

Revegetation Fact Sheet

Shelterbelts

MURRAY MALLEE



Local Action Planning Association Inc.

This option is for revegetation with local native species to establish belts of native vegetation for the purpose of sheltering crops, stock or pasture from damaging winds as well as providing limited habitat for wildlife. These belts are usually established using local species from local seed and include understorey plants. Other species can be used to establish a shelterbelt but local native species are preferred because they will enhance the natural biodiversity of the area.

DESIGNS

Shape

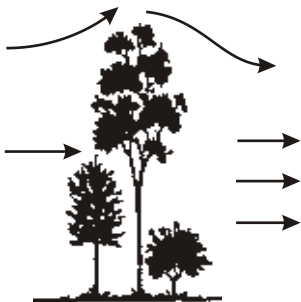
Width is important to achieve better shelter and improve the cost effectiveness of fencing. At least three rows are required to create an effective shelterbelt. A good mix of trees and shrubs improves the ability of the belt to reduce wind flow. You may use existing fence-lines on one side of the shelterbelt to reduce the cost of fencing.

Shelterbelts and windbreaks should not be solid or dense 'walls'. They need to let about 40-60% of the wind through to steady the wind-speed down, otherwise the wind will tend to 'bounce' over the shelterbelt and do more damage than if there were no trees there at all. Avoid gaps in the belts, as this will produce 'wind tunnels'. Access necessary for stock or machinery movement between paddocks should be considered when planning the shelterbelt design, to avoid creating a gap.

Best results are achieved from belts located in the path of prevailing damaging winds and can be used to protect crops during establishment or stock during lambing/calving or 'off-shears'. Shelterbelts located high in the landscape (that is, on ridges) provide the greatest shelter distance. However, shelterbelts on slopes can still reduce the windspeed sweeping up exposed hillsides.



Direct seeded 4 row shelterbelt in the southern Mallee



Permeable windbreaks that allow some wind to pass through are most suitable

Look for opportunities for incorporating, and therefore protecting, remnant vegetation within shelterbelts.

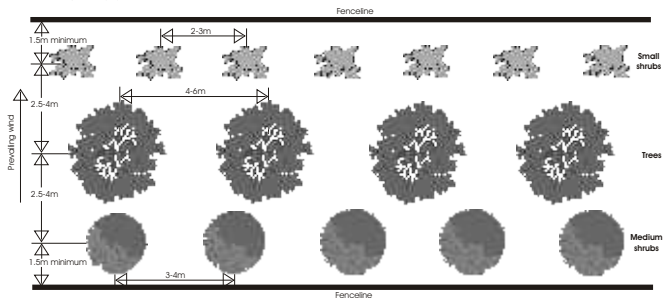
For Timberbelts, similar designs can be used as for shelterbelts but species selection and their management will be different.

Layout of rows: For narrow 3 row shelterbelts, the most effective design is to plant the first row on the windward side with medium shrubs, the second with trees and the third with small shrubs (see diagram). This can help achieve the appropriate spacings to eliminate gaps. Randomly mixing species is only appropriate for shelterbelts 4 or more rows wide.

Plant spacing:

Within the shelterbelt rows trees should be planted 4 to 6 metres apart, larger shrubs 3 to 4 metres apart and small shrubs can be planted as close as 2 to 3 metres apart. To reduce grazing damage of trees and shrubs by stock allow at least 1.5 metres between the fence and the outside shelterbelt rows. A greater distance between the fence and rows will help to reduce possible future damage to the fence by the trees and shrubs.

Plant spacing guide for a three row windbreak



Calculate the distance of the shelterbelt then divide that distance by the chosen plant spacing for each row to determine the number of seedlings required for each row. For example, for a shelterbelt 600 metres long, with trees 6 metres apart, large shrubs at 4 metres apart and small shrubs at 3 metres apart the seedling requirements are:

Trees: $600/6 = 100$ trees

Large shrubs: $600/4 = 150$ large shrubs

Small shrubs: $600/3 = 200$ small shrubs

Total plant requirements = 450 seedlings

Direct seeding 3 row shelterbelts is unlikely to result in the preferred shelterbelt profile (medium, tall then small rows) and may also result in gaps in the shelterbelt where a seedling has not established. Direct seeding of shelterbelts is more suitable for 4 or more row shelterbelts; although the risk with these is that the profile may be too dense when many thousands of plants per hectare establish.

