

Berri Barmera Local Action Planning

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Revegetation & Vegetation Guidelines



A healthy river - sustainable use

Mannum to Wellington Local
Action Planning Committee Inc.

Berri Barmera Revegetation and Vegetation Guidelines



Berri Barmera Local Action
Planning Committee Inc.



PRIMARY INDUSTRIES
AND RESOURCES SA



Mannum to Wellington Local
Action Planning Committee Inc.



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HOW TO USE THESE GUIDELINES

Throughout the guidelines there are four zones referred to within the Berri Barmera LAP area. These are colour coded and work plans can be found according to the associated colour.

Zone No.	Zone	Colour coding	Work plans Page No.
1	Riparian / wetland	Blue	21 & 22
2	Floodplains / wetlands	Green	23 - 26
3	River slope / Cliff face	Lilac	27 - 29
4	Highland	Yellow	30 - 32

STEP 1. - IDENTIFYING YOUR ZONE part 1

Using the cross section drawing of the Berri Barmera LAP region (page 16) you can easily identify the zone in which you would like to revegetate.

STEP 2. - IDENTIFYING YOUR ZONE part 2

Once you have pin pointed which one of the four zones you are in, open the appropriate A3 page on pages 17 to 20. This page will assist you with pictures and examples of the land management issues and revegetation opportunities that you might consider appropriate for your property.

STEP 3. - PLANNING

Go to Chapter 3, page 7 and read the relevant page/s on the zone you have selected to undertake work. This will assist you identifying issues and benefits that you may not have considered in step 2.

STEP 4. - WORK PLANS

Using the colour coding refer to the relevant work plans in Chapter 6. Eg If you have decided that you want to commence with the River slope / Cliff face and you have sand dunes go to Chapter 6.3.2 on page 28 which is in the lilac section of the guidelines. Pages 33- 34 provide you with more detail on weed control and timing of seed collection.

STEP 5. - REVEGETATION PRINCIPLES

Read Chapter 4 as this information is extremely useful and will assist you in identifying any further considerations you may need to successfully implement your work plans.

STEP 6 - USING REVEGETATION SUPPORT MATERIAL

Chapter 7, page 35 is a chart outlining the process for funding and assistance. Chapter 8, from page 36 provides you with a list of available resources.

- 1) The 'Revegetation Information Booklet' provides you with contact details of contractors and suppliers such as seed merchants, nurseries, direct seeding contractors, labour for tubestock planting. See the project officer for a copy if you do not have one.
- 2) Fact sheets providing more detail for every activity within each of the four zones. Individual fact sheets are available upon request.

1. INTRODUCTION

These guidelines have been adapted with permission, from the original document "Revegetation and Vegetation Guidelines - Mannum to Wellington LAP" January 2001. The Mannum to Wellington guidelines were developed, in consultation with local land managers and local interest groups or individuals, as a tool to assist in the planning and implementation of revegetation.

This set of guidelines has been developed in conjunction with the local Berri Barmera Local Action Planning (LAP) project officer and study of the LAP area building upon existing local plans.

These guidelines provide landholders with the opportunity to make sound decisions for revegetation and vegetation management by:

- **demonstrating how revegetation can easily fit, benefit and enhance their current work practises.**
- **providing detailed steps and a timeline on how to implement the revegetation program.**
- **providing information and procedures for each of the necessary activities.**

2. BACKGROUND

STUDY AREA

The Berri Barmera Local Action Plan area concentrates on issues, which have a specific impact on the River Murray in the North of the River Murray between Lyrup Ferry and Overland Corner. (Refer to the Berri Barmera Local Action Plan)

In 1999, the Berri Barmera LAP Committee developed a Local Revegetation Plan to address a range of natural resource management and environmental issues through strategic revegetation of the local area. To assist in the implementation of this plan the committee commissioned PIRSA Rural Solutions to develop these guidelines.

- The objective of the revegetation and vegetation guidelines is to set out clear guidelines for all possible revegetation and vegetation management projects within the Berri Barmera Local Action Planning area. These guidelines are consistent with the Berri Barmera Incentive Program options and are based on technically sound, practical and easy to use techniques. The goal of this report is that land managers find it easy and attractive to use.

3. PLANNING

The Berri Barmera Local Action planning area can be divided into four main revegetation zones

Zone 1 - Riparian

Zone 2 - Floodplain / Wetlands

Zone 3 - River slope / Cliff face

Zone 4 - Highland (irrigated and non irrigated)

3.1 REVEGETATION DESIGN

There are many reasons for revegetation and vegetation management, too many to list. However, it is important that some of the basics are considered including; assisting with soil management by reducing water run off and wind erosion, water management from irrigation by reducing evaporation and wind speed across crops, vegetation linkages, protection of native vegetation and assisting with biodiversity. Revegetation can also assist in wind and frost considerations, the use of recycled water, changing paddock design to improve production outcomes, industry quality assurance, salinity reduction, community image, resale value of your assets, overall aesthetics, business confidence, new business opportunities and greenhouse issues.

Appropriate layout planning of the property and area is extremely important if the challenges of sustainable land use are to be realised.

Riparian - Zone 1

The riparian areas include the area fronting the Murray River.

ISSUES TO CONSIDER in designing revegetation in this zone.

- Land tenure will need to be determined prior to any revegetation works.
- Consider discharge from highland zone when selecting species for revegetation.
- Removal of willows and Athel pines and replacement with local native shrub species requires technical assistance and careful management.
- Impacts of tourism with joint usage of the riverbanks.
- Spot spray areas for revegetation near water using Glyphosate bioactive.
- Vermin control will assist regeneration of native vegetation and will be required prior to any revegetation.

BENEFITS in revegetation design include:

1. Encouraging local native species to naturally regenerate provides competition to weeds and inhibits infestations over time. Natural regeneration of local species also minimises the spread of weeds.
2. Controlling erosion along main trunk of river.
3. Improving River Murray water quality by encouraging natural filtration using reeds, rushes and sedges and through the exclusion of livestock from riparian areas.
4. Increasing habitat for local fauna and flora.
5. Improving the biodiversity of the areas by linking or expanding existing vegetation.

Floodplain / Wetlands - Zone 2

The floodplain / wetlands have areas that are saline, influenced by ground water movement. These areas flood intermittently.

ISSUES TO CONSIDER in designing revegetation in this zone.

- As an alternative to livestock grazing on degraded sites.
- The value of lignums, samphire or atriplex to the overall rehabilitation of the site.
- Inability to successfully revegetate large saline areas in one year. (Some form of soil works and disturbance maybe required prior to the establishment of vegetation. Generally, these sites are the most difficult sites to establish woody vegetation types.)
- Quality and size of seedlings planted.
- Pre-site works and timing of operations.
- Mounding of saline sites.
- Minimising the disturbance of native vegetation when mounding and moving equipment.
- Species selection and seed availability.
- Use of drainage waste water, removal and reuse in revegetation or forestry.
- Vermin control will assist regeneration of native vegetation and will be required prior to any revegetation.
- Severity of salinity will determine management with revegetation and/or engineering works.

