

CASE STUDY

JUNE 2023

Riparian Revegetation Enhancing Ecosystem Services

Project Background

The Proserpine O'Connell Basin Water Quality (Reef Trust VII) Project aims to strategically work with landholders throughout the O'Connell Basin to deliver biodiversity, connectivity and riverine outcomes within the Great Barrier Reef (GBR) catchment. The habitat restoration and riparian rehabilitation component of the Project focuses on enhancing riparian and in-stream habitat and river reach connectivity.

The riparian zone is a unique natural system that acts as a transition between terrestrial and aquatic ecosystems along the length of rivers and streams. It is a specialised ecosystem, often recognised as niche habitat for unique species. The riparian buffer typically has high biological diversity in comparison to the surrounding landscape.

Riparian rehabilitation is widely accepted as a cost-effective streambank stabilisation tool, with healthy riparian corridors stabilising streambanks and protecting sensitive areas from extreme events. Consequently reducing fine sediment delivery to the GBR lagoon however, restoring riparian corridors has many other system benefits that often receive less recognition or funding support.

KEY OUTCOMES

- 10 ha weed control
- 2 ha revegetating habitat
- 6.5 ha aquatic area remediation
- Two engineered streambank remediation sites and two gully remediation sites
- Three pest animal control aerial shoots

A majority of the landscapes remnant vegetation, biodiversity values and recreational values can be found along riverbanks and riparian areas. These areas also act as wildlife corridors, habitat refuges and buffers against extreme conditions. Therefore, the aim of this case study is to acknowledge the additional benefits that are established through the restoration of riparian areas throughout the O'Connell Basin.

The Targeted support to maximise soil, biodiversity and vegetation outcomes in the O'Connell and Proserpine basins of the Mackay Whitsunday NRM region Project is funded by the Australian Government's Reef Trust.



What are Ecological Services?

Ecological services are recognised as the many and varied benefits the natural environment and healthy ecosystems provide human society, including natural processes such as water filtration, oxygen production, climate buffering, food production, pollination, and many more natural services.

The environment also inherently contains intrinsic values which may not directly provide services to humanity but are valued off their own merit. Riparian zones with a healthy and diverse native species composition provide a wide range of ecological functions and services.

Through restoring riparian habitat the Reef Trust VII project has enhanced the potential ecological service capability nine project locations.

The graphic in Figure 1 displays the range of ecological services provided through a healthy and functional riparian zone and what could have potentially been support via restoring these areas (Beesley et al., 2017).

