DRAFT GUIDELINES

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FIRE MANAGEMENT PLANNING FOR ROADSIDES

A Guide For Transport Corridor Managers, Fire Officers, Conservation Groups and Adjoining Landowners

Adapted from document by Sarah Davis 2001

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

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INTRODUCTION

Used

Fire in the Australian environment intro

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 landowners' concerns about fire hazard and the effective management of the conservation values of bushland remnants on roadsides.

THE PURPOSE OF THIS GUIDE

Used

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

This section has not gone into the "new" document (14th March 2006).

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.

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 – expand.

In agricultural areas, bushland often forms 'islands' of areas of remnant vegetation amongst a 'sea' of agricultural croplands. 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 MANAGEMENT PLANNING

Used

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 – expand. 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

Used

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 and Declared Rare Flora
- Local Government manages all other road verges
- WestNet Rail manages all non-metro 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)
- RCC?

Is there some way to box this up?

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

Used

The 'long and narrow' linear shape of road and rail reserves introduces many problems for the conservation of natural vegetation, known as "edge effects".

This shape means that most of the vegetation is vulnerable to the impacts of the elements, such as wind, wind-borne particles (eg sand), temperature and solar radiation. It also means that weeds can invade the entire remnant very easily.

Weed invasion into the native vegetation is a significant problem. This is often exacerbated by an inappropriate fire regime, as frequent burning encourages weeds. Burning, mowing or spraying to remove weeds also has the potential to destroy significant amounts of remnant vegetation, thus careful management is needed.

Clearing of a strip for a firebreak or road widening may remove a considerable percentage of the vegetation on these already very thin strips of vegetation. This leaves the remaining vegetation even more susceptible to "edge effects", and can render that strip of vegetation unviable as habitat for most fauna. This is particularly relevant on a 20 metre or 1 chain road reserve.

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

Used

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 Rottnest 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 ash bed may be destroyed by pests before they can germinate. Wind may erode the bare soil and remove both seeds and ash bed 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. Other 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 elected to provide maximum benefit to the plants to be regenerated.

Weed Invasion

Used

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 thrive on disturbance and thus are often the first to colonise an area after fire. Many weeds, particularly grasses, 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…
Diagram of fire cycle

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. Examples?

Fires starting on roadsides

This section not in "new" document 14th March 2006
This section needs lots of work.
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

This section not in "new" document 14th March 2006
Put this section with habitat mosaics?? Or perhaps an "others" section.

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

Used

Making and maintaining a firebreak on the boundary of a property is a legal obligation of landowners in WA. Many landowners have traditionally done this by ploughing or clearing a strip on the outside of their boundary fence in order to protect their fence and increase their cropping or grazing area. However, on narrow road reserves, this seriously impacts on the quality and quantity of the native vegetation on the roadside, and usually makes it unviable as habitat. Thus, firebreaks 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.

Firebreaks are a form of disturbance which provide excellent sites for weed growth so by confining firebreaks to the paddock, the area of native vegetation that remains undisturbed is greater.

- 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 occur in degraded areas of vegetation
- Firebreaks should only occur in the road reserve where the native vegetation or grass width is greater than 20m and the firebreak would protect the native vegetation
- 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. This will help to provide some competition for weed species.

The landscape and ecological services of roadside vegetation should be taken into account when deciding where to put firebreaks. For example, the remaining vegetation may play an important role in maintaining water tables and therefore salinity and/or form an important corridor for faunal movement between remnants. Firebreaks 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

This section not in "new" document 14th March 2006

Roads are useful fire control lines during response activities, as they form an existing and known mineral firebreak that is safe and trafficable and usually at least 5 metres wide. Native vegetation can significantly add to the value of this barrier as it is less flammable than annual grasses and acquires fuel loads at a much slower rate. Native, woody, vegetation also burns at a much slower rate than annual grasses and can thus give a longer window of opportunity to control the fire.

Is it worth going into wind here?

Environmental considerations

Used

There are several environmental considerations that are necessary to take into consideration when establishing a mineral firebreak. This includes erosion, weed infestations, dieback, hydrology, vegetation continuity and fuel breaks.

Erosion

Used

The loss of topsoil 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 or sprayed rather than ploughed.

Dieback

Used

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

Hydrology

This section not in "new" document 14th March 2006

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

Vegetation continuity

Used

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

This section not in "new" document 14th March 2006

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. This will help prevent fires that are traveling along a road reserve.

Hazardous fuel level, threatening life or property value

This section not in "new" document 14th March 2006

This is giving the wrong message

High fuel loads 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;
- Pruning or other selective clearing; and
- 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

Used

Road and rail managers often receive pressure from adjoining landowners 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

In areas where native vegetation is being slowly overwhelmed by weeds and annual grasses, perhaps as a result of past burning practices, burning should not be undertaken, as any burn is likely to favour the weed populations.

Well conserved verges

Where almost complete cover of native vegetation exists with minimal weeds present, burning may be undertaken when there is no alternative. However, care should be taken to minimise weed invasion as a result of the burning, as the resulting conditions will favour weeds.

Where local government is in doubt as to the conservation value of the roadside, they can refer to the conservation values mapped by the RCC, provided that they have it.

In the majority of cases, burning the vegetation only increases the fuel loading in the long-term, by increasing the weed loading. Burning of well conserved roadside vegetation to reduce a perceived fire hazard is rarely necessary. However, the occasional burning of roadside vegetation may be required for regeneration of aging native plants or as a weed control measure prior to rehabilitation or restoration works.

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. Assessing the fuel load and the potential for fire risk.

THE EFFECTS OF BURNING ON NATURAL VEGETATION

This was not used in "new" document 14th March 2006

Destruction – grass invasion – regeneration – mosaic – wildlife?

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.

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

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

Wildlife?

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 must 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; and
- 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 back burn from the road in order to halt the spread of wildfire.

FIRE PROTECTION IN URBAN AREAS

This was not used in "new" document 14th March 2006

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, a review of fire management in the in a slightly larger area of urban bushland, the Talbot Road Bushland in Stratton, 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 PASTORAL AREAS

This was not used in "new" document 14th March 2006

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 Kimberley 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 firebreaks that are likely to be effective. In addition, it is believed that many fires are started from roadside areas where travelers stop and light campfires.

As with agricultural areas, a 3 metre firebreak allows better access for maintenance and can provide some protection for fences. Until recently, the protection of fences through the use of firebreaks has not been an issue, as only limited areas were fenced. However, 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. Main Roads discourages the provision of maintenance strips on the roadside of a fence due to the possible impact on drainage sensitive vegetation (e.g. 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 some areas 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 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 and under the clearing regulations.

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

Used

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 that must be kept in mind are the ecological management of vegetation and the abatement of fire hazard.
6. Firebreaks should not be permitted on roadsides unless the width of the roadside vegetation strip is greater than 20 metres.
7. Firebreaks 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.

THREAT TEST

Used

- Is there heavy fuel loading of highly flammable fuel?
- Is there life or property at risk from a fire stating on the roadside?
- Is it impossible to adequately protect the property in any other way? (e.g. 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, e.g. by mowing, removing dead wood, or the use of weed specific herbicides?