

## Cooperative management of grasslands for fire safety and the environment

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### Abstract

Protection of the environment, and ensuring the safety of the community from wildfire, are two key goals for the community and government.

Achievement of these goals can provide some challenges. Unless they are well-designed, works to reduce wildfire risks such as slashing or burning, may impact on biodiversity values. Conversely, most of our native communities are fire-dependent, and need fire to maintain viable populations.

South-west Victoria, Australia contains some of the most important remnant native grasslands in the state. Approximately one-third of these grasslands are located on roadsides. The grasslands are home to several endangered species including the Striped Legless Lizard (*Delma impar*).

For many years, volunteer fire brigades in south-west Victoria have conducted extensive burning in grasslands along rail lines and roadsides. Thousands of kilometres of roadsides are burnt each year.

This paper outlines what CFA brigades in Victoria's south-west are doing to work together cooperatively with agencies and the wider community to achieve both fire safety and biodiversity goals on grassland corridors.

The methods used by these brigades may help others to plan for cooperative fire management on a property, local or landscape scale.

### Introduction

South-west Victoria, Australia, is predominantly a pastoral area, situated on a volcanic plain.

The area has suffered some of the worst wildfires in the state's history. Six people died in the 1939 fires. In 1940, many homes were destroyed and 70,000 sheep killed. In 1944, fires burnt 440,000 ha. In 1977, 116 homes were destroyed and a number of people died. Fires on Ash Wednesday 1983, destroyed 157 homes and took ten lives.

The area is also noted for its biodiversity importance. Less than 0.15% of the original one million hectares of Western (Basalt) Plains Grasslands are left (Department of Sustainability and Environment (DSE) 2003). 28% of the remaining grasslands are located on roadsides (DSE 1999). Some are home to endangered fauna such as the Striped Legless Lizard (*Delma impar*).

Fire management in south-west Victoria focuses on management of fire fuels located on strategic roadsides. This work supplements work carried out by landowners or managers on their own properties to protect their assets and the wider community from wildfire.

Brigades have burnt strategic roadsides for road authorities for many years. This work is carried out to help prevent fires from starting and spreading, to assist their control and to make roadsides safer for road users in the event of fire.

Brigades have known that this work also helps to improve the environmental values of the grasslands.

Brigades in the south-west have been working with partners over the last six years to integrate management of grasslands for both fire safety and environmental outcomes.

This paper outlines what these brigades are doing to achieve this. While their work is mainly confined to grasslands on roadsides and other corridors, this process can be applied at the property level, and to different vegetation communities.

### Process and partners

All roadside fire management in Victoria's south-west is planned, implemented and reviewed through municipal fire management planning processes.

Municipal councils are responsible for developing Municipal Fire Prevention Plans (these are to be renamed 'Municipal Fire Management Plans'). The plans identify the risks to the community from fire, and treatments to manage these risks.

The process is managed by the Municipal Fire Prevention Officer, in accordance with the Country Fire Authority Act 1958, and the Municipal Fire Prevention Planning Guidelines (CFA 2003).

Fire management treatments are determined in consultation with brigades, the community, and road, rail, utility and environment organisations. The plans are formally endorsed at Municipal Fire Prevention Committee meetings and forwarded to the responsible council for approval and adoption.

Brigades have worked with DSE biodiversity staff and other partners to identify and document environmentally-responsible fire management treatments for each roadside.

They are guided by the Roadside Fire Management Guidelines (CFA 2001b) and other policy documents, including Roadside Management, Native Vegetation and Conservation Plans developed by road authorities, councils and catchment management authorities, and Flora and Fauna Guarantee Action Statements (including DSE 1993 and 2003, Department of Natural Resources and Environment (DNRE) 1999).

The key steps followed by brigades are summarised in Table 1.

