veg-group/>. The RE number can then be entered into the regional ecosystem description database which will provide information on that particular vegetation community, including dominating canopy species, understory and groundcover species <https://apps.des.qld.gov.au/regional-ecosystems/>.

This factsheet is to assist landholders and stakeholders within the Mackay Whitsunday region in planning and delivering a riparian restoration project. This is a general guide only and is not intended to prescribe mandatory standards or requirements.

PLANTING DESIGN AND PLANTING DENSITIES

Planting designs need to consider the function and form (i.e. tree, shrub, or groundcover) of the vegetation and the location that it will be planted along the bank profile (upper, mid, or lower bank). Consulting the landowner with the planting plan is also recommended to encourage their buy in and ensure there are no issues with farming operations. Planting in high densities with fast growing species can provide quick canopy cover, protect the bank and shade out invasive weeds. A structurally diverse root system from ground cover, shrubs and trees will bind the soil and prevent erosion. The following can be used as a guide:

- ▶ **Lower bank** – dense plantings in rows or clumps of suitable groundcovers that have matted root systems and flexible foliage to protect the bank from undercutting and scour. Plant ground covers at 1m spacings. In stable conditions, trees and shrubs can be planted at 2m – 3m intervals. In areas subjected to high erosion processes, trees and shrubs can be planted at 1m – 1.5m spacings and in-filled with groundcovers for increased bank protection.
- ▶ **Mid bank** – plant a diverse mix of native grasses, groundcovers, shrubs and trees to bind soils and

reduce flow velocities during flood events. Tube stock can be planted at 1.5m – 2m spacings.

- ▶ **Upper bank** – utilise fast growing, hardy trees and shrubs with deep root systems to provide structure to the bank and bind soils. Native grasses and groundcovers will help to prevent soil loss and filter surface water run-off from pollutants and excess nutrients. Tube stock can be planted at 1.5m – 2m spacings.

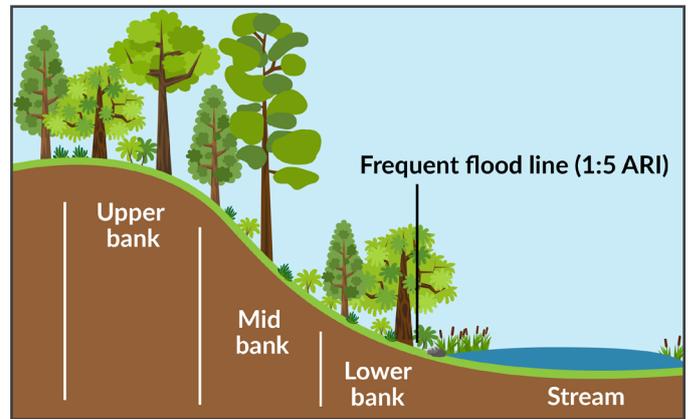


Diagram: Structural Diversity and bank positioning of native species in the different zones.

In general, the wider the revegetation area/riparian zone, the better. Greater width increases chance of survival, reduces weed incursion, and provides greater stability for the watercourse and habitat.



Sourcing local native species will increase the success rate of a revegetation project.

TIMING OF ACTIVITIES

Timing will depend on the scale of the project and deliverable timelines. Determining factors include whether the project will require engineered works prior to planting, local rainfall and environmental conditions such as wet and dry seasons. Planting in the different seasons of the Mackay Whitsunday region each present their own challenges which need to be factored into the budget and plan. Many landholders will not want their bank cleared for planting during the wet season for fear of a flood event. While planting during the dry season will increase watering requirements and plants can suffer from heat stress and die. Planting immediately following the wet season will provide good soil moisture with minimal risk of a flood event and allow for plenty of maintenance hours before the next wet season when weeds compete with the revegetation.

INITIAL WEED CONTROL AND USE OF CHEMICALS

A key element to any riparian restoration project is good site preparation and weed control practices. Ideally, the project area should be cleared of invasive woody weeds, vines, and exotic grasses prior to planting. Initial weed control should consist of the following:

- ▶ Assess the site and identify the weeds present, their location and features, and any risks involved in treating them.
- ▶ Identify appropriate treatment methods. This could include brush cutting, hand weeding, crash grazing, biological control and/or use of herbicides.
- ▶ Follow up treatment of emergent weeds at three weeks and eight weeks after the initial site preparation. Often there will be a significant seed bank in the soil, so multiple weed treatments may be required prior to planting.
- ▶ Continue to monitor and control emerging weeds after planting.

