FACT SHEET 6

Managing stock

6

Riverlandscapes

This Fact Sheet is the sixth in a series dealing with the management of riparian land.

Uncontrolled access by domestic stock to riparian land can lead to excessive run-off, bank erosion, loss of productive land, decline in important wildlife habitat, reduced water quality and damage to in-stream ecosystems. Unfortunately, domestic stock, particularly cattle, favour riparian frontages and, if not managed carefully, will spend much of their time along streambanks and in the water. The result is usually over grazing that erodes bank soils allowing weed invasion, and develops stock tracks that erode during heavy rain. This results in increased sediment and nutrients being washed into the stream. Inputs of animal dung and urine are important factors in reduced water quality for downstream users.

It is often not necessary to permanently exclude animals from riparian lands, but it is important to control their movement and to manage grazing pressure. This takes a bit of planning and effort, but many landholders are discovering that in the long-run, significant payoffs can be gained through increased production, improved water quality, stable streambanks and healthy riparian vegetation.

FACT SHEET 6

Impact on water quality

Photo George Lukacs.

Uncontrolled stock access results in impacts on riparian lands and degraded water quality.

The impact of stock on water quality

Livestock, as well as native and feral animals, can contaminate streams in several ways:

- their manure and urine directly contributes large quantities of phosphorus and nitrogen to streams. Under conditions of sufficient light, and increased temperatures (i.e. where riparian vegetation has been substantially cleared), this can lead to excessive growth of nuisance water plants and algae, including toxic blue-green algae.
- animal wastes are also an important source of disease-causing bacteria and viruses. These may have significant effects on other animals that drink downstream. There is growing evidence that livestock drinking contaminated water show significantly decreased growth rates and lower productivity than those that have access to clean, uncontaminated drinking water.
- streambanks which contain bare soil and compacted walking tracks and pads as a result of over-grazing, contribute large amounts of soil and nutrients to the stream during heavy rainfall. Over-grazing of riparian vegetation, or poorly-placed watering points along a stream results in concentrated animal numbers, and this can lead to increases in streambank erosion and more sediment and nutrients entering the water.
- animal wastes fouling tributary steams above the catchments for dams and reservoirs can significantly increase treatment costs for downstream users.

Nuisance algae, one result of increased nutrient levels.
Photo MDBC.

Photo Phil Price.

Impact on riparian vegetation

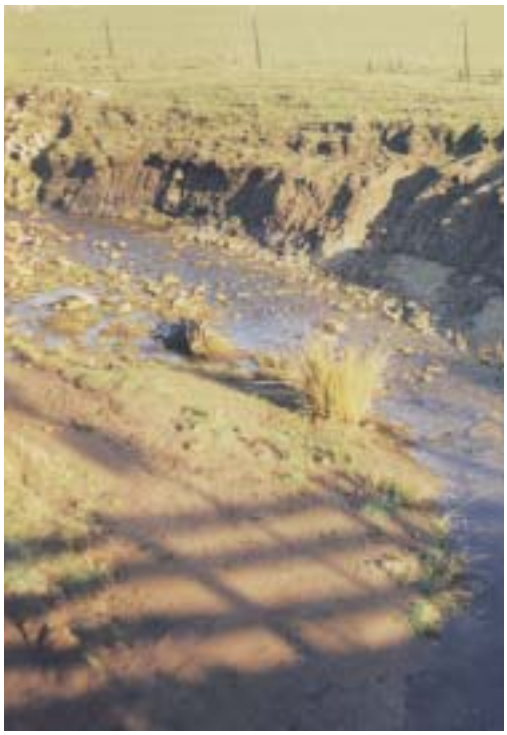
Stock tracks and pugging provide direct routes for sediments and nutrients to wash into the riparian zone.

The impact of stock on riparian vegetation

Other Fact Sheets in this series explain how groundcover and healthy riparian vegetation help to control streambank erosion and to maintain the health of aquatic ecosystems. Over-grazing of riparian lands is a primary cause of vegetation removal and is, therefore, a major problem for both land and stream management.

Streambank erosion

Over-grazing by livestock opens up patches of bare soil along the bank and the land adjacent to it. Walking tracks and pads provide a source of bare and disturbed soil, ready for rapid erosion in the next rain event. Stock moving along the water's edge disturb and pug the soil at the toe of the bank, making it prone to being washed away when rain increases the streamflow. Fact Sheet 2 in this series discusses the issue of bank erosion in more detail.



