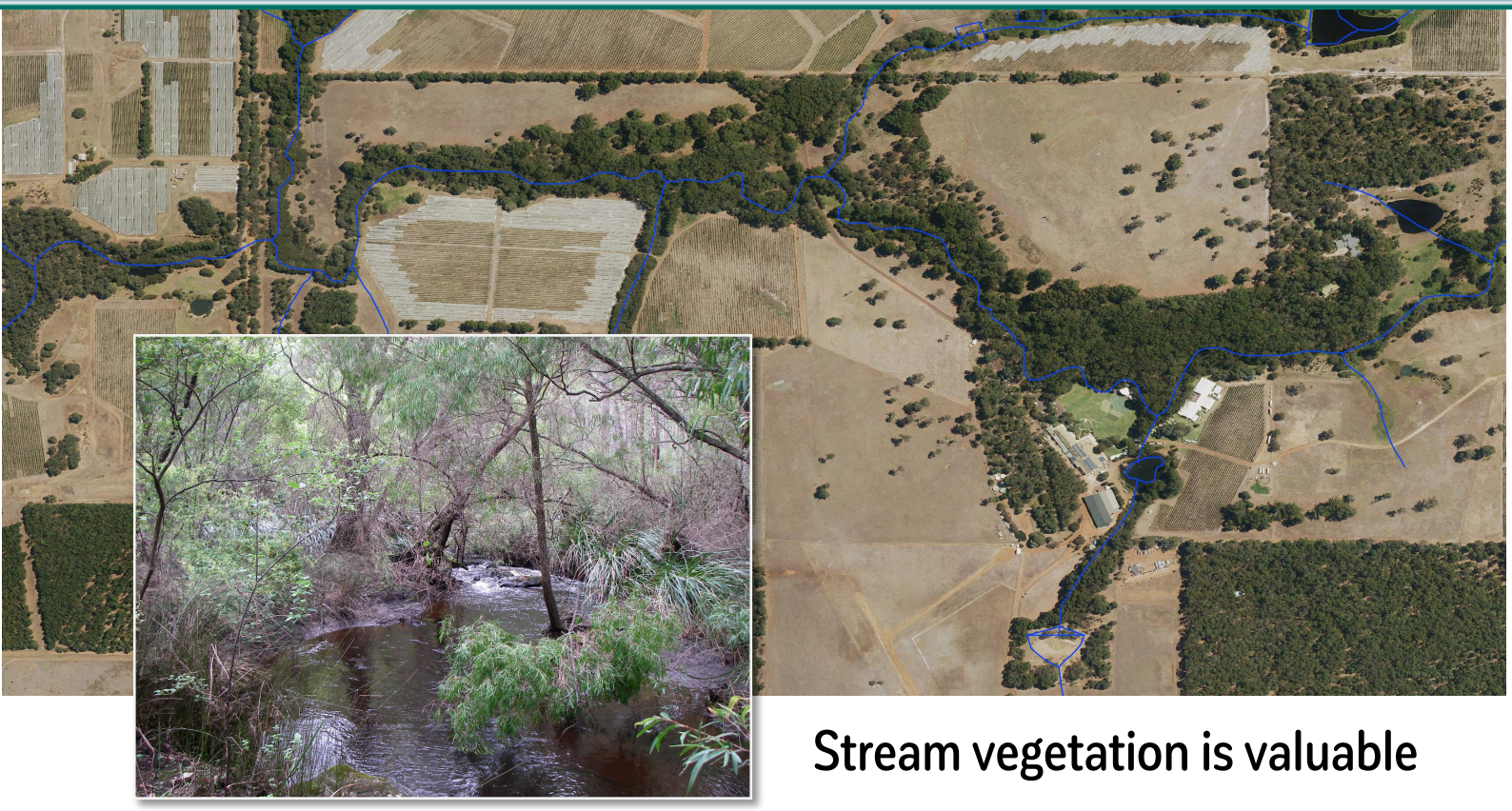
MANAGING STREAMS AND WETLANDS

Nature Conservation Information Sheet



Stream vegetation is valuable

Rivers, streams and wetlands have an important drainage function and support a wide range of unique and wonderful plants and animals. Unfortunately they face many threats in a cleared and modified environment. In this Information Sheet we outline actions you can take to protect and restore your valuable wet areas.

An important principle for management of streams and wetlands is:

- ✓ conserve the best areas first;
- ✓ move on to those areas showing signs of recovery; and
- ✓ then treat the more degraded parts of the system.