BENEFITS in revegetation design include:

1. Increasing the commercial value of the property by improving the aesthetics.
2. Portraying to others within the community that you are a responsible land manager.
3. Greenhouse benefits.
4. Potential timber and woodlot plantings, reducing drainage water or reducing seepage.
5. Improving River Murray water quality by encouraging natural filtration using reeds, rushes and sedges and through the management of livestock with fencing.
6. Improving the biodiversity of the areas by linking or expanding existing vegetation.

River slope / Cliff face - Zone 3

River slope / Cliff face sites are from the edge of flood-plain to top of slope. They may be used for horticultural pursuits.

ISSUES TO CONSIDER in designing revegetation in this zone.

- Extra irrigation of water or by reuse of drainage water during summer is useful.
- Species selections appropriate for the site and horticultural use.

BENEFITS in revegetation design include:

1. Minimising seepage onto Zones 1 & 2.
2. Soil erosion reduction.
3. Increasing the commercial value of the property by improving the aesthetics.
4. Increasing crop production through the provision of shelter.
5. Supplementary income by growing firewood.
6. Improving the biodiversity of the areas by linking or expanding existing vegetation.
7. Involvement in greenhouse plantings.

Highland (irrigated and non irrigated) - Zone 4

The highland zone is that area above the cliff face but may include low-lying areas, which may be affected by salinity.

It is generally used for irrigated fruit trees and vines. The area includes some good examples of native vegetation.

ISSUES TO CONSIDER in designing revegetation in this zone.

- Speaking with appropriate authorities including local council if revegetating on roadsides and ETSA when planting near power lines.
- Use of appropriate species in single row windbreaks for irrigated horticulture.
- Species selection and bird issues in horticultural and viticulture blocks.
- Weed management of large areas of revegetation.
- Direct seeding versus seedling planting for large-scale plantings.
- Plant interception belts (long strips of vegetation) to capture surface water and blocks of vegetation for discharge.

BENEFITS in revegetation design include:

1. Increasing crop production through the provision of shelter during harsh times of the year.
2. Protecting irrigated horticultural crops will increase productivity and improve quality of the produce.
3. Reduction in localised and regional groundwater movement means less impact of saline waters to low lying areas and the river.
4. Improving the biodiversity of the highland areas by protecting, linking or expanding existing vegetation.
5. Involvement in greenhouse plantings.
6. Reduction of drainage water / seepage.

4. REVEGETATION

A successful revegetation program is best planned at least 18 months in advance. This planning is vital for vermin, weed control or soil mounding. In some cases long stemmed tubestock or 5 inch (13cm) potted specimens maybe required which will take at least 18 months for suitable seedlings to be grown ready for planting.

EXISTING NATIVE VEGETATION

In some cases it was obvious that within the Berri Barmera area, levels of native grasses, herbs, reeds, rushes, sedges, saltbush and samphire were plentiful. What was really missing was the middle and overstorey species. Soil disturbance by people and livestock and salinity caused by irrigation has caused a loss of these valuable species. Another reason for the decline of the middle and overstorey species is that these plants die of natural causes and very few are replaced. The young seedlings as they germinate are eaten by hares and rabbits or the environment has been modified so much that germination and survival is difficult.

Most of these riparian areas have been highly modified and are deteriorating from continued misuse, increased dryland salinity or salinity as a result of irrigation. Therefore, the restoration program, which might include mounding, will occur up to 3 years prior to any replanting.

4.1 BEST PRACTICE IN REVEGETATION

- Plan the project well by investing in a property layout plan and an action plan.
- Order any trees or collect seeds and required materials 18 months in advance.
- Control woody weeds well in advance.
- Give high priority to the control of rabbits and hares.
- Prepare the site well and at the appropriate time.
- The sites will require protection from livestock. Make sure the fence is suitable to do the job.
- Only plant the most suitable species for the site. Remembering natural regeneration of smaller ground cover or shrub species is highly likely.
- Use the most suitable local indigenous plant species where possible.
- Grow seedlings from locally sourced seed or cutting materials.
- Follow-up by re-planting any gaps in the following year.
- Commitment is required to achieve results.
- Seek professional assistance if unsure about the best action to achieve results.
- Highly saline sites will require technical review.

4.2 SPECIES SELECTION

Natural regeneration and Biodiversity

Natural regeneration is the cycle of replacement of old and ageing trees by the germination of self-sown seedlings and saplings. Natural regeneration is a recognised form of revegetation, which compliments other revegetation activities. Revegetation species are often selected due to ease of seed collection or propagation. Some smaller ground cover or shrub species are often not included due to seed viability. Seed may remain in the ground for many years and given time with stock exclusion, weed and vermin control and the right weather conditions may naturally regenerate.

PIRSA Rural Solutions acknowledges the following definition of Biodiversity and where ever possible recommends that revegetation projects should not compromise the biodiversity of any site.

Definition of biological diversity

Biological diversity (also known as biodiversity) means the variety of life forms: the different plants, animals and micro-organisms, the genes they contain, and the ecosystems they form. It is usually considered at four levels: genetic diversity, species diversity, ecosystem diversity and community diversity. (Australian Natural Heritage Charter - 1999)

Principles¹

Biodiversity is considered essential to:

- Maintain the health and function of the environment
- For agricultural productivity, social and cultural well being
- For ecologically sustainable use of natural resources.

The four principles of biodiversity conservation outlined by Possingham (1996) are:

1. A comprehensive and representative network of natural areas. This principle dictates that those habitat types, which have been preferentially altered, are the highest priority of restoration and revegetation.
2. A focus on threatened species, with highest priority for species of national, state and then regional significance.
3. A coordinated approach to the management of threatening processes.
4. A strategic vision of subregions where diverse ecosystems can evolve and function in a relatively undisturbed fashion.

Within the Berri Barmera LAP area many of the smaller herbaceous species remain as discreet plant communities. There is a need to concentrate on revegetating middle and overstorey species during and after it is highly likely that other smaller local species will naturally colonise the site.

In areas of extreme environmental modification eg hyper saline conditions within the LAP area, the use of non-local species may be recommended. The use of non-local species should be limited only to those sites which have been visited and reviewed by a qualified person.

4.3 ESTABLISHMENT TECHNIQUES

There are four main ways to revegetate areas within the Berri Barmera LAP. They are:

- natural regeneration
- seedling planting
- hand direct seeding
- and machine direct seeding.

In many circumstances, a combination of all of these processes will be used.

¹ From Murray Plains District Soil Conservation Board District Plan Review 2000. Section 2 chapter 12.

NATURAL REGENERATION

As earlier stated many of the native grasses, herbs, reeds, rushes, sedges, saltbushes and samphires are plentiful and will establish naturally in areas where they are void. Natural regeneration is the easiest way to establish large areas of native plant species provided a seed source is available. The control of weeds, vermin, livestock and people is essential for success.

DIRECT SEEDING

Direct seeding is a very good way to revegetate large and long areas on the highland or along roadsides. It relies on winter rainfall after seeding to guarantee success. Direct seeding is quick, easy and effective but does require a considerable amount of local seed. This seed should be collected during the spring / summer of the year prior to establishment.

HAND SEEDING

Hand seeding complements all other ways of establishing vegetation. As with seedling planting the operator has control over the placement of species. This may be necessary in difficult to access sites especially on the very steep cliff faces. With hand seeding, the seed is directly placed by hand on to a prepared soil bed. Direct seeding heavily relies on enough rainfall during June / July for germination.

