Submission regarding the 'Inquiry into Public Land Management Practices on Bushfires in Victoria'

By the
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[redacted]

Introduction

The Gippsland Environment Group has profound interest and concern regarding fire management and public land management practices throughout the Gippsland area. Our main concern is that economic greed and vested interests are dictating current land management practices rather than the maintenance or enhancement of biodiversity throughout the landscape. Drastic changes must to be made to the DSE approach to burning practices, as current mismanagement of the forest by DSE is possibly the greatest threat to biodiversity.

Our concerns and recommendations regarding the various terms of reference are listed below:

1) *The extent, timing, resourcing and effectiveness of prescribed burning on both crown and freehold land.*

Prescribed burning practices (for the purpose of fuel reduction) are widespread throughout forested areas of Victoria, yet their actual intended benefits (effectiveness) or environmental impacts are poorly known.

Extent of prescribed burning

Prior to the recent 2006/07 fires, DSE were currently aiming to burn over 6% of 'forested' public land in Gippsland each year for next 3 years (DSE 2005). However, on average less than 2% of forest is actually burnt per year (Leonard 2004), mainly due to limited resources and weather conditions. These figures are determined due to the frequency needed to maintain fuel levels below a certain level, however, the ecological requirements or natural fire tolerance intervals of vegetation communities and individual species have been ignored in the determination of this figure (compare Fire Cycles in Appendix Q in Forest Management Plan (DSE 2004) with Fire Protection Plan (DSE 2005)). For the Bairnsdale area, a figure of 87.2% of land is aimed to be burnt on a 20 year interval, which is far below the average fire cycles determined by the minimum and maximum fire cycles for each vegetation type in Gippsland (DSE 2004). If the DSE were able to achieve their outcomes, the DSE are ignoring scientific evidence about the detrimental ecological effects of inappropriate burning (Catling 1991; SAC 2001; 2003),

and also ignoring and breaching their own legislation for the preservation of biodiversity (e.g. Flora and Fauna Guarantee Act 1988).

Timing of fire

The majority of prescribed burning is conducted in Autumn when conditions are safer to burn, to minimize the chance of escape. Although this may be an effective time of year to conduct burns, the seasonality of fire is known to greatly influence vegetation structure and composition, and burning at one time of year can promote some species (both flora and fauna) while disadvantaging others (McLoughlin 1998). As forests are generally dryer during Autumn, gullies and woody debris are significantly more susceptible to fire (Catling 1991; McLoughlin 1998). For ecological purposes, more spring burning should be conducted in south-eastern Australia, which would be more in tune with natural fire regimes, and to at least vary vegetation structure and habitat types by creating more of a mosaic throughout the landscape. Variation of the seasonality, frequency and intensity of prescribed burning are all important factors in creating and maintaining variation in habitat structure, which is essential for the maintenance of biodiversity.

Effectiveness of prescribed burning

It is recognized that if fuel load is going to be kept to a minimum, then fire frequency must be within a 4-5 year period for most habitat types (Simmons and Adams 1986; 2004; Moore and Shields 1996). Fuel reduction burning can significantly reduce wildfire intensity within an 18 month period, but its effectiveness decreases progressively over a seven year period (Buckley 1990; Conroy 1996). This is because litter levels and bark fuels are known to rapidly accumulate up to levels of 90-95% within 3-4 years following fire, due to a loss of moisture homeostasis and lack of fungal activity (Chatto 1996; Tolhurst and Kelly 2003), while fine fuels can recover to 70-80% within 2-3 years (Moore and Shields 1996). It is these fine fuels which are more volatile and the greatest contributor to wildfire intensity, yet fuel reduction burning may only remove up to 75% over 30-60% of the area treated, compared with almost 100% of area with wildfire (Moore and Shields 1996). Therefore the amount of fuel actually reduced by fuel reduction burning, is markedly different to what is achieved by a wildfire (Rawson *et al.* 1985).

Fuel levels can actually be promoted if fuel reduction burns are not conducted properly, as fire can kill plants and not consume them. Fire dries out the forest by eliminating moisture holding capacity and stimulating regrowth of flammable plant species (e.g. fine fuels such as grasses). Many sub-canopy plants are killed and there can actually be more elevated fuels shortly after fire, actually exacerbating fire threat rather than reducing it. Therefore in many circumstances, fuel reduction burns, particularly if conducted at a low intensity, and long time intervals, can have minimal affects on fuel load, and have little impact on reducing the impacts of high intense fires (Rawson *et al.* 1985). During high fire danger days, recent fuel reduction burns have proved to be inadequate on many occasions (Rawson *et al.* 1985).

