Victorian National Parks Association
Submission to the
Inquiry into the Incidence and Impact of Bushfires

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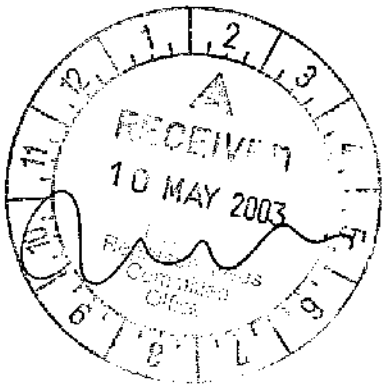

Submission No.176

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People Caring for Nature

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1. Introduction and Summary

Fire in the Australian environment is complex, challenging, sometimes necessary, and sometimes downright dangerous. Along with our nation's aridity, it is probably the most difficult aspect of our environment to deal with. The solution to living in our environment will only come from a mature mix of actions which will deliver, where and when appropriate, fire control, fire accommodation and fire encouragement.

The unsophisticated, interested and blame-apportioning comments that followed the 2002-3 fires will not yield a successful and sustainable relationship with our natural environment. Such a relationship will balance the needs of safety, biodiversity, tourism, agriculture and cost efficiency with the realities of where and how we live. The Victorian National Parks Association believes significant strides in this direction have been made in Victoria and that in general, both fire planning and suppression is intelligent, balanced and worthy of commendation. Improvements can be made, but we believe that the basic structures, processes and principles are correct and need to be respected and preserved.

This submission concludes that:

⇒ Major fires occur in Victoria approximately once every seven years. Fire in Victoria is neither exceptional nor unusual.

⇒ The 2003-3 fires were caused by:
- drought (the hottest on record);
- lightning (80+ strikes across the eastern ranges on January 7th-8th);
- the overwhelming of human resources (there were sufficient resources to put out over 70 fires, but not the final 14 strikes which spread to create the major fires).

⇒ The firefighting services in Victoria were extremely successful in limiting human and property losses (42 houses lost and one life).

⇒ Fires are not caused by national parks:
- 8 or 9 of the 14 lightning strikes that resulted in extensive fires were in state forest or land other than national park;
- national park comprised only 38% of the total area burned by the fires;
- fire history in Victoria reveals no link whatsoever between the area devoted to national park and the frequency and extent of fire (13 of Victoria's 19 major fires since 1900 occurred when national parks covered 1% of the State or less).

⇒ Logging does not reduce fires: if anything, dense regrowth post-logging increases fuel loads.

⇒ Grazing does not reduce fires: if anything, grazing reduces more succulent, fire-resistant vegetation and promotes woody, flammable shrubs.

⇒ Fuel reduction burning is not a panacea for fire control. In certain, strategic circumstances it can assist asset protection, but in others it can increase fuel loads and it had very limited effect, if any, on the 2002-3 fires.

⇒ Endlessly increasing the road and track network will not reduce fires. Victoria has an extensive track network already.

⇒ Urban-rural subdivisions are usually undesirable on environmental grounds and are at increased fire risk.

⇒ If current strategic fuel reduction burning is increased to broadscale burning then there will be concomitant losses in biodiversity and environmental services, such as water quality.

In the following submission we cover the first 6 terms of reference of this inquiry. The remaining matters, which relate to fire fighting methods, are largely outside our area of expertise.

We also address the attacks upon national parks and the parks system which are characterised by five points: that logging, grazing and 4WD tracks reduce fires, that far more fuel reduction is needed and that conservationists are to blame for high fire risk urban-rural subdivisions.

2. Extent and Impact of the Bushfires

Undoubtedly, the recent fires had severe effects on some aspects of the environment, on some private and public assets and on communities. Environmental impacts include increased susceptibility to soil erosion, impacts on some rare flora and fauna species and possible additional impacts because the widespread nature of the fires may have reduced the numbers of other poorly fire-adapted species.

However, there are also many flora and fauna species and communities that are well adapted to fire, especially in dry forest areas, including some that benefit from fire. Some of these species may even have been lacking recent fire. Even in the case of fire sensitive species such as the Mountain Pygmy Possum, it must be remembered that there were similarly widespread alpine fires in 1939 and yet this species and others survived. Nonetheless there are additional pressures today, including global warming, habitat fragmentation and modification from uses such as ski resorts and logging, which may compound the impact of the fires. The issue of biodiversity and fire is discussed further below.

In the case of public and private assets, remarkably few houses and major assets were destroyed in Victoria, considering the extent and duration of the fires. Even the one life lost was due to a post-fire flash flood and not directly due to the fires. This indicates a degree of effectiveness of fire fighting and fire protection methods in Victoria relating to asset protection including fire protection measures that are taken before the fire approaches. This is discussed in more detail below.

2.1 Previous major fires

It is stated over and over again that south-eastern Australia is one of the three most fire-prone places on Earth, and yet each fire event is treated as exceptional.

