Issue 09 - May 2009

Wombat Forestcare Newsletter

The seasons are changing and although the bushfire period may be over for now, fires and how to manage them will continue to be an important element of living near bushland and forested areas of southeast Australia. It is a subject worthy of considered discussion and action. Presented here are several articles looking at the effectiveness and impacts of various fire management strategies on biodiversity. I'm sure much would be gained by better implementation of what we already know... Tibor Hegedis *(editor)*

Effectiveness Of Prescribed Burns

By Glenda Holmes

When I was asked to write an article on the effectiveness of fuel reduction burns, I agreed, thinking it would be a good opportunity to learn about this complex issue. It certainly is complex and with great scope for controversy... and so much has already been written!

Unfortunately, many loud voices have spoken since the recent horrific wildfires, blaming the greenies for their opposition to fuel reduction burning. These claims are offensive and groundless. No mainstream environmental group in Australia (and most greenies that I know of) are opposed to prescribed burns which are scientifically targeted and managed.

There are instances where fuel reduction burns have been effective in assisting retardation of fires, but it is unlikely that any amount of fuel reduction burning could check the fury of wild fires, such as occurred on 7th February, 2009.

Fuel reduction burn, Domino Road near Trentham. *(photo by Tibor Hegedis)*

There is a lack of research into the effectiveness of burning 150,000 hectares of public land in Victoria during 2008. What happens to the biodiversity in areas that are burnt too frequently but which never face a wildfire?

In the analysis of Black Saturday, we must avoid a simplistic knee-jerk reaction to a problem which is far more complex than our anthropocentric nature often allows us to be. There has been a tendency to work towards protecting our built assets at the expense of our natural assets.

One of my favourite pastimes is to walk in the Wombat. It saddens me deeply when I see parts of the forest where prescribed burns have been too intense. Mosaic or "patchy" burning is important to provide unburnt patches as areas of refuge for small animals, birds, lizards, frogs and insects. Unfortunately, it is common to see extensively burnt sites where a mosaic is rare.

Sedgy riparian vegetation, important water catchment areas, have been allowed to burn. Some wetland plants, such as Ghania, take several years to produce seed following burning. Sedgy Riparian Woodland is listed as Vulnerable, meaning that more than 70% has been lost since European settlement.

The Wombat State Forest is headwaters to six major rivers (Coliban, Loddon, Campaspe, Lederderg, Werribee and Moorabool) and therefore a crucial water source for Victorian communities. This raises questions, in relation to prescribed burning, regarding carbon storage and water supply, particularly as our climate becomes hotter and dryer.

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Some of the best and most recent commentary I have read is from Andrew Campbell (trained forester and recently retired CEO of Land & Water Australia). Andrew says, "Few people have made the connection between fires and water supplies.

If we did fuel reduction burns over the areas and on the frequencies advocated by the "it's all the greenies' fault" brigade, then water yields from forested catchments would drop, CO_2 emissions would increase, species composition of forests would change and some species would disappear." (see www.triplehelix.com.au)

An extensive submission to the "Inquiry into the Impact of Public Land Management Practices on Bushfires in Victoria" was made by Jenny Barnett, Fire Ecologist with the Victorian National Parks Association. (Jenny was tragically killed in the recent Kinglake fires.)

In the VNPA submission, Jenny stated, "Far more resources are essential to monitor the effects of fire (both prescribed and wildfire) on biodiversity, including flora and fauna surveys before and after conducting prescribed burning". (see www.vnpa.org.au)

Quoting Andrew Campbell again, "The problem is understanding the appropriate scale, pattern and frequency that will balance ecological health with (changing) fire protection objectives. This should be the subject of much more research."

There is a great deal more to learn but, put simply, humanity is part of the ecosystem – we have to learn to live in the environment not apart from it. If we don't learn to understand and care for the system that sustains us, biodiversity will continue to deteriorate and all of life, including humanity, is threatened.

I've learned lots from my reading. It is important to be as informed as we can – for all of our sakes and the environment. We need an objective and unemotional debate. ■

The Impacts Of Fuel Reduction Burning On Biodiversity

By Murray Ralph

Fire is a natural component of the landscape in many areas of Victoria. In fact Victoria is often cited as one of the most fire prone areas on the planet. Traditional patterns of aboriginal burning have also played a major role in the extent of fire in some parts of the landscape.

However, it should be recognised that the frequency and intensity of fire (fire regimes) was actually very variable across different ecosystems and habitats. Victoria has about 300 different ecological communities, many with differing fire regimes. At one extreme, rainforests and wet forest experienced fire very infrequently. At the other extreme, native grasslands tended to burn at less than five year intervals.

