

DRAFT GUIDELINES

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FIRE MANAGEMENT PLANNING FOR ROADSIDES

A GUIDE FOR TRANSPORT CORRIDOR MANAGERS, FIRE OFFICERS, CONSERVATION GROUPS AND ADJOINING LANDOWNERS

*Fire and Emergency Services Authority of Western Australia and
Roadside Conservation Committee*

INTRODUCTION

Areas of remnant bushland on roadsides and rail reserves are environmentally valuable as reservoirs of plant species that have been cleared from the surrounding countryside, and as vital links for movement of wildlife between other areas of bushland. In some areas of Western Australia, transport corridors provide the only remnant of the original vegetation.

Fire management of transport corridors is especially important in maintaining the biodiversity of the bushland, as fire is a major influence on the survival of native vegetation.

Frequent uncontrolled burning of road verges and rail reserves has a severe and degrading effect on natural vegetation, often resulting in the replacement of native vegetation with introduced grasses and other weeds.

Each year a significant number of fires start on the roadside, and spread to neighbouring land, causing economic damage to the adjoining landowners.

The requirement for guidelines on burning and fire control measures for transport corridors stems from the potential conflict between land owners' concerns about fire hazard and the effective management of the conservation values of bushland remnants on roadsides.

THE PURPOSE OF THIS GUIDE

This document will attempt to give some guidance for the fire component of management planning for transport corridors, as well as to give some background information on how to reduce the impact of fires on roadside vegetation.

This document is not designed to cover in detail all of the issues associated with fire management on transport corridors. It is merely a guide and a starting point. Discussions between the corridor manager, the fire service, Local Government, conservation groups, adjacent landowners and other stakeholders should be used to decide on the strategies to used for fire management for a particular corridor.

IMPORTANCE OF REMNANT VEGETATION

The native plants along road and rail reserves often provide the traveller's first contact with Western Australia's world renowned flora. In many parts of the state, road verges and rail reserves are the only remaining native vegetation in extensively cleared agricultural landscapes.

The patches and strips of native vegetation provide valuable habitats for many species of plants, birds, mammals, reptiles, amphibians and invertebrates. They provide food and shelter and allow animals to move between populations otherwise isolated by areas cleared for agriculture or development.

In addition, road and rail side vegetation helps to reduce salinity problems, acts as a windbreak, and may help to reduce erosion.

FIRE MANAGEMENT PLANNING

A fire management plan is a document, which discusses all of the issues associated with fire in a particular area. It may form part of a comprehensive management plan for the protection of bushland. The manager of a transport corridor is encouraged to write and implement a fire management plan. Many stakeholders may be available to provide expertise and to assist in the development of the plan.

In planning fire management for remnant vegetation areas, it must be remembered that many initiatives designed to reduce fire hazard also reduce environmental quality. Similarly, some initiatives to protect the environment can result in an undesirably high fire hazard. It is therefore important that all parties who have a vested interest in the management of the roadside are involved in planning the best possible solution to this conflict of interest between the potential for degradation to the environment through fire prevention measures and the damage caused by fire.

ROLE OF STAKEHOLDERS

There are a number of stakeholders with an interest in the management of road or rail side vegetation, and it is important for all stakeholders to consult with each other before undertaking any activity that may impact the road

verge or rail reserve. Decisions about all roadside activities, such as roadside burning, must involve the relevant managing agency.

- Main Roads WA manage the land bordering most highways and major roads throughout Western Australia.
- CALM manages many roads contained within larger reserves.
- Local Government manages all other road verges.
- Westrail manages all rail side reserves
- Landowners may have an interest in the management of the road/rail reserve adjacent to their land
- Local conservation groups may have an interest in the management of road and rail reserves.
- Volunteer Fire Brigades can provide advice about fire management and may undertake burning at the request of the managing agency.
- Tourist groups may have an interest in the visual amenity of the roadside
- Facilities managers may have infrastructure contained within the road reserve (eg underground cables)

It is important that all stakeholders are involved in the consultative process, and that everyone works together to ensure the best outcome for the ecology of the roadside vegetation community.