This is why under exceptionally dry conditions, as experienced during the 2003 and 2006/07 fires, back-burning as well as recent fuel reduction burning did little to reduce wildfire intensity, as they are often ineffective due to the amount of fuel loads left behind. Even many areas which were burnt during 2003 and re-burnt in 2006/07 (that were

expected to reduce fire intensity), burnt just as hot as the surrounding long-unburnt forest and did not contribute to the assistance in the fire fighting effort. Only sites that were burnt within the past 18 months to 2 years drastically slowed down fire intensity, which is supported by previous studies (e.g. Buckley 1990).

Infrequent occurrence of intense wildfire favours the development of dense understorey (Catling 1991), so repetitive low intensive fuel reduction burning can actually have negative effects in the long-term. Fire can also stimulate vigorous regrowth (increasing elevated fuels) due to stimulating germination, lack of competition, increased nutrients and light availability (Gill and Catling 2002). However, overtime the regrowth reduces and thins out due to competition and shading (e.g. Gill and Catling 2002), in some forests this occurs between 10-15 years after fire (Leigh and Holgate 1979; Catling *et al.* 2001). It is therefore possible that the greatest flammability of forests is within a decade after fire. Therefore, as time since fire increases (vegetation communities becoming older), it is quite likely that their potential flammability actually decreases, due to increased moisture retention, and reduced elevated fuels. Although overtime fuel levels may stabilize (or reduce or increase marginally), they only become flammable under extreme fire danger conditions, and under those conditions virtually anything will burn. On average the number of days per year that a dense forest can support fire is significantly less than that of a dry open forest, due to the differences in moisture retention between the two vegetation types (despite there apparent difference in fuel load). Frequent fires promotes more grasslands and woodlands, which both burn more frequently than closed forested vegetation types with long unburnt history. Grass fires can actually travel 4 times faster than forest fire due to the increased amount of fine fuels. So although fuel loads may be less, in frequently burnt areas, they actually pose a greater fire risk.

Although there is a correlation between fuel load and fire severity, the widespread use of prescribed burning for the purpose of fuel reduction should be justified by sound scientific evidence, showing that not only that prescribed burning can reduce fuel loads, but also reduces fire flammability and threat, without compromising the conservation of biodiversity in the process. Fuel reduction burning, for the single purpose of fuel reduction usually ignores environmental concerns, and can therefore jeopardise biodiversity conservation in the process (Catling 1991; Morrison *et al.* 1996; SAC 2003). As the effectiveness of prescribed burning often does not meet its fuel reduction objectives (particularly in the long-term), increasing fire frequency in the landscape may actually increase wildfire intensity. Therefore surely the effectiveness and the use of fuel reduction burning should be questioned, particularly when it is used broadly throughout the landscape as a management tool for fire suppression activities. However, in theory prescribed burning can be beneficial to the environment as well as reducing fuel loads if conducted according to sound ecological guidelines for the promotion or maintenance of biodiversity across the landscape. Management objectives must be shown to be met, and therefore it is essential that monitoring (both ecological and fuel dynamics) must be conducted.

Prescribed burning on its own is recognized as not being an effective strategy for reducing fire threat to life and property (Esplin *et al.* 2003; Simmons and Adams 2004).

Wildfire is inevitable in the landscape, so therefore, greater focus needs to be placed upon how people and their assets can survive wildfire (Simmons and Adams 2004), rather than trying to reduce the potential threat of wildfire, by impacting upon the environment. Protection of assets through alternative methods (such as defending house and property) are the most important and effective ways of reducing impacts of wildfire.

2) *The manner in which prescribed burning is conducted, including how applicable codes of practice are employed.*

It has been said to us by the Fire Operations Manager for Gippsland that the Code of Practice cannot be fully implemented due to the lack of resources available. Therefore, resources are prioritized and most emphasis is placed upon fuel reduction targets, rather than fully adhering to environmental guidelines.