Despite this there is a commonly held misconception that the entire landscape was regularly subjected to low intensity fires by the aboriginals and our ecosystems were adapted to this regular burning. However, the patterns of aboriginal burning also varied markedly across different ecosystems.

Some areas, such as native grasslands tended to be burnt frequently to promote certain plant foods and to assist with hunting. Other areas, such as rainforest and wet forests, are thought not to have been burnt by aboriginals.

An area of Greater Glider habitat *that was heavily burnt near the Werribee River in 2007. (photo by Tibor Hegedis)*

The response of different ecosystem types to fire reflects the variation in natural and human fire frequencies. Grasslands and heathlands require frequent fire to maintain species diversity. On the other hand, other ecosystems such as rainforests and wet gullies can be severely damaged by fires and take many years to recover.

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In response to Black Saturday there have been many calls for significantly increased fuel reduction burning. However, not only will this not stop intense bushfires it will have very serious implications for biodiversity in many areas. It is the view of many scientists and environmental groups that even the current level of prescribed burns are doing serious harm.

Under current fuel reduction burning regimes, large areas of public land are burnt or proposed to be burnt every 4-10 years. For many ecosystems these frequencies are significantly shorter than the natural fire regimes with which these ecosystems would have evolved.

The start of a prescribed burn at Blakeville-Bunding Road. *(photo by Tibor Hegedis)*

Professor David Lindenmayer from the Centre for Resource and Environmental Studies, ANU considers that 'Fire regimes and the way they've changed are a major threatening process for biodiversity…' and that 'Australia has up to ten per cent of the world's species and many of those are threatened by altered fire regimes'.

Over the course of repeated prescribed burns, it is very likely that composition of native species in some areas will become significantly modified. In relation to native plants, fire scientist Kevin Tolhurst states that "Repeated burning may therefore significantly deplete regenerative reserves and result in species loss if fires are more frequent than the time needed for plants to fully recover from the effects of being burnt."

Fuel reduction burning also results in the loss of habitat, reducing the ability of fauna to find food, shelter and areas for breeding. More intense prescribed burns also cause various degrees of injury and death to native animals. Wildlife rescuers from Wildlife Victoria, have seen numerous incidences where smoke inhalation has lead to pneumonia and death in Koalas and other canopy dwellers.

Kevin Tolhurst also outlines the need for a mosaic of unburnt patches within prescribed burns to provide refuge for animals, reptiles and insects, and to enable them to recolonise the site. As vegetation in gullies is particularly important habitat for native fauna, Tolhurst specifically recommends that gullies should remain largely unburnt as refuge areas.

However, this is rarely achieved and many burns leave very little habitat. As Professor Lindenmayer states "…most natural fires are very patchy, they leave a very patchy environment and that's critical to the recovery of biodiversity and the environment after fire. The big difference with backburning and human fires is that they tend to be very uniform and that creates a very homogenous environment which is not so good for many species to recover, or recover quickly from."

Widespread fuel reduction burning may also be creating a drier and more flammable forest. A study in NSW carried out over a twenty year period, 'Long-Term Effects of Repeated Prescribed Burning on Forest Invertebrates' by Alan York, points to an 18% reduction in top-soil moisture content in sites burnt every three years. Regular burning can also promote fire tolerant species therefore creating more fire risk.

Under the Code of Practice for Fire Management on Public Land it is a requirement to undertake ongoing monitoring of the effects of fire management on flora and fauna (Section 237, page 21). However, very little monitoring actually occurs. In fact, funding for biodiversity research at a State level has been significantly reduced over recent years.

Finally, if we are to increase fuel reduction burning this would mean doing more in Spring when wildlife activity is at its peak in terms of mating and nesting. It also means that wildlife will find it more difficult to find adequate food, water and shelter to get them through the drier summer months. ■

A Subterranean Solution? The Role of Fungi in Post-Fire Recovery

By Alison Pouliot

Hidden from view in the depths of the forest, beneath the soil surface, is a vast network of fungal mycorrhizae that may provide an important key to post-fire revegetation. Yet despite knowledge of the importance, occurrence and diversity of fungi, their role in forest ecosystem functioning and recovery following fire is little understood and still a rarely considered aspect of Australian fire-recovery management.