Our climate, vegetation and topography ensures that fire is not a rare occurrence as can be seen from a list of major fires in the State since records began (Calder 1997; Pyne1991; DSE 2003).

1851, 1898, 1905-6, 1912, 1914, 1926, 1932, 1939, 1942, 1943-4, 1952, 1965, 1968, 1969, 1972, 1977, 1980-81, 1983, 1985, 1997, 1998, 2002-3

This list reveals that since records began in the 1840s there have been major fires approximately every 7 years. When records for every year are taken into account, the average is 620 fires a year burning 110,000 ha (Parks Victoria 2003). Fire is hardly exceptional or even unusual in Victoria.

3. Causes and Risk Factors Contributing to the Impact and Severity of the Bushfires

3.1 The real causes

3.1.1 Drought

Unquestionably, the major cause for the 2002-3 fires was drought. This may have been exacerbated or even caused by global warming. "Most major Australian droughts over the last 100 years are associated with El Nino" (Nicholls 1983; 1985). This warming of the equatorial Pacific Ocean occurs approximately every three-seven years and the current drought is associated with this event (Karoly et al. 2003).

As stated, such climatic events are regular occurrences in Australia, but even within this context, the current drought was exceptionally severe. "During 2002, Australia experienced its worst drought since reliable records began in 1910. The average Australian rainfall for the nine months March-December 2002 was the lowest ever during this period" (ibid).

Adding to this extreme was the temperature. "This drought has had a more severe impact than any other drought since at least 1950, because the temperatures in 2002 have also been significantly higher than in other drought years" (ibid). These temperatures have been described as "extraordinary when compared with the five major droughts since 1950, with average maximum temperatures more than 1.0C higher than these other droughts" (loc.cit.) (see Table 1).

Table 1. The 2002 drought compared to other droughts since 1950 (Karoly et al. 2003)

Year	Rainfall (mm/month)	Max. Temp. anomaly (0C)
2002	**14.1**	**1.65C higher than average**
1994	16.5	0.69 C higher than average
1982	22.4	0.12 C higher than average
1965	25.0	0.24 C higher than average
1957	21.8	0.50 C higher than average

The causal link between low rainfall and high temperatures and fire is a "marked increase in evaporation rates, which sped up the loss of soil moisture and the drying of vegetation and watercourses" (ibid). The extremely dry state of vegetation in Victoria, and indeed Australia, is demonstrated by Figure 2.

With 2002 being both extremely dry and hot, and Victoria having already suffered six dry seasons in a row, it was not surprising that the vegetation of the State was dry and severely stressed. Such vegetation is highly combustible and the lightning strikes of summer 2002-3 (see below) provided the source of ignition. Once started, the drought conditions meant the undergrowth, ground cover and leaf litter was exceptionally dry, even in vegetation types which normally remain damp, such as wetter forest types and alpine areas. This meant much more fuel was available enabling hotter and harder to control fires which entered areas that tend to remain unburnt by fires in milder years.

3.1.2 Multiple lightning strikes

Another cause was the simultaneous lighting of over 80 fires by lightning strikes in eastern Victoria on January 7-8, 2003 (Mike Leonard, pers. comm., 24/4/03). At the same time over 40 fires were started in NSW. This unfortunate event over-stretched the fire-fighting resources forcing DSE to prioritize its fire fighting efforts towards those fires closer to townships and other important assets rather than being able to follow its normal policy of tackling all fires with an aim as controlling them as quickly as possible. To its great credit the number of uncontrolled fires was reduced to 14 within three days (Mike Leonard pers. comm.). However it was these 14 that subsequently went on to combine into the massive fires that lead to this and other inquires. Perhaps this inquiry might be able to determine whether additional resources and other improvements might help this first strike capacity. However the economics and practicalities of constantly maintaining equipment and a strike force sufficient to counter the risk and events experienced this year may not be realistically possible for all years and some compromise, or mechanism to match fire fighting resources with seasonal conditions, may be necessary.

3.2 The myths

3.2.1 Myth 1: Fire is more severe because we do not follow the practices of Aboriginals or of graziers in the past

Many voices have been raised to claim the severity of the recent fires is dues to lack of sufficient fuel reduction burning. These same voices often refer to pre-European fire regimes, claiming that fire under Aboriginal regimes was far more frequent and on a much larger scale.

We acknowledge that Aboriginal people burnt parts of the environment some of the time, but only the most selective reading of history would support the thesis that all Victoria was like a park after being burnt from end to end. Reference to sightings of smoke and open areas are commonly made, but explorers' accounts are also littered with descriptions of "impenetrable scrub", "thick bush" and "endless forest". Open areas encountered were as likely to be caused by maturity of forests from lack of disturbance, not the opposite. Firestick practices seem to have been prevalent in grasslands and heathlands, but nowhere near as common in the great forests of the Divide, Otways and South Gippsland, and even parts of the Mallee remained long unburnt.