THE PROBLEMS AFFECTING TRANSPORT CORRIDORS

The 'long and narrow' linear shape of road and rail reserves introduces many problems for the conservation of natural vegetation.

Weed invasion into the native vegetation is a significant problem, which can be exacerbated by an inappropriate fire regime. Burning or mowing to remove weeds has the potential to destroy significant amounts of remnant vegetation.

Clearing of a strip, say for a firebreak or road widening, may remove a considerable percentage of the vegetation.

Fires starting on the roadside are an ongoing problem, with a significant number of bushfires originating beside the road. Carelessness by the travelling public appears to be the main cause of these fires.

On railway lines the risk of fires starting by carelessness is less, but sparks generated from a train or by track maintenance are potential sources of fire.

ISSUES IN FIRE MANAGEMENT

Fire Regimes

Some ecosystems have evolved to survive fire and some plants may even require fire to regenerate. However, in linear reserves, the influence of disturbances and weed invasion on bushland must be considered carefully when deciding whether planned burns are appropriate.

Many native plants are able to survive or recover from fire by **resprouting** from buds beneath their bark or their rootstock, **germinating from seeds** stored on the plant or in the soil, or are able to re-establish in an area by **recolonisation**. Most plants and animals are favoured by long periods without fire. Obligate seeders, such as some *Banksia* species, must be subjected to fire or smoke before releasing and germinating seed. Other species, such as Rottneest Island Pine (*Callitris preissi*) are 'fire-shy' and the population may be killed by fire.

However, it is the **fire regime** that is important in the survival or destruction of the vegetation community. The fire regime includes

- Frequency of fire
- Time of year in which fires occur
- Intensity of the fires
- Distribution of the fires (mosaic pattern)

Fire frequency

A fire regime where too-frequent fires occur may cause a change in the vegetation structure or localised extinction of a plant species. For example, where a plant has grown from seed after a fire, but has not matured enough to set seeds itself is again involved in a fire, the seed stocks in the soil are depleted. Repeated fires may completely remove that plant species from the community.

If a seeder plant is killed by fire, it will regenerate from seeds stored on the plant or in the soil. To replenish the seed bank, the seedlings must be able to reach maturity, flower and set more seeds. Different seeder species need a different length of time between burning. For example, kangaroo paws need at least two years to produce more seed. Tree species such as wandoo may take up to 12 years to produce enough seed to ensure the survival of the population. Weeds such as Wild Oats, Veldt grass and Wild Turnip produce copious seed annually, and have the capacity to take over from native plants.

Burning too frequently, at the wrong time of the year and at the wrong fire intensity encourages weeds and eventually eliminates native plants.

Fire seasonality

Long narrow strips of vegetation such as are found on roadsides in agricultural areas are particularly vulnerable to seasonal stress, and this

increases in intensity in lower rainfall areas. Spring burns subject regenerating vegetation to a long waiting period before the next effective rainfall. Seeds which may have fallen in the ashbed may be destroyed by pests before they can germinate. Wind may erode the bare soil and remove both seeds and ashbed nutrients.

Windblown seeds of weeds such as grasses blow onto the bare area from surrounding land.

Spring burning is potentially detrimental to native vegetation on narrow strips such as roadsides, especially in low rainfall areas.

Fire intensity

Fires of different intensity favour regeneration of different plants. Some plants need an intense fire to open their fruits or crack their seed coats. Others respond better to a cool burn. Intense fires may damage or kill mature trees.

Low intensity fires may leave patches of unburnt material that can be a seed source or an animal refuge. Conditions for burning must therefore be carefully selected to provide maximum benefit to the plants to be regenerated.

Weed Invasion

Perhaps the major threat to the ecology of road and rail side vegetation communities is invasion by weeds. Weeds include grasses and woody weeds, and include both declared and environmental weeds. Weeds are good at invading disturbed ground, and are often colonised into an area after fire. Many weeds are also better at recovering after fire than the native vegetation. This causes a vicious cycle where weeds contribute to the fuel load, which carries more fires, which helps more weeds to grow...

This means that before any planned burning is conducted on roadsides, there needs to be a comprehensive assessment of the potential to make the weed problem worse.