One of the main aims of the Fire Code of Practice, is that 'the use of prescribed burning is in accordance with sound environmental guidelines, and assists the achievement of other fire management objectives'. Despite several sections of the code referring to species protection, and for maintaining and enhance indigenous ecosystems (e.g. forest stewardship), the government cannot be shown to be achieving these outcomes, and in many circumstances the Government is actually conducting activities contradicting these guidelines. The code of practice satisfies environmental stewardship concerns, however, virtually none of these environmental concerns are being conducted or proven in the field!

If fire is going to be used as a management tool to benefit the health of the environment (as it states in the *Code of Practice for fire management on public land* (DSE 2006)), then it is essential that the role of fire, and the species responses are well understood across the landscape. Therefore, this aspect must also be well understood at a local level. The *Code of Practice for fire management on public land* (DSE 2006), *Guidelines and procedures for ecological burning on public land in Victoria* (Fire Ecology and Working Group 2004), *Victorian Biodiversity Strategy* (NRE 1997) as well as numerous scientific papers (e.g. Whelan *et al*. 2002), all state that monitoring at a local level is essential, yet the DSE have failed to adhere to this (has been admitted by senior members of staff). The greatest failing, has been in the lack of field monitoring to understand species life cycles and fire tolerances, therefore, species requirements cannot be implemented into burning regimes (which is recognised as essential for species survival). Therefore the broadscale use of such burning has the potential to cause significant ecological impacts. DSE virtually cannot justify conducting ecological burning in Gippsland forests, due to their lack of knowledge and resources. Numerous threatened species occur in Gippsland, and it appears that there is limited if any environmental considerations being implemented into their fire plans.

Despite ecological guidelines being well understood in regard to fire regimes (e.g. *Guidelines and procedures for ecological burning on public land in Victoria* (Fire Ecology and Working Group 2004)), and the fact that frequent fire regimes and inappropriate fire regimes are recognized under legislation as being threatening processes to the environment by this government (SAC 2001; 2003), it continues to implement a burning regime which breaches these guidelines and legislation. If ecological

considerations for Special Protection Zones (SPZ) and National Parks are ignored then I feel that these areas are being inappropriately managed for conservation of a whole range of species and communities. Prescribed burning should be used as stated in the *Code of Practice for Fire Management on Public Land* (DSE 2006) to "maintaining and enhance indigenous ecosystems", not the deterioration of indigenous ecosystems and reduction of habitat quality which appears to be happening.

The manner in which burns are conducted

In recent years, many fuel reduction burns conducted by DSE in the forests of the Gippsland area, have been exceptionally intense, due to the exceptionally dry conditions. In several of these burns (e.g. Clifton Creek in 2003; Casey Creek in 2005), they were both conducted in Special Protection Zones (Zone 3), which were supposed to be managed for species conservation purposes, yet burns conducted were intent on fuel reduction purposes and actually greatly jeopardized species protection at the sites (to a degree where some species no longer can occur there). In both these fires mentioned, the fire crowned through a significant proportion and resulted in the loss of significant numbers of large hollow-bearing trees (several hundred fell at one site and was one of the reasons it was a SPZ in the first place). At one site in particular the fire killed numerous understorey shrubs (e.g. Allocasurina, Banksia, Cherry Ballart) and failed to consume them, resulting in increased elevated fuels, possibly increasing fire threat along with all the dense Bracken regeneration which was 5-6 feet high within 6 months after burning.

The manner in which they are burnt, is often similar to a coupe burn after logging. The edges are burnt and incendiary devises are shot into the middle (occasionally by helicopters) and this often results in high intensity fires occurring. Not only is this style completely unnatural, many animal species are unable to survive and escape due to being surrounded by fire. Fires should be lit as a front, which replicates natural fire.

In conclusion, prescribed burning is currently being conducted with very little consideration of ecological values, and as virtually no monitoring is being conducted, cannot be shown to able to justify forest stewardship which underlines the Forests Act 1958, the Code of Practice for Fire, and the Forest Management Plans. Inappropriate fire regimes is recognized as one of the greatest threatening processes to our environment, yet the Government is continuing to implement regimes based upon fuel load and perceived threat, rather than environmental need, therefore breaching legislation for the maintenance of biodiversity across the landscape.