Following this principle will save you money, time and effort, and increase your chances of success.

Riparian vegetation

The rich soils associated with a stream valley support a diverse suite of plants including trees, shrubs, sedges and rushes. **This riparian vegetation has many values and its importance in maintaining healthy streams and wetlands cannot be overemphasised.**

Riparian vegetation slows the water, holds the banks together and reduces erosion. It collects sediment and nutrients and protects water quality. It shades the water and keeps water temperature low, reducing the risk of algal growth and maintaining suitable conditions for aquatic fauna. The leaf litter, woody debris and insects from riparian vegetation provide food and habitat resources for many animals, and riparian vegetation often provides a corridor linking remnant vegetation in the landscape.

Management issues and actions

Stock access

Unrestricted stock access causes vegetation damage through grazing, trampling, the introduction and spread of weeds, ringbarking, trunk damage, erosion and soil compaction. Stock also negatively impact on water quality.

The control of livestock access is the most important management tool in the protection and restoration of streams and wetlands, and fencing is the best method to achieve this. Include as much of the wet area in the fence as you can allow. A broad area of riparian vegetation will be more resilient and provide better habitat. It will be less susceptible to vegetation loss from wind, insect damage and tree decline. Fencing will also be less expensive without the need for many strainer posts at stream meander points.

Fencing and control of stock access may lead to an increase in weeds and weed control may be required for a few years to assist natural regeneration. Keep a close eye on the area and control invasive weeds early before they become widespread and established.

The provision of off-site or restricted stock watering points may be required if stock previously accessed the area for water. See http://www.water.wa.gov.au/water-topics/waterways/managing-our-waterways2/water-notes for Water Note 7: Livestock management: watering points and pumps.

Fire management

Riparian vegetation does not respond well to fire. Native vegetation will be slow to recover and the burnt area will provide an ideal environment for weeds which will often grow rapidly resulting in an increased fire hazard and degraded native vegetation community.

If possible, streams and wetlands should not be burnt. If these systems are within remnant vegetation, try and leave them unburnt by burning out from their edge towards surrounding upland vegetation. Excluding controlled burns from these fire sensitive vegetation communities however, needs to be balanced against any damage that would be caused by the need to create a fire break or access track to enable the burn to be contained.

Environmental weeds

Weeds grow well in wet areas where soils are rich and there is plenty of water. Disturbance from clearing, grazing, erosion and modification of the stream channel intensifies weed growth and spread. Weed control principles to keep in mind in regard to wet areas include:

- Weeds thrive in disturbed areas and areas of bare ground.
- If weed control is carried out, revegetate to prevent further weed invasion in the bare soil.
- Aggressive perennial weeds that spread rapidly are the highest priority for control, for example, blackberry, arum lily, watsonia, African cornflag, Sydney golden wattle, sweet pittosporum, giant reed, blackwood, olives and figs. Tree ferns and batswing fern are increasingly common on streams in the region and are also priority for control.
- Removal or control of weeds in riparian areas needs to consider the potential for erosion after weed control.
- Some native plants look and act like weeds. Do not begin weed control until you are sure a plant is a weed.
- Chemical control of weeds in wet areas requires careful consideration and careful application. It is important to consider the effects of the herbicide on native flora and fauna, and on water quality. If you decide to use a herbicide, choose one that has a modified surfactant to reduce impact in wet areas
- Never spray directly over a waterbody. When you are working near the edge of a waterbody, direct the spray away from the waterbody where possible. Spray only to the extent of covering foliage with droplets. Spray when weather is calm; strong winds may carry herbicide drift into waterbodies. Use a flat fan nozzle and a low pump/spray

pressure to reduce the likelihood of spray drift. Do not spray when rainfall is forecast within four hours as herbicide can be washed off the pest plant into aquatic ecosystems.

For more information see Nature Conservation Information Sheets: *Managing Environmental Weeds* and Nature Conservation Information Sheet: *Arum Lily Control*

Erosion and sedimentation

Stock access and loss of vegetation often result in bank erosion. Sediment from erosion and from the surrounding cleared catchment flows in to the stream and accumulates in pools and other areas. Erosion results in further vegetation loss as trees and large shrubs are undermined and fall in to the stream channel.

Strategies for controlling erosion include control of stock access, allowing grasses to colonise to provide bank stability, revegetation with native species and/or construction of riffles to slow water velocity.

