Department of
Sustainability and
Environment

Using Fire
to manage our parks and forests

Australia is a dry and fire prone continent. The geographical location of Victoria, its vegetation and a climate of mild winters followed by warm summers, combine to produce one of the most severe fire environments in the world.

Fire, both as a natural event and its use by the Aboriginal people, has been significant in shaping much of our native flora and fauna. Journals of early European navigators contained many references to smoke sitings over the continent.

The characteristics of the smoke indicated that fires were used for cooking, keeping warm, and that other fires spread over large areas of land.

Many of our native plants, animals and ecosystems exhibit characteristics that reflect adaptations to natural stresses such as fire and drought.

The use of fire in land management has many applications. The term 'prescribed burning' refers to the use of fire to achieve planned land and resource management objectives.

On public land within Victoria the use of prescribed burning falls generally into one of three main categories:

- Fuel management
- Flora and fauna management
- Commercial forest management.

Prescribed burning is conducted at certain times of the year, and aims to achieve specific heat intensities and rates of spread, according to the desired management objective(s).

Victoria
The Place To Be

Bushfire fuel: leaves, twigs, bark and shrubs

Bandicoot habitat

Using fires to manage our parks and forests

Fuel management

In an average year, over 600 unplanned bushfires start in our national parks and State forests. While one quarter of these fires are started by lightning, the remainder are caused by human activity. The majority of human caused fires are due to arsonists, campfire escapes or escapes from burning off on farms adjacent to public land.

While every effort is made to prevent fires from starting, Victoria will always experience bushfires from either natural or human causes. These bushfires can threaten human life, property, assets and, at times, the environment. Some of these fires are difficult to control, in spite of the use of the latest technology and highly trained firefighters.

One way of protecting settlements and also limiting the spread and severity of bushfires is by strategically reducing the 'fuel' in our parks and forests. The reduction of fuels, such as leaves, twigs, grass, shrubs, bark or other vegetation, is referred to as 'Fuel Management'.

Fire behaviour is determined by weather, topography and fuel. Fuel is the only factor that can be altered before an unplanned fire starts. Once a fire has started, fire intensity and the speed with which the fire spreads are affected by the fuel load.

Methods of reducing fuel loads include mowing, raking, slashing or burning. Of these, only burning is feasible for larger areas.

Fuel reduction burns, low intensity burns or cool burns are all terms used to describe fires of low intensity used to remove the fine, more flammable fuel from parts of forests and parks. By reducing these fuels, a bushfire that either burns into a fuel reduced area or starts in one will have lower flame height, reduced intensity and will spread at a slower rate, making firefighting easier.

Ground ignition using a drip torch

Fuel reduction burns are sometimes also used to remove the stringy, fibrous and ribbony bark off the lower parts of some eucalypt trees. If this bark catches alight during a bushfire, it can be carried by wind as burning embers, setting spot fires ahead of the main fire.

Some types of forest (such as rainforest) are very sensitive to fire and the use of fire in them to reduce fuels is not an option.

Flora and fauna management

Fire has been significant in shaping the distribution and composition of much of Australia's native flora and fauna. Many species have developed specific mechanisms to survive periodic fire. Some even depend on it for critical life stages. The impact of fire on a given ecosystem will vary depending upon its intensity, season and the time since the last fire, as well as the species involved.

Prescribed fire is used in the maintenance of a number of our native ecosystems. Fire is used in the recovery and management of species and communities of both flora and fauna. It is often involved in the management of rare, threatened or pest species. The timing, frequency and intensity of these fires must be matched closely to the needs of species and their communities.

The use of fire in flora and fauna management is documented as part of the implementation of Victoria's Flora and Fauna Guarantee Action Statements. Action Statements draw on the current knowledge and may require the planned use of fire or its exclusion in relation to individual species or habitat. Where prescribed fire is required, a fire management specialist will be involved.

Flora

Fire is used in the recovery and management of a number of rare or threatened species and communities. For example, fire is used to regenerate ageing communities that rely on being burned for regeneration to occur. Such examples include:

- Buxton Gum *(Eucalyptus crenulata)* in the Central Highlands
- Heathlands in north-western Victoria and Wilsons Promontory National Park
- Native grasslands on basalt plains west of Melbourne and in North East Victoria.

