



rivers and
water quality

arteries of the Australian environment

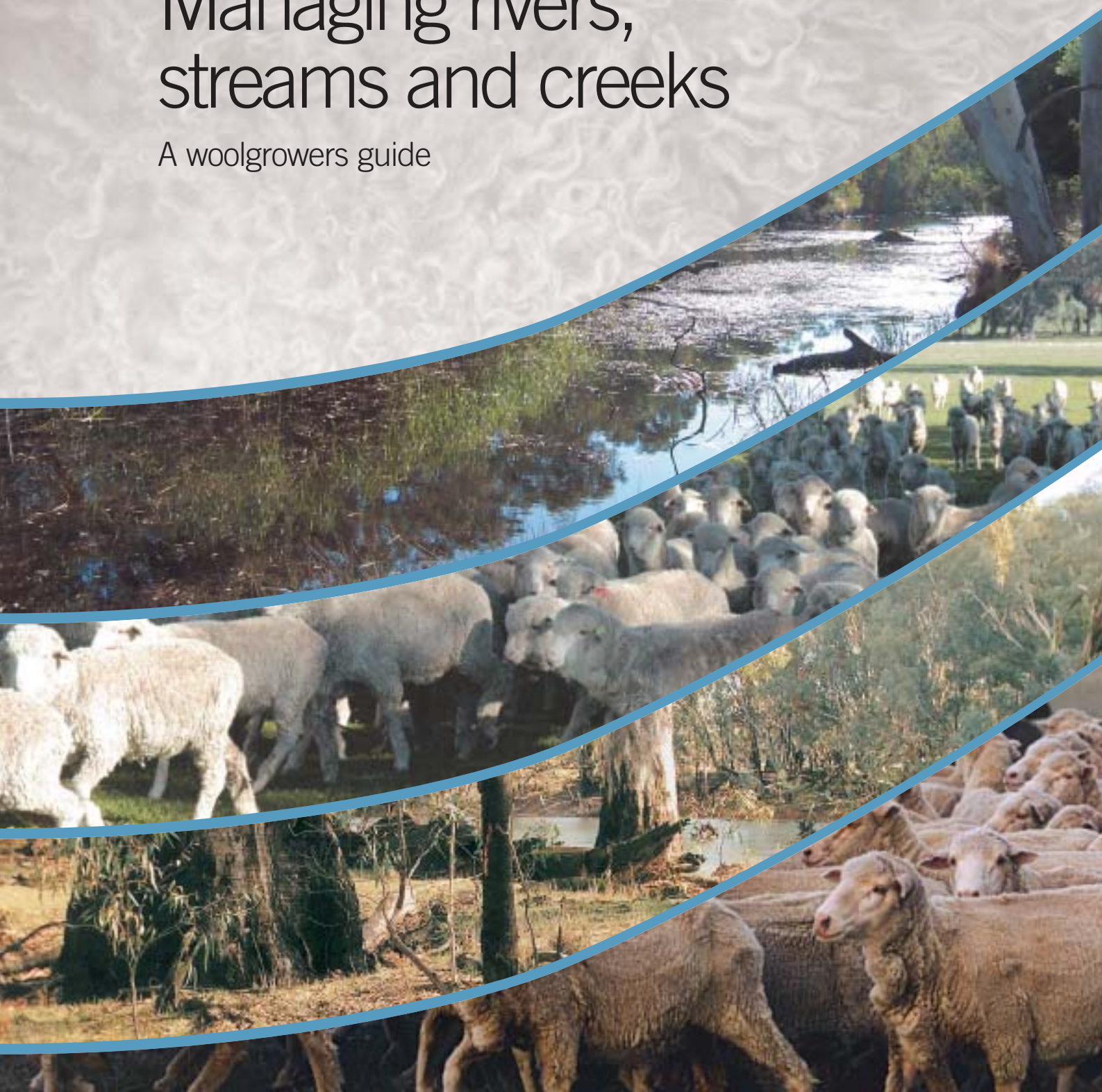
LandWater & Wool
Shaping the future



another australian wool innovation limited

Managing rivers, streams and creeks

A woolgrowers guide



“What is riparian land?”

Any land which adjoins, directly influences, or is influenced by a body of water.