Where direct seeding is used, sow the seed in rows approximately 4 metres apart. Seedlings will emerge at close spacings along the seeding row and usually more than 2,000 seedlings per hectare will be established with successful direct seeding. As the seedlings grow some will die due to competition and they will sort out their own final spacing. Any gaps will need to be filled the following years. You will need approximately 400 to 600 grams of seed per kilometres or 1 to 1.5 kilograms per hectare depending on species mix used.

Species mix: Identify or find out the local native species that are growing or would have originally grown on your site (for contact details refer to the *Mallee Futures Program Resource Book*). Start with the dominant Eucalypt species (mallee trees) and major shrubs (for example, tea-trees and wattles). These species are the starting point for preparing a site species list. Suppliers of seed or

seedlings and other sources of assistance will be able to help you prepare a species list that will include the range of overstorey (trees and tall shrubs) and understorey (shrubs and ground covers) species. A rough rule of thumb would be to try and achieve at least a 40:60 split of overstorey to understorey species. A basic planting should have at least 10 species. Do not just use one species for each row of the shelterbelt but plant a variety. For example, for the large shrubs row you may be able to use a tea-tree, a wattle, a hop-bush and a needlebush all in the one row.

If possible seed should be collected locally from sites with a similar soil type and the species you want. Native plants growing in your area are well adapted to the local soil and weather conditions and will be less susceptible to diseases and insect problems. You may be able to collect the seed yourself and help is available to do this, or you may wish to purchase the seed from a commercial seed collector. (Refer to the *Mallee Futures Program Resource Book* for commercial seed collector details)

SITE PREPARATION

Weed control

Good weed control is essential for the success of revegetation projects. Control of annual weeds can usually be done just prior to planting. However, weed control in the year before planting is necessary for perennial or persistent species (for example, horehound, veldt grass and evening primrose).

Rabbit and kangaroo management

Rabbit control is essential and may need to be done up to two years ahead of revegetation works. If rabbit control is not done tree guards may have to be used and this will increase the cost of the project. Kangaroos may also destroy plantings so liaise with National Parks and Wildlife Service for their management.

Ripping

The ground should be ripped (up to a depth of 400 mm if possible) if the soil is heavy or too rocky near the surface to easily plant seedlings. Although, beware of pulling up rocks and making the site more difficult to manage. Ripping should be carried out several months in advance of work, and if possible in the year before, and should be track-rolled.

Cover crop

A cover crop, such as cereal rye or triticale, will help with weed control and provide protection for light soils. Prior to planting or direct seeding (see below) the cover crop should be sprayed and left as mulch. If possible, only spray out a 2 metre wide strip in which the revegetation is to be done. The unsprayed cover crop outside of these strips will protect the seedlings and soil from wind.

Fencing

Choose the style of fencing that best suits your needs, that keeps stock out and reduces the movement of kangaroos and rabbits. Where it is necessary to fence on highly erodible sand dunes, avoid sharp corners that may promote wind erosion.

ESTABLISHMENT OPTIONS

Seedling planting

Seedling planting is more reliable than direct seeding in the low rainfall areas of the mallee. However it will require more effort and expense. A wide range of local native seedlings is available at a low cost (for example, 'speedling'), if ordered in advance. With proper ground preparation and by planting seedlings with modern hand planting tools such as a 'Pottiputki' one person can plant between 1,000 to 3,000 speedlings per day. Tubestock seedlings can be used but they are more expensive and slower to plant. Machinery planting is the fastest planting method if it suits your application.