TUBESTOCK

The use of tubestock or seedlings is traditionally the most preferred method of establishing vegetation. Selecting the best species for the site is vitally important. Seedlings can be grown from locally collected seed or by cuttings. In doing so, the more vital species in riparian restoration may be successfully planted.

A large percentage of the Berri Barmera revegetation will occur through planting seedlings and not direct seeding due to the location (river flats, saline wetlands and river slope / cliff faces).

It is recommended that tubestock planted into very wet or highly saline sites should be grown in large containers and be up to 18 months old, leaving the traditional sized plants and tubes (often 4 -6 months of age) for planting on the River slope / Cliff face and highland.

4.4 WEED CONTROL

Managing weeds prior to revegetation is essential for the success of the project especially on the highland irrigated areas. Weed control on the saline areas is usually not required prior to establishment of seedling.

If the site is sprayed, care must be taken so that increased soil erosion does not occur directly after spraying or that existing native species are not destroyed at the time of spraying. Spot spraying is the best method for revegetation activities where seedlings are planted.

Willows are common in this part of the river and their control along with other woody species such as boxthorn and Athel pine is recommended prior to revegetation.

4.5 TIMING OF REVEGETATION

Within most of this area revegetation should occur after the opening rains and after such time that good weed control can be provided usually in May, June or July. If revegetation is not

completed in this area by the end of July each year, it is suggested the projects be placed on hold until the following year.

4.6 VERMIN CONTROL

Successful revegetation will also rely on land managers' ability to control rabbits and hares. Control of rabbits and hares should occur in the spring/summer prior to any revegetation. Species selected for revegetation may require careful consideration if rabbits and hares are seen to be a problem within the zone and in some instances, the use of tree guards may be necessary.

4.7 MINIMISING WEED INFESTATIONS

Prior to any contractors undertaking work on your property, machinery should be thoroughly cleaned to reduce the spread of weeds. After completion of projects on site, all equipment should be cleaned prior to leaving the property.

4.8 IRRIGATED SEEPAGE SITES

It is important to recognise that planting of Eucalypt species at irrigated discharge sites will generally not be successful. Although Eucalypts will grow here for the first few years, excess salt build up will accumulate around the root zone causing death.

Best species planted here will be melaleucas, however each site is different. They should be technically considered prior to any works taking place. Mass planting is generally required to have any real effect at these sites.

4.9 SALINE GROUND

Soil mounding (to 30cm high) is important on sites that are saline or waterlogged to assist with drainage and leaching salts from the soil profile. It is important that this task is carried out when the soil is workable, generally during early summer. It is also recommended that these sites are allowed up to 3 years grace prior to establishing woody vegetation on them and the regeneration of samphire on the mounds is encouraged to reduce surface soil salinity.

Seedlings planted on top of the mounds should be well developed, often 18 months old and planted from containers 13cm (5 inches) in diameter. Seedlings when planted must be well watered in with fresh water.

The use of a mulching product around seedlings planted on saline ground is valuable if available. Dripper irrigation will also assist with plant establishment in the early years but not essential.

4.10 FENCING

Generally, electric fencing will provide adequate control for livestock around revegetation sites or to protect existing native vegetation. The design and number of plain wires required will change from site to site. Consideration of native wildlife movement needs to be part incorporated in the final design. This information should be discussed with your local technical field officer prior to establishing a funding agreement with the Berri Barmera LAP.

4.11 ROADSIDE OR DISUSED ROAD PLANTING

Roadside revegetation is important for the overall aesthetics and biodiversity needs of the district. By establishing vegetation on roadsides, it is possible to also provide necessary wind protection for livestock and crops. The use of local native species on roadsides is recommended.

Prior to establishing any revegetation on roadsides or disused roads, it is important to:

- Seek permission from local government to avoid conflicts in the future over the locations and style of revegetation.
- Talk with local landowners to avoid livestock damage by stock movement along the sides of the roads.
- Discuss with service providers such as Telstra location of lines. (Only required if a known service provider maybe involved)
- Seek approvals to collect local seeds for direct seeding purposes.

4.12 WINDBREAKS FOR HORTICULTURE

Single row windbreaks have been known for years to assist with quality and quantity productivity of many horticultural crops. Often species selection has been difficult in these circumstances due to the lack of available lands for the windbreak, root competition to crops or a perceived issue with birds. Local native species that should be assessed and used in windbreaks in this area include *Myoporum platycarpum* (False sandalwood), *Eucalyptus largiflorens* (River box), *Melaleuca lanceolata* (Dryland tea-tree) and *Allocasuarina verticillata* (Drooping sheoak).

Revegetation on horticulture blocks need not be restricted to single rows. There are considerable opportunities where suitable revegetation and vegetation protection can occur. It is important to incorporate revegetation into the design of horticultural blocks as early as possible.

Blocks or strips of vegetation if large enough may have influence over irrigated ground water movement and reduce the impact of ground water movement towards the River Murray or saline basin discharge areas.

4.13 OVERHEAD IRRIGATION

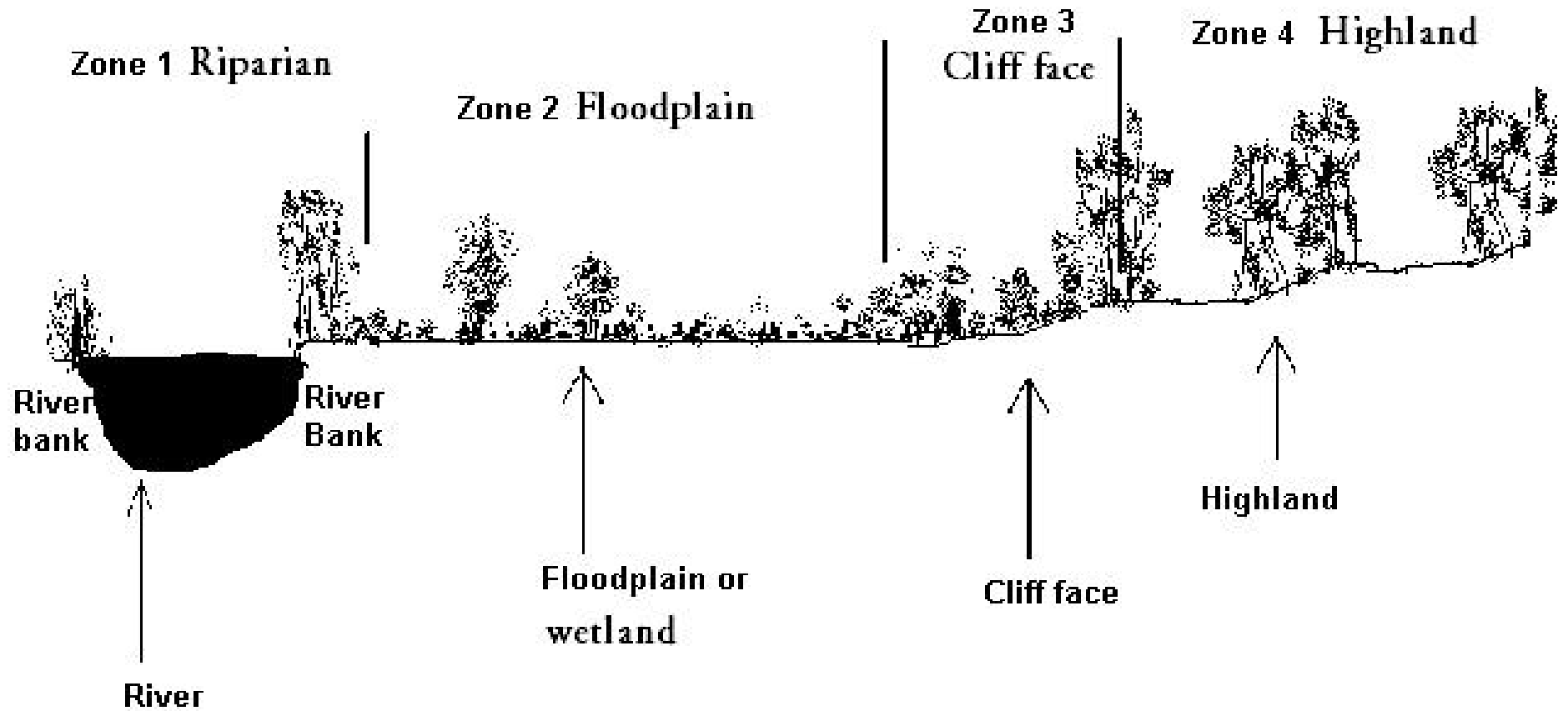
If pivot irrigation is used the four corners/sides of the pivot are sensible localities for revegetation. This form of revegetation will assist in wind and water management and provide shade and shelter for farm animals and people.