Anthrocobia muelleri fruits abundantly in autumn following fires. *(photo by Alison Pouliot)*

The February 2009 bushfires that destroyed large areas of Victoria's forests including swathes of the Wombat, will inevitably trigger many questions related to post-fire forest ecosystem recovery as well as existing approaches to forest management. One area that is often overlooked in most Australian fire ecology surveys and studies is the pivotal role played by fungi in forest recovery following fire.

Very little is known in Australia about fungal responses to fire. Fungi underpin all forest ecosystems and, in fact, nearly all terrestrial ecosystems through their roles in decomposition and nutrient cycling, as a food source for numerous animal species and by enhancing soil structure and nutrient uptake by plants.

Fungi are especially important to the viability and stability of the Wombat Forest's low nutrient soils (and those of Australia more generally). European and North American studies have extensively documented the importance of fungi as indicators of forest ecosystem health with many species recognised as being 'keystone species', the potential loss of which could cause substantial changes to ecosystem structure and functioning.

Changed fire regimes

Increases in the severity, frequency and extent of Australian forest fires in recent decades have inevitably resulted in more extreme effects on forest ecosystems. Increased fire temperatures may lead not only to the elimination or severe reduction of above-ground biomass, but also affect crucial below-ground physical, chemical, biological and microbial processes. Given that forest ecosystem sustainability occurs largely beneath the soil, heat penetration of soils that disrupt biological and mycological processes can critically affect forest recovery. The survival of fungi following soil heating is determined by various physical and chemical factors including soil water content and the duration and intensity of fire.

Fungi form mycorrhizal relationships with an estimated ninety percent of plants. In this mutualistic association, the fungus effectively extends the plant's root system enabling it to obtain inorganic nutrients and water from a greater volume of soil, while the plant returns the favour by supplying carbohydrates to the fungus. In addition to assisting in the capture and uptake of nutrients, mycorrhizae provide protection against pathogens as well as maintaining soil structure and buffering against moisture stress. As mycorrhizal fungi primarily inhabit the litter and organic soil layer, they are usually significantly affected by fire, with very intense fires often being lethal to both mycorrhizae and plant roots.

Recent fire ecology research in southwest Oregon, North America, showed that severely burned and disturbed forests lose their ability to rapidly form

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new mycorrhizal relationships. To assist in recovery, post-fire mycorrhizal inoculations were performed to improve mycorrhizal colonization of pioneering vegetation and improve the cover and nutrition of seeded native grass species.

Nutrient cycling processes are also affected by fire with the magnitude of these changes directly related to fire intensity. Severe fires can lead to changes in soil hydrologic functioning, degradation of soil physical properties, reduction of beneficial soil microbes and micro/macroinvertebrates, alteration of carbon/nitrogen ratios and nutrient losses through increased erosion and leaching or dentrification.

Australian fire-fungi research

As with many plant communities, fire favours some fungal species but has negative effects on others. West Australian fire-fungi impact studies have shown changes in fungal species composition following fires in Karri forests. Immediately following fires, fungal species diversity was reduced but abundance increased. Fungal community structure also differed significantly each year following fire for at least five years. Fungi are a challenging group to research as the fungal life occurs largely below ground and improved molecular techniques to measure fungi in the absence of fruit bodies as well as greater taxonomic knowledge are necessary to improve understanding of the relationships between fire and fungi *(Robinson & Bougher, 2003)*.

Some fungi species which show a preference for burnt areas include *Anthrocobia muelleri* and *Morchella elata*. These are sometimes called phoenicoid fungi (derived from the mythical Phoenix fire bird) which respond to changes in soil chemistry where ash temporarily increases soil alkalinity. Fire can stimulate both the germination of spores lying dormant in the soil, as well as the sclerotia of some species to produce fruiting bodies. It has also been suggested that heating can destroy many soil micro-organisms that are competitive with fungi, thus providing the fungi an advantage *(ANBG, 2009)*.

A. muelleri proliferate in the alkaline soil conditions following fires. They have been shown to fruit only in the first year following fires where the alkaline conditions provide a competitive advantage over other species *(DECWA, 2009)*. While some fungi are found only following the occurrence of fires, others which are found in unburnt areas may also show an increase in fruit production following fires such as the morel, *M. elata*. Morels are perhaps best known for their quality of edibility although foragers should also be aware of the poisonous 'false morels (genera *Verpa* and *Gyromitra)* lookalikes.