This stream has had unrestricted stock access that has kept the banks bare and unstable. The area has recently been fenced off in an effort to prevent further bank erosion. Photo Siwan Lovett.

Loss of native plant species

Stock selectively graze the seedlings of some native species, preventing the establishment of new plants and the eventual loss of the species. Loss of species and absence of structural diversity within natural riparian vegetation leads to a loss of biodiversity, increased potential for weed invasion, and loss of habitat and wildlife values.

Soil compaction

Trampling of riparian land during prolonged access by livestock results in soil compaction and physical damage to plants. Soil compaction may affect the ability of seeds to germinate, and reduces the rate at which rainfall or run-off infiltrates the soil. Groundcover species, such as herbs, tufted grasses and tussock species, which help to slow overland flow and to trap sediments, can all be damaged or removed through trampling and excessive grazing.

Weed invasion

The disturbance created by livestock through grazing of plants and opening up of bare ground, together with increased nutrient levels from animal dung and urine, creates an ideal situation for the establishment of weeds. Weeds may also be spread directly by the animals, either through attachment to hair or skin, or through their manure. Troublesome weeds can spread in the other direction, from riparian lands onto adjacent farmland.

Bridal creeper infestation impacting on riparian land.
Photo Sharon Rixon.

Managing stock access and grazing pressure

In areas where restoration of native riparian vegetation is needed to overcome problems created by uncontrolled stock on riparian land, removing or controlling stock access during the period of restoration is the first and most important step in management. However, the long-term aim of management should be sustainable grazing which does not cause direct damage to vegetation cover. Some practical methods to control stock access and grazing pressure are discussed on the following pages.

This riparian zone has been fenced out to restrict stock access. Once the area has been rehabilitated, stock may be permitted access for drought refuge or shelter in times of severe weather events. Photo Siwan Lovett.

Fencing

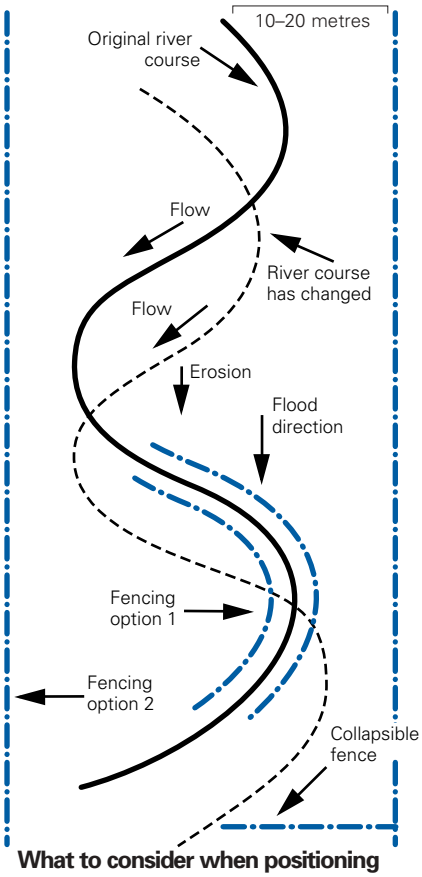
The simplest way of regulating animal access and grazing pressure on riparian land is to erect a fence between it and the rest of the property. Fencing will enable you to manage stock access according to need and available feed, and opens up opportunities for additional or alternative productive use of riparian margins, for example, for forage production or agroforestry.

The use of fenced riparian margins as a living haystack is gaining acceptance as more and more landholders report that carefully-planned, strategic use of the feed available on riparian lands can have a significant benefit to profitability. This type of management requires careful planning to incorporate it into the grazing enterprise, but the rewards can be significant.

The type and location of fencing that best suits your needs will depend on your type of stock, when and how much you want to use the riparian area, the size and shape of the stream channel, flood frequency, and size of the flood peak. Riparian fencing needs careful planning as flooding is a continual threat to conventional fence lines. Landholders and researchers have come up with several alternative methods to cope with these problems. This fact sheet covers some of these, but more detailed information is available from government agencies, catchment management authorities, farm advisers and retailers.