4.14 CULTURAL SIGNIFICANT SITES

Under the Aboriginal Heritage Act 1988 it is an offence to knowingly remove, disturb or interfere with any Aboriginal sites, objects or remains. Finds or evidence of such sites are to be reported to the Department of State Aboriginal Affairs - 8226 8900.

Activities where disturbance is likely to occur where Aboriginal sites are known to exist, should not proceed without advice from the Aboriginal Heritage Department.

5.1 Cross section of Berri Barmera LAP region



5. Identifying Your Zone

5.2 RIPARIAN / WETLAND - ZONE 1

Zone area	Description - land use	Soil types found
Zone 1 – Riparian/Wetland Includes: <ul style="list-style-type: none"> River bank, Islands, Estuary's Channels 	<ul style="list-style-type: none"> Immediately alongside watercourse including riverbank. Wetlands and samphire swamps. Recreation 	<ul style="list-style-type: none"> Sand from fine to coarse texture, may incorporate clay. Cracking Clay Saline



Photos: Clockwise from top left hand corner are:

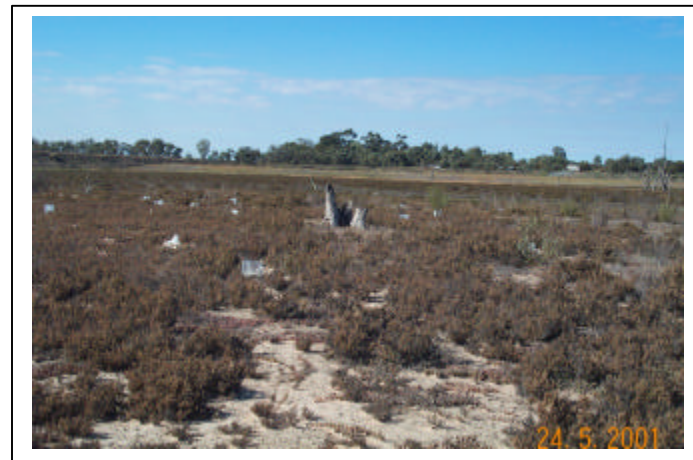
- Riparian wetland
- River bank
- Edge of Lake Bonney
- Drainage / Discharge Basin
- Willows along River

Land management issues	Existing vegetation	Revegetation opportunities
<ul style="list-style-type: none"> Grazing animals including rabbits Recreational activities Weeds – willows Minor river bank slumping Dryland salinity and irrigation induced salinity 	Natural vegetation encompasses two ecological boundaries. First is between the watercourse and the vegetation, providing a direct link with the terrestrial (land) and aquatic environment. The second is between the riparian vegetation and the various habitats contained within the surrounding catchment. Expected species to be found reedbeds – <i>Typha domingensis</i> , <i>Phragmites australis</i> , <i>Triglochin procerum</i> , <i>Eucalyptus camaldulensis</i> , <i>Eucalyptus largiflorens</i> <i>Muehlenbeckia</i> sp. <i>Acacia stenophylla</i> .	Removal of pests, weeds and animals will greatly enhance the overall diversity of vegetation species. Natural regeneration is the key to biodiversity revegetation outcomes. Use of local native shrub species along riverbanks will assist any erosion control requirements if willows are removed.

5. Identifying Your Zone

5.3 FLOODPLAIN / SWAMP - ZONE 2

Zone area	Description - land use	Soil types found
Zone 2 – Floodplain/ Swamps <ul style="list-style-type: none"> • Non-saline floodplain • Saline swamps 	<ul style="list-style-type: none"> • Biodiversity issues • Recreational • Minor livestock grazing 	<ul style="list-style-type: none"> • Cracking Clay • Saline • Sand over clay



Photos: Clockwise from top left hand corner are:

1. Floodplain near Berri
2. Floodplain - Natural regeneration
3. Saline swamp -Natural regeneration
4. Invasive pest plants
5. Saline swamp

Land management issues	Existing vegetation	Revegetation opportunities
<ul style="list-style-type: none"> • Non-productive grazing land. • Recreational activities • Woody weeds – Athel pines • Large areas of saline soil covered with samphire. • Vermin eg rabbits 	<p>Good pockets of remnant vegetation. Depending on land use some ground cover and low shrub species may be found such as <i>Atriplex</i> sp., <i>Chenopod</i> sp., <i>Cyperus</i> sp., <i>Enchylaena tomentosa</i>, <i>Halosarcia</i> sp., <i>Maireana</i> sp., <i>Muehlenbeckia</i> sp., <i>Rhagodia</i> sp., <i>Sarcocornia</i> sp., <i>Eucalyptus largiflorens</i>, <i>Atriplex</i> sp etc</p>	<p>Assist with enhancement of existing remnant vegetation. Increased revegetation using local native species. Assistance in controlling ground water issues. Recreational activities.</p>

5. Identifying Your Zone

5.4 RIVER FACING SLOPE / CLIFF FACE - ZONE 3

Zone area	Description - land use	Soil types found
Zone 3 - Cliff Face <ul style="list-style-type: none"> Sloping towards river Between highland and Floodplain 	<ul style="list-style-type: none"> Horticulture on gentle slopes Varying from steep to shallow gradients. 	<ul style="list-style-type: none"> Very sandy soils. Saline/water logged in some cases Dry limestone rocky outcrops.