Direct seeding

Direct seeding is cheaper and easier than planting seedlings, but timing and weed control is more critical. Direct seeding germinants tend to cope better with kangaroos and rabbits (in low numbers) than seedlings. Direct seeding in low rainfall areas and on non-wetting soils has been most successful using a V-blade machine that prepares a V-shape in which the seed is sown. (Refer to the *Mallee Futures Program Resource Book* for the availability of direct seeding machines and contractors).

Combining seedling planting and direct seeding

A combination of seedling or speedling planting and direct seeding is often used because of the difficulty establishing some species with direct seeding. Direct seeding is most reliable in the mallee using wattles (*Acacia*), cassias (*Senna*), hop-bushes (*Dodonaea*) and native apricot (*Pittosporum*). Some mallees (*Eucalyptus*), native pine (*Callitris*), sheoak (*Allocasuarina*) and ti-trees (*Melaleuca*) are often best established with planted seedlings or speedlings. Species that are not easily grown from seed but are grown from cutting propagation will have to be planted as seedlings, these include species like emu bush (*Eremophila*), native fuchsia (*Correa*) and sugarwood (*Myoporum*). The seed of some species such as needlebush (*Hakea*) and rarer plants is too expensive to use broadscale with direct seeding so these species are best propagated and planted as seedlings.

TIMELINE

In the year of planting the weed control, planting and seeding should be done as soon as possible after the break of the season and generally no later than the end of July. Delay planting in frost prone areas, but not weed control.

	Jan	Feb	Mch	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Preparation year							Begin weed control (if necessary)	Ripping (if necessary)			Order seed and seedlings	Collect seed
Planting year	Collect seed	Feral animal control		Ripping (if necessary)	Sow cover crop	Weed control, planting and seeding	Check direct seeding (for red-legged earth mite)	Follow-up weed control (if necessary)	Fencing finished		Monitor and plan for infill planting	
Follow-up year		Watering if needed				Infill planting Follow-up weed control						

Pull out of planting if it is still too dry



Utilising a roadside for shelterbelt establishment

MAINTENANCE

Watering

Watering of seedlings may be necessary in low rainfall areas of the mallee if there are extended periods of two months or more without significant rain. If watering is done using a water-cart a small basin to contain the water will be needed around each seedling.

Infill planting

Be prepared for the possibility of infill planting in the following year. Direct seeding results are sometimes 'patchy' and it may be necessary to follow up with supplementary seedling planting in the following years. Be aware that it may take 18 months to obtain a clear picture of direct seeding results so do not begin infill planting immediately.

Weed control

Controlling weeds throughout the spring and summer after planting will help the survival of seedlings and boost their growth. It is common to spray the weeds either side of the seedlings while protecting the seedlings from spray drift using a shielded sprayer.

Insect control

Check regularly for red-legged earthmites after planting and spray an appropriate insecticide if necessary. Direct seeded germinants are vulnerable to attack by red-legged earthmites.

Pest animals

Be prepared for ongoing control of rabbits and hares.

Fire breaks: Plan and maintain fire breaks and tracks.

Feral predators: Control feral predators like foxes and cats. This will improve lambing rates and at the same time will improve the habitat value of plantings for a wider range of native birds and animals.

Financial incentives and technical support

Contact the Murray Mallee Local Action Planning Association Inc for:

- Information about the availability of financial incentives and technical support to assist with
 - the costs of establishing shelterbelts;
- A copy of the *Mallee Futures Program Resource Book*, which contains additional contact details for further advice about establishing shelterbelts.
- Ph 08 8531 2066, Fax 08 8532 5300, email mmlap@lm.net.au

Project Planning Checklist

- Calculate the area to be planted in hectares. Calculate the spacings for seedlings and the number of seedlings required and/or calculate the total direct seeding distance in kilometres and the rate of seed planned in grams per kilometre. Determine the most suitable species to be
- planted and where seed can be collected
- locally. Plan a weed and vermin control program. Plan a maintenance program.

Although the Murray Mallee Local Action Planning Association has taken all reasonable care in preparing this information, neither the Association or its officers accept any liability resulting from the interpretation or use of the information.



Four row shelterbelt in the northern Mallee