*Table 1: Planning steps*

Plan	Identify the risks (fire safety and environment)	Consult with stakeholders
	Identify the objectives	
	Identify the treatments	
	Incorporate agreed risks, objectives and treatments in the Municipal Fire Prevention Plan	
Do	Implement the treatments	
Review	Check that treatments meet objectives	

*Adapted from CFA 2001b, Standards Australia and Standards New Zealand 2004a and 2004b*

Risks, objectives and treatments were reviewed with partners during a tour and a workshop held in January 2006.

The tour, the workshop, and a review of the science have confirmed what brigades have known for a long time:

- fire safety and the health of grasslands are both threatened by weed invasion and fire frequency,
- good environmental management means good fire safety (and vice versa), and
- burning can help achieve both fire safety and environmental outcomes.

The following sections of this paper outline the planning, implementation and review of the roadside fire management carried out by brigades to achieve these dual outcomes.

### Risks

Invasion of native grasslands by weeds, and fire frequency are key risks to both fire safety and biodiversity. Methods used to carry out fire management works can also pose risks to the environment.

#### *Weed invasion of native grasslands*

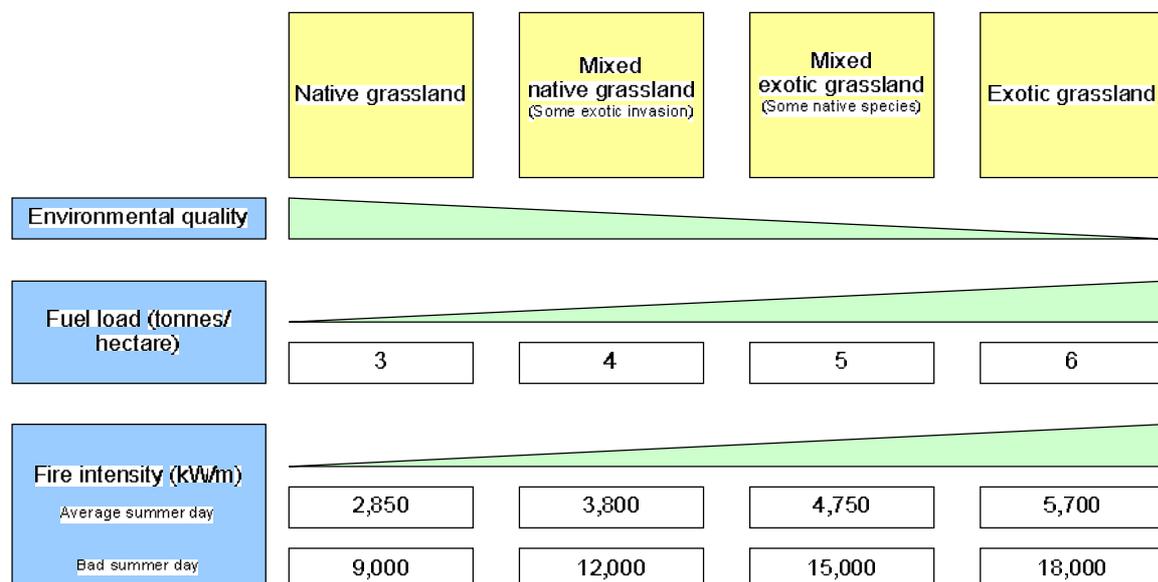
Weed invasion suppresses native vegetation species. It also changes the habitat for the wildlife it supports.

Weeds can also raise fuel levels substantially. For example, *Phalaris* can grow to two metres tall, with fuel levels of 29 tonnes/hectare (CFA 2004c). This contrasts with fuel levels of 6 tonnes/hectare measured for native *Themeda* grasslands during January in an average year.

The probability that a wildfire can be controlled decreases as fuel levels and the corresponding fire intensity increase. The probability decreases significantly at fire intensities greater than 3,500 kW/metre (McCarthy and Tolhurst 1998).

As shown in the table 2 below, under average summer conditions, fires that start in exotic grasslands are unlikely to be controlled, unless response is rapid. Under these conditions, there is a much higher probability that fires in native grasslands can be controlled.