Photo Mike Wagg

Introduction

At least three-quarters of all woolgrowing properties have frontage to a waterway. Sheep need access to high quality water to thrive, and riparian pastures are often highly productive with good quality feed. Waterways can also pose a range of management problems such as insecure boundaries and flooding. As a result, woolgrowers have strong financial and environmental reasons for understanding and managing the waterways and adjacent (riparian) lands on their farm.

This guide provides practical tips to assist woolgrowers in identifying the issues and trade-offs that can occur in managing riparian land. Much of the information described here has been developed and used by growers, and can be applied to increase production and profit, while also maintaining the farm's natural resource base and improving its capital value. Some of the principles outlined can also be applied to the management of large farm dams.

Riparian lands and water courses can have many uses and values. It is possible some of the functions of well-managed riparian land, like carbon storage, water filtration and salinity control, may in the future form part of the farm's production system, and be valued and traded as part of an 'ecosystem services' market. However, for the time being, the following issues are worth considering to improve the management of riparian areas on your farm.

Success in farm waterways management

1. Grazing management

Grazing management is probably the most important single factor influencing the condition and productivity of riparian pastures and woody vegetation. Woolgrowers use a range of grazing management options, including set stocking, rotationally grazing by season, and rotational grazing based on feed on offer. As a general rule, set stocking is not recommended for riparian areas unless the overall stocking rate is low and there aren't any signs of pasture degradation such as decline in palatable species, a lack of regeneration of pasture, trees or shrubs, or obvious areas of bare soil and/or erosion. Recommended grazing management options are provided in the following list.

- Some form of rotational grazing. This is likely to provide the best long-term management regime and may involve grazing riparian areas later in the spring or summer, when flood risk is lower and other parts of the property have begun to dry out and lose green feed. Fencing according to land class may be required for this to be practical.
- Maintain a vigorous and competitive pasture sward to prevent erosion and invasion by unpalatable or woody weeds into riparian areas. Avoid spreading fertiliser any closer than 20 metres to a waterway.

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- In regions with high annual rainfall, time the grazing of riparian pastures to assist control of fluke and other internal parasites.
- Monitor the impact that stock are having on riparian pastures and stream banks. Consider controlling stock access to riparian areas by using off-stream watering points, mineral or supplement licks, and providing shade and shelter away from the stream or creek. This can be quite effective at changing animal behaviour, reducing the amount of time sheep spend in the riparian area.
- Where saline discharge sites occur adjacent to waterways, restricting stock access so that ground cover is maintained will reduce salt concentration on the surface, helping both erosion and water quality.

Riparian fence, photo Phil Price.



Fencing tips

If installing fences to enable greater control of stock in and around riparian areas there are three types to consider.

- Plain wire suspension fence — this is often preferred for use in areas where periodic flooding is likely. Plain wire is less likely to collect flood debris, be damaged or pushed over by flood waters. A plain wire fence is generally cheaper than fabricated mesh, although it may require droppers, and given the need for tension, there is some limitation on following the curves and meanders of a stream or creek. A plain wire fence can be cut, if necessary, when a flood is imminent and is relatively simple to replace and re-strain after the flood has passed. This practice can help to ensure that strainers and in-ground droppers remain in place.
- Prefabricated mesh such as Ringlock or Hingejoint. These fences are more effective in controlling stock than a plain wire fence and do not require droppers. They are, however, more expensive and susceptible to collection of debris. They cannot be as readily removed or prepared to withstand a flood, although the use of a lay-down fencing panel may make this less of a problem.
- Two- or three-wire electric fence. This is cheap, quick to erect, and relatively flood-proof, but does require some form of electric power to operate it. With the decreasing price of solar-powered battery systems to energise electric fences, this type of fence is now often preferred by woolgrowers for use in a flood-prone area.
- Gates should be located so that getting stock in and out is easy to manage.

Our experience

**Mark and Anna Gubbins,
'Coolana', Victoria**

"We no longer see these fenced off areas as wasted country. They are a real asset. Some people question the value of the trees and revegetation, but I can't remember the last time we had any problems with stock during cold snaps and high winds. The benefits of shelter are obvious. It cuts wind velocity and provides a haven for lambing and for shorn sheep. In fact all our shorn sheep are moved off shears into sheltered paddocks as part of standard practice."