There is no evidence that Aboriginals burned large areas of snow-plain or sub-alpine grassy Woodland. Indeed, dendrochronological studies of fire scars on Snow Gum have been used to gather data on fire frequency in the alpine and sub-alpine areas. This research has shown that there was a substantial increase in fire frequency in the high country after 1860 (Banks 1989; Richards et al. 2001). It appears that major fires are rare, occurring once or twice a century (Wahren et al. 1999). Aboriginal burning in the high country appears to be in no way synonymous with large-scale, indiscriminate burning post-settlement championed by vested interests such as graziers. The Royal Commission by Stretton into the disastrous Black Friday fires in 1939 soundly criticised a range of interest groups including graziers for this practice.

Forest with sparse understorey and grassy ground cover can result both from very frequent burning (which eliminates many species from the undergrowth, especially species that are slower to mature) and from infrequent burning (which allow shorter lived species to largely die out, but leaving a 'seed bank' in the soil). Probably both conditions existed before settlement in various areas and habitats. Interestingly the Stretton report subscribed to the latter pre-settlement condition blaming the increase in scrub within forest on disturbance including clearing and burning by settlers and graziers.

We will never know just how much burning was carried out pre-settlement, but fires are possibly more common now, not less common.

3.2.2 Myth 2: Prescribed burning will prevent fires or help in all circumstances
Prescribed burning is routinely carried out in Victorian parks and forests. The process by which this is undertaken is discussed later in our submission. We acknowledge that fuel reduction using fire is an important tool in the protection of assets. However it is certainly not a panacea that will work in all circumstances – especially in the severe fire conditions that were experienced this season.

We have become aware of some examples where pre-existing fuel reduced areas were less than effective in these fires. For example:

1. Extensive areas to the south of Mt Buffalo National Park which were regularly fuel reduced, including some within the last 3 years, were severely burnt.

2. A hillside just to the east of Swindlers Valley at Mt Hotham burnt twice on two successive days (see photos A&B). On the second day three fire fighters who were using the already burnt area as a 'safe' area nearly lost their lives because of the ferocity of the fire on the second burn through the area.

3. In the Kosciuszko National Park, some areas that had been prescribed burnt only 8 months previously were severely burnt and experienced crown fires.

4. In some cases fires burnt scattered trees and windbreaks that were within large areas of cleared, heavily grazed farmland (see photo J). Farm buildings, fences and other assets were also lost in Benambra and Wulgulmerang in heavily cleared areas like this

5. An area in the Cobberas (near the source of the Murray) was heavily burnt in a control burn about a year ago. The recent fires originally burnt around this relatively large area but over the following week it progressively burnt from fires on the edge and spot fires. Because of the very remote location of this previous burn, it was of no apparent help in controlling the wild fire. The end result is that sensitive alpine and sub-alpine vegetation in a wilderness zone in a National Park has been burnt twice within about a year with likely severe ecological damage - but no real benefit in terms of protecting any assets.

Discussions we have had with the fire management branch of DSE about the recent fires (Mike Leonard pers comm., 24/4/03) suggest that the usefulness of fuel reduced areas depended very much on weather conditions. In the cooler mornings such areas were generally of assistance, but on many afternoons, with stronger winds and single-figure humidity levels, almost nothing would stop the fires - hence the results seen in the first four examples above.

Fuel reduced areas, unless very recently burned and under relatively mild conditions, also need the presence of active fire fighters to be effective. Otherwise the fire may well slow down, but it will still pass through and continue. In general, for fuel reduced areas to be useful, they need to be near to the assets to be protected or in other strategically useful positions. Fuel reduced areas in remote areas, like the fifth example above have little chance of being useful and the burning of vast areas in the hope of combating fires wherever they may occur is both physically and economically impractical, and potentially highly environmentally damaging.

Even when a control burn is perfectly implemented, is recent and is strategically well placed, only partial reliance can be placed on it. Even wildfires, which normally remove more of the fuels than a control burn, cannot be relied upon for protection from subsequent fires in severe fire conditions. The above example on the Mt Hotham slopes illustrates this as do the Big Desert fires of the last 20 years (see Figure 3). Major wildfires have regularly swept the Big Desert and some areas burnt in the late 2002 fire had been burnt four times in the last twenty years. Note also the ineffectiveness of the Murrayville-Yanac Road "firebreak" and recent fuel reduction burns.

In severe fire weather fuel reduction must be used in conjunction with fire protection methods such as good house design and a high level of fire precautions around the buildings (removal of flammable materials, clearing of leaves from eaves etc.) and fire readiness of the occupants (correct clothing, fire-fighting tools, ability to stay and defend the property etc.)

Apart from the limitations on the effectiveness of prescribed burning described above, there are some environments where prescribed burning will actually increase rather that reduce fuel loads. The alpine and sub-alpine area is one of these. The effect of fire on some of the vegetation communities here is similar to the effects of grazing (see discussion below), except that it is more dramatic. The removal of the grass cover encourages the germination of shrub seedlings and regular fire will favour those species that can take advantage of the bare ground that remains for years after fire. Some of these shrubs such as *Bossia foliosa* and *Ozothamnus hookeri* can increase rapidly after fire and will burn fiercely in any subsequent fire (Good 1980). Thus as with grazing, a grassy sward may be replaced by more fire-prone shrubs and fire danger is increased, not reduced.