In many cases, a different method of reducing the fire hazard may be preferable. Agriculture WA and the Environmental Weeds Network can advise about methods to reduce weeds without burning.

Fires starting on roadsides

Fires often start on the sides of roads eg City of Cockburn records

The presence of exotic weeds such as grasses, watsonia or wild turnip increases the roadside fire hazard.

Flammability – most roadside weeds ignite more easily than do native plant fuels

Fuel availability – Weeds such as wild oats germinate, grow and die in one year, quickly becoming fuel for a bush fire. Depending on climate and growth rates, native plants take much longer to reach this state.

Continuity of fuel bed – Native plants usually have gaps between them. Weeds produce a continuous fuel bed, permitting a fire to spread quickly. Any disturbance of the soil or vegetation on the roadside increases the weed component and so increases the fire hazard of that roadside

Visual amenity

The visual amenity of roadsides is important, especially in areas where roads are often used by tourists. Fire management should not impinge on the visual amenity of the roads. For example, planned burning should only occur on one side of the road in any one year, and not over long distances of the roadside.

Firebreaks

Many land owners have traditionally ploughed or cleared a strip on the road side of their boundary fence as an aid to limiting the spread of a fire. Although the value of those strips as firebreaks is debatable they may provide access in case of fire and also for management activities such as herbicide use or slashing.

In many agricultural areas of the state, the road reserves are relatively narrow, leaving only a thin strip of native vegetation on the roadside. This narrow strip may be the only remaining native vegetation in an area completely cleared for cropping or pasture.

Fire breaks are a form of disturbance which provide excellent sites for weed growth

Fire breaks should not be permitted on narrow (1 chain or 20m) road reserves

On wider road reserves when the width of the roadside vegetation strip is greater than 20m and, in the opinion of the roadside manager, a firebreak is necessary for the protection of the roadside vegetation, then one could be authorised.

- The reserve manager must authorise construction and maintenance of all firebreaks
- The width of a firebreak should be no wider than 3m
- Firebreaks should only be provided in degraded areas of vegetation
- Firebreaks should only be provided in roadsides where the vegetation or grass width is greater than 20m.
- The potential for the spread of dieback diseases during construction and maintenance work must be considered and managed where necessary.

If firebreaks have previously been constructed on narrow road reserves, or very wide breaks previously constructed, the reserve manager may wish to rehabilitate these with local native plant species.

The ecological value of roadside vegetation should be taken into account when deciding where to put firebreaks. For example salinity.....Fire breaks for the protection of adjacent values, for example crops, should be constructed within the property where the value is located.

Decisions on burning or firebreak construction should be made on a case-by-case basis

Firefighting considerations

Roads useful as fire control lines during response activities – safe and trafficable

Environmental considerations

Erosion

The loss of top soils as a result of the creation of mineral earth breaks reduces the value of the area. To reduce erosion, the area considered for a firebreak should be slashed rather than ploughed.

Dieback

Mineral firebreaks should not be considered in areas within a diseased area, unless the appropriate cleaning equipment is available .

Hydrology

In the planning of mineral earth firebreaks, consideration needs to be made for the channelling of water run off.

Vegetation continuity

Where the linear reserve abuts a larger area of native vegetation (whether reserve or private property) consideration about the impact of a firebreak on the continuity of the bushland should be made before constructing firebreaks. For example, a firebreak may help weeds to become established within a continuous area of bushland, when an alternative alignment may help to keep weeds out of the bushland

Fuel breaks

Where possible, landowners should be encouraged to maintain property access tracks and driveways free of weeds so that continuous fuels on the roadside are broken

Hazardous fuel level, threatening life or property value

High levels of bushfire fuels on the road reserve may contribute to bushfires threatening life or property values. Crops adjacent to the road or rail reserve are particularly at risk

Fire protection works might include:

- grass slashing;
- firebreaks;
- weed spraying; or
- pruning or other selective clearing
- coordinated fuel reduction burns.

Property owners around the State need to be aware, however, that none of these works can be undertaken on a road verge without the involvement of the manager of the verge - either Main Roads WA or the relevant Local Government.