Photo Currie Communications

2. Shade and shelter

Significant productivity gains to both sheep and pastures can be made by providing shelter and shade. The first step is to protect and maintain in good condition any remaining native vegetation on the property, particularly when it is adjacent to streams or creeks. The following points are some of the management options that could be considered.

- Fencing — usually required as a first step in revegetating riparian areas, either by natural regeneration or planting (see Fencing tips).

- A vegetated strip at least 10 metres wide with a mix of native trees, shrubs and grasses provides maximum shelter from wind for stock and pastures in adjoining paddocks. Wind speed reduction occurs for up to 15 tree heights into the paddock.
- The longer the windbreak, the more effective it is in providing shelter.
- Healthy vegetated riparian land provides habitat for insect eating birds and insect parasites that can help to protect pastures and crops from damage.
- Competition from weeds is a key issue when replanting riparian areas. It is preferable to start work on weed control the year before the planned planting. Spot spraying rather than total weed kill is usually advisable near waterways. Ripping can be used to open up the sub-soil to speed establishment, and to temporarily reduce competition from nearby established trees. Direct seeding, where it is feasible, is much cheaper than planting tubestock.
- Well managed riparian land acts as a filter strip to trap and assist in sediment and nutrient management.



Our experience

Lindsay and Biz Nicolson, 'Buffalo Brook', Tasmania

“To provide alternative stock water we constructed a 3 megalitre dam in the higher country. This dam gravity-feeds a series of troughs that supply water to stock in a rotational grazing system. Water from the Buffalo Brook is also pumped to supply troughs in paddocks close to the pump and four waterholes were put in to supply more distant paddocks. This water would have ended up in Buffalo Brook; it's the same water, just used differently.”

3. Off stream stock water

Allowing sheep constant access to a stream or creek when it contains water is a cheap way of watering them, but it also presents difficulties for sheep management and is a primary cause of declining water quality in Australia. Water quality, especially salinity, can vary considerably over the year and may reach extremely high levels over summer. Providing off stream water involves initial capital expenditure and ongoing maintenance costs, but wool growers have reported the following benefits.

- Installing a watering system is often the trigger to change paddock layout and fencing so that grazing management better reflects land capability.
- Once a watering system is installed woolgrowers have a greater ability to match their grazing management system with animal needs according to season and amount of feed on offer.
- Some woolgrowers report noticeable improvements in animal health, growth rates and wool production as a result of a continuous source of clean and uncontaminated water.

- The condition of riparian areas may improve significantly, with natural regeneration of trees able to occur once stock are removed from the stream.

The pay-back period to recoup the costs and ongoing maintenance of alternative watering systems will vary according to the system used. In some areas, grants through Catchment Management Authorities are now available to help defray the capital costs of riparian fencing and off stream watering systems.

Contributions to catchment health

Water quality and the condition of riparian areas are key components of most catchment and water management plans. Targets are being set in most regions for in-stream nutrient and salt levels, and the proportion of riparian areas with native vegetation. The use of off-stream watering systems for stock is an important tool that catchment management agencies will be encouraging, and woolgrowers may be able to receive support and possibly financial assistance from these agencies if they are interested in establishing an off-stream watering system.



Photo Kyle Nichols.

Our experience

John and Sue Holt, 'Burn Brae', South Australia

"Fencing off the creek areas has provided a huge range of benefits including reduced erosion, increased water quality, improved creek bank stability, weed management and increased biodiversity. Revegetation of these areas has also provided effective shelter for livestock, particularly lambing ewes, as fencing following the creek line has produced what we call 'rooms', that provide protection from the elements no matter which way the wind is blowing. We believe the riparian land acts as an environmental corridor for wildlife and are encouraged by the number of bird species returning to our farm to live in these areas."



Photo Mike Wagg.

Our experience

Mike and Cathy Wagg, 'Jarrapool', Victoria

"Since fencing off our river we have been very lucky as there aren't many weed issues in the remnant vegetation, and regeneration of redgums and tea tree has been good. When we fenced the area out we were careful to leave vehicle access for laying rabbit bait which we do every autumn. This has kept rabbit numbers very low and even the casuarinas are getting a chance to regenerate. We now use the area for intermittent grazing and for providing shelter. We put 180 tail-end prime lambs in there off-shears this year, straight out of the shed so that they wouldn't carry weed seeds in. While they were in there we had a 125 mm thunderstorm and didn't lose a single lamb."