In other habitats, fuel reduction burning may similarly increase fire risk in some instances where it encourages rapidly growing, flammable shrubs. There is also a possible impact on soil invertebrates, especially where an area is repeatedly burnt, that may result in the rate of break down of leaf litter being reduced. Hence the build up of fuel may be more rapid than in unburnt areas

The drought had a secondary impact by affecting the fuel reduction program of the Department of Environment and Sustainability (DSE) which plans and oversees fire protection in all public land, including parks and reserves. The dryness of the ground fuel and the weather patterns meant that the number of days when it was considered safe to conduct these burns was considerably reduced. Caution on the behalf of the Department with respect to these burns is understandable in the light of the risk and liability these can pose. It must be remembered that much of the public that is so ready to point a finger of blame at the department (and at 'greenies') after these recent bushfires are also extremely ready to complain and sue the Department should any of the control burns escape. For instance, compensation is being claimed for damage from a recent escaped controlled burn from the Cobaw Forest north-west of Melbourne and there are also demands for compensation as a result of back-burning conducted during the February fires in East Gippsland. DSE is damned if it burns and damned if it doesn't.

However, although the amount of fuel reduction burning was below that which might have been achieved in wetter and cooler years, it must also be remembered that the severe conditions meant that such fuel reduced areas were of less use than they might have been under milder conditions. For more remote areas or for those townships where severe fire approached on hot windy afternoons, it is debatable whether the presence of such areas would have been of great assistance. See further comments below under 'myths'.

3.2.3 Myth 3: Grazing reduces blazing

The recent fires have lead to the predictable repeat of the claim of the Victorian Mountain Cattlemen's Association that *'grazing reduces blazing'*. Much is made of the fact that sections of the Bogong High Plains were unburnt. But from visiting the area ourselves (March 2003), we observed that there were also many parts of the Bogong High Plain and of other areas in the alps that were grazed and yet burnt. The extreme variability in the intensity of these fires when they passed through the higher areas means that it is possible to use selective photography to prove practically anything you want. In fact there are severely burnt, partly burnt and unburnt areas to be found in both grazed and ungrazed areas (see photos C,D,E,F,G,H&I).

Of the 62 grazing licences in the Alpine National Park 42 were burnt or partly burnt. In the surrounding state forests, 92 licences were burnt out of a total of 129. A total of 240,000ha under grazing licences within the Park that was burnt amounting to approximately 93% of the area of all National Park grazing licences within the fire area. These figures do not suggest a great immunity to fire being conferred by these licences (see fig. 4, next page)

At the time of the 1939 fires, sheep as well as cattle were grazed on the high plains. Sheep graze much closer to the ground than cattle and yet all this grazing, and the graziers' fires to promote 'green pick', did not stop the fires from burning through the same alpine and sub-alpine areas as have been recently reburned.

There have been many claims that the cover of shrubs is reduced by cattle grazing, which in turn reduces the fire risk in the alps. However, such claims are not supported by any of the long-term monitoring studies, nor by a consideration of the behaviour and diet of cattle. Open heathland and grasslands in the high plains form a continuum that is influenced by disturbance. Creation of bare ground by cattle trampling promotes the establishment of shrubs over grasses (Williams 1985; Williams and Aston 1987). As shrubs in open heath, such as Grevillea, age and begin to open out, they are eventually replaced by snow grasses and succulent herbs if undisturbed. However disturbance of this grass sward allows a subsequent generation of shrubs to establish as seedlings. Cattle suppress these seedlings to a large extent by grazing, but over time there is a slow but steady increase in shrub cover. This is a common process and has been well-documented over the Bogong High Plains both by comparison with grazing exclusion plots, some monitored for over 50 years, and by examining historical photos (van Rees 1984; Williams 1985).

In closed heathland, cattle have very little impact on shrub cover, as the shrub species present in this plant community are not palatable, and the dominant shrubs regenerate vegetatively (eg. from stem buds or root stock) following disturbance.

Alpine grazing therefore does not reduce blazing by "controlling" the shrubs. Nor do they remove the bark and litter in the surrounding woodlands and forests that spot fires into the alpine and sub-alpine areas. Instead *grazing* steadily *increases blazing* over the long-term by encouraging the establishment of shrubs within the grasslands. It was clear to us from visiting the high plains after the recent fires that shrubs were a major factor in spreading the fires, often burning while the grasslands (both grazed and ungrazed) remained around them (see photo H) and acting as a conduit for the fire into bogs. Even some of the most heavily grazed areas on the Bogong High Plains were burnt (see photos D&E).