Photos: Clockwise from top left hand corner are:

- Gentle sloping cliff face - Horticulture
- Looking towards water discharge lagoon
- Saline slope near lake Bonney
- Dry sandy soil - Around Lake Bonney
- Dry sandy soil - Around Lake Bonney

Land management issues	Existing vegetation	Revegetation opportunities
<ul style="list-style-type: none"> Horticultural uses Irrigation & water influence Non-productive grazing land. Recreation Native Vegetation / Biodiversity 	Some remaining remnants such as <i>Acacia ligulata</i> , <i>Pittosporum platycarpum</i> , <i>Callitris gracilis</i> , <i>Senna artemisioides</i> , <i>Eucalyptus porosa</i> , <i>Eucalyptus largiflorens</i> , <i>Eucalyptus socialis</i> , <i>Atriplex semibaccata</i> , <i>Enchylaena tomentosa</i> , <i>Maireana</i> sp., <i>Muehlenbeckia</i> sp., <i>Nitraria billardierei</i> , <i>Atriplex</i> sp	The use of local native to link existing vegetation stands increase biodiversity, reduce soil erosion, assist with ground water movement towards the river, provide windbreaks to horticultural crops and increase aesthetics of the area. Refer to work plans for revegetation species lists.

5. Identifying Your Zone

5.5 HIGHLAND - ZONE 4

Zone area	Description - land use	Soil types found
Zone 4 – Highland <ul style="list-style-type: none"> • Irrigated • Non-irrigated • Remnants 	<ul style="list-style-type: none"> • Irrigated horticulture/ vines. • Grazed / cropping. • Water discharge basins 	<ul style="list-style-type: none"> • Sandy • Sand over Clay • Limestone soils. • Maybe saline from natural processes or human induced.



Photos: Clockwise from top left hand corner are:

1. Water discharge pond - local vegetation surrounds
2. Water discharge basin - Irrigated horticulture
3. Non irrigated saline soils
4. Good remnant roadside vegetation
5. Good remnant roadside vegetation - Lake Bonney

Land management issues	Existing vegetation	Revegetation opportunities
<ul style="list-style-type: none"> • Non-productive sandy or limestone soils. • Little remnant vegetation remaining • Induced irrigated salinity discharge areas • Naturally occurring saline soils • Revegetation species selection & knowledge 	<p>As for zone 3 there are some areas of remnant vegetation but these may be isolated or scattered as most areas are used for horticulture. Species expected to be found are <i>Acacia ligulata</i>, <i>A. oswaldii</i>, <i>Pittosporum platycarpum</i>, <i>Callitris gracilis</i>, <i>Senna artemisioides</i>, <i>Eucalyptus largifloriens</i>, <i>E. gracilis</i>, <i>E. incrassata</i>, <i>Atriplex sp</i>, <i>Enchylaena tomentosa</i>, <i>Maireana sp.</i>, with heath understorey on sandy over clay sites.</p>	<p>An area of remarkable scope for large-scale revegetation, protection of existing vegetation and assisting the protection of crops by establishing windbreaks. Using a wide range of local species is important in this zone. (refer to work plans for species). Horticulture crops will benefit from single row plantings using <i>Eucalyptus largiflorens</i>, <i>Melaleuca lanceolata</i> and <i>Myoporum platycarpum</i>.</p>

6.1.1 Work plans: Zone 1 Riparian land next to the river - seedling planting

Description: Immediately alongside watercourse including river bank and associated estuary channels and wetlands. Highly productive, the vegetation community reflects fertile soils and improved moisture conditions found here. Natural vegetation encompasses two ecological boundaries. First is between the watercourse and the vegetation, providing a direct link with the terrestrial and aquatic environment, the second between the riparian vegetation and the various habitats contained within the surrounding catchment.

Revegetation Considerations: Identify lease/title of this zone by confirming with Crown Lands SA (8595 2111) and if Crown land written approval may be required. Linkages need to be formed with flood-plain activities. Hand tools for establishment will be necessary – no ripping. Tree guards may be required. Natural regeneration should occur on most sites. Some seedlings may need to be propagated from plant cuttings. Weed control may not be required prior to planting.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year One – Planning stage												
Remove livestock /												
Fencing (if required)												
Weed control												
Vermin control												
Propagate or order seedlings												
Year Two – On site stage												
Natural regeneration	The cycle of replacement of old and aging trees by the germination of self-sown seedlings and saplings is nature's way of growing trees.											
Weed control												
Vermin control												
Site preparation- spot spray ²												
Plant seedlings												
Year Three – Maintenance stage												
Weed control												
Replanting / filling in												
Main species for revegetation – the species listed below are a general guide only and have been recognised as most likely to provide successful revegetation outcomes. Additional species may be included if proven to be easily established.												
<i>Acacia stenophylla, Atriplex sp. Eucalyptus camaldulensis, Eucalyptus largiflorens, Myoporum acuminatum, Muehlenbeckia sp.</i>												

² Refer to tree planting and after care fact sheet - Chemical control before planting.

6.1.2 Work plans: Zone 1 Riparian land next to the river – Managing Remnants

Description: Immediately alongside watercourse including riverbank and wetlands.
Highly productive the vegetation community reflects fertile soils and improved moisture conditions found here.
Natural vegetation encompasses two ecological boundaries. First is between the watercourse and the vegetation, providing a direct link with the terrestrial and aquatic environment, the second between the riparian vegetation and the various habitats contained within the surrounding catchment.

Natural Regeneration Woody weed control

Considerations: Vermin control.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year One – Planning stage												
Pre-site inspection												
Property design												
Remove livestock												
Fencing (if required)												
Woody weed control												
Weed control									Actively growing summer weeds			
Vermin control												
Year Two – On site stage												
Natural regeneration	The cycle of replacement of old and aging trees by the germination of self-sown seedlings and saplings is nature's way of growing trees.											
Weed control												
Vermin control												
Year Three – Maintenance stage												
Weed control												

6.2.1 Work plans: Zone 2 Floodplain/ Non-saline wetlands - revegetation

Description: Irrigated pasture, grazing or recreation.
Includes significant areas of natural vegetation. Revegetation can be used to extend these areas.

Revegetation Recreational activities.

Considerations: Impacts of natural flooding.
Site preparation techniques.
Vermin control.

Large seedlings or long stem seedlings are recommended for these sites as they have proven increased growth and survival rates.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year One – Planning stage												
Redesign of property *												
Remove livestock *												
Fencing *												
Weed control ✓												
Vermin control												
Propagate or order seedlings												
Year Two – On site stage												
Weed control												
Vermin control												
Plant seedlings												
Year Three – Maintenance stage												
Weed control												
Replanting / filling in gaps												
Main species for revegetation – the species listed below are a general guide only and have been recognised as most likely to provide successful revegetation outcomes. Additional species may be included if proven to be easily established.												
<i>Atriplex sp.</i> , <i>Eucalyptus camaldulensis</i> , <i>Eucalyptus largiflorens</i> , <i>Melaleuca lanceolata</i> , <i>Melaleuca halmaturorum</i> , <i>Muehlenbeckia sp.</i> ,												

* If required or as part of landscape landuse.

✓ Weed control during summer to control summer active weeds.

6.2.2 Work plans: Zone 2 Floodplain/ Non-saline wetlands - natural regeneration

Description: Irrigated pasture, grazing or recreation.
Includes significant areas of natural vegetation.

Revegetation Recreational activities.

Considerations: Impacts of natural flooding.
Vermin control.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year One – Planning stage												
Redesign of property *												
Remove livestock *												
Fencing *												
Weed control												
Vermin control												
Burning												
Year Two – On site stage												
Weed control												
Vermin control												
Year Three – Maintenance stage - consider actual revegetation (using workplan 6.2.1) if natural regeneration unsuccessful												
Weed control												
Vermin control												

- If required or as part of landscape landuse.