Fire is also used to remove some pest plants and environmental weeds. For example, fire helps to deal with exotic grasses and invasion of Coast Wattle *(Acacia sophorae)* in heathlands. It also assists the control of self-sown exotic seedlings in native vegetation adjacent to pine plantations. In these cases, fire either destroys the unwanted plants or causes their germination so they can be identified and removed.

Eastern Barred Bandicoot

Desert Banksia found in Mallee woodland

Using fire to help establish a new forest following harvesting

Fauna

Since animals rely on vegetation for food, shelter and breeding requirements; the needs of both flora and fauna have to be integrated. Fire can be used to alter an aspect of an area so that the needs of specific fauna are met. For example, fire may be used to change an area for shelter or breeding requirements or to promote the growth of different types of vegetation for feeding requirements.

The complexity of managing an ecosystem to favour particular species or groups requires detailed ecological information. Prescribed fire is increasingly used for ecological purposes as scientists learn more about the needs of our plants and animals. Some current examples include:

- habitat regeneration for the Eastern Barred Bandicoot *(Perameles gunnii)* at Hamilton; and
- using fire to alter heath communities to accommodate the requirements of the Ground Parrot *(Pezoporus wallicus)* and Smoky Mouse *(Pseudomys fumeus)*.

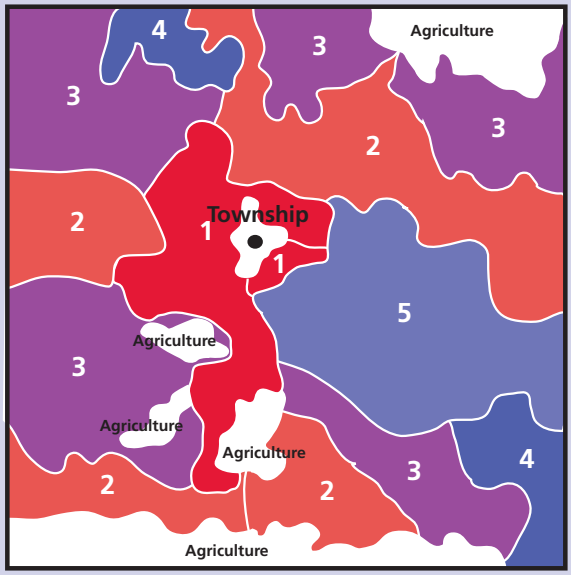
The use of fire in commercial forest harvesting

Fire is an efficient tool for providing appropriate conditions for native forest regeneration following harvesting of many forest ecosystems. For a number of vegetation types in Victoria it is one of the few regeneration options. These forest types have specific regeneration requirements, which can be satisfied by the use of fire of varying intensity.

Under favourable weather conditions, high intensity fire is readily achieved on harvesting sites, where large quantities of slash provide fuel for burning. This high intensity fire results in an ash bed surface, which provides a competition-free environment for germinating seedlings. Prescribed fire is the most common method of seedbed preparation for the regeneration of 'Ash' and 'high elevation mixed' eucalypt forests.

These forest types generally occur in areas with high elevation and high rainfall, where climate dictates that high intensity fire will only be achieved during the late summer-early autumn period. As most harvesting is conducted during the summer months, the opportunity for the safe conduct of prescribed burns is limited. At these times, vegetation at lower elevations can have a higher flammability than the areas being burnt. Hence skill is required to conduct these burns safely.

Low to moderate intensity fire is also sometimes used to remove debris in forest plantations following harvesting.



Prescribed fire – planning to get the balance right

All prescribed burns on public land in Victoria are conducted in accordance with a strategic Fire Protection Plan prepared with community involvement. In these plans, public land is divided into five zones. Priority setting for fuel reduction burning, habitat management and commercial forest operations is based on these fuel management zones. The extent and frequency of any burning program is also based on these priorities.

ZONE 1 ● covers areas where the need for fire protection is greatest. This zone typically abuts or surrounds areas where there is a bushfire threat to human life and property in human communities.