The ineffectiveness of grazing as a tool for reducing the impact of fire in the high country was illustrated after the Caledonia fire of January 1998. Prior to the fire, the effective grazing pressure on the Wellington and Big Plains (.21 head/ha) was more than double that on Holmes Plain and Mt Reynard plateau (.09 head/ha). Yet, both in terms of canopy scorch of the surroundng forest and in terms of the damage to the grassland and bogs, the fire intensity was far higher at Mt Wellington/Big Plains than at Holmes/Mt Reynard (DNRE 1998b). The cattle from these areas were subsequently temporally moved to an unburnt plain nearby that had been ungrazed for many years.

3.2.4 Myth 4: Logging reduces blazing

The Caledonia fire intensity map (DNRE 1998a) when overlain on a logging history map for the Carey State Forest which was substantially burnt in the Caledonia fire (DNRE 1998b) shows no inverse correlation between canopy scorch or burn intensity and logging coupes. This suggests that logging and time since logging may be almost irrelevant when fires erupt at times of extreme fire danger.

The present fires have encompassed an extremely wide range of forest including unlogged and heavily logged areas. There is no evidence that logging retarded fires in any way whatsoever. Indeed some of the more severe and/or rapidly spreading fires occurred to the east of Mt Beauty, south of Corryong and to the north-east and east of Benambra which have many recent logging coupes.

The dense regrowth that occurs after clearfelling will if anything add to fuel loads. Where these regrowth forest are thinned, extreme difficulty has been experienced in conducting fuel reduction burning within them because of the high levels of debris that results from the thinning operations (Buckley et al 1989). Thus it is unlikely that logging, especially intensive logging practices, will reduce fire risk - the reverse is more likely.

3.2.5 Myth 5: More tracks are needed

It has been oft claimed during and after the recent fires that the existing road and track network is inadequate and that it needs to be extended and upgraded to improve and aid fire detection and suppression. As roads and road maintenance have severe detrimental effects on conservation values, in particular through facilitating the spread of weeds and vermin, expansion of the track network is not to be taken lightly. A study of weeds in the Kosciuszko National Parks (Johnston et al. 2001) has found that the majority of weeds are introduced in this way.

The VNPA contends that the current road and track network in Victoria is extensive and more than adequate to meet the needs of firefighting. This is best demonstrated by examining those areas with the least extensive networks statewide to see if even these areas are "well tracked" or not and if they were particularly prone to burning in the current fires.

The most thorough examination of the State to date for 'naturalness' was the 1990 Land Conservation Council report *Wilderness - Special Investigation.* Wilderness areas mapped in this report were synonymous with highly 'natural' areas. These areas were determined by examining four indicators, three of which related to the absence of roads and tracks: remoteness of access, aesthetic naturalness and remoteness from settlement.

Figure 5 shows the result of mapping and summing these indicators. What should be noted is that the majority of the fire area in the east corresponds with areas of low-medium wilderness quality where naturalness values have been significantly reduced primarily by the presence of tracks and roads. As Helman et al. (1976) has put it: "Roads remain the biggest single problem facing the delineation of wilderness in Australia".

Mosley (1971) highlighted the problem when he said that he could find only six small areas in the Victorian Alps further than five kilometres from a vehicular track. Similarly, even the wilderness areas identified by the LCC (1990) were so covered by tracks that most descriptions of them (eg for the Catherine block and Yarrarabula block [south of Bright] were: "no areas of the block are greater than 3km from a road or track", or at best, "no areas of the block are greater than 5km from a road or track" for the Bogong block. And it must be remembered *these are amongst the state's remotest, least-tracked areas.*

Examination of the 2003-3 fires at a more precise scale supports the assertion that lack of access was not an important factor in fire spread. Figure 6 shows the location of the 14 lightning strikes that DSE was not able to quickly extinguish and became the source of the 2003 fire. The track network in almost all of these locations is perfectly adequate and comparable with the 70+ locations where lightning was quickly extinguished. Access was not the limiting factor.

Fire histories elsewhere in the State indicate that access is not the critical factor. It would be hard to find a more extensive road and track network than exists in the Dandenongs and yet the area has suffered constant fires, most recently in 1997 when three people were killed and 41 houses burnt. Similarly, most of the 1983 Ash Wednesday fires occurred in heavily tracked areas to the east of Melbourne, eg. Beaconsfield, or to the south-west, eg. Anglesea.

The only area in the State where the track network is more limited and fire occurred in 2002-3 was in the Big Desert. Even so, "there are 119km of trafficable roads within the block", as well as "beekeeper tracks and those formed by broombush cutters and army vehicles" (LCC 1990).

Lastly, it is worth pointing out that the Stretton Royal Commission on the 1939 fires considered the question of the adequacy of the track network and concluded (Stretton Report p 16);

> *"Firelines and Trails - As much of this work as could have been done by the Commission has been done"*
>
> *"Roads and Tracks - The importance of these means of access for men and equipment has been for many years been recognised by the Commission .... The Commission has carried out, in recent years, as much of this work as it as it has been able and permitted to do"*

Nowhere in the report is there any statement that insufficient tracks and trails affected the outcome. There are now many more tracks than in 1939 and far faster and more efficient means of transport.