TIP: Burning of areas may assist the natural regeneration process. Further technical visitation is required.

6.2.3 Work plans: Zone 2 Floodplain/Saline wetlands - revegetation

Description: Salinity caused by human interference.
Covered in samphire or bare soil.
Wet from irrigation or dry cracking soils.

Revegetation Cover site with a mulch if possible.
Considerations: Dripper irrigate seedlings during the 1st and 2nd years.
Tubestock propagation of seed and plant cuttings need to be well developed.
Vermin control and use of tree guards.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year One – Planning stage												
Redesign property plan *												
Remove livestock *												
Mound site												
Mulching												
Weed control												
Fencing *												
Propagate or order seedlings												
Year Two – On site stage												
Plant seedlings												
Water												
Year Three – Maintenance stage												
Replanting / filling in												
Watering												
Main species for revegetation – the species listed below are a general guide only and have been recognised as most likely to provide successful revegetation outcomes. Additional species may be included if proven to be easily established.												
<i>Atriplex sp. Eucalyptus camaldulensis, Eucalyptus largiflorens, Melaleuca halmatorum, Muehlenbeckia sp. Myoporum acuminatum,</i>												

* If required or as part of landscape land use.

Placing mulch on the mounds may assist with minimising evaporation, which inhibits salt crystals forming around seedlings.

NB. Mounding prior to planting may assist - further technical assessment of site is required.

6.2.4 Work plans: Zone 2 Floodplains / Wetlands – Managing Remnants

Description: Salinity caused by human interference.
Covered in samphire or bare soil.
Wet from irrigation or dry cracking soils.

Natural Regeneration Saline soils.
Considerations: Modified soils.
Drainage issues.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year One – Planning stage												
Pre-site inspection												
Property design												
Remove livestock												
Fencing												
Soil Disturbance												
Weed control												
Vermin control												
Year Two – On site stage												
Natural regeneration	The cycle of replacement of old and aging trees by the germination of self-sown seedlings and saplings is nature's way of growing trees.											
Weed control												
Vermin control												
Year Three – Maintenance stage												
Weed control												

Soil disturbance (especially in cracking clay) and vermin control will assist the natural regeneration process.

6.3.1 Work plans: Zone 3 River slope/ Cliff face Sand over clay or limestone

Description: Very dry.
Can be steep or a gentle slope.

Revegetation Dry environment.
Considerations: Rabbits / Vermin.
Snails.
Woody weeds.
Hand planting.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year One – Planning stage												
Remove livestock												
Fencing												
Snail control – bait laying												
Rabbit control – bait laying												
Propagate or order seedlings												
Year Two – On site stage												
Natural regeneration	The cycle of replacement of old and aging trees by the germination of self-sown seedlings and saplings is nature’s way of growing trees.											
Snail control – bait laying ³												
Rabbit control – bait laying												
Site preparation												
Plant seedlings – P2, dripper	Irrigation											
Year Three – Maintenance stage												
Rabbit control – bait laying												
Replant if required												
Main species for revegetation – the species listed below are a general guide only and have been recognised as most likely to provide successful revegetation outcomes. Additional species may be included if proven to be easily established.												
<i>Acacia notobilis, Acacia pycnantha, Allocasuarina verticillata, Callitris gracilis, Dodonea viscosa spathulata, Eucalyptus anceps, Eucalyptus brachycalyx, Eucalyptus leptophylla, Eucalyptus foecunda, Eucalyptus diversifolia, Eucalyptus porosa, Eucalyptus oleosa, Eucalyptus gracilis, Eucalyptus socialis, Melaleuca lanceolata, Melaleuca acuminata, Myoporum platycarpum, Pittosporum phylliraeoides var microphylla, Senna artemissioides nothosp coriacea.</i>												

³ (Dennis Hopkins, PIRSA, pers. comm., 2001)

6.3.2 Work plans: Zone 3 River slope/ Cliff face Sandy dunes

Description: Dry non-wetting sandy soils.

Revegetation Many weeds.

Considerations: Sand drifts.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year One – Planning stage												
Remove livestock												
Fencing												
Snail control – bait laying												
Rabbit control – bait laying												
Weed control												
Propagate or order seedlings												
Year Two – On site stage												
Natural regeneration	The cycle of replacement of old and aging trees by the germination of self-sown seedlings and saplings is nature’s way of growing trees.											
Snail control – bait laying ⁴												
Rabbit control – bait laying												
Mulch												
Site preparation												
Plant seedlings – P2, dripper	Irrigation											
Year Three – Maintenance stage												
Rabbit control – bait laying												
Replant if required												
Main species for revegetation – the species listed below are a general guide only and have been recognised as most likely to provide successful revegetation outcomes. Additional species may be included if proven to be easily established.												
<i>Acacia brachybotrya, Acacia calamifolia, Acacia ligulata, Acacia oswaldii, Allocasuarina verticillata, Baeckea behrii, Bursaria lasiophylla var albicoma, Callitris gracilis, Dodonaea visosa spathulata, Eucalyptus socialis, Eucalyptus dumosa, Eucalyptus porosa, Eucalyptus odorata, Eucalyptus incrassata, Eutaxia microphylla, Melaleuca acuminata, Melaleuca uncinata, Melaleuca lanceolata, Myoporum platycarpum.</i>												

⁴ (Dennis Hopkins, PIRSA, pers. comm., 2001)

6.3.3 Work plans: Zone 3 River slope / Cliff face – Managing Remnants

Description: Dry cracking clay soils.
 Dry limestone rocky outcrops.
 Dry non-wetting sandy soils.

Natural Regeneration Soil condition.
Considerations: Rainfall.
 Vermin.
 Woody weeds.
 Availability of native plant seed.
 Allow 3 years before intervention by seedling planting.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year One – Planning stage												
Pre-site inspection												
Property design												
Remove livestock												
Fencing												
Weed control												
Rabbit control – bait laying												
Year Two – On site stage												
Natural regeneration	The cycle of replacement of old and aging trees by the germination of self-sown seedlings and saplings is nature’s way of growing trees.											
Propagate seedlings												
Weed control												
Rabbit control – bait laying												
Year Three – Maintenance stage												
Weed control												
Plant seedlings												

6.4.1 Work plans: Zone 4 Highland - Irrigated Horticulture

Description: Fruit trees, viticulture.

Revegetation Single rows or incorporating and enhancing remnants in blocks or at the corner of paddocks.

Considerations: Good planning is essential.
Wind direction.
Wind crop requirements.
Bird impacts on horticulture and viticulture crops.
Potential to assist ground water movement.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year One – Planning stage												
Design layout												
Propagate seedlings												
Snail control – bait laying ⁵												
Rabbit control – bait laying												
Weed control summer weeds												
Year Two – On site stage												
Weed control												
Seedling planting												
Snail control – bait laying												
Rabbit control – bait laying												
Install drippers or water												
Year Three – Maintenance stage												
Replanting – fill in gaps												
Main species for revegetation – the species listed below are a general guide only and have been recognised as most likely to provide successful revegetation outcomes. Additional species may be included if proven to be easily established. Careful species selection will avoid problems in future years.												
<i>Allocasuarina verticillata</i> , <i>Callitris gracilis</i> , <i>Eucalyptus porosa</i> , <i>Eucalyptus odorata</i> , <i>Melaleuca lanceolata</i> , <i>Myoporum platycarpum</i> .												