Planned Burning

Road and rail managers often receive pressure from adjoining land holders to burn the vegetation in order to reduce the fire hazard.

Degraded verges

Where there exists little or no natural vegetation and weeds and foreign grasses predominate – burning may be undertaken where necessary, provided that isolated stands of native vegetation are protected against damage from fire

Partially degraded verges

The native vegetation is under siege, perhaps as a result of past burning practices. Weeds and native vegetation exists side by side in varying proportions – burning should not be undertaken, as any burn is likely to favour the weed populations.

Well conserved verges

Almost complete cover of native vegetation, with minimal weeds being present – burning may be undertaken if not alternatives are possible, but care should be taken to minimise weed invasion as a result of the burning.

Refer to RCC mapping program

In the majority of cases, burning the vegetation only increases the fuel loading in the long-term, by increasing the weed loading.

Before burning the roadside, question whether it should be done at all. All alternative methods of fire hazard reduction should be examined as a prerequisite to any planned burning.

Burning of well conserved roadside vegetation to reduce a perceived fire hazard is rarely necessary.

Occasional burning of roadside vegetation may be required for regeneration of aging native plants or as a weed control measure prior to further works.

THE EFFECTS OF BURNING ON NATURAL VEGETATION

Destruction

In the more closely settled areas, where frequent and regular burning is carried out, there is conclusive evidence of a reduction and in most cases the ultimate destruction of native flora. The natural seeding and propagation of the plant community is disrupted and complete regeneration may be delayed or prevented.

Grass Invasion

Frequent burning destroys natural vegetation which is replaced by foreign, vigorous and aggressive grasses. This in itself greatly increases the flammable material and the need to burn. Hence the stage is set for a vicious cycle of annual burning needs to satisfy property protection.

Regeneration

To date, our knowledge is limited concerning the effects controlled burns have when used as a tool to assist the regeneration process. It is known, however, that given time and protection from fire, native species will return providing competition and ultimately displacing foreign grasses.

THREAT TEST

- Is there heavy fuel loading of highly flammable fuel?
- Is there life or property at risk from a fire starting on the roadside?
- Is it impossible to adequately protect the property in any other way? (eg by firebreaks inside the farm boundary or around buildings, or mowing areas around crops etc)
- Are there any other methods of reducing the fire threat from the roadside, eg by mowing, removing dead wood, or the use of weed specific herbicides?

In areas of high fuel loading that are adjacent to life and property, it may be appropriate to burn small patches of the bushland in a mosaic pattern. This allows some areas of bushland to remain unburnt at all times, while reducing the overall fuel levels.

However, this should be subject to the following :

- Burning of roadsides should only be carried out if alternative methods are unavailable or unsuitable.
- Consultation with all stakeholders prior to the burn.
- The reserve manager must authorize all planned burning
- Planned burning is to be followed by appropriate weed control operations.
- A comprehensive written prescription, stating the objectives of the burn and methodology to be followed, must be produced and kept in the landowner/managers office and the local fire station.
- The person in charge of the fire being be competent in prescribed burning (preferably having completed AFAC Module 3.17—*Prescribed Burning 1*).
- Adequate resources being available (including personnel, machinery, equipment and vehicles) on the day of the burn.
- Compliance to Local Government requirements (including: Restricted and Prohibited Burning Times, obtaining a 'Permit to Burn the Bush', and notification of neighbours).

Where fire is being used on the adjoining land for agricultural purposes (for example stubble burning), the fire should be prevented from spreading to the roadside vegetation.

During wildfire operations, Fire Control Officers retain the right to backburn from the road in order to halt the spread of wildfire.

FIRE PROTECTION IN URBAN AREAS

In metropolitan urban areas, bushland often forms 'islands' of areas of remnant vegetation amongst a 'sea' of residential and industrial development. These island areas of bushland provide a substantial opportunity for conservation of biodiversity, often protecting threatened ecological communities.

Fire management of urban bushland reserves should be looked at in a holistic manner, with the bushland reserve, adjacent areas of bushland and road and rail reserves all included in the fire management plan.