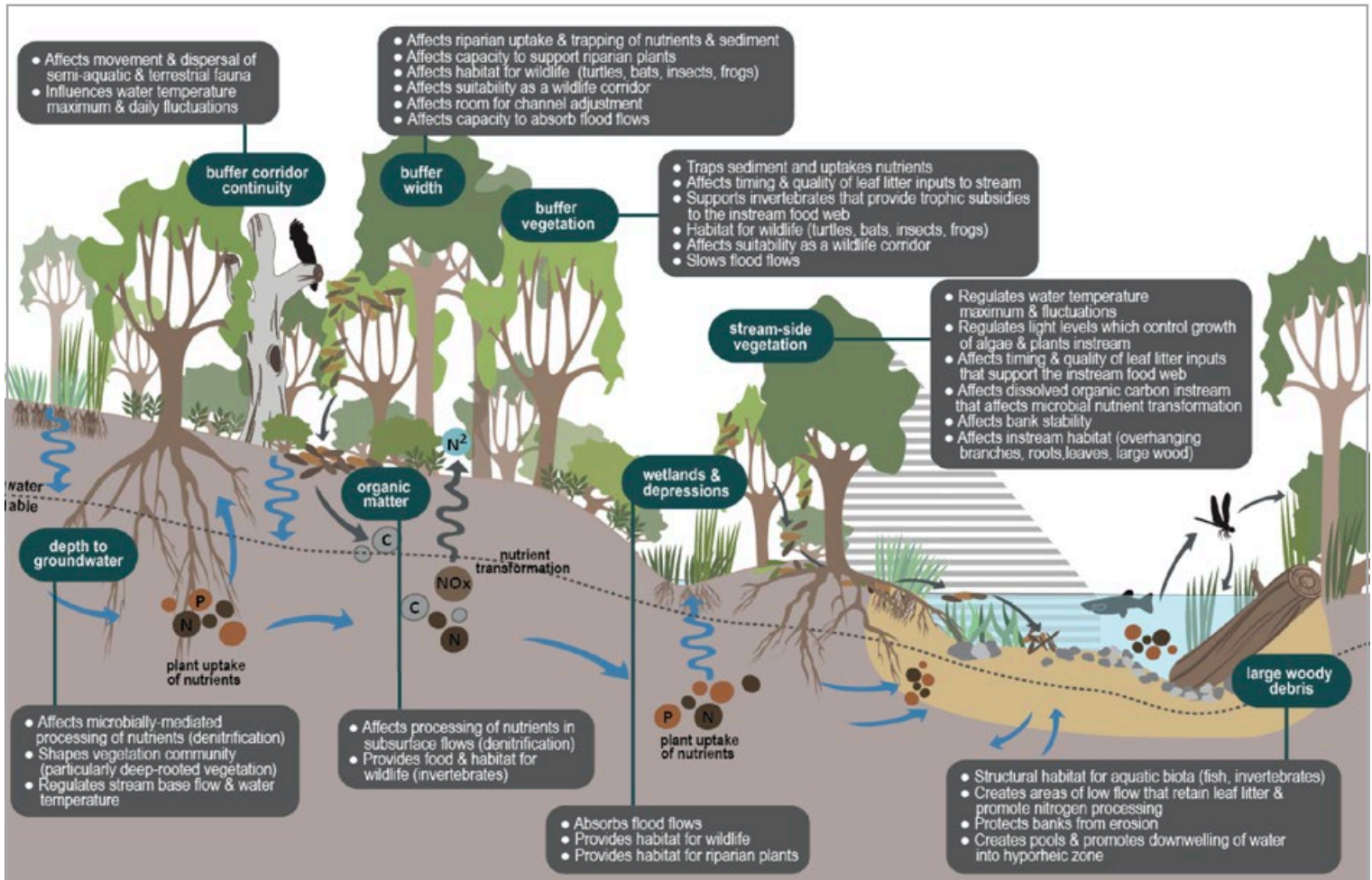
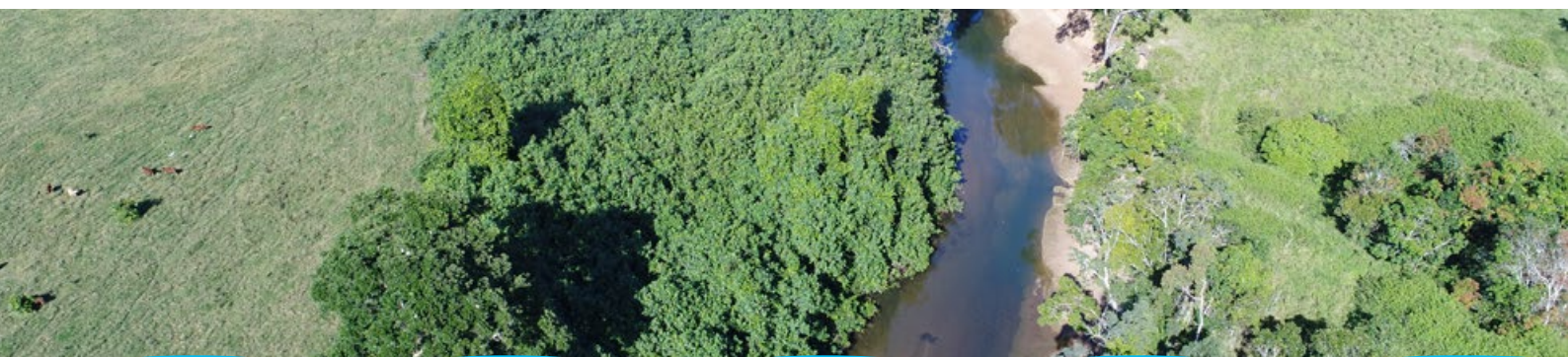


Figure 1: The Ecological Services of a Healthy Riparian Environment. Source: Beesley LS, Middleton J, Gwinn DC, Pettit N, Quinton B and Davies PM. (2017). Riparian Design Guidelines to Inform the Ecological Repair of Urban Waterways, Melbourne, Australia: Cooperative Research Centre for Water Sensitive Cities.

