

# Farmnote

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## Vegetation buffer zones

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Vegetation buffer zones are areas of existing bushland. The role of this vegetation is to reduce the effects of external influences on the value and health of the bushland. The buffer does this by forming a physical barrier between the remnant vegetation and the cleared farmland. This reduces the effect of such things as chemical drift, wind-borne soil and weed seeds, erosive winds and nutrients.

Much of the Western Australian wheatbelt has been cleared for agriculture. The natural bushland that remains exists in a very fragmented landscape, generally as small isolated islands, surrounded by cleared farmland. This remnant bush is threatened by influences originating outside remnant that will decrease the health and value of these bush blocks. There is an immediate need to ensure that current threats do not get worse, and to slow down the rate of decline.



*Figure 1: An area of bushland showing weed invasion from the neighbouring farmland. Photo: M. Ocktmann*

Healthy native plant communities have the capacity to regenerate, cope with disturbances and resist weed invasion. They do this in a number of ways:

- Stored in the soil is a large bank of seed of various fast growing species. These pioneer plants, also called coloniser species, germinate en masse after a disturbance to the bush, such as a fire. These plants give a quick foliage cover of the soil surface, helping to suppress weeds and minimise erosion, and allowing the natural processes of the bush to re-establish.
- Many native plants have the ability to resprout, or coppice, from stems or underground root tubers, giving a quick cover to the disturbed area.
- Microscopic plants, like fungi and lichen, form crusts on the soil surface within the remnant. These suppress weed growth and generate and recycle nutrients. They also provide an environment more suitable for the germination of native plants.

- Some native plants produce natural toxins that inhibit the germination of many weeds (allelopathy). These toxins still allow the growth of the native species because they have adapted to these conditions. The toxins are introduced into the soil through decaying leaf and bark matter shed by the plants and from stem flow washed from the trunk by rain.
- The root systems of many native plants compete effectively for nutrients and moisture, which helps to suppress weed establishment.

In the fragmented landscape of the Western Australian wheatbelt, the remaining bush is generally restricted to small, isolated areas. The health and value of these isolated patches is already compromised by increased exposure to the influences of the surrounding farmland. These influences are generally known as 'edge effects'. Edge effects include:

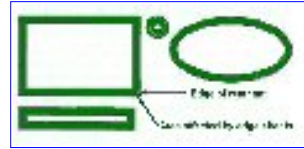
- chemical and fertiliser drift;
- wind erosion;
- nutrient enrichment;
- weed invasion;
- deposition of foreign material into the remnant, such as straw; and
- livestock damage.

Many plants can be damaged by chemical spray drift and grazing. Fungi and lichen that encrust the ground (cryptogams) are especially sensitive to chemicals and disturbance through stock movement. Also the fallen leaf and bark matter around the edges of the remnant vegetation is blown away, removing some of the weed-inhibiting toxins contained within leaves and bark, and disrupting the natural nutrient cycling process.

The combination of soil disturbance, fewer natural inhibitors, chemical drift and increased nutrient enrichment through fertiliser drift, creates an ideal environment for weed growth. Native pioneer species are often less competitive than exotic weeds, and after continual disturbance without successful establishment, the coloniser species gradually disappear. Grass weeds can form a thatch on the ground, covering the soil and preventing native seeds from reaching a site where they could germinate given the right conditions. Increased competition from weeds usually begins on the edges of remnants, but over time will encroach further and further into the remnant. As the weeds become more dominant the loss of native species, including the death of trees, can become complete.

Narrow or small areas of remnant vegetation are more likely to be threatened by the edge effect, and subsequent weed invasion, than larger areas of remnant. Imagine that the figures below are patches of remnant vegetation of varying shapes and sizes. [The shaded areas indicate the area likely to be heavily infested with weeds.](#) The thinner or smaller the remnant the greater the likelihood of complete weed invasion. In other words, large round or square remnants have a much better chance of long-term survival than long narrow remnants. When attempting to protect or restore woodland or any other vegetation type, consideration should be given to the size and shape of the

remnant.



## The role of vegetation buffers

Vegetation buffer zones are areas of usually dense revegetation surrounding existing remnant vegetation. Their role is predominantly to decrease the influences of surrounding cleared farmland on the value and health of remnant bush. The buffers can also provide:

- increased water use within the catchment;
- some nature conservation value through the provision of extra habitat;
- shelter and fodder for stock. These must be carefully managed as stock and some fodder plants can increase the threat to the 'protected' remnant;
- commercial harvesting opportunities (although this may also be a threat to the remnant depending on the style of harvesting); and
- a combination of benefits.