3) *The impact of prescribed burning and recent wildfires on Victoria's biodiversity, wildlife and other natural assets including water quality and quantity*

The impact that prescribed burning and recent wildfires have had on biodiversity will be poorly understood, mainly due to the lack of pre and post fire ecological monitoring which has been conducted. Fire, both wildfire and from prescribed burning, can cause significant environmental impacts, however it all depends upon the time since last fire, the scale and season of the fire as well as the amount of unburnt refuge areas remaining for species to able to recolonise from.

The ecological impacts of wildfire has been exacerbated since European settlement, due to our past and current management (or mismanagement) of public land. The distribution and abundance of many species have declined significantly, and many are now isolated in small areas, potentially vulnerable to extinction. The ability of species to recover following fire is compromised due to this reduction in abundance and distribution, fragmentation of populations, competition with feral species, and for some species increased predation/ consumption risk by feral species. Current fire fighting techniques of burning 'unburnt' areas (or refuge areas) within burns can eliminate or reduce species recovery. For many species which are eliminated by wildfire, their existence in an area is totally dependant upon the retention of unburnt refuge areas so immigration or recolonisation can occur (e.g. Lunney 1987; Invin *et al.* 2003). If these unburnt patches are burnt due to their perceived fire risk (as they regularly are under current fire operation practices), or are conducted against large impassable boundaries, then this will severely impede species recovery and further threaten local extinction possibilities. Therefore particular species are at risk from human activities associated with wildfire, rather than wildfire *per se*.

This was the case particularly in 2006/07. Due to the dry conditions, the fire was intense and left very few unburnt (or mildly burnt) areas, resulting in a lack of mosaic burning. However, where there were unburnt areas (within burnt areas) they were then burnt by fire officers, due to their perceived threat. There is no doubt that the ecological impacts of this practice will be possibly the greatest ecologically devastating impact of the latest fires, as this will cause the local extinction of many species, and it may take decades or even centuries (if at all) for some species to recover. If these practices are to continue then the government must ensure adequate monitoring programs are implemented and where appropriate that reintroduction programs or other programs are conducted to aid species recovery. One aspect of the Government agency is species protection, while other agencies seem intent on further threatening species!!

Ecological Impacts of fuel reduction burning

Most plants and animals are not adapted to fire *per se*, but instead are adapted to an appropriate fire regime, constituting components such as fire frequency, intensity and seasonality and they all shape community composition in different ways (McLoughlin 1998). Without intricate knowledge of the way these factors influence species responses to fire, applying an optimal fire regime to meet management objectives cannot be conducted, and would not be known due to a lack of monitoring. Therefore without identifying the appropriate burning regime, then severe ecological impacts can occur. This is why inappropriate fire regimes and frequent fire is recognized by this Government as being threatening processes to the environment (SAC 2001; SAC 2003). Despite this recognition by the government, virtually all fires conducted, and their burn methodology, are based upon fuel reduction, rather than environmental requirements, surely breaching its own biodiversity conservation legislation in the process.

If fire frequency is too short, this can disrupt species life cycles and can lead to local extinction of particular, mainly long lived species. It can also simplify habitat structure in the long-term (e.g. Catling 1991; SAC 2001). Both intensity and seasonality of fire also greatly influence species responses and independently can cause negative and positive responses in species.

Unfortunately the appropriate burning regime which minimizes fuel loads usually conflicts with the conservation of numerous plant and animal species. Therefore there is significant conflict between protection of biodiversity and minimizing fuel loads throughout southeastern Australia, and it has been shown that it is impossible to achieve simultaneously both fuel reduction and community conservation for any specific managed area (Morrison *et al.* 1996).

In order for fire to have minimal long-term impact on the environment, or to enhance or maintain biodiversity, it requires complex scientific information regarding species and communities responses to fire, critical life history requirements and on site fire history information (e.g. Whelan *et al.* 2002). Such information usually determines a minimum and maximum fire interval period for varying ecological communities (e.g. DSE 2004). Such information can be used in order to identify when to burn in order to minimize potential impacts and ensure species recovery and maintain biodiversity.

