

MANAGING AND REHABILITATING RIPARIAN VEGETATION

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Riparian areas are the last line of defence against water pollution and help to protect streams against the effects of human influence. The important part riparian areas play in maintaining biodiversity needs to be recognised if these areas are to be given management priority and the long-term protection of their values ensured.

As the landscape becomes increasingly urbanised or modified, waterways will become more degraded, unless effective management programs and techniques are implemented to protect the natural assets of streams and rivers.

What is riparian land?

The term “riparian land” refers to any land which adjoins or directly influences a body of water. This includes:

- the land immediately alongside small creeks and rivers, including the riverbank itself;
- gullies and dips which sometimes run with surface water;
- areas around lakes; and
- wetlands on river floodplains which interact with the river in times of flood

(LWRRDC, 1996).

The importance of riparian land

Riparian land is recognised as being of high value because it is the most fertile and productive part of a landscape. The interaction between land and water in the riparian zone provides a range of habitats necessary to support a diverse range of flora and fauna. Highly fertile soils and moist conditions favour the establishment and growth of a diverse range of plant species.

In addition to being productive, riparian land is often a vulnerable part of the landscape susceptible to damage from agricultural and urban development, weed invasion and natural events such as floods. This combination of productivity and vulnerability means that careful management of riparian lands is vital to the conservation of both biodiversity and economic productivity.



Photo by C. Catterall courtesy of LWRRDC

Relatively intact watercourse in sub coastal Queensland

Riparian values and functions

Riparian areas are important as they maintain biodiversity within the landscape, as the vegetation directly adjacent to watercourses plays an important role in providing:

- wildlife habitat;
- buffering of sediment and nutrient run-off;
- stream bank stabilisation;
- temperature and light control; and
- aquatic habitat.

Wildlife habitat

Even though riparian lands occupy a small proportion of the landscape, they frequently support a higher diversity of plants and animals than the surrounding landscape and therefore are regarded as being of high habitat value (Lynch *et al.*, 1999). This is a result of the wide range of

habitats and food types found in a riparian environment, its proximity to water, its microclimate and its ability to provide refuge for native plants and animals in times of stress, such as drought and fire. In addition to providing important dwelling habitat for wildlife, riparian areas provide vital vegetation corridors which enable wildlife to move between patches of remnant vegetation.

Buffering of sediment and nutrient run-off

Riparian land influences water quality by protecting streams from influxes of sediment and nutrients. Vegetation within a riparian zone can slow the overland movement of water during rain events, causing sediment and nutrients to be deposited on land before reaching the stream channel. Australian studies have shown that buffer strips are effective in trapping

or absorbing nutrients, with both natural vegetation and grassy filter strips able to trap around 90 percent of the sediment moving from upslope (LWRRDC, 1996).

Stream bank stabilisation

Root systems

Reinforcement by the roots of riparian vegetation is usually the most important safeguard against bank collapse, with fine root systems being most effective in this process.

Water use

By using up water and improving drainage, riparian vegetation can help stabilise the bank and reduce the risk of sudden collapse.

Buttressing

Vegetation on the face of a stream bank helps support (or buttress) soil so the bank does not collapse. (LWRRDC, 1996)

In general, root systems, by strengthening the bank, are the most important way that vegetation acts to minimise the risk of bank collapse.

It is estimated that at least \$50 million is spent each year on preventing or remedying stream bank erosion in Australia. Added to this is the cost of treatment to counter reduced water quality. Given these costs, it is not surprising that there is a rapidly growing interest in techniques to help stabilise streams and their banks. Maintaining healthy riparian vegetation is one technique that can provide relatively cheap and long-term stability as well as numerous other benefits to water quality and wildlife.

Temperature and light control

The shade created by intact, healthy vegetation along creeks and rivers:

- acts to maintain low water temperatures (many native aquatic plants and animals are sensitive to increased temperature);
- decreases the amount of available light and so prevents excessive growth of nuisance plants or algae; and
- creates dim or patchy lighting - providing habitat for predators and prey

(LWRRDC, 1996).

The clearing of natural riparian vegetation for agriculture or urban development causes increased light