Positioning the fence

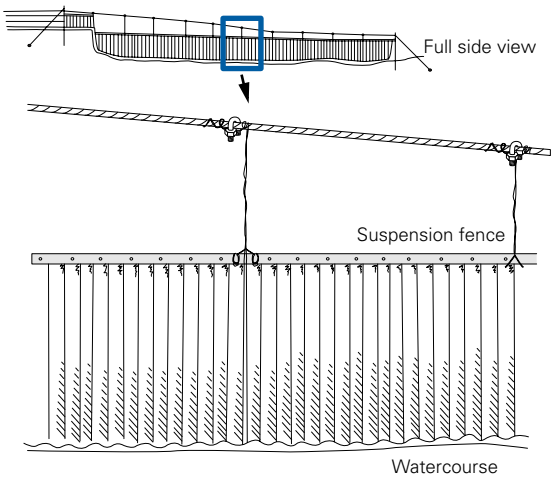
Many landholders make the mistake of placing the riparian fence line too close to the stream. This makes it liable to frequent flood damage, and the fence line may be lost if the stream channel is widening or incising. It is better to do the job properly and be prepared to place the fence line some distance from the current bank, generally at least 10–20 metres. As the plan is to continue to use the riparian land for carefully managed grazing, it should not make a great difference to grazing returns to place the fence at a reasonable distance from the top of the bank. By doing so, you can also take out some of the bends and curves of the stream, reducing the number of end-assemblies that may be required if you are going for conventional fencing. This can help to reduce the capital cost of the fence. As well, there are now in place many local government and community riparian fencing schemes that help with the capital cost faced by landholders.



What to consider when positioning a riparian fence line.

Hanging fences

Hanging fences are built across narrow streams so that animals cannot walk along the stream to bypass fence lines. Hanging fences are usually suspended from steel cable or multi-stranded, high-tensile fencing wire strung across the stream. In order to prevent them being damaged or destroyed during floods, they have hanging panels that are designed to ride up with heavy flows and return to their normal position once the peak flow has passed. The hanging panels are usually galvanised iron or ringlock hinged across the cable. They may be damaged by debris coming down in a big flood, but the damage is usually not severe and the panels can cheaply and easily be repaired or replaced.

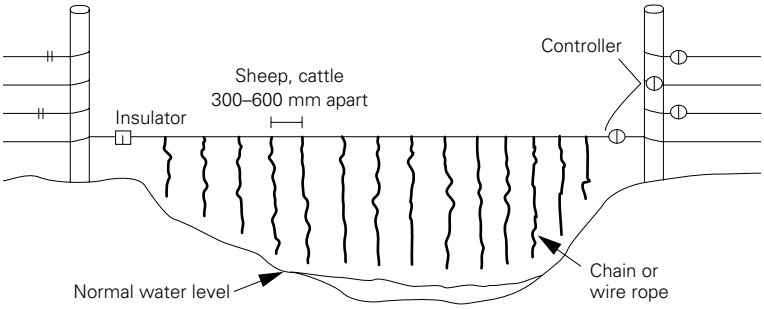


Design for hanging fence

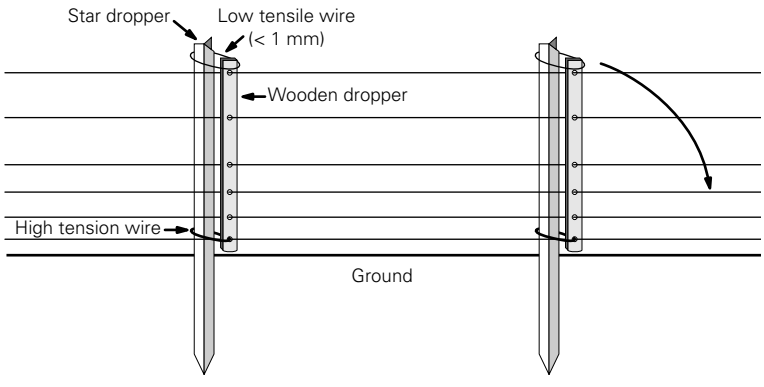
Electric fences

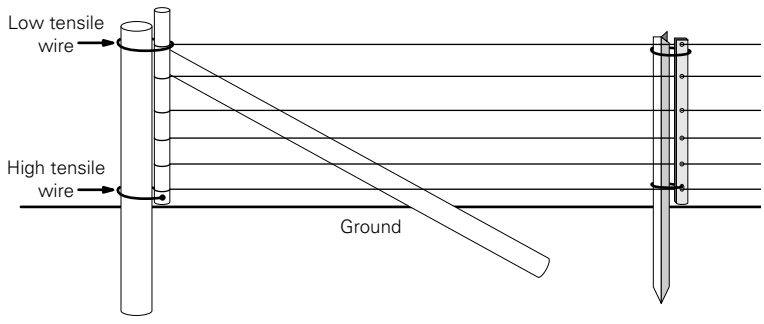
Electric fences have also been designed for use along and across streams. An electric fence is not only much cheaper to construct initially, but it is much cheaper to repair following an unexpectedly large flood. Steel droppers will usually survive a flood unless hit by large debris, so it is often only the cost of a length of electric fencing wire that has to be covered by the landholder.