ZONE 2 ● provides strategic corridors that will act as barriers to the spread of bushfires by reducing their speed, intensity and the potential of spot fires to develop. These areas also assist firefighting operations, making suppression safer and more effective.

ZONE 3 ● provides an irregular mosaic of fuel reduction, which complements burning in other zones and allows for burning to achieve a range of broad-based ecological management objectives.

ZONE 4 ● allows for the use of fire for active management of specific flora and flora, either as individual species or communities that have fire regime requirements.

ZONE 5 ● the area is zoned for the exclusion of prescribed burning for a period of time nominated in the Protection Plan where there may be loss of economic, ecological or cultural values associated with burning.

Heathland habitat

The Smoky Mouse relies on fire to alter heathland habitat for food requirements.

Within the community there exits a range of views regarding the role of fire. These range from the belief that there should be no interference to natural fire patterns through to the belief that, because fire is a natural part of the forest's ecology, it should be used freely as a management tool. The perceptions by Australians of their environment continue to evolve. Fire was, is, and will remain, part of ecological Australia.

The right time to burn

Prescribed burns are usually conducted in autumn or spring when the weather is milder. In these seasons the behaviour of the fire is much easier to predict and manage.

Often, the number of prescribed burns planned in a given season exceeds the actual number achieved. This is due to seasonal variability in the weather and the fact that appropriate weather, available resources, fuel moisture and other prescribed conditions must all coincide before a burn in a particular area is conducted.

How are burns conducted?

The method used to burn is based on the size of the area to be burnt, prevailing weather, objectives for each burn and the availability of resources. Before burns are conducted, neighbours are notified and firefighters ensure control lines are established around the area to be burnt. Control lines may be natural features, such as streams, existing roads, or can be tracks cleared of vegetation by handtools or machinery.

Burns are usually started by ground or aerial ignition or a combination of both.

Ground ignition

The most common method of ignition is to use a handheld 'drip torch' – a canister of flammable liquid, fitted with a wand, a burner head and a fuel flow control device. The use of a drip torch is usually suitable for fuel reduction burns of up to 400 hectares or for windrows and harvested coupes of up to 40 hectares.

Other ground ignition methods include a flamethrower (fitted to the rear of a vehicle that can be used to burn edges of tracks) and electrical ignition (using electric circuits or detonators) to burn heavy fuels that sometimes result from forest harvesting.

Aerial ignition

Aerial drip torches slung under a helicopter are commonly used to light high intensity burns on small areas that have been harvested.

Incendiary devices ejected from aircraft are commonly used for large-scale fuel reduction burns. By adopting this method, areas of up to 4000 hectares can be treated in one day.

What about smoke in the air?

Prescribed burns are conducted with a view to minimising the contribution of smoke to the smog in urban areas. The Department of Sustainability and Environment liaises with the Environment Protection Authority (EPA) and the Bureau of Meteorology during smog events to minimise the impact of smoke.

Fire as a firefighting tool

Fire is not only used as a management tool, but can also be used to fight fires. When fighting bushfires, firefighters use a variety of strategies to control the fire. One tool is the use of fire to fight fire – backburning.

Backburning is used to burn fuels (vegetation, sticks, dead leaves, etc.) ahead of the path of the main fire. Backburns are usually lit at times of the day or night when fire behaviour is more predictable. By removing the fuels ahead of the main fire, the main fire is slowed down or stopped. The fire lighting tools used are those used for prescribed burning. The choice will depend on the size and location of the proposed backburn.

Before firefighters are able to backburn, external control lines need to be established around the proposed fire edge. Control lines may be features such as roads, rocky outcrops and rivers. They may also be tracks cleared of vegetation by hand tools or machinery. These are later closed so that regeneration can occur.

For more information contact

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In 1984, a multidisciplinary study was established in the Wombat State Forest, 80 km north-east of Melbourne, to investigate the effects of repeated low-intensity prescribed burning in mixed eucalypt forest in Victoria. The study, which continues, includes the impacts on various aspects of flora, fauna, soils, tree growth, fuel management and fire behaviour. Relevant research reports can be found on DSE's website.

www.dse.vic.gov.au/fires

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