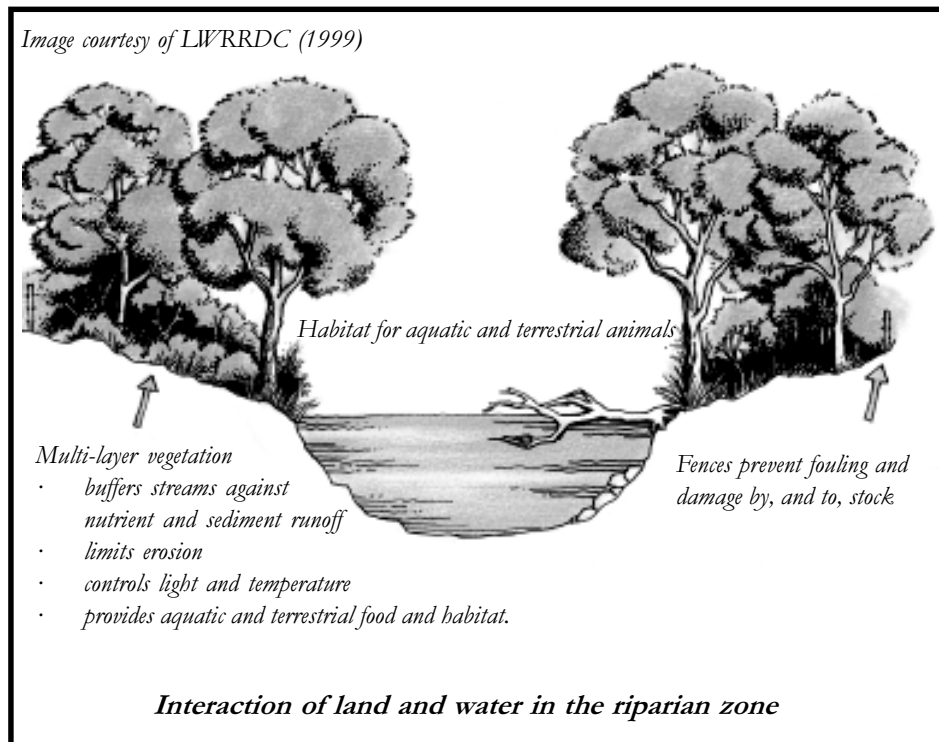
intensity and water temperatures. If combined with nutrient pollution from agricultural or urban run-off, this can lead to excessive growth of algae or massive growth of water plants.

Aquatic habitat

Woody debris such as branches, large limbs and even whole trees are an important natural component of aquatic ecosystems. They alter the flow of water in small streams to create pools, which provide vital habitats for aquatic plants and animals. Woody debris also provides niches and habitats for small invertebrates, and accumulates leaf litter and finer particles as a means of retaining nutrients and food for aquatic animals. Many fish species rely on woody debris for refuge and sites for laying eggs (LWRRDC, 1996).

Rehabilitation and management

A large proportion of natural bushland areas are located on private land and therefore support from landholders is needed for rehabilitation and management efforts to be successful. Landholders need to become involved in weed control, the planting of more appropriate species along creeks and the general maintenance of riparian areas. The continued involvement of landholders in the rehabilitation of stream sections is required to ensure the long-term maintenance of riparian values in catchments.



Guidelines for the rehabilitation of riparian vegetation

The aim of any riparian rehabilitation program should be to produce a stable stream channel with well-vegetated banks, to provide good water quality for a range of domestic and productive uses and a home for a variety of wildlife (Telfer, 1998). It is important to resolve any problems relating to stream channel stability before revegetating stream banks to increase the success of a rehabilitation project.

Factors to be considered when planning a rehabilitation project:

- genetic integrity and biodiversity should be maintained through the planting of indigenous vegetation species, not exotics;
 - structural diversity and appropriate plant positioning is important to minimise erosion;
 - vegetation should be planted using appropriate techniques and densities to take into account the natural attrition of seedlings, to reduce weed competition and encourage the regeneration of native species; and
 - the rehabilitated corridor should be fenced off from stock.
- (Webb and Erskine, 1999).

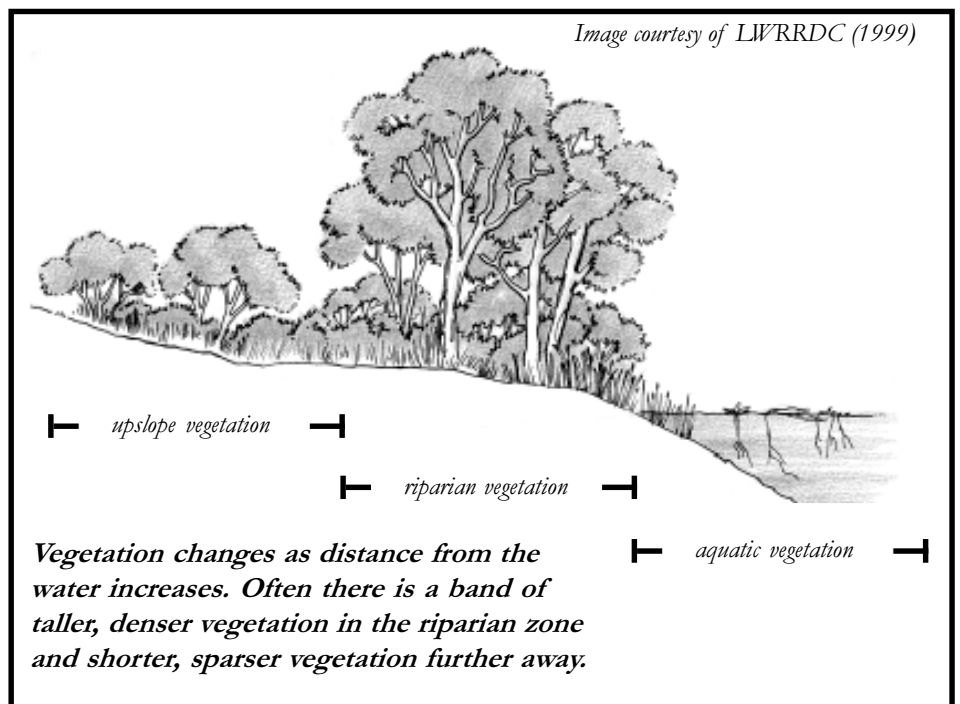
Rehabilitation strategy

1. Set achievable goals with measurable objectives.

The first and most important step in a successful rehabilitation program is to set clear goals. Clearly defined goals make it easy to evaluate the success of the project. Objectives need to be developed for measuring the success of the project. These objectives may be to restore habitat values, reduce erosion, manage weeds or improve water quality.