Although recently DSE and PV are starting to develop ecologically based fire regimes this is mainly based upon minimum and maximum fire interval periods (cycle) which identify appropriate average fire frequency tolerances (e.g. *Guidelines and procedures for ecological burning on public land in Victoria)*. However, this only uses basic information and fails to identify appropriate seasonal and intensity affects on ecological communities or individual species. Although the Government should be congratulated for this initiative, any potential impacts or benefits which may occur are likely to be unknown due to a lack of pre and post fire monitoring being conducted, despite clear guidelines in regard to the importance of monitoring in order to determine if objectives have been achieved.

Fire plays an important role in the forest ecosystem in Australia, so if we as humans are going to use fire as a management tool to reduce the intensity of wildfire and try and replicate natural fire regimes in order to maintain biodiversity, then we must understand what we are doing and should be based around sound scientific evidence which can indicate which particular fire regime have minimal impacts or optimize biodiversity outcomes. Unfortunately we have a long way to go before we understand community and species responses to fire, and our government should be allocating further resources into studying our impacts so we can learn what fire regimes meet management objectives. A lack of scientific ecological monitoring has resulted in our current poor understanding of species responses to fire, and therefore our inability to conduct suitable ecological burns throughout much of our forests. This area combined with spatial and temporal variations in fuel load dynamics are two areas of great need of further ecological research, and paramount before widespread change in fire management is conducted.

5) *the legislative and regulatory arrangements for prescribed burns and bushfire management*

The Forests Act 1958 clearly states that the (62A) 'Secretary *may* apply and use fire for land and resource management', and use fire for the purpose of (62A 1c) 'to maintain, manage, protect or enhance the ecology of, or land or vegetation in, the State forest, national park or on protected public land'. As stated under (62A 2) 'in applying and using

fire in a state forest or national park, or on protected public land, the secretary must have regard to any relevant Code of Practice'.

There is considerable legislation relevant to species protection, many of which are listed in page 7 of *Guidelines and procedures for ecological burning on public land in Victoria.* Some of these include;

National Parks Act 1975 *Section 17C(2)(ii)* and *18(2)(a)(i)* relate to the preservation and protection of indigenous flora and fauna for National Parks and State Parks, and for other parks respectively;

Parks Victoria Act 1998 *Section 7(2)* – Parks Victoria must not act in a way that is not environmentally sound.

Flora and Fauna Guarantee Act 1988 – Lists the key objectives of flora and fauna management, and includes managing potentially threatening processes (of which Inappropriate Fire and Frequent Fire are both listed).

Wildlife Act 1975 *Section 12* – specifies that the Department is responsible for the management of wildlife reserves for the propagation or management of wildlife or the preservation of wildlife habitat, which may include the provision or appropriate fire regimes.

Species protection and maintenance of biodiversity are well considered in all Codes of Practice on public land (e.g. Code of practice for Fire management, Code of Forest Practice for Timber Production), as well as Forest Management Plans (e.g. DSE 2004). However, in order to determine if management objectives have been met requires rigorous monitoring, yet the government agencies conduct little monitoring so the deleterious or benefits of their actions cannot be proved. Therefore due to the lack of monitoring, Codes of Practice are not being followed, and species protection legislation is being breached in the process.

The methodology used during prescription burning, and the justification for burning regularly do not satisfy appropriate methods for maintaining biodiversity. Considerable scientific evidence exists explaining the most appropriate methods to conserve biodiversity, and how intricate knowledge of ecosystem functions and life histories should dictate fire management. Unfortunately the majority of prescribed burning conducted by DSE are based upon 'fuel load' requirements rather than ecological requirements. Therefore, highly likely to be causing significant ecological impacts.

One of our greatest concerns is that there is no accountability by the government for the ecological impacts that it is causing by the implementation of their forest practices. Any practice which jeopardizes or impacts upon the environment must have an Environmental Effects Statement, in order to determine likely impacts that are caused. Research institutes much follow strict ethical guidelines when conducting research, or impacting upon the environment, yet these burning regimes are implemented with little regard for environmental impacts. Both logging and fire impact more upon the environment than

any other practices, yet they have little regard for species protection and are among the greatest threats to biodiversity.

The fact that significant prescribed burning was conducted throughout the state following the recent 2007 fires proves that the department does not have an adequate environmental policy. This wildfire caused significant environmental impacts, and the further use of fire will only further reduce population densities and reduce recolonisation ability. It also proves that environmental impacts have not been adequately assessed, and monitoring of populations has not been conducted, and that fuel load and perceived threat dictates forest management, rather than biodiversity requirements.