The use of herbicides around watercourses should be avoided as many are toxic to aquatic ecosystems. Brush cutting during high growth times (e.g. wet season) rather than spraying doesn't kill the roots which continue to act to bind the soil reducing erosion risk. However, where the use of herbicides is necessary, the following steps should be taken:

- ▶ Only use herbicides approved for application near a watercourse.
- ▶ The person applying the herbicide is qualified and licenced in chemical application.
- ▶ Ensure best practice methods are always applied, including following the manufacturer's guidelines, using dye to show what areas have been sprayed and wearing appropriate personal protective equipment.
- ▶ Only carry out herbicide application during appropriate weather conditions. Utilise tools such as a hand-held weather meter to provide accurate on-ground conditions and maintain spray records.
- ▶ Where practical use direct application methods such as cut and swab or drill and fill.

Caution needs to be taken when removing weeds from riparian areas due to the high risk of erosion. Where possible avoid disturbing the soil and leaving large areas without cover, especially during the wet seasons.



Initial planting at a revegetation site along St Helens Creek following engineered works.

PLANTING, FERTILISING AND INITIAL WATERING

The following steps should be followed for planting out tube stock:

1. Ensure site preparation has been completed and there is good soil moisture.
2. Understand the planting design i.e. where certain species need to be planted and in what densities.
3. Dig a hole that is double the depth of the pot and twice as wide. Chip the sides of the hole to make sure that they aren't smooth. This will help the plant roots to penetrate the surrounding soil. If doing long stem planting, holes could be up to 50cm deep.
4. Add slow release organic fertiliser suitable for native plants and/or water crystals to the bottom of the hole, if using.
5. Just prior to planting, soak tube stock in a tub of water or Seasol mix until bubbles stop appearing. This will hydrate the root ball and give the plant the best possible start.
6. Carefully remove the plant from the plastic pot by gripping the stem between two fingers, inverting the pot and striking firmly on the base until the plant slides out. Some nurseries use coir pots, which are 100% biodegradable and can be planted straight into the ground.
7. Place the plant in the hole, backfill with soil until firm around the plant. Create a shallow saucer or depression in the soil around the stem to help direct water run-off to the plant.
8. Apply mulch around the tube stock to a depth of 10cm. Ensure the mulch is not touching the stem or base of the plant to avoid fungal infections.
9. Water in the plants as soon as possible after planting (must be same day) with at least 5L of water per plant. Watering immediately after planting will help to settle the soil and ensure good contact between the soil and plant roots.

USE OF SEED, MULCH AND MATTINGS

Applying mulch, hydromulch, jute or weed matting can be beneficial to a revegetation site as it protects the soil surface, retains soil moisture, provides organic matter to the soil as it breaks down and suppresses weed growth. When using mulch, it must be uncontaminated, free of foreign material, serious pathogens and invasive weed(s)/seed.

Direct seeding with non-invasive grass species may be necessary to establish ground cover quickly and minimise the amount of the time that soil is bare.



On-going maintenance is a must. Brushcutting ensures there is still ground cover to protect the soil and reduce the risk of erosion while the revegetation is establishing.

ONGOING MAINTENANCE AND WATERING/IRRIGATION

Follow up maintenance to control weeds is essential to ensure the success of any riparian project. Weed species, particularly grasses, will outcompete young tubestock for soil moisture and nutrients and inhibit their growth. As a minimum, weed maintenance should be carried out for 12 months post planting. Ideally, weed monitoring and maintenance would continue until canopy cover is achieved to shade out and inhibit weed growth.

Watering of revegetation following planting is often necessary for successful plant establishment. As a guide, tube stock should receive a deep watering one to two times per week for the first two weeks following planting and then once a fortnight for up to the next eight weeks. Additional watering requirements will be site specific. Factors influencing watering requirements include soil moisture levels at the time of planting, species of plant chosen, soil type and condition, and amount of rainfall at the site following planting. Avoid over-watering as this can

encourage plants to develop shallow root systems, making them vulnerable during dry conditions.

Depending on project budget it may be more cost effective to install an irrigation system at the project site, rather than pay a contractor to hand water each plant. An irrigation set up can differ from site to site, so it is best to seek advice and have it installed by a qualified professional.

MONITORING, EVALUATION AND REPORTING

Monitoring, evaluation and reporting are important tools for determining the success and/or failure of a revegetation project. Regular monitoring will reduce the risk of issues developing by triggering contingency measures. There are a range of monitoring tools to suit all budgets from photo point monitoring and ground surveying to more expensive high-tech solutions such as LiDAR surveying which can be used to create digital elevation models. Information learnt through monitoring and evaluation processes can help modify practices to ensure the success of future revegetation projects.

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