By creating a buffer zone around your woodland you may be able to reduce or eliminate edge effects. The buffer will:

- reduce the risk of chemical and fertiliser drift;
- protect the remnant from strong winds
- create a trap for wind-borne soil and weed seeds
- increase local water use, helping to slow the effects of a rising watertable; and
- trap and use nutrients that are carried from paddocks by flowing water.

## Creating a buffer

There are a number of options you could consider when planning for buffers around your woodland. Planning considerations for buffers include:

- The buffer should be dense enough and large enough to provide an effective barrier to outside threats. The buffer should always be designed to achieve this purpose. The minimum width for a buffer should be five metres, but it should also be dense enough to provide adequate protection.
- Will the species and composition of the buffer be able to provide other benefits? Harvestable products; natural habitat values; significant water use where necessary; shelter and windbreak values outside of the remnant.
- Are any of the species in the buffer a potential threat to the remnant? Avoid any woody weeds species, species that are highly competitive (roots for nutrients and water, shade, allelopathy), and species that

harbour diseases and animal pests. Genetic material from outside the remnant (even of the same species) may be a problem too.



*Figure 2: This buffer was established by planting tree seedlings and sowing seed of local shrub species at the same time. Photo: Mike Clarke*

Options for creating buffers that offer extra benefits include:

- Planting of local tree and understorey species to create a very dense thicket of vegetation that will provide some nature conservation value.
- Planting of commercial tree crops around the edges of the remnant to protect the remnant and provide an opportunity for alternative farm income. Eucalyptus oil mallees could be used in this way. Local species are less likely to be a threat to the remnant. Exotic species, like tagasaste, need to be assessed very carefully.
- Planting a number of different understorey, middle storey and tall tree species to create an effective windbreak.



*Figure 3: This vegetation buffer of oil mallees will help protect the adjacent bushland from the influences of the neighbouring paddock. Photo: David Bicknell*

## Buffer establishment

There are several methods for establishing buffers:

- natural regeneration;
- direct seeding;
- tube stock planting; or
- a mixture of methods.

Natural regeneration is nature's own method of direct seeding. For it to be successful, though, as with all direct seeding, the right conditions need to be present. These right conditions are:

- a site free of weeds and other damaging disturbances like livestock and rabbits. This can be achieved with selective herbicides and rabbit (and other pest) control measures;
- a bank of seed present either in the soil or in the canopy of the trees and shrubs or, in the case direct seeding, applying collected seed directly to

site;

- an area away from the influences of mature trees and other plants as these can suppress seed germination and reduce establishment. In some conditions, this involves ripping the soil to cut competition by existing roots or in extreme circumstances, removing mature plants;
- the right environmental conditions to break seed dormancy and to stimulate germination. Dormancy of seed can be broken in a number of ways such as a smoke water treatment of the site, or with a light cultivation. Fire has been used to stimulate germination, but has management problems (get specialist advice before attempting this). The dormancy of collected seed can also be treated with smoke water or soaked in hot water; and
- good follow up conditions to allow establishment. For direct seeding, establishment rates to be improved by timing the operation for soon after the break of season.

Direct seeding will often give more natural looking and denser environment. For better survival of germinants from direct seeding, weeds and pests need to be carefully managed. As well, more species are available as seed than as seedlings from nurseries. This is partly because of the lack of demand for some species as tube stock, but also because of the cost and survival of seed. Obtaining seedlings of some local species may be difficult, as many nurseries lack experience in propagating 'unusual' species.

Using nursery seedlings gives control over spacing, species densities, weed control and planting design. Having this control may be important when establishing a tree crop or designing a windbreak. To ensure good establishment rates with tube stock, the site must be well prepared and weeds controlled.

## **Sourcing seed and choosing species for buffer planting**

Species should be selected to suit the soil type and landscape position to improve the chances of successful establishment.

Ideally, seed should be sourced from within the remnant around which the buffer will be planted. Using this very local seed is important in the protection of the local origin and genetic integrity of the area. Of course this is not always possible, as much of the vegetation that once occurred is no longer present and the size of the area may simply not be large enough to meet your requirements. If this is so, you should then look to other nearby good remnant bush areas with a similar vegetation type occurring on similar soils. These may provide seed and suggest the species you may want to re-establish as part of your buffer. A seed collecting licence may be needed: contact the Department of Conservation and Land Management.