4. Adequacy and economic and environmental impact of hazard reduction

4.1Fire and biodiversity

Victoria is a highly diverse State and this is one of our most valuable natural resources (see Table 2).

Table 2. Number of native terrestrial species in Victoria (adapted from Traill and Porter 2001)

Taxonomic group	**Number of species**
Mammals	91
Birds (excl. seabirds and vagrants)	~330
Reptiles	149
Frogs	55
Fish (freshwater)	50
Invertebrates	High tens of thousands
Vascular plants	4336
Lichens	~900
Mosses and liverworts	~1,500
Algae	?1000
Fungi	?35,000

At the broadest scale, there are 16 natural regions in the State, varying from the dune sheets of the Lowan Mallee in the north-west to the mountains of the Eastern Highlands (Conn 1993). These regions are clothed by different native plant alliances providing habitats as varied as rainforest, mallee scrub and herblands (grasslands).

These habitats both reflect the 'natural' burning regime and shape the regime. They have evolved in unison for thousands of years.

Some habitats frequently burn and are more flammable, such as grasslands and heathlands. Some habitats infrequently burn (if at all), such as rainforests and tall wet forests. Other habitats burn at frequencies in-between, such as dry forests and dry woodlands.

Reducing the scale even further, major habitats are made up of "sub-habitats" of varied topographical, geological, hydrological and biological factors, which leaves them far from uniform. In Victoria they can be divided into 28 Broad Vegetation Types and over 400 Ecological Vegetation Classes. As such, this variety burnt "patchily" leaving burnt areas surrounded by unburnt areas from which species could utilise and re-colonise burnt patches.

The biodiversity in Victoria reflects this diversity of regions, habitats, sub-habitats and burning regimes. Any attempt to impose a single burning regime across this diversity will simplify statewide ecosystem structure, function and composition and reduce overall biodiversity. The key to preventing this simplification of the natural environment is to employ flexible, diverse burning regimes that mimic, as much as possible, the natural conditions under which particular species and habitats have evolved.

In the case of the Alpine National Park in Victoria, there are 11 Broad Vegetation Types represented and a wide range of Ecological Vegetation Classes. These include Foothill Forests where fire is common, high altitude ash forest where fire is required perhaps only once every few hundred years, rainforests that are rarely if ever burnt, and sub-alpine and alpine areas where large fires are also rare. It is simplistic to assume that a blanket prescription of fuel reduction is the key to mitigating future wildfires across the entire range of ecosystems. Even if fuel loads were able to be reduced in the high country by damaging levels of fuel management, it is doubtful that there would be any significant impact in reducing fire intensity in times of extreme fire danger. The higher altitude areas of Victoria would be better served by the removal of disturbances such as grazing which, in the long-term, would most probably contribute more to a reduction in fire danger than fuel management efforts. Indeed it is likely that any attempt at fuel reduction burning in the high country will instead increase shrubs and hence fuel (see above).

4.1.1 Physical effects

The major effects of fuel reduction burns (lower intensity fires of the understorey) are:

- reduced litter biomass for one-three years post-fire (Figure 7: York 1994)
- reduced nutrient cycling (DEST 1996)
- increased temperature fluctuations and exposure to light on the ground storey
- loss of food and shelter on the ground storey for periods of one to many years.

These effects can be expected to increase in magnitude and kind with broadscale burning (eg. loss of forest canopy resources).

These basic physical effects have been witnessed to cause a range of biodiversity impacts, examples of which follow:

4.1.2 Flora

- "Frequently repeated fires are likely to alter significantly the species diversity and structure of plant communities studied here" ([Dry Sclerophyll Forest] Tolhurst et al. 1992)
- "Frequent rotational burning appeared detrimental in the long-term to nutrient cycling and flora and fauna, especially longer lived and slower reproducing species" ([Dry Sclerophyll Forest] DEST 1996)
- Plants in alpine and sub-alpine areas generally lack the large carbohydrate stores that enable plants in fire prone areas to resprout readily. Species such as snow daisies may take many years to recover physiologically after fire (van Rees and Walsh 1985; Kirkpatrick and Dickenson 1985). Some species such as the Mountain Plum Pine, an important food plant for the Mountain Pygmy Possum, can be eliminated by a single fire (Mansergh et al. 1989).

4.1.3 Mammals

Some small mammals like the Brown Antechinus and Bush Rat may be advantaged by frequent fire, whereas species such as the Long-footed Potoroo and Mountain Pygmy Possum are greatly disadvantaged as fire removes protective cover and food supplies, respectively.