Many small areas of bushland, such as Sir Frederick Sampson reserve in the southern suburb of Sampson, use a mown area of grassland on the road verge as the firebreak around the bushland.

In another example of this holistic approach, in a slightly larger area of urban bushland, the Talbot Road Bushland in Stratton, a review of fire management in the bushland resulted in the degraded weed-infested road verges being slashed to provide a low fuel load area adjacent to bitumen roads. The original "around the boundaries" firebreaks are being rehabilitated to help reduce the impact of weed invasion on the bushland.

FIRE PROTECTION IN AGRICULTURAL AREAS

In agricultural areas, bushland often forms 'islands' of areas of remnant vegetation amongst a 'sea' of agricultural crop-lands. The clearing of extensive areas has resulted in the roadside verges being a major remnant of the natural vegetation.

Roadsides also form vital linkages between isolated areas of bushland, allowing animals and birds to migrate along the verge vegetation.

FIRE PROTECTION IN PASTORAL AREAS

Pastoral areas are somewhat different to agricultural areas in that the majority of native vegetation is still intact and road reserves are much wider. Vegetation in the Kimberleys can grow rapidly in the wet season and produce abundant biomass which can be a fire hazard during the dry season. As pastoral lease areas are contiguous with roadsides, there is little opportunity to provide fire breaks which are likely to be effective. In addition it is believed that many fires are started from roadside areas where travelers stop and light camp fires.

As with agricultural areas, a three metre fire break is unlikely to stop a fire spreading, but may allow better access for maintenance and can provide

some protection for fences. Until recently, the protection of fences through the use of fire breaks has not been an issue, as only limited areas were fenced. As more fences are installed and begin to age, their maintenance is becoming a serious problem. Many pastoralists are seeking to extend the life of their fences by protecting them from the heat of a bush fire. Officially Main Roads discourages the provision of maintenance strips on the roadside of a fence due to the possible impact on drainage sensitive vegetation (eg mulga) caused by potentially concentrating flows and the potential for land degradation/erosion.

In spinifex country, the possible impact on drainage sensitive vegetation is less likely to be important. In addition regeneration of spinifex by burning is required each five to seven years. Pastoralists in spinifex country where drainage sensitive vegetation is not present may install a maintenance strip on both sides of their fence prior to prescribed regeneration burns on their land in order to protect their fences.

In certain country these issues might be resolved by slashing the vegetation rather than grading, but in the absence of definitive information Pastoralists should be advised that Main Roads officially discourages the installation of maintenance strips. If they choose to ignore this, they will be liable for any erosion impacts. In addition all native flora is protected under the Wildlife Conservation Act (1950). If the installation of the maintenance strip produces a vegetation drainage shadow, the pastoralist may be increasing their liability under this Act.

Burning sections of roadside may be necessary to provide low hazard areas in case of a wildfire. Burning should not be carried out more frequently than every three to four years in any area and preferably not more often than every six to seven years. For protection of the environment and for visual amenity purposes, burning should be confined to one side of the road, and short sections of the roadside should be burnt in any one season.

In all cases, prior to installing firebreaks or burning the roadside, talk to your local Fire Control Officer and the manager of the road reserve (Main Roads or Local Government).

ROADSIDE BURNING POLICY

FESA supports the Roadside Conservation Committee's Burning Policy

- 1 Roadside burning should not take place without the consent of the managing authority.
- 2 Local Governments should adopt local laws to control roadside burning.

3 Roadside burning should be planned as part of a Local Government Fire Management Plan.

4 Only the verge on one side of a road should be burnt in any one year.

5 When designing a Fire Management Plan, the two principles which must be kept in mind are the ecological management of vegetation and the abatement of fire hazard.

6 Firebreaks should not be permitted unless the width of the roadside vegetation strip is greater than 20 metres.

7 Fire breaks on any road reserve should be permitted only when, in the opinion of the road manager, one is necessary for the protection of the roadside vegetation. The road manager shall specify the maximum width to which the break may be constructed.

8 In the case of any dispute concerning roadside fire management, the Bush Fire Service should be called in to arbitrate.