Morchella elata, an edible species, fruits in springtime in burnt areas. *(photo by Alison Pouliot)*

Fire is an integral component of the Australian forest ecosystems. While we still have much to learn about the ecology and taxonomic status of the majority of Australian macrofungi, the role of mycorrhizal fungi in the recovery of post-fire vegetation will hopefully attract more research and be incorporated in post-fire recovery management approaches. Meanwhile, keep an eye out in the Wombat for some tasty morels that will inevitably appear this spring following the fires! ■

A Different Approach To Managing Fire In The Landscape

By Murray Ralph

The devastating loss of human life and destruction of assets that occurred on Black Saturday has changed many people's lives in fire prone areas of Victoria. Although threat from fire has always been present, it seemed manageable. Now serious doubts exist about our capacity to survive fire and protect our homes and about how well prepared our communities really are for bushfires.

With global warming very intense fires will occur more frequently; fires that we do not have the capacity to prevent, or contain once they begin. In response to this we have to refine our approach to fire management, and focus more on how people and assets can prepare for and survive bushfires.

Undoubtedly many aspects of the current approach to fire management in Victoria work very well, including community education and communication systems, aerial fire detection and suppression and infra-red 'hotspot' mapping. The expertise of fire agency personnel and Country Fire Authority (CFA) volunteers is also very high and both do an excellent job.

So what needs to change?

Firstly, we must change planning legislation to stop houses or subdivisions being built in or very close to bush.

Burnt sign. . . of the times?
(photo by Tibor Hegedis)

Secondly, we must implement a range of measures to improve the capacity of our existing assets to survive fire. We need new regulations that also apply to existing houses in fire prone areas, such as mandatory sprinkler systems and shutters (or removable protective barriers) for windows. Financial incentives, such as rate or other rebates, grants and reduced insurance premiums, could be used to assist with these new regulations and encourage better fire management for properties.

Thirdly, we must change our approach regarding fire preparation. Currently only a small proportion of public resources for fire preparation are directed to reducing fuels immediately around houses, towns and hamlets. Instead public resources are mostly concentrated on reducing fuels in public forests that are often miles away from assets.

Presently, the Department of Sustainability and Environment (DSE) prepares detailed Fire Protection Plans for public forests and large areas are subject to fuel reduction activities every year. In the 2007-2008 financial year over 153,000 hectares of State Forests, State Parks and National Parks had fuel reduction burns.

In contrast, local councils, who also manage large areas of public land, generally commit few resources to fire management. Every council prepares a Municipal Fire Prevention Plan (MFPP), but most lack detail. For example, the Hepburn Shire MFPP (which is in a very fire prone area) was last updated in 2001, has little analysis on fire risks and no actions are outlined.

The extent of strategic fuel reduction activities carried out by the CFA is also limited as they tend to have more of a fire fighting focus. On private land, despite dramatic improvements over recent years, the extent of bushfire preparation still varies highly from resident to resident and occurs with very little regulation.

What all this means is that at landscape level we are actually applying the opposite approach to that espoused by fire authorities for private landowners i.e. that reducing fuels near houses each year is essential, and the closer the fuel is to a house the greater the risk it is. As a result many towns and surrounding areas contain a range of flammable fuels, yet these risks are currently not adequately identified or regularly reduced in a strategic manner.

To address this situation fire management should be fully integrated across all land tenures (as recommended by the Inquiry into the Victorian Bushfires 2002-2003) and the current fire management agencies should be merged into a single agency (Fire Victoria has already been suggested as a name).

This agency would coordinate fire management, develop regional Integrated Fire Management Plans and undertake the more specialist types of fuel management methods that require greater expertise.

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Forest and farmland after fires near Daylesford. *(photo by Tibor Hegedis)*

Although the CFA would be absorbed into this agency, volunteer fire brigades could continue as they currently do, and play a major role in fire response.

As part of an Integrated Fire Management Plans each region should be divided into Vegetation Management Zones. Zone One would be the area within town boundaries. Zone Two would be the area within 50-100m of town boundaries. Zone Three would be the areas 100-500m from towns and Zone Four would be the broader landscape. The exact delineation of Zones would vary depending on risk factors, such as vegetation type, likely direction of fires and slope.

Prescriptions for the management of vegetation and other fuels would be developed for each different zone. These prescriptions should be based on scientific evidence and a detailed analysis of the events of Black Friday, including setback distances for vegetation to reduce direct flame attack and radiant heat to houses (two of the major causes of houses burning down, with the third being embers).

But if these prescriptions are to apply, they should to all types of vegetation, not only native vegetation but also gardens (depending on flammability). Of course, the first fuels that should be targeted are the woody weeds, such as gorse, broom and blackberry that can be prevalent in or very close to some towns.