6) *The effectiveness of maintaining permanent, strategically placed fire brakes and containment lines through public land areas*

This term of reference only refers to the maintenance of firebreaks instead of their establishment. Possibly this is due to the elaborate firebreak network already constructed during the previous fires (500-600km of firebreaks were constructed in Gippsland). Therefore many of the environmental impacts have already occurred, and the question is really asking, now what do we do with them?

Firebreaks can be particularly useful for fire suppression activities, however, their effectiveness must be able to justify damage incurred by their construction. Therefore their extent, length, width and position must satisfy environmental and other landscape values before permanent construction. This is why long consultation process is essential to address these criteria, and a relevant Code of Practice must be followed. Unfortunately such consultation was not conducted during these latest fires, which resulted in considerable variation in their construction and landscape values regularly ignored during their construction.

However, the possibility of using such strategically placed fire breaks and containment lines has several long term problems;

1/ It has a high probability of being inappropriately located, given that wildfire ignition points and wind direction are random.

2/ The cost of maintaining such breaks to a useful standard would be an ongoing drain on local fire prevention resources.

3/ The construction of fresh mineral earth breaks, of the length required, would be a further impost on the already excessive stream water siltation due to roading and logging runoff.

4/ It is well recognised that forest tracks provide a means for which wild dogs and foxes can move and hunt more efficiently (e.g. May and Norton 1996), leading to greater predation impact on native fauna. Soil disturbance will also facilitate weed invasion and spread.

5/ The extent and width of these clearings may inhibit the movement of many fauna species across these bare unsheltered dividing strips, and can lead to gene pool isolation, and increased susceptibility of local extinction (particularly due to wildfire).

The majority of firebreaks and bulldozing activity should never have been allowed in the first place. Numerous important ecological and cultural sites were damaged or destroyed during this process. **We recommend that bulldozer operators conduct a certain level of ecological training, and have passed some certificate, to ensure that they understand the impacts of their actions.** They must also be continually supervised by relevant government agencies to ensure that they are adhering to a code of practice and ecological guidelines.

It is essential that the construction of, and maintenance of, firebreaks and containment lines conform to a Code of Practice, so impacts can be minimised and effectiveness maximised. Most importantly a code of practice should prevent exactly what happened this year where the whole bulldozing operation, construction of firebreaks and rehabilitation works can only be regarded as a complete shemozzle.

This recent bulldozer activity is a perfect indicator of our governments ecological policy. In other words, all must be done to suppress wildfire, with scant regard for ecological considerations.

8) *The impact of traditional land uses such as timber harvesting, grazing, four-wheel driving, hunting, camping, mining and prospecting on the scale and intensity of bushfires and the ability of relevant agencies to respond*

Since European settlement there has been profound alteration of vegetation structure and composition throughout the forests of south-eastern Australia, and the principal causes of this vegetation change is due to past management practices such as logging (both clear-fell and selective) as well as grazing and associated frequent burning to promote the 'green pick' for stock (McKinty 1969). These practices have a long history in Gippsland and have dictated forest management for over a century, and these practices are recognized as having significantly modified and degraded forests from its historical state (McKinty 1969; LCC 1974, LCC 1982, Norris *et al.* 1983). The vegetation change has resulted in shrubby plant species which love disturbance (e.g. Cassinia sp, Hop Goodenia, Bracken, Silvertop Ash) dominating forested ecosystems, where these practices occurred. The extent to which this has impacted upon current fire regimes is relatively unknown, however, there is considerable evidence to suggest that these practices have severely influenced the frequency and intensity of fire in the landscape.

Cattle grazing

The traditional activity of stock grazing combined with a frequent burning regime to promote the 'green pick' (more nutritious growth) was a widespread and common practice throughout Australia, and is still continued in many areas (e.g. Tasker and Williams 2006). This combined practice is known to have a major influence on vegetation structure and complexity (e.g. Leigh and Holgate 1979) as grazing promotes

the growth of unpalatable shrubby vegetation (usually more sclerophyllus and pyrophyllic), and can reduce or even prevent recruitment of palatable species which are often more succulent and fire sensitive (e.g. Tasker and Bradstock 2006), while frequent fires can eliminate long lived fire sensitive species by disrupting life cycles, and simplify forest structure (SAC 2001). These reasons are why grazing practices have been recognized as modifying vegetation structure and likely to increases fire intensity and frequency in the long-term (Stretton 1939; McKinty 1969). These grazing practices were common throughout forested areas of Gippsland, and there is a considerably long history of grazing and frequent systematic burning of over 150 years (McKinty 1969; Norris *et al.* 1983). Although frequent burning and cattle grazing was once a common practice, the change in vegetation structure which was caused by this industry, has resulted in many forested areas now being unproductive for grazing.