Table 2: Grassland environmental quality and fire safety



Predictions are based on average summer day (high fire danger) and bad summer day (very high to extreme fire danger) scenarios for south-west Victoria. Weather parameters are based on local knowledge. Calculations are based upon CSIRO 1997a and 1997b. Pasture is 80% cured (CFA 2001). Fuel loads were determined from visual assessment of 'natural pasture'.

### *Fire frequency*

Lack of fire is one of the main factors that has contributed to the loss of native vegetation species in grasslands in the south-west and elsewhere (DSE 2003 and 2006a).

Without fire or other disturbance for 5 to 10 years, tussock grasses dominate the grassland and suppress other species, including lilies and herbs. As tussocks die off, weeds can invade the gaps.

Too-frequent fire may also cause loss of some species. For example, five year intervals between fires may be most beneficial for Striped Legless Lizard habitat (DSE 1993).

However annual burning is reported to have favoured native grasslands on roadsides (DNRE 1999). Morgan and Lunt (1999) note that most species-rich grasslands in south-eastern Australia have a history of frequent burning, with intervals of one to three years between burns.

### *Damage to habitat by fire management activities*

Key risks include:

- damage by traffic to soil crusts,
- damage by traffic to vegetation and other habitat (such as rocky Striped Legless Lizard habitat), and
- preparation of breaks needed to control the burns and to protect fences.

### **Objectives and treatments**

Responsible fire management aims to minimise impacts on the environment. Where practical, and where this will achieve fire safety goals, brigades also assist agencies to improve biodiversity.

*Table 3: Objectives and treatments*

<b>Objectives</b>	<b>Treatments</b>
Community safety is improved	Fuels are reduced by burning grasslands located on strategic roadsides on an annual basis, unless advised otherwise by DSE
Impacts of fire management on the environment is minimised	Ploughing is restricted to control lines three metres wide (unless otherwise approved by roads authority)
	Broad acre ploughing is no longer used to reduce fuels
	Herbicide use is restricted to control lines three metres wide unless otherwise approved by roads authority, or when applied by “wick wiper” as part of a weed control program (CFA 2004a and 2004b)
	Traffic through native grasslands is restricted to minimise damage to vegetation, rocky areas and soil crusts
	Burns are conducted in summer, rather than spring. This can help lizards to take refuge in soil cracks.
	Foam is not used to ‘black out’ burns
Grasslands are protected, and where practical, improved and extended	Sensitive areas are excluded from burning or other treatments
	High-quality native grasslands are burnt at intervals no longer than five years, or otherwise as advised by DSE
	Exotic grasslands are replaced with native species (CFA 2004c and 2004d)

## **Documentation of plans**

All risks, objectives and treatments, the person (or agency) responsible, and timelines are documented in a database and mapped electronically (CFA 2004e).

This system helps to ensure that all partners agree to the works and achievement of the objectives can be assessed.

## **Implementation, monitoring and review**

Subject to weather and resourcing, brigades burn over 2600 km of roadsides each year for land managers in accordance with the Municipal Fire Prevention Plan.

Formal monitoring of burns by brigades has been limited. However, a comparison of maps has identified a strong correlation between high value native grasslands and annual burning programs. This view is supported by research reported in DNRE 1999 and DSE 2003.

DSE are developing a fire ecology monitoring manual (DSE, 2006b). This will be used to develop local procedures for monitoring of environmental outcomes, and will assist review of treatments.

## **Conclusion**

Brigades in Victoria's south-west have been working with partners over the last six years to formally integrate management of grasslands on roadsides for fire safety and environmental outcomes.

Systems and processes for planning, implementing and reviewing environmentally-responsible fire management will continue to be improved, in conjunction with the community, local authorities and other partners.

Improvement will be assisted by the municipal fire planning process and the recently revised Fire Ecology Program (DSE 2006a and Fire Ecology Working Group 2004).

Brigades contribute around 24,500 hours each year to roadside management. The outcomes they have helped to achieve makes them one of the largest groups of environmental volunteers in Victoria.

The work of these brigades provides a good model for environmentally-responsible roadside fire management. It can also guide fire management at the property and statewide level.

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