2. Assess the condition of the stream.

Assessing the condition of a stream will identify problems and determine



priorities for rehabilitation. This will involve documenting vegetation, stream bank condition and the impact of adjacent land uses. The highest priority for managing riparian vegetation should be to protect areas in good condition, as it is much more cost-effective to protect these areas now, than to rehabilitate them later because of poor management. Management strategies should aim to protect intact riparian vegetation and, in situations where degradation has occurred, seek to rehabilitate and restore (LWRRDC, 1999).

3. Select appropriate strategies and techniques

Species selection

It is important to select locally indigenous species for revegetation to maintain the genetic integrity and biodiversity of the rehabilitated area. Using Australian natives not found in the area or using introduced species will affect the outcome of the rehabilitation project. To select the most appropriate species for revegetation contact an agency with local knowledge of the area e.g. Land for Wildlife Co-ordinator, nearest Queensland Parks and Wildlife Service office or your native plant stockist.

Structural diversity and plant positioning

It is important to recognise that different types of vegetation have

different functions and therefore are more suited to different parts of the stream bank. Therefore, in selecting plant species for revegetation of a stream bank, it is important to select a diverse range of vegetation forms. Look for an example of an intact and natural creekside in your area.

Upper bank: Large trees with deep root systems and shrubs bind the soil, with groundcovers filtering run-off from adjacent land uses.

Middle bank: A good mix of trees, shrubs and groundcovers to bind bank soils and reduce flow velocities during floods, thus protecting against erosion.

Lower bank: Dense undergrowth of shrubs, native rushes and sedges with matted root systems and flexible branches protect the bank from undercutting and scour. Choose plants that are tolerant of periodic inundation. (Telfer and Connell, 1998)

Choose a revegetation method

- Natural regeneration: This method of re-establishing vegetation should always be the first choice. The area should be fenced off to protect from grazing and trampling by stock, allowing natural regeneration to occur. Implementation of a long-term weed management strategy is important to control exotic species.

Advantages: cost-effective, requiring only the cost of fencing and weed maintenance, and uses species which are adapted to the site. Results in vegetation communities that are diverse in composition and structure.

Disadvantages: successful natural regeneration requires a nearby source of propagules — from local plants, vegetated areas upstream or from seed stored in the soil. Once grazing is excluded, weeds may become a problem if not treated. (LWRRDC, 1999).

- Direct seeding: an efficient, cost-effective method of re-establishing native vegetation. A diverse mixture of plants can be established.

Advantages: seedlings develop good root systems to cope better with climatic extremes and require little maintenance.

Disadvantages: poor seasonal conditions will affect germination. Requires careful pre-planning and site treatment for effective weed control. (LWRRDC, 1999).

- Planting seedlings: Widely used, this method requires weed control and fencing.

Advantages: useful for species that do not germinate readily or for sites requiring fixed spacing of plants.

Disadvantages: the roots of seedlings are not as well developed as those of seedlings from direct seeding or natural regeneration. (LWRRDC, 1999).

4. Implement rehabilitation works and activities

Implement a weed management strategy

The control of riparian weed species is the key element of any stream rehabilitation program. Long-term

management of weeds in both the riparian zone and aquatic habitats is best achieved by maintaining an intact canopy cover of each of the different vegetation layers to shade out weeds and by limiting disturbance. Seek advice from the relevant agencies on the best methods for weed eradication.

Implement a stock management strategy

Fencing the rehabilitation site and managing stock access will minimise impact to riparian zone vegetation. Installing remote watering points for stock can dramatically reduce their impact on a waterhole or stream.

Implement a buffer zone

If the prime objective is to trap sediment and nutrients, the appropriate width and management practice for riparian buffers depends on the volumes of water and sediments being transported and the nature of the landscape adjacent to the stream channel.

5. Set up a monitoring program

Monitor the site regularly to reduce the risk of problems developing or becoming more serious. Keep good planting records including photographs, plant survival rates, techniques used, and the effectiveness of these techniques in meeting the desired outcomes (Telfer and Connell, 1998). Regular monitoring of riparian vegetation should aim to measure changes in species composition, the structure of plant communities, extent of recruitment and regeneration of native species, changes in the composition and extent of weed species, and the health of native species (LWRRDC, 1999).

6. Maintain works or undertake follow up activities

Follow-up maintenance will be

required to ensure long-term success.

- Keep seedlings above the height of weeds.
- Fertilise and irrigate as necessary.
- Replacement planting may be required after flooding.

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