The argument that cattle grazing should be used as a tool to minimize fuel load is totally unsubstantiated and cannot be supported scientifically, as there is considerable evidence to the contrary. Cattle grazing in the alpine area has been shown to have had no affect on the severity or scale of the 2003 alpine fires (Williams *et al.* 2006), while it can actually increase fire threat due to the reduction or elimination of more succulent species and promoting shrubby vegetation.

Logging

The relationship between logging and fire intensity is poorly understood. However, it is a well established fact that clear-fell logging and selective logging operations in the past (and is still being continued) has radically altered vegetation structure and composition on a massive scale throughout the forests of south-eastern Australia (e.g. McKinty 1969; Norris *et al.* 1983; Scotts 1991) and considerable inferences can be drawn in regard to the influence fire has had on the flammability of forests.

When wetter forest types (e.g. Damp Forest, Wet Forest) is logged, this removal of timber and overhead canopy cover, considerably dries out the site, which is then subject to an intense coupe burn to promote the regrowth of commercial timber for the future. This process has a dramatic affect on the survival of numerous understorey plant species, particularly long-lived fire sensitive species. For some species to survive on site, they must firstly survive the logging process and the mechanical soil disturbance, followed by the intense coupe burn, followed by silvicultural thinning often conducted several decades latter. Such disturbance almost ensures that several understorey wetter forest type species either cannot survive or do so at a much reduced abundance. These understorey plants usually create a moist environment, which ensures that fire frequency is long (e.g. 50-300 years) and many are particularly long lived species and can be several hundred years old (e.g. Cyathea sp, Sassafrass). The elimination of closed understorey canopy disrupts moisture homeostasis, and dries out the forest (particularly logs, leaf and bark fuels) for decades or even centuries to come. However, as logging rotation is intended to be every 80 years, this is far too short for several understorey plants to survive. The development of understorey plants is unwanted by forestry operators as it impedes light and competes with the Eucalypt regrowth.

The composition of species of eucalypt regrowing after logging is often in completely different proportions. Coupe burns usually favour ‘Ash’ Eucalypt species (such as Mountain Ash, Alpine Ash and Silvertop Ash, in their particular habitat) and stringbark

Eucalypt species. This is often to the detriment of other Eucalypt species, resulting in a once multi species forest of mixed age, being converted into a single age, almost monoculture. Therefore vegetation community composition is being significantly altered on a grand scale, and numerous Eucalypt species which are being logged are failing to regenerate. Species of the 'Box' Eucalypts are not regenerating in the majority of coupes, which means that these species which are highly resistant to fires, and create very little bark fuels, are actually being replaced by more flammable stringbark/Ash forests (Chatto 1996) which contain very high stem densities (up to 2000-3000 stems per hectare). Clear-fell logging can cause Eucalypt stem densities to reach several thousand stems per hectare (compared to several hundred in unlogged mature forest), and greater stem density increases the risk of fires crowning in the canopy. Box eucalypt species were also selectively logged prior to the practice of clear-fell logging (McKinty 1969), and therefore their abundance throughout the forest is currently significantly reduced, compared with historical times. Box species, or Eucalypts with little bark fuels often used to dominate areas with more frequent fires, however, as they are now replaced with a much greater density of more flammable Eucalypt species, this all results in more intense wildfires. This combined with drier 'wet forest' types, all exacerbates the threat of an intense wildfire situation.

It has also been recognized that frequent burning combined with the ringbarking of Eucalypt trees resulted in the dominance and spread of Braken (*Pteridium esculentum*) in many areas of Gippsland (Norris *et al.* 1983), also increasing fire threat.