Where native vegetation must be removed all attempts should be made to minimise the extent of vegetation removal. For example, if understorey vegetation must be removed, at least retain clumps at certain spacings. We should also consider other options including ecological thinning of forests within 100-500m from towns, on the sides that fires are likely to come from.

So what of fuel reduction burning? As Andrew Campbell (former forester, DSE fire sector leader and CEO of Land & Water Australia) stated "There is a crucial distinction between managing fuels in the immediate vicinity of houses and townships, and the broadscale fuel reduction across the forest estate. I think the former is under-done and the latter is over-rated.'

One of the most respected fire scientists in Victoria, Kevin Tolhurst from Melbourne University, also stated recently that more fuel reduction burning would not have stopped Black Saturday (ABC Radio). So if more fuel reduction burning won't stop intense fires then obviously the current level is certainly not effective.

So rather than broadscale fuel reduction burning we should undertake smaller fuel reduction burns and other fuel reduction measures in very strategic areas more regularly, including on an annual basis nears towns. Away from towns we should target fuel reduction burns to those strategic areas where we may be most able to contain or control fires.

Finally, we also need to have a better way of communicating the intensity of fire risk to the public based on the Forest Fire Danger Index (FFDI). ■

Greater Gliders

By Gayle Osborne

The Wombat State Forest is the western extremity of the Greater Glider's range in Victoria and the largest population in the forest has been identified near Spargo Creek, with a Special Protection Zone (SPZ) established for their safeguard.

Greater Gliders are the largest of the gliding possums; 350-450mm in length with a long downy tail 450-600mm. They are beautiful, furry creatures ranging in colour from brown to grey to cream, pale underneath with a short snout and large ears.

They live in tree hollows and are totally dependant on mature forest. Extensive logging of the Wombat Forest has greatly fragmented their habitat and now only 8% mature forest remains.

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The magnificent Greater Glider *(photo from the book "Australian Wildlife Year" - Reader's Digest Publications)*

The breeding season for Greater Gliders is from March to June, when a single young is born, remaining in the mother's pouch for 4 months. They are independent at 9 months.

In March 2007 the SPZ south of Spargo Creek was subject to a prescribed burn despite our objections and the Fire Protection Plan stating that that burns should "be carried out in late spring-early summer to avoid disturbance to breeding cycles."

Due to a forecast wind change, the fire flared up and severely burnt a large area leaving many mature hollow bearing trees destroyed and severe leaf scorch, adding to the impact.

As the Greater Glider's diet consists almost exclusively of eucalyptus leaves and a female's home range is only about one hectare there would have been little or no food available for them or their young after the fires.

Greater Gliders are susceptible to smoke inhalation which can lead to pneumonia and death. They also become heat stressed at temperatures above 30˚C and for this reason will favour hollows on the south and east side of trees.

A second area of habitat was heavily burnt the following year (2008) and a third area is currently planned to be burned, which will take the total fire effected area to in excess of 1,000 hectares and will cover the entire known range of this population's habitat. There are a few other populations in the forest but this area is considered the most significant.

Wombat Forestcare makes constant representations to DSE regarding these burns and has requested that DSE engage an appropriate scientist to be consulted regarding the planning of the proposed burning of the remaining Greater Glider habitat. We have been appalled by the total disregard for the documented prescriptions in the fire plans. ■

Newsletter articles (and suggestions) are always most welcome. For more information please contact **Tibor Hegedis** by emailing to **newsletter@wombatforestcare.org.au**

Wombat Forestcare (Inc.) Membership

Wombat Forestcare Inc. is dedicated to preserving the biodiversity and amenity of the Wombat State Forest by utilising the skills and resources of the community. It will monitor activities affecting the forest and will work with government departments and their officers to improve or correct procedures which may impact on it. By becoming a member you will have input into our activities and projects, and give support to caring for our forests. For memberships and further information contact Gayle Osborne, phone: 03 5348 7558 or email: info@wombatforestcare.org.au - Membership Fees are only $10 Single and $15 Family.

Pictures from the Hepburn Wildlife Shelter...

www.hepburnwildlifeshelter.com

by Tibor Hegedis

Okay, Basalt is still on the bottle, but he's cut back now to only one a day... and only if he really needs it. More on the adventures of Basalt and his friends in the next exciting issue...

A young wallaby had his ears burnt during the fires, but he's recovering well...

Gayle is giving some soothing treament to a wombat with mange.

For help with orphaned or injured animals call the 24 Hour Wildlife Emergency Number on **13 000 WILDLIFE** (that's **13 000 94535**) or Hepburn Wildlife Shelter on **03 5348 3932**