4. Pest management

Make sure when fencing out waterways that vehicle access is left so that activities like slashing, bait laying and spot spraying can be conducted if required.

Weeds

It is important to ensure that noxious weeds are controlled prior to revegetation and fencing, and that any rabbits are controlled and warrens are ripped. To reduce weed invasion into riparian vegetation:

- maintain a mix of different native vegetation types and levels in riparian areas, so that there are trees, understorey shrubs and ground layer grasses. This competition will make it more difficult for weeds to invade.
- avoid excessive disturbance to riparian vegetation, for example from repeated vehicle and equipment access, timber gathering or other clearing.

- periodically monitor weeds to ensure that any invasion can be dealt with before numbers build up. Work with neighbours to prevent re-infestation of the areas being rehabilitated; most weed invasions of intact riparian vegetation have come from adjacent and upstream land.

Pest animals

There is a risk that unmanaged or revegetated riparian areas may provide harbour for pest animals, which can include both native and feral species. Wallabies, kangaroos, possums, deer, goats and rabbits can overgraze native vegetation and compete with stock for pasture. Pigs, foxes, wild dogs and cats can spread disease, harm wildlife and kill lambs. In closely-settled areas, where riparian areas are likely to include grazed pasture and small areas of native vegetation, the establishment of these pests is normally not a problem. However, when larger areas are available, particularly in association with bush runs, this is an issue that woolgrowers will need to consider.

Methods of preventing or controlling pest animals are specific for each type of animal and for certain situations. Readers seeking further information are referred to the series of publications available from the Department of Agriculture, Forestry and Fisheries, including *PESTPLAN: a guide to setting priorities and developing a management plan for pest animals*, and the series of guides for control of pests including rabbits, feral goats, feral horses, rodents, feral pigs, wild dogs and dingoes.

5. Other issues

Wool contamination

Depending on the nature of the stream bank and bed, as well as the type of riparian vegetation, restricting access to waterways may improve wool value through reduced contamination. Sheep with greater than six months wool are especially susceptible to vegetable matter contamination or staining and yield reduction due to mud on hocks and bellies.

If a reticulated water supply is not an option, restricting access to waterways to more solid areas and laying gravel access points can reduce pugging and bogging where stream beds and banks have a high clay content.

- insecure boundaries pose a risk of lice or footrot being carried in from neighbouring properties by stray sheep.
- unrestricted access to waterways may be a risk factor in the spread of Ovine Johne's disease.

Fencing out waterways and providing an alternative water supply can significantly reduce these risks.

Stock inspection and mustering

Having waterways fenced out can save a considerable amount of time in stock inspection and mustering. It also reduces the risk of sheep becoming bogged, or washed away in floods. In areas where ryegrass staggers is a problem, having waterways (and dams) fenced out will reduce the amount of deaths that can occur through misadventure when sheep are suffering from staggers.

Capital value

Some landholders have combined riparian management with agroforestry, hay production, seed harvesting and honey production. This, along with the amenity value that a well managed riparian frontage provides, can enhance the capital value of a farm above that of one with a degraded riparian area.

Waterways and catchment management

The quality of a waterway is a reflection of the activities that occur in the entire catchment. Water quality, in particular, is something that needs a whole of catchment approach to achieve improvements. Each individual farm has a role to play. The starting point is to develop a whole farm plan that identifies stream, wetlands and land of differing capability. Land should be fenced by landclass and managed according to capability.

Protect water quality

Preventing contaminants such as sediment, nutrients, pesticides, and animal wastes from entering waterways is the most sensible approach to maintaining water quality. Once in the water, pollutants are difficult, expensive, and sometimes impossible, to remove. Well managed riparian areas perform a range of functions to protect and maintain good water quality.

