



Department of
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Farmnote

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Fire Management and Revegetation

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By Ryan Denham, Agriculture Western Australia, Narrogin, and Steve McDonald, Fire and Emergency Services Authority of Western Australia, Narrogin.

Introduction

The prevention of fires on farms is essential to reduce the threat to life and property. Western Australia's climate creates a very high risk of fire in most of the agricultural region for several months of each year. Buildings, machinery, crops, livestock and people's lives are at risk when a fire burns uncontrolled across farms.

A common concern for farmers is the increase in fuel load (mainly from weeds, but also from bark, leaves etc.) and fire risk that occurs in revegetated areas. This can be a problem in the first few years of establishment, before the trees and shrubs develop a significant canopy and shade out the weeds, or before stock can be introduced to graze the area. Herbicide application to control the weeds without harming the trees and shrubs may be possible in some cases.



Figure 1. *The large volume of dry weeds evident in this photo of a two year old revegetated area can pose a fire risk. Planning and management can reduce the risk.*

This farmnote is intended to provide information regarding the factors affecting fire risk in revegetated areas and to suggest possible strategies that to minimize this risk. These strategies should form part of a whole farm fire prevention and action plan.

Fire behaviour

Fires are usually characterised by the type of fuel they are burning, such as grass, scrub, forest, and so on. Most fires on farms are usually grass fires, such as in pasture, weeds and crops.

The major factors influencing grass fire behaviour are: fuel moisture content, fuel type and arrangement, wind speed and ground slope.



Figure 2. *An example of the devastating fire can cause. This photo was taken following the December 1997 fire in Brookton.*

Fuel moisture content

The amount of moisture in fuel controls the rate at which it will burn and therefore the amount of heat given off. Annual weeds or pastures that are ungrazed but fully cured (usually at the end of December and into January) pose the greatest fire hazard. The fuel moisture content is also influenced by the relative humidity of the air on a given day.

Fuel type

The total amount of dry grass present directly affects the speed of the fire, the height of the flames and the fire intensity. In areas of revegetation there may also be leaf litter and twigs present that add to the fuel load, which while slowing the speed of the fire, increase its intensity and make it harder to control. The level of aeration is also a factor, with compacted ground cover, such as pasture posing less of a risk than well-aerated, upright material, such as crops or stubble.

Wind speed

Wind speed has a big effect on both fire speed and direction. The rate of fire movement increases by a greater proportion than the increase in wind speed.

Ground slope

With all other conditions being equal, fires travel faster up slopes than on flat ground. The general rule is that the speed of the fire doubles with every 10 degrees increase in slope.

Revegetation and fire management

When designing the layout of a revegetation project, it is important to consider the possible fire implications. In general, over the long term, trees and revegetated areas create a barrier (or windbreak) that will slow down grass fires. They can also potentially catch airborne embers or sparks which will slow the speed of the fire.

The extent to which revegetated areas are barriers to fire depends on a number of factors, including the spacing of the trees and shrubs, the amount of fuel and leaf litter, the wind direction during a fire and the position of the revegetated area in the landscape. The position in the landscape can be important. Vegetation in waterlogged and saline areas is at low risk of fire, while vegetation higher in the landscape can be at higher risk due to it being dry and the plants containing less salt.

Surrounding land use can also be important in relation to the fire risk, with dry pasture and cereal crops usually posing the greatest risks.

Fire hazard

In revegetated areas, large weed burdens (which are often well aerated) develop in the first few years. After about year five, the canopies of the trees and shrubs will shade out many of the weeds and they usually cease to be a significant fire hazard after this time.

Depending on a number of factors such as landscape location, proximity to buildings and surrounding land use, weed control within the revegetated area may be wise in the first few years. In other cases the elevated fire risk for these few years may be acceptable.