Electrified flood gate



Below: Drop/lay down fence. Upper diagram showing drop-down wooden posts at star droppers and bottom diagram showing drop-down end strainer post. Photo lower right Ian Bell.





For going across the stream, as with hanging fences, a steel cable is used as a horizontal support, from which steel chains or hinged panels are hung. The chains and/or panels are separated electrically from the grounded cable, and all are electrified and able to move independently, allowing floodwater and debris to pass underneath.

Portable electric fences are another option that allow landholders to control stock movement along waterways. Fully-portable electric fences can also be quickly moved if there is advance notice of a likely flood peak.

Drop fences

Drop fences are designed to be either manually operated (dropped) before a flood, or to drop from their anchor points under the pressure of floodwater and debris. Once the floodwaters have receded, these fences are quick and simple to pull back up and reattach to their anchor points. They can also be dropped to allow stock or vehicle movement from one paddock to another without the need for expensive gateways.

Electronic fences

Electronic fencing has been developed overseas as an alternative to fixed fencing, particularly for cattle. The stock wear a receiver, initially developed in the form of an ear-tag, and transmitter boxes are located to form a boundary between the riparian area and the rest of the paddock. The transmitters emit a continuous signal that defines the boundary. The ear-tags respond by producing firstly an audio signal, followed by an electric stimulus to the animal's ear if it attempts to enter the exclusion zone. Tests have shown that cattle quickly get used to this form of fencing, which is cheaper than conventional fixed fences and can be moved quickly in the event of a flood peak. This type of fencing is under active development in Australia, with the aim of bringing the price down to a level at which it can be adopted widely.

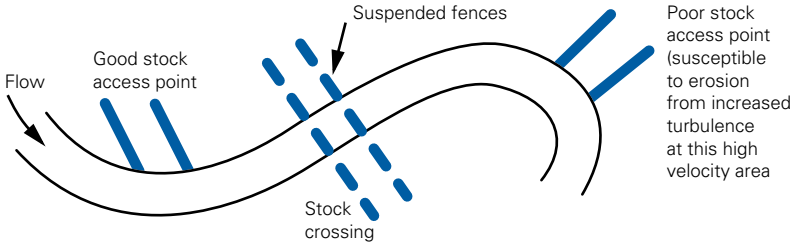
Watering points

Once a streambank has been fenced, or other ways found to control stock access, you may need to consider providing alternative watering points. The careful siting of watering points and supplementary feeding stations where appropriate, can be used as an alternative to fencing, as it helps manage stock access to streams. Some landholders have demonstrated that by providing a shaded access point to clean water, or by providing a watering point closer to preferred pastures, they have been able to significantly reduce the amount of time stock spend in riparian areas without the need for fences.

Ready access to clean, unpolluted water is an important factor in optimising animal health, growth rates and productivity. Hence, the costs of providing alternative water sources for stock, other than through unrestricted access to rivers or streams, may be more than repaid through increased production. Some watering systems to consider are listed below.

Formed access point

Stock can be watered from a stream or river without undue damage to the bank if a formed access point is built at a carefully-selected section of the channel. It is important to avoid boggy area, and the outsides of meander bends where flow speed is high and streambanks are subject to increased erosive forces. Cross-stream fencing may be required to prevent animals wandering along the streambank. Overall, formed access points are a relatively cheap option that result in significant reductions in stock impacts on riparian lands.



Where to site a formed access point

In practice, a graded slope into the stream is selected or constructed as the site for a formed access point. Its surface is then protected by using concrete, compacted gravel, logs or similar materials to form a walkway. It is important to consider likely changes in the depth of flow in order to make sure that access to water is available for as much of the year as possible. When dealing with steep, difficult riverbanks, it is important to recognise that stock show marked preference for using a more-comfortable access point to drink, so a site with a gently sloping bank is preferable.