Secure boundaries

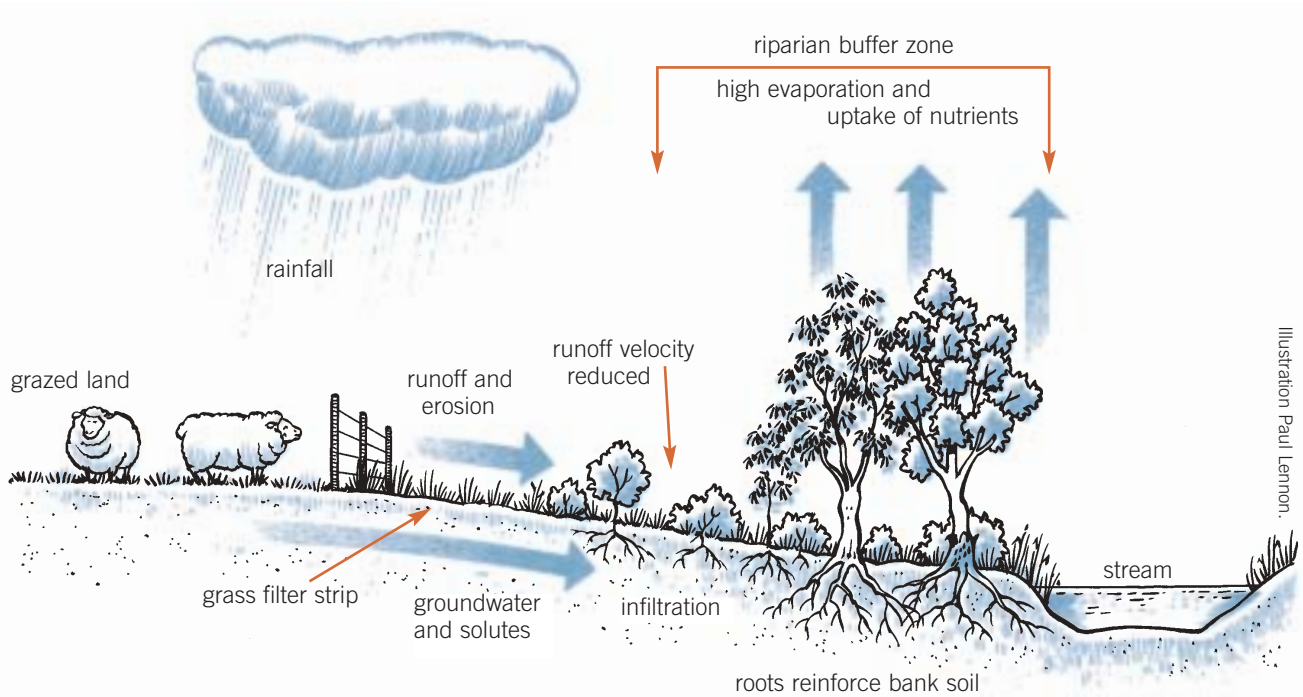
On many farms a single stream will water several paddocks, with fencing between paddocks and neighbours running across the stream. When flooding occurs the fencing between paddocks and neighbours can be washed away posing some general management issues as well as some specific threats:

- mobs of sheep may become boxed.

My experience

**Trevor Sprigg, 'Boyup Brook',
Western Australia**

"The river bank has stabilised beautifully in eight to ten years. Reeds are colonising the bare ground, and the flooded gums and melaleucas are gradually returning. But it is a long process, and may take 40 years before it is complete. I just hope that when I move on, any new owners will continue the process."



The following recommended management practices optimise the benefits that can be gained from managing riparian areas as integrated parts of the overall farm.

- Adequate vegetative cover on all sloping land prevents or slows contaminants from entering streams. Where slope exceeds 3% and ground cover is less than 30%, soil erosion through sheet movement or formation of small rills can be expected, especially under intense rainfall. Management of grazing to ensure a minimum of 50–70% vegetative cover is always maintained is a key step in preventing this type of erosion.
- Laneways and stock tracks are best placed along the contours rather than across them, especially adjacent to a water course. Where tracks must go up and down the slope, periodic shallow drains and/or levees placed across them will safely take drainage water off into grassed areas.
- Vegetated filter strips, both within the paddock and near the stream, will trap and retain sediment moving in overland flow. The aim is to slow down the flow sufficiently so that the sediment and attached nutrients drop out and are trapped within and among the vegetation, preferably where they can contribute to increased pasture growth. A well-grassed filter strip only 6 metres wide can be very effective in trapping sediment where overland flow is shallow. In dips and gullies where flow is concentrated, the strip needs to be proportionately wider but can be grazed with care.
- The timing and duration of stock access to riparian areas can be managed to ensure they are not overgrazed, and sheep removed well before a season of potential intense rainfall events such as summer storms.