In all cases of planting native species it is recommended that you include the use of pioneer species. Often the initial colonisers after a disturbance will be

native grasses (eg. *Austrostipa* spp., *Austrodanthonia* sp.) and other species such as *Dampiera*, *Gastrolobium*, small *Acacia* species and other legumes. Many of these species are not always available or may be simply too costly, but efforts should be made to include these in seed or seedling mixes. As well as these colonising species, all other layers of vegetation, such as trees and shrubs should be included.

Wherever possible you should seek further advice from experienced people from within your region.

## Further information

- Greening Australia (WA), 10 The Terrace , Fremantle  
Tel: (08) 9335 8933
- Land for Wildlife  
Department of Conservation and Land Management  
Locked Bag 104  
Bentley Delivery Centre, WA, 6983
- Agriculture Western Australia  
10 Doney Street  
Narrogin WA 6312  
Tel: (08) 9881 0222

## Further reading

- **Direct seeding information kit** (1998) Holt, C. and Bicknell, D. Revegetation on Farms Project publication, Agriculture Western Australia.
- [Direct seeding of native plants for revegetation](#) (1998) Holt, C. Farmnote no. 40/98. Agriculture Western Australia.
- **Managing your bushland** (1993) Hussey, B.M.J. & Wallace, K.J. Department of Conservation and Land Management, Perth.
- [Site assessment for successful revegetation](#) (1998) Bicknell, D. et al. Farmnote no. 36/98. Agriculture Western Australia
- [Site preparation for successful revegetation](#) (1998) Bicknell, D. et al. Farmnote no. 37/98. Agriculture Western Australia
- [Weed control for successful revegetation](#) (1998) Bicknell, D. et al. Farmnote no. 47/98. Agriculture Western Australia

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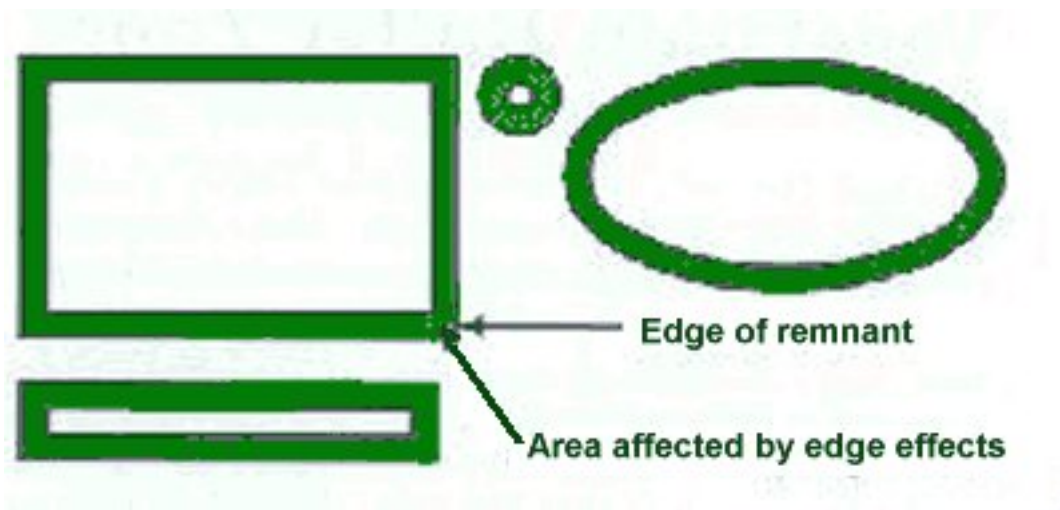
**Farmnote 38/2000 : Vegetation buffer zones : Figure 1**



*Figure 1. An area of bushland showing weed invasion from the neighbouring farmland. Photo: M. Ochtman*

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## Farmnote 38/2000 : Vegetation buffer zones : Diagram



*Diagram: Narrow or small areas of remnant vegetation are more likely to be threatened by the edge effect, and subsequent weed invasion, than larger areas of remnant.*

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## Farmnote 38/2000 : Vegetation buffer zones : Figure 2



*Figure 2: This buffer was established by planting tree seedlings and sowing seed of local shrub species at the same time. Photo: Mike Clarke*

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### Farmnote 38/2000 : Vegetation buffer zones : Figure 3



*Figure 3: This vegetation buffer of oil mallees will help protect the adjacent bushland from the influences of the neighbouring paddock. Photo: David Bicknell*

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