For detailed information go to Stream Stabilisation at http://www.water.wa.gov.au/water-topics/waterways/managing-our-waterways2/river-restoration-manual

Introduced animals

The control of rabbits, foxes and cats is recommended to protect vegetation and native wildlife. For further information go to https://www.agric.wa.gov.au/pests-weeds-diseases/pests/pest-animals and Nature Conservation Information Sheet: *Fox Control* .

Assisted natural regeneration

In areas that still retain native trees and understorey, assisting natural regeneration is the cheapest and easiest revegetation option. Control of stock access to the area is essential. Judicious control of weeds to allow native seed to germinate and seedlings to grow will also be necessary.

Regeneration can be assisted using brushing which involves laying seed bearing parts of appropriate local native species on the ground in the fenced area, allowing seeds to fall from them. Species suitable for this technique are those that retain seed on the plant, but shed it when the plant dries out. This includes many of the myrtaceous species (peppermints, tea trees, *Melaleucas* and *Eucalypts*). Brushing is easy to combine with other revegetation techniques such as direct seeding and planting tubestock, and provides shelter to seedlings, increasing seedling survival rates.

Revegetation

Areas that have been more heavily grazed and cleared generally contain more weeds and have a diminished seed bank. Options to re-establish vegetation in these areas include: direct seeding, brushing, planting tubestock, dividing and transplanting rushes and sedges. The riparian zone should be planted in a wide band with a diverse range of species. This not only improves the habitat value, but also provides a matrix of different root structures that will improve bank stability and assist erosion control.

Revegetation projects require planning and organisation. Plants need to be ordered in the summer before winter planting and site preparation will be required prior to planting.

Weed control before and after revegetation is crucial to success. Control of perennial grasses may be best undertaken in late summer prior to autumn/winter planting.

Plant selection and planting density. To maximise ecological benefits revegetation should include all layers - trees, shrubs, herbs (non-woody plants), groundcovers, rushes and sedges. A common mistake is to plant too many trees and too few understorey plants. When planting try and mimic natural areas. A rule of thumb is a planting ratio of 1 tree to 10 shrubs/herbs plus rushes and sedges. Plant many more rushes than the number of shrubs (as these need to be planted in groups of 5-6 seedlings per m² to allow them to establish). With the larger sedges such as *Lepidosperma* spp. include a similar number to shrubs/herbs in the mix. Suggested planting densities are included in Table 1.

Table 1: Suggested planting densities for revegetation	
Type of plant	Planting density
Trees	1 tree/3-5 m²
Shrubs	1 shrub/m²
Herbs such as *Conostylis* & *Patersonia*	4 plants/m²
Rushes	5-6 rushes /m²
Large sedges such as *Lepidosperma* spp	1 sedge/ 2 m²

A list of plants suitable for revegetating streams, dams and wetlands is included in Nature Conservation Information Sheet: *Revegetation with Local Natives*

Division and transplanting of rushes and sedges. Many rushes and sedges propagate very well by vegetative division – plants can be split into individual plants every two months or so under good condition. An appropriate easily accessible wet site can provide a good nursery area for propagation of rushes and sedges.

Planting. Rushes and sedges should be planted in spring when the water table is beginning to fall and the soil is still moist. Other seedlings should be planted when the soil is moist and follow up rain is likely (usually May to July).

Aim to get the seedlings in the ground with the minimum disturbance. Before planting, seedlings should be well watered. Damage to roots should be avoided at planting. However, if seedlings are root bound excessive root growth should be removed prior to planting. Root-bound seedlings will die or suffer reduced growth if left untreated. Seedlings should be firmly planted in so they cannot be lifted out by their foliage and there are no air pockets around the seedlings. Rain in the days following planting will benefit survival and vigour. If no rain is expected shortly after planting an initial watering-in is recommended to settle soil around the roots and minimise stress.

Post-planting maintenance. Plants will often need to be protected from rabbits and kangaroos with tree bags or fencing. On-going weed control is important to reduce competition and will be needed for some years after planting.

References and further information

EPA South Australia (2007) *Safe and effective herbicide use: A handbook for near-water applications*. Environmental Protection Authority, Adelaide, SA

Detailed information on management of streams and wetlands at:
http://www.water.wa.gov.au/water-topics/waterways/managing-our-waterways2/river-restoration-manual

Pen, L.J. (1999) *Managing Our Rivers*. Water and Rivers Commission, East Perth, Western Australia.

Australian Government | National Landcare Program

This Information Sheet is funded by the Australian Government's National Landcare Program