To demonstrate the sensitivity of some mammals to changed burning regimes, population viability analysis for the endangered Southern Brown Bandicoot of South Australia indicates significantly increased likelihood of extinction at fire frequencies both greater than and less than once every 15 years and when these burns are broadscale in nature (see figures 8 & 9 - Possingham and Gepp 1993)

4.1.4 Birds

Birds are ubiquitous across and within habitats and thus demonstrate the full range of responses to fire. A suite of species, such as the Malleefowl, Red-lored Whistler and Black-eared Miner require long unburnt habitat, in the order of 60 years unburnt or more, to survive, whereas the Ground Parrot (Eastern) seems to require fire frequencies of 4-15 years in heathland environments, and the Rufous Bristlebird (Otways) requires fire frequencies of 6 years plus to provide just the vegetation structure and composition they need (Garnett and Crowley 2000). Across the board:

- 80 (31%) of Australia's threatened bird species and subspecies have 'inappropriate fire regime' or 'wildfire' listed as a threat to their survival in *The Action Plan for Australian Birds 2000* (ibid) signifying the major importance of fire in the conservation of our avifauna. (Affected species listed in Appendix 1 of this publication).

4.1.5 Invertebrates

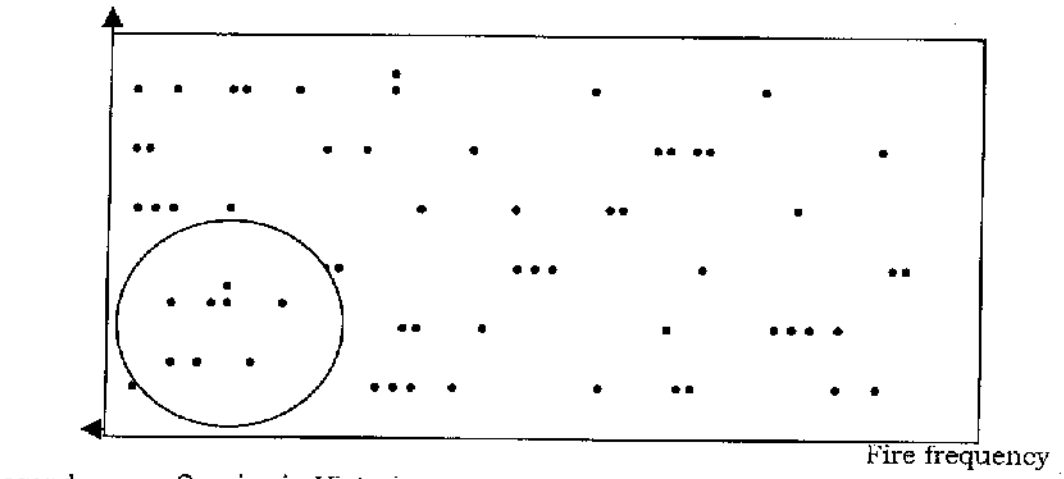
- "There is clear evidence of community changes (to ants) in response to some fire regimes; with frequent fuel reduction, rarer species with more specialised requirements tended to be replaced by species with broader environmental tolerances" (DEST 1996)
- "In Mountain Ash Forest, fire intensity was found to affect the rate of recovery of soil invertebrates" (loc.cit.)
- Frequent fire caused a significant decrease in abundance of several invertebrate taxa in Dry Sclerophyll Forest in eastern Australia (York as cited in DEST 1996 - see Figure 10).

4.1.6 Conclusion

The paradoxical nature of the effects of fire was summed up by ecologist Barbara Wilson when she wrote: "Uncontrolled wildfires and unplanned fires may eliminate critical habitat and populations (of endangered wildlife). On the other hand, the absence of a particular successional aged habitat (created by fire) may result in population declines and threats to species" (Wilson as cited in DEST 1996). As emphasised at the commencement of this section, diversity of regimes and habitat in Victoria is the key and any attempt at a "one-size-fits-all" policy will have the overall effect of simplification of the State's environment and a significant reduction in its biodiversity.

Such a situation can be represented diagrammatically - see Figure 11.

Figure 11. Notional distribution of species in Victoria against fire parameters of frequency and intensity



Legend: . Species in Victoria
○ Species advantaged by low intensity, high frequency fuel reduction burning

4.2 Adequacy and economic impact of fuel reduction burning

We are generally supportive of DSE's fire management process which draws up regional fire management plans encompassing all public land, including state forests, parks and reserves. These plans identify strategic areas to be fuel reduced near assets such as townships and pine plantations (deemed 'priority 1'), areas to serve as strategic breaks in more remote areas ('priority 2) and areas to be burned as part of a more broad-scale regime to complement the 'priority 1 and 2' areas ('priority 3'). Other areas, such as some heathlands, that require special fire management regimes to maintain fire dependant species are also identified ('priority 4) along with areas that are fire sensitive and should not be burnt ('priority 5').

'Priority 1 and 2' areas may have to be burnt at frequencies that compromise some species within them. However we accept this compromise providing the areas are not excessive. We are sceptical however, as to whether 'priority 2' areas are very effective, especially those in more remote areas (see our comments above). 'Priority 3' areas are to be burnt within the ecological tolerances of the major vegetation types and this principle is even more strictly applied in 'priority 4' areas.