Alternative water supply

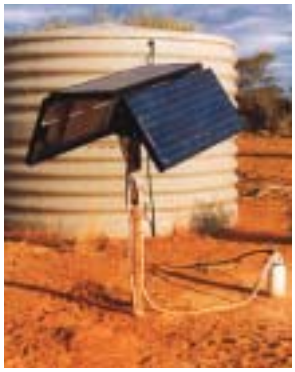
Provision of a water trough connected to a permanent water supply from a dam upslope, or through a reticulated water scheme, is often a cheaper option than attempting to lift and pump from a river. In the more-intensive industries such as dairying, the number and layout of watering points is an important consideration in enabling and encouraging stock to maximise the use of available feed. In these situations, the time taken to walk down to the stream for a drink and back is considered by some landholders to be 'unproductive' time. This means that for these landholders the cost of a reticulated water supply and better-sited watering points more than pays for itself through increased production.

Pumping river water

In many areas, riparian lands overlie old river channels with beds of sand and gravel. These may provide a plentiful supply of good-quality water that can be accessed through a bore powered by an electric pump or windmill. Such aquifers are often not far beneath the land surface, so that even a small-sized pump can provide sufficient water for a large number of animals.

A range of pumps has been developed to use the flow of the stream itself to pump a small volume to a header tank and stock trough, with the tank providing a storage buffer. Solar pumps, which are becoming more cost-effective, are ideally-suited to watering stock in remote areas.

Another pump type, used more commonly overseas than in Australia, is a nose pump (see below) operated by cattle. As the animals drink from the pump bowl, they push against a lever, which in turn operates a piston and diaphragm and pumps more water from the stream. Their low cost and small number of moving parts has made this type of pump an attractive option.



Solar powered water pump.

Nose pump.

Managing grazing pressure

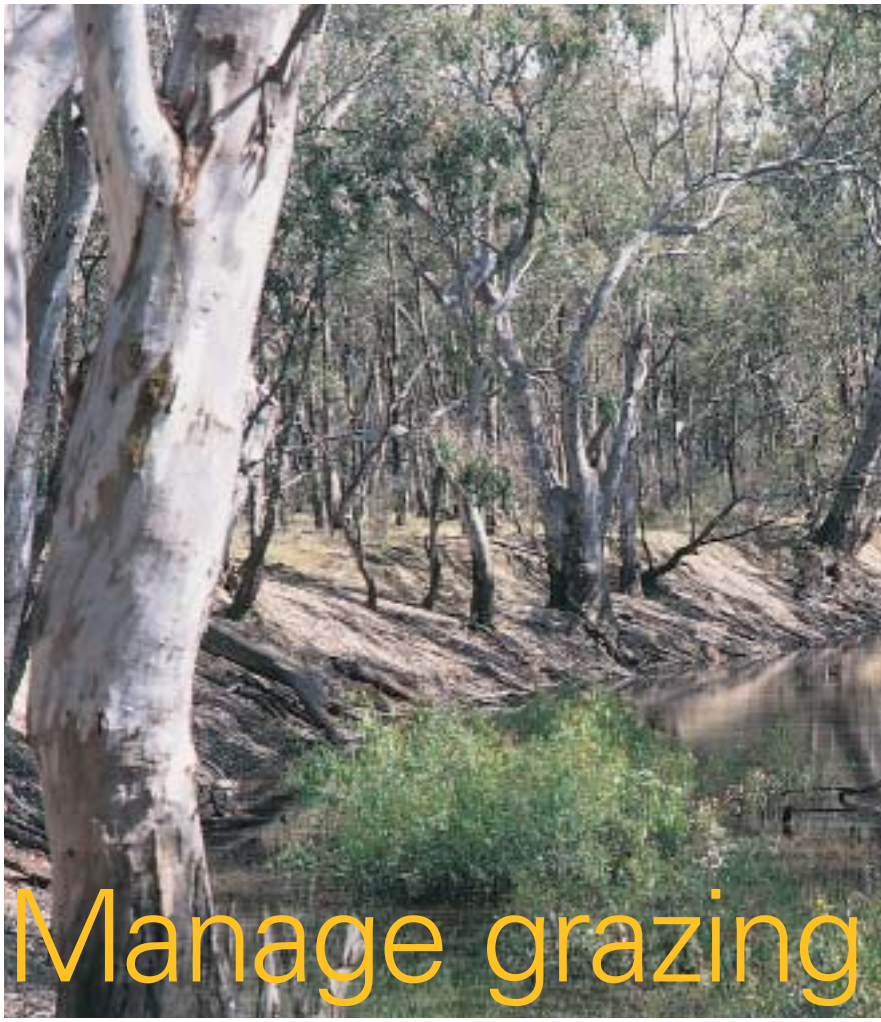
In managing stock grazing on riparian lands, the aim is to maintain continuous groundcover, with enough vegetation to protect the soil surface from heavy rain and to provide a filtering capacity where this is required. You may also wish to maintain vegetation for bank stability, as well as for wildlife and in-stream habitat. Your particular management objectives have an important bearing on how you manage grazing pressure on the riparian land. In general, timing, intensity and duration of grazing all need to be considered.