⁵ (Dennis Hopkins, PIRSA, pers. comm., 2001)

6.4.2 Work plans: Zone 4 Highland non-irrigated - large areas

Description: Rocky limestone or sandy soils.

Revegetation Many weeds.

Considerations: Suitable for direct seeding.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year One – Planning stage												
Remove livestock												
Fencing												
Seed collection												
Rabbit control – ripping ⁶												
Rabbit control – bait laying												
Snail control – bait laying ⁷												
Weed control												
Year Two – On site stage												
Weed control												
Direct seeding												
Snail control – bait laying												
Rabbit control – bait laying												
Year Three – Maintenance stage												
Replanting – fill in gaps												
<p>Main species for revegetation – the species listed below are a general guide only and have been recognised as most likely to provide successful revegetation outcomes. Additional species may be included if proven to be easily established.</p> <p>LIMESTONE - <i>Acacia pycnantha</i>, <i>Allocasuarina verticillata</i>, <i>Dodonea viscosa spathulata</i>, <i>Eucalyptus anceps</i>, <i>Eucalyptus brachycalyx</i>, <i>Eucalyptus leptophylla</i>, <i>Eucalyptus foecunda</i>, <i>Eucalyptus diversifolia</i>, <i>Eucalyptus porosa</i>, <i>Eucalyptus oleosa</i>, <i>Eucalyptus gracilis</i>, <i>Eucalyptus socialis</i>, <i>Pittosporum phylliraeoides var microphylla</i>, <i>Melaleuca lanceolata</i>, <i>Senna artemisioides nothosp coriacea</i>, <i>Melaleuca acuminata</i>, <i>Myoporum platycarpum</i>.</p> <p>SAND - <i>Acacia brachybotrya</i>, <i>Acacia calamifolia</i>, <i>Acacia ligulata</i>, <i>Acacia pycnantha</i>, <i>Acacia oswaldii</i>, <i>Allocasuarina verticillata</i>, <i>Bursaria lasiophylla var albicoma</i>, <i>Callitris gracilis</i>, <i>Eucalyptus socialis</i>, <i>Eucalyptus dumosa</i>, <i>Eucalyptus porosa</i>, <i>Eucalyptus odorata</i>, <i>Eucalyptus incrassata</i>, <i>Melaleuca acuminata</i>, <i>Melaleuca uncinata</i>, <i>Melaleuca lanceolata</i>, <i>Myoporum platycarpum</i>.</p>												

⁶ Rabbit control in Year 1 is more likely on rocky limestone sites.

⁷ (Dennis Hopkins, PIRSA, pers. comm., 2001)

6.4.3 Work plans: Zone 4 Highland – Managing Remnants

Description: Rocky limestone rocky outcrops.
Dry non-wetting sandy soils.

Natural Regeneration Soil condition.
Considerations: Rainfall.
Vermin.
Woody weeds.
Availability of native plant seed.
Roadsides.
Allow 3 years before intervention by seedling planting.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year One – Planning stage												
Pre-site inspection												
Property design												
Remove livestock												
Fencing												
Weed control												
Snail control – bait laying ⁸												
Rabbit control – bait laying												
Year Two – On site stage												
Natural regeneration	The cycle of replacement of old and aging trees by the germination of self-sown seedlings and saplings is nature’s way of growing trees.											
Propagate seedlings												
Weed control												
Snail control – bait laying												
Rabbit control – bait laying												
Year Three – Maintenance stage												
Weed control												
Plant seedlings												

⁸ (Dennis Hopkins, PIRSA, pers. comm., 2001)

6.5 Weed and Pest control – poor weed and pest management can lead to failure

If you are unsure about the use of chemicals contact a registered operator for assistance or the Animal & Plant control officer in your area. Some contractors are listed in the contractors section of this kit.

	<i>Year before planting</i>						<i>Year of planting</i>											
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Previous year weed control and fencing⁹																		
1st Weed control for summer grasses & after early rains																		
Exotic tree removal Eg willows																		
Follow up Weed control																		

Choosing appropriate species for revegetation is worth considering due to the impact on river ecosystems. The widespread planting of willows along many waterways provides an valuable example. These fast growing trees were originally planted in an urgent attempt to prevent the rapidly growing problem of stream bank collapse and channel erosion. They did alleviate the problem of bank instability, but their vigorous and invasive nature has also resulted in major channel diversion and habitat loss in many creeks and rivers.¹⁰ Invasive species such as willows should be avoided.

Vermin control																		
Rabbits – warren destruction																		
Rabbits – fumigation																		
Rabbits – bait laying¹¹																		
Snails – bait laying																		
Insect control for direct seeding																		

⁹ To allow easy access you may not want to fence along watercourse if willows etc need to be removed over summer.

With general revegetation activities, we do not recommend the use of residual sprays due to potential to enter the aquifers. Use round-up bioactive or similar product near watercourses.

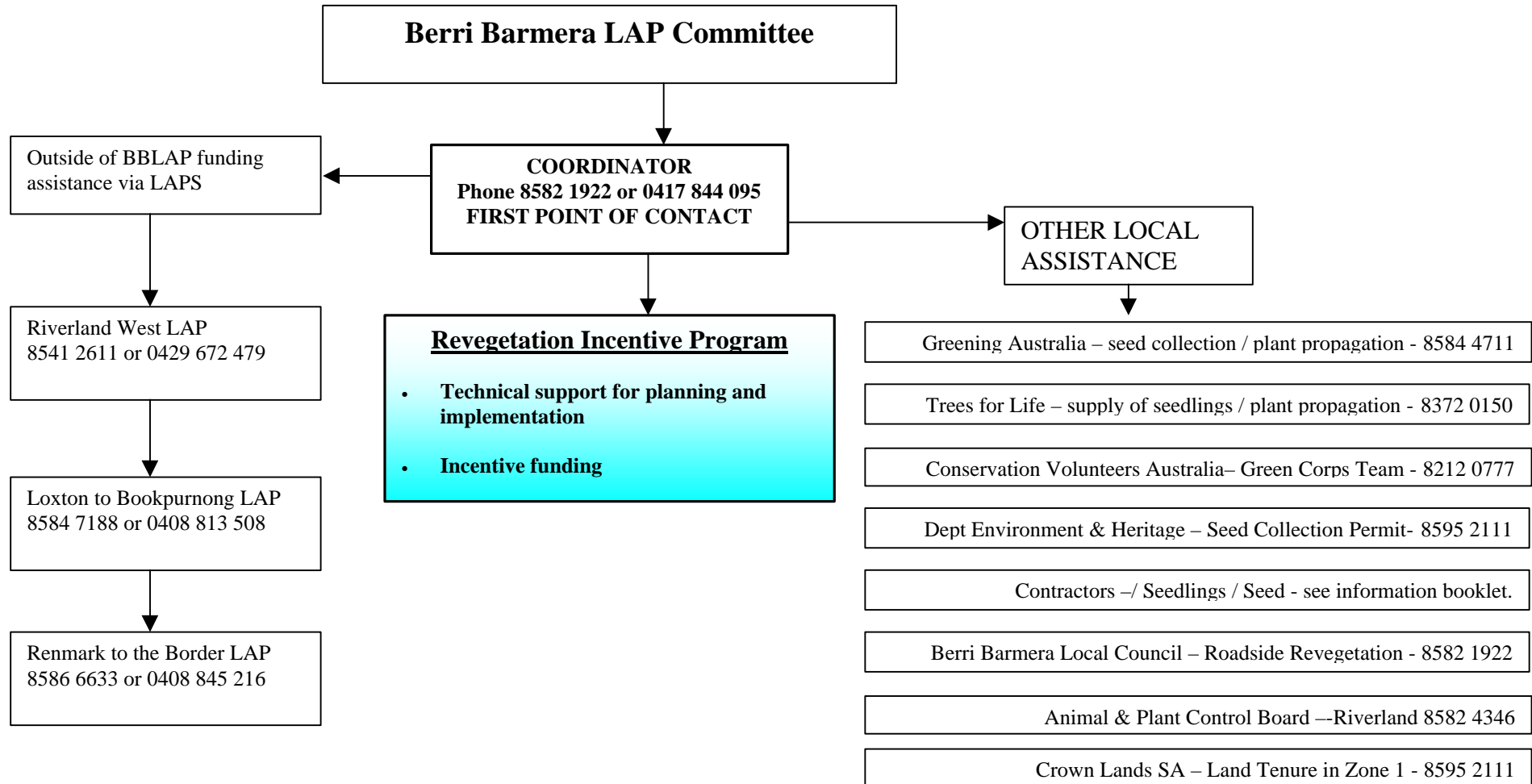
¹⁰ Taken from Riparian Vegetation – some ecological perspectives. Author Paul Reich.