We may not agree with every detail of every fire plan but we support the principles. The main problem may be the level of resources available. For instance we would like to see enough resources to ensure the implementation of burning regimes for 'priority 4' areas.

5. Appropriate land management policies and practices to mitigate bushfire damage and their potential environmental impact

5.1 The current fire management planning process in Victoria

As discussed above, fuel-reduction burning, more properly called prescribed burning, is regularly carried out by the Department of Sustainability and Environment and Parks Victoria and has been limited only in the last few years because the extreme dryness of the country has made some burns too dangerous. Prescribed burns do get away, as witnessed by the Anglesea and Little Desert fires in the '90s, and the recent Cobaw fire. They have to be carried out with enormous care.

Prescribed burning is carried out as part of comprehensive regional fire protection plans, as outlined above, that are compiled after extensive community input and review. They are not drawn up in isolation by bureaucrats. Their purpose is to protect people and property and at the same time, as far as practical, mimic natural burning regimes so as to maximise biodiversity.

Sometimes we need more fire, sometimes we need less, and sometimes the current regime seems about right. Victoria has good, integrated fire protection plans and implementation, and all involved are doing their best to deal with a highly complex phenomenon. We believe the processes in Victoria are appropriate.

5.2 Do National Parks and National Park management contribute to fire risk?

A common source of fire and its spread is often said to be 'national parks'. The 1939 Black Friday fires burnt a larger area than those in 2003. There was extensive logging and grazing in 1939, but only a handful of national parks. 'Greenies' had not been invented. How frustrating it must have been to not have parks and environmentalists as ready scapegoats for the Black Friday inferno.

These days we have no such troubles. The opportunistic seize on fires to run campaigns against the bush and the people who cherish it, and the attacks have begun.
The complete inaccuracy of these statements can be seen when the area proclaimed as national park and conservation reserve is compared with the dates and clusters of major fire events, as in Figure 12.

If national parks in some way cause and promote fire, then how did 13 of Victoria's 19 major fires since 1900 start and spread when national parks covered 1% or less of the State?

Further to the fallacy of this assertion, Rees (1984) investigated fire and land tenure for the period 1974-84 in Victoria and found that forest fires were four times more likely to occur in state forest compared with national park, and that state forest fires burnt eight times the area of national parks fires. Only five percent of forest fires started in national park.

Similar studies in other states have reached the same conclusions. In South Australia, analysis of fires over the 10 year period 1974-84 found that only 14% of fires started in National Parks and Wildlife Reserves whilst 85% of fires started on other land and burnt into NPWS parks and reserves (Brandle 1992). In NSW it was reported that of the 942 fires which occurred in National Parks in 1990-94, only 64 of these left park boundaries but 341 came from neighbouring lands into National Parks (National Parks and Wild Life Service "Fire Facts" sheet 1994). Thus in all cases, the surrounding state forests and private land appear to be more of a risk to National Parks than the other way round.

It is essential to take a historical perspective and average statistics for a true picture to emerge. Because 38% the area burnt in the 2002-3 fires was in national park and conservation reserve, opponents of national parks used this figure to attack parks and their management. Even the higher than usual fire figures for parks in 2002-3 do not in any way support this, and this is emphasised by historical records of fires and land tenure.

The dangers of looking at figures in isolation also apply to fire ignition. The 2002-3 fires were started by lightning, but overall the majority of fires (62%) are started by man (Rees 1984). How this can in any way be construed as the 'fault' of national parks is beyond understanding.

6. Alternative bushfire mitigation and prevention approaches

Since the Ash Wednesday fires of 1983, and the subsequent analysis by CSIRO of reasons for the loss of houses, there has been much more emphasis in Victoria on house design, for regulations to enforce this for new houses in fire prone areas, and on educating the public on how to best protect their house before and during fires. The latter consists of matters such as appropriate plantings close to houses, installation of roof sprinklers, clearing up flammable material around houses, clearing of gutters, reducing other possible areas that might catch burning embers etc. The public are now encouraged to stay with their houses if they feel capable and are given advice on the appropriate clothing and equipment and actions to take including drawing up their own 'fire plan'. The relatively low loss of houses with these severe fires perhaps illustrates the success of this program.

7. Appropriateness of existing planning and building codes

As mentioned above, building design guidelines exist for houses being built in fire-prone areas. This approach is supported. In Victoria this is implemented via a 'wildfire overlay', applied via the planning legislation and which covers significant areas of native vegetation. We have great concern, however, that this overlay merely applies the building guidelines and does not discourage new development such as residential subdivision in these areas. It is one thing to ensure that a house being rebuilt in these areas has sound fire-resistant features, but it is another to allow increased development that demands widespread clearing in order to make it safe. There is therefore currently great potential for conflict. The overlay should be changed to discourage development such as residential subdivision in these areas, to ensure that the environmental impacts of developments are considered, and that extensive vegetation clearing not be allowed in order to meet the fire protection criteria to permit new development.