Figure 3. *This area of remnant vegetation has been completely destroyed by fire. This photo was also taken after the December 1997 fire in Brookton.*

Fire retardant trees and plants

The selection of fire retardant trees and plants and careful consideration about their placement will help to prevent damage to property should a fire start. The main features of fire retardant plants are that they usually have a high salt and moisture content and a low volatile oil content in their leaves.

Contact the Fire and Emergency Services Authority or your local Bush Fire Service office for more information.

Management and design options

Fire management can target three design factors: fuel continuity, fuel height and fuel load. Several management options are outlined below. Often a combination of these will be suitable, as indicated by the site and plant species.

- Grazing can directly reduce the fuel load through the removal of weeds, and reduce fuel height through trampling. But grazing needs to be limited or avoided in cases where the species used for revegetation are also palatable to stock (eg: *Allocasuarina huegeliana*), particularly in the first few years of growth, before they are out of reach.
- Slashing can reduce fire risk through the reduction of fuel load and height.
- Herbicide application gives good weed control and can dramatically reduce the total fuel load within a revegetation site. The first step is to control weeds before planting the area by using knockdown and residual herbicides. This should control weeds throughout the first year and into the second. If weeds need to be controlled in following years, knockdown herbicides may be applied with a hand held applicator, being careful to avoid contact with trees and shrubs. Before weed germination, residual herbicides may be applied either by hand held applicator or overspraying. Using herbicides this way is likely to be an off-label use, and therefore a permit will be required. It is recommended that expert advice is sought prior to spraying.
- Groundcovers or shrubs in the species mix provide competition to weeds and may shade out weeds, therefore reducing the fuel load. Planting the seedlings closer together may also contribute to reducing the weed burden, through competition and shading. Understorey species in widely spaced clumps, rather than as a continuous layer will interrupt fuel continuity.
- Firebreaks are an important part of the whole farm plan, including around revegetated areas. Cultivated bare earth and chemical firebreaks are the two types that most landholders are familiar with. Chemical firebreaks are probably the most desirable as they are usually firmer, make better access tracks and result in less erosion.

Firebreaks are important around revegetated areas and remnant vegetation. There have been many cases of stubble fires 'getting away' and spreading into remnant revegetation and revegetation due to non-existent or inadequate firebreaks.

It is important to site firebreaks well away from trees or other vegetation. Even a single tree can significantly decrease the effectiveness of a break.

- Densely planted pruned trees can be used as a barrier in some instances. This is achieved through the suppression of weed growth, interception of windblown sparks or embers and the reduction of ground level fuel availability. It is important that pruning off cuts are removed or trampled (by letting stock in to graze around the mature trees) to avoid a build up of dry matter. Remember that any plant can constitute a fuel source under extreme conditions, so this technique does not cancel out the need for firebreaks.
- The layout of revegetation areas, and their position in the wider landscape can provide opportunities for reducing fire hazards. Natural features can be incorporated into firebreaks or 'low fuel' zones, and may possibly be used as part of a bushfire prevention plan. These include property access tracks, rivers, creeks, lanes, green crops, contour banks, salt scalds, rocky outcrops, shelterbelts and stock races. Revegetation can also be used strategically to reduce wind speeds across the farm.
- Vegetation bottlenecks or narrow corridors can be target areas for fuel reduction (eg: tree pruning or use of high salt content species). Such designs should be considered in the context

of prevailing winds and adjacent land use activities.

Conclusion

This farmnote is intended to provide background information and an introduction to some strategies that may be used to reduce the fire risk posed by revegetated areas. There are many factors to consider, including species selection, plantation design, surrounding enterprises and landscape position. Revegetated areas are just one element of the farm that need to be considered as part of a whole farm fire prevention and action plan. For further information or advice contact the Fire and Emergency Services Authority (FESA).

Further information

Fire and Emergency Services Authority (FESA)

480 Hay St

Perth 6000

Tel: (08) 9323 9300

Fax: (08) 9323 9470

Website: www.fesa.wa.gov.au

Or your local Bush Fire Service office.

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