A healthy riparian corridor will increase biological diversity, streambank stability, ecological buffer capability, runoff filtration and habitat. Riparian areas have a complex vegetation structure, including deep rooted trees to hold banks, shrubs,

and ground cover with matted root systems to protect subsoil. In the Great Barrier Reef catchments this is critical to maintaining good water quality and reducing sediment impacts to the reef.



Project Activities that Enhance Riparian Ecological Services



Figure 2: SB001 Nine months of growth at a streambank remediation site along the O'Connell River

Through the Reef Trust VII project 8.5ha of riparian habitat was rehabilitated across nine sites with a total of 16,000 native riparian tube stock planted.

The rehabilitation of previously degraded streambank frontage connected the landscape to established riparian zones, improving vegetation communities and providing habitat and movement corridors for plants and animals. The rehabilitation of these riparian zones included weed control, native tree planting and the installation of engineered designs.

Figure 3 shows a remediation aquatic ecosystems site which has aimed to connect and strengthen the O'Connell River riparian area. This work has connected adjacent Eucalyptus woodlands to the riparian vegetation, improving the habitat connectivity and biodiversity.



Reef Catchments support has been a catalyst for advancing projects we have wanted to do for some time.

It's been good to see the main issue that we have get addressed and while seeing the flow on benefits to the environment and organisations like Reef Catchments. We have enjoyed working collaboratively with project staff and the process has been very easy.

For me the most interesting learning has been seeing how quickly you can revegetate and return the environment back to a natural state. The growth rate of our revegetation site is impressive, and I enjoy going down there.

~ Frank and Kirsty Clayton - Project landholders and Bloomsbury growers

Figure 3: SB005 Remediating Aquatic Areas Project Site along the O'Connell River

The Reef Trust VII project has also supported protecting the riparian area through funding cattle and feral animal exclusion fences. This limits the movement of large hoofed animals in the sensitive riparian area and can reduce erosion risks and weed transmission, whilst improving natural recruitment and on farm financial outcomes, as highlighted in Figure 4.

Along with the direct benefits to the landholder in protecting productive agricultural land from further loss through erosion, many secondary benefits have been realised. A reduction in weed species encroaching into farmland has been seen with the establishment of native vegetation in the riparian zone. Other ecosystem benefits include reduced sediment export, improved landscape connectivity and improved water quality.



Figure 4: A feral animal exclusion fence installed along cane headland adjacent to the riparian area.

We have seen good improvements in the health of the cane and reduced erosion risk through the decline in pig disturbance in the form of diggings and tracks throughout the headland. I'd estimated at least 1000 tonnes of cane production improvements this year after the install of the exclusion fence.

~ Frank and Kirsty Clayton - Project landholders and Bloomsbury growers

Heathy landscapes often mitigate against the impacts of extreme events by providing catchment roughness and resilience.

Natural components such as vegetation, waterways, soil and biodiversity act as buffer systems to changes in climatic

conditions or extreme events. For example, flooding events are impacted by certain drivers such as high rainfall intensity and ecological components (e.g. vegetation, soil, impervious surfaces). This, in turn, determines the flood behaviour (e.g. flow paths, speed, volume, and height).

Catchment vegetation and riparian management can reduce the speed and volume of water entering the river system and the speed at which water drains from an area, reducing flood heights and speeds in downstream catchments.



Figure 5: SB006 a RTVII streambank pile field remediation site installed along the O'Connell River

Figure 5 displays a Reef Trust VII pile field site installed along the O'Connell River. These timber pile fields act to perform the function of remnant vegetation, slowing the water velocity and encouraging deposition. These pile fields have a life span of approximately 15 years, which provides protection while the remediation site establishes and transitions into providing this bank stability service.

The Reef Trust VII project has invested in several forms of remediation working towards the goal of increasing ecological services, biodiversity, connectivity and riverine outcomes for the O'Connell Basin.