Timing

Grazing should be restricted or prevented altogether when plants are starting their annual growth cycle. Heavy grazing during this time can substantially weaken pastures and natural vegetation. Grazing should occur when plants are either dormant, such as in winter, or when there will be less impact upon plant vigour, seed and root production. Vegetation should be spelled around the time of flowering and seed production in order to allow for continual replacement and maintenance of good vegetation cover. This is especially important for native species. In addition, grazing on riparian lands should be restricted or removed altogether during that period of the year when maximum rainfall is expected. This will help to ensure maintenance of a complete groundcover when the potential for erosion and soil loss is at its greatest.

Intensity

You will need to monitor the impact of grazing during the period when the animals have access to the riparian area. This will enable you to assess whether grazing intensity is too high or too low, and to move the stock before vegetation degradation becomes a problem. Grazing intensity can also be managed as a tool to reduce weed populations where these are palatable, or to reduce total plant material if fire management is an issue. The key to successful management of intensity is careful inspection and the ability to move stock elsewhere before damage occurs.



Manage grazing

Duration

Continuous grazing of riparian areas all year round, which is usually the situation when no attempt is made to control stock access, gives vegetation no chance to recover. In this situation, native grasses, herbs and shrubs will eventually die out, and be replaced by unpalatable, weedy species. Riparian areas, where the dominant vegetation is native or sown pastures, also need careful management in order to maintain the preferred botanical composition and feed quality.

Through careful management riparian lands can be used for both economic and environmental gains. Photo CSIRO Ecosystem Services Project.

Reducing costs

The costs of fencing and providing alternative sources of water are often substantial. Increasingly, individual landholders and groups have access to public assistance to help manage the capital costs involved. This is because many of the benefits of controlling stock along riparian lands are enjoyed by the wider community, as well as the landholder. The capital cost of effective fencing remains a significant problem, particularly for extensive grazing properties in inland regions. The development of electronic fencing methods may provide a solution to this long-standing problem.

For further information

Wright, D. & Jacobson, T. 2000, *Managing Streamsides: Stock control, fencing and watering options*, Department of Primary Industries Water & Environment, Tasmania.

Askey-Doran, M. 1999. 'Managing stock in the riparian zone' in Price, P. & Lovett, S. *Riparian Land Management Technical Guidelines, Volume Two: On-ground management tools and techniques*, Land & Water Australia, Canberra.

FACT SHEET 6
BACK PAGE

These **Fact Sheets** are grouped according to whether they deal with riparian land, in-stream issues, river contaminants or other matters. They aim to set out the general principles and practices for sound management. Other information that focuses on local conditions and management issues is available from state government agencies, local governments, catchment management authorities, rural industry bodies and community organisations. Together, this information should assist users to understand the key issues in river and riparian management, and enable them to adapt general management principles to their particular situation, and to know where to go for advice specific to local conditions.

Other relevant Fact Sheets

1 Managing riparian land
2 Streambank stability
3 Improving water quality
4 Maintaining in-stream life
5 Riparian habitat for wildlife
7 Managing woody debris in rivers
8 Inland rivers and floodplains
9 Planning for river restoration
10 River flows and blue-green algae
11 Managing phosphorus in catchments
12 Riparian ecosystem services
13 Managing riparian widths

Numbers 1–7 of these Fact Sheets are based on the previous *Riparian Management* series produced in the 1990s. The authors involved in the development of the earlier series were: Michael Askey-Doran, Stuart Bunn, Peter Hairsine, Ian Prosser, Ian Rutherfurd, Brian Finlayson, Ian O'Neill, Chris Gippel and Wendy Tubman.

Further information on river and riparian management can also be found at the Land & Water Australia 'River Landscapes' website.

www.rivers.gov.au

This website provides access to projects, fact sheets, guidelines and other information designed to assist people to better manage river and riparian areas across Australia.

River Landscapes

Edited by Phil Price and Siwan Lovett and produced by Land & Water Australia's National Riparian Lands Research and Development Program.

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