Our experience

Richard and Jenny Weatherley, 'Connewarran', Victoria

“River and waterway management should be a part of the whole farm ecosystem and not a separate issue. For example, we had noted a rise in the salinity of the river water, so to water the stock efficiently and provide the stock with clean water, the best thing we could do was to shut them away from the river altogether and water them from another source. There is a strong correlation between water quality and livestock productivity. But while the river is not used for stock watering any more, it’s a vital ingredient to the property’s increase in overall biodiversity.”

Stream health and wildlife

Assessment of streams, creeks, and riparian lands in most catchments shows that in-stream health has suffered as a result of past land and water management practices. Land, Water & Wool research into gully erosion in NSW recently found that a 50-millimetre rainfall event can send 75 tonnes of suspended sediment, 15 megalitres of discharge (water flow), 20 kilograms of phosphorus and 75 kilograms of nitrogen through a single farm gully within hours. The following management approaches will assist in improving in-stream health and wildlife on wool-growing properties.

- All streams and wetlands, including gullies that run only intermittently, can be mapped onto the property plan. Ensure that natural riparian vegetation is kept in these areas during farm or paddock development. The aim is to retain full natural shade along the stream for reduced water temperature and light levels. A 25 metre wide strip will usually be sufficient to ensure that tall trees can survive through natural regeneration. Where the natural riparian vegetation has been disturbed and the canopy opened up, replanting can be used to regain natural shade levels, and should include shrubs, grasses and reeds as well as trees.
- When rehabilitating a stretch of stream, visit undeveloped and natural areas in the local district, and compare the mix of riparian vegetation there with what is present on the farm. For smaller streams, up to 10 metres wide and oriented east-west, the northern bank is particularly important for vegetation retention or replanting, as it will provide the maximum amount of shade for the stream.
- Local Waterwatch groups can assist with regular water quality and stream health monitoring so that changes over time can be tracked in streams, creeks and wetlands.

- Keep fallen timber in streams so that it can provide habitat for in-stream life. In situations where large pieces of wood are present in the channel, these can be dragged back against the banks at an angle of 40°, where they have little effect in diverting water flow onto the banks.
- Make sure works on streams, e.g. for diversions or pumping stations, are approved or licensed by the relevant agency. The siting and design of these structures must take into account potential consequences on riverine systems.

Protecting, maintaining and restoring riparian land will be of most benefit to wildlife when both the total size and its links with other natural areas are maximised. For example, on stream meander bends it may be cheaper to fence out the whole bend than to attempt to follow the bank curves, this can also provide valuable wildlife habitat. Consider the specific requirements of the in-stream and land based species being catered for when planning revegetation. Diversity in replanting is important as it allows different species to use the same area. Advice from plant and animal experts will assist in developing a riparian management plan for wildlife.

Is management working?

Before implementing management changes, it is good to assess the health of your riparian area to know what needs to be improved and where to start. Different assessment methods are available to evaluate riparian areas, and Land, Water & Wool has developed a 'woolgrower checklist' that will give an overall assessment of the condition of riparian areas. If a more detailed assessment is needed, a Rapid Assessment of Riparian Condition (RARC) method is available from the Land, Water & Wool website (www.landwaterwool.gov.au).

Land, Water & Wool River Management Guides

Land, Water & Wool is a joint initiative of Australian Wool Innovation Limited and Land & Water Australia. It is an integrated natural resources management program that focuses on issues associated with sustainable wool production. For more information visit our website — www.landwaterwool.gov.au

Land, Water & Wool has produced two 'River Guides', one for the High Rainfall Zone (600 mm or more annual rainfall) and one for the Sheep/Wheat Zone (300–600 mm). If you would like the more detailed version it is available from www.landwaterwool.gov.au and www.rivers.gov.au, or in hard copy from CanPrint Communications — Freecall 1800 776 616.