¹¹ (Dennis Hopkins, PIRSA, pers. Comm., 2001)

Seed Collection – a guide to the best times to collect native plant seed and cuttings

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
<i>Acacia</i> (wattles)													<p>A permit is required to collect native seed from Public or Crown land. This can be obtained through the Department of Environment and Heritage, Native Vegetation Branch or through your local Council. When collecting from private land please contact the landowner for consent.</p> <p>Attend a Seed Collection workshop run by Trees for Life or contact your local Bushcare Support Officer.</p> <p>There are several publications and fact sheets available through PIRSA to assist with Plant identification, seed collection and storage:</p> <ul style="list-style-type: none"> • <i>Collecting native plant seed – FS 32/97</i> • <i>Collecting and storing native seed – FS 38/97</i> • <i>Seed collection for native understorey species – FS 5/99</i> • <i>Seed pre-treatments for native understorey species – FS 4/99</i> • <i>What seed is that – Neville Bonney</i> • <i>How to collect native tree seed, easily, Greening Australia</i> • <i>Direct seeding native trees and shrubs, Greg Dalton</i>
<i>Allocasuarina</i> (sheoak)													
<i>Atriplex</i> (saltbush)													
<i>Callitris</i> (native pine)													
<i>Dodonea</i> (hop bush)													
<i>Enchylaena</i> (ruby saltbush)													
<i>Eucalyptus</i> (gums)													
<i>Maireana</i> (bluebush)													
<i>Melaleuca</i> (paperbarks)													
<i>Myoporum</i> (native myrtle)			Should be propagated by cuttings *										
<i>Nitraria</i> (nitre bush)													
<i>Rhagodia</i> (saltbush)		Individual species flower and set seed at different times throughout the year.											
<i>Senna</i> (punty bush)													

* Remove cutting material from mature plants using fresh growth (usually after flowering) producing a cutting 2-cm long. Remove 60% of the base foliage. Dip stems into a propagation powder/liquid and place cuttings into propagation mix. Keep well watered until roots take place, usually 8 - 10 weeks.



Landcare or NHT Funded groups registered with Landcare SA have insurance cover provided by PIRSA & DEH joint agreement.

8.0 - ADDITIONAL RESOURCES AVAILABLE

REVEGETATION INFORMATION KIT

This resource includes contact details for the following:

- Seed collectors and suppliers
- Seedling suppliers
- Bushcare resources
- Revegetation businesses
- Revegetation machinery hire

FACT SHEETS

There are available a series of fact sheets on topics relevant to each of the four zones. These are:

GENERAL REVEGETATION FACT SHEETS FOR ALL ZONES

- Getting Started: Opportunities, needs & priorities for revegetation
- Natural regeneration of native vegetation
- Species selection
- Growing local plants
- Collecting native plant seeds
- Seed collection for native understorey species
- Tree planting and after care
- Tree guards for revegetation
- Irrigation for revegetation
- Harrogate Landcare Group, Electric fencing for sheep and cattle in the hills
- Weed management guidelines for management of remnant native vegetation
- Bathurst burr
- Rabbit control principles
 - Page 5: Biological control
 - Page 7: Warren Ripping
 - Page 10: Fumigation
 - Page 12: Poisoning

ZONE 1: RIPARIAN / WETLAND FACT SHEETS

- Wetlands along the River Murray
- Wetland cycles and the River Murray
- Willows and the River Murray
- Introduced plants and animals and the River Murray

ZONE 2: FLOODPLAINS AND WETLANDS FACT SHEETS

- Wetlands along the River Murray
- Revegetating black cracking clays of the Berri Barmera LAP
- Introduced plants and animals and the River Murray
- Trees and shrubs for saline sites
- Samphire for waterlogged saltland
- New groundwater management guidelines for healthier vegetation in saline areas

- Improved information to guide the establishment of eucalypt plantations in saline regions
- The FILTER System- turning effluent into an asset

ZONE 3: RIVER SLOPE / CLIFF FACE FACT SHEETS

- Site preparation for successful revegetation: for agricultural regions with less than 600mm rainfall

Section 6: Ripping

Section 7: Mounding

- Hand direct seeding of native plants
- Seed pre-treatments for native understorey species
- The FILTER System- turning effluent into an asset
- Horehound

ZONE 4: HIGHLAND FACT SHEETS

- Windbreaks for the Berri Barmera LAP
- Site preparation for successful revegetation: for agricultural regions with less than 600mm rainfall

Section 6: Ripping

Section 7: Mounding

- Hand direct seeding of native plants
- Seed pre-treatments for native understorey species
- Direct seeding of native trees and shrubs on non-wetting sands of the Murray Mallee
- Direct Seeding
- The FILTER System- turning effluent into an asset
- Onion weed
- Horehound

9.0 REFERENCES - Berri Barmera Local Action Planning Committee

Background Research List

General Publications / Journals

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- Hyde, M. 2000, *Biodiversity Study: Berri Barmera Local Action Planning Region; River Murray; South Australia*, Wallowa Mallee Research Books, South Australia
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- Lovett, S. & Price, P. (eds) 1999, *Riparian Land Management Technical Guidelines, Volume One: Principles of Sound Management*, LWRRDC, Canberra, ISBN 0 642 26775 8 (set of 2 vols)
- Murphy, Michael 1991, *Guidelines for the Rehabilitation of the Lower Murray River Floodplain*, River Publications, Magill SA, ISBN 1 875251 02 2

Myers, B. J., et al. 1995, *Effluent Irrigated Plantations: Design and Management*, Technical Paper No.2, CSIRO Division of Forestry, Canberra, ISBN 0 643 05824 9

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