A widely held belief in the community is that logging, grazing and burning reduce fire threat by reducing fuel load, however, any short-term benefits they may have is counteracted by the actually exacerbation of fuel loads in the long-term by stimulating germination, and promoting plant growth through increased light levels, and a reduction in competition. This actually creates a more flammable forest increasing fire threat, due to the promotion of disturbance loving species and the drying out of the forests. It is interesting that many of the advocates of the re-introduction or expanding these practices also have vested interests (mainly economic greed) in their continuation or return.

10) *The impact of climate change on bush fires and public land management practices.*
The greatest impact that Climate Change will have on the environment will be that fires will become more intense and more frequent throughout the landscape. Therefore management programs for both fire and biodiversity will need to consider these changes and the likely impacts that will occur. Disregarding the impacts of fire, many species will undergo changes in distributional and abundance due to climate change, and if they are going to survive, we must ensure that these movements are not jeopardized in anyway. This will require that more contiguous corridors of habitat are retained so that changes are able to take place and that they are not impeded by unnatural boundaries (e.g. cleared land or large fire breaks). As climate change is one of the greatest threats to biodiversity, how we manage fire in terms of species protection will become even more important in the future, and the best way to do this will require significantly more knowledge than we currently have.

12) *the involvement of local communities in the management of fire*

Consulting individuals with local knowledge and long experience may be justified in regard to conducting 'fuel reduction burns' in local areas, or fire ecology and weather patterns, but communities should not be consulted in regard to developing appropriate fire regimes for a region, as fire management is forest management which requires a holistic approach in regard to species protection, rather than having individual communities all managing their patch to varying objectives.

The majority of communities, and individuals living close to forested public land will undoubtedly prefer to have fire suppression activities conducted to their maximum extent to minimize any potential fire threat in the future. If local communities and individuals are consulted we will continue to see vested interest and economic greed dictating fire management, rather than best environmental practice. There is considerable legislation combined with a plethora of ethical reasons why conservation of our endemic species should dictate forest management. Public land is owned by the public, not the vocal minority, or those who have vested interests, economic gain or live near public land.

A major flaw in the 'Peoples Fire Review' is that they are interviewing people from towns directly affected by fire. Therefore they will gather a considerably biased view, and is in no way the opinion of the people, but merely that of a community who want to reduce the impact of fire. Just because people choose to live in an area which will inevitably experience fire, does not mean that environmental conservation should be jeopardised (its like building a house on a floodplain, and expecting that it will never flood). Particularly when the assets of those concerned residents are often replaceable and insurable (e.g. feed, fences, stock and property). Only important irreplaceable assets should be protected, and surely our most important asset is our environmental assets, which are the exact assets which are currently being compromised by fire suppression activities to protect individual private assets. As an entire community we must value our assets accordingly, not according to a neighbour of public land who wants it to be burnt at a regime which minimizes fire threat to his property which then jeopardises conservation of biodiversity in the process.

Our main concerns is that a large percentage of the community are pushing for increased amounts of fuel reduction burning (increased frequency of burns), in the perceived notion that this will reduce the fire threat. There have been several organizations which have been pushing an agenda (often with vested interests) claiming that the implementation of their strategies will prevent these 'mega fires', often in despite of scientific evidence to the contrary. An example of this is the 'Peoples fire review', which has been organized by and supported by groups and individuals which have a vested interest in minimizing the impacts of fire (and were also affected by fire). Although they claim to have no preconceived notions, their view points are already well known in the pubic arena, and are all the same! Even the opinions of the 'bushfire experts' on the review panel are well known, so there is no doubt that they are using this platform as another avenue to push their agenda, yet their opinions and motives are often scientifically flawed and do not consider environmental impacts. The greatest worry is that much of the propaganda which has been pushed by these groups and vocal minority has often been accepted throughout the community (often without scientific basis), and there seems to be little concern about likely impacts to flora and fauna, if such management programs were

implemented. The groups propelling such an argument should be condemned for creating a false sense of security in the general public that large mega fires can be controlled. In actual fact intense wildfire is a natural part of the environment, and any methods for reducing intensity are in itself a threat to the environment.

Communities and individuals must accept their own responsibility in regard to fire safety, rather than demanding changes to fire management which may jeopardise conservation objectives.

Conclusions

There is almost a unanimous call from the community for a change of public land management for which fire management is only one part. However, where conflict arises in the community is how public land should be managed, which begs the question what are our forests managed for? If forests are to be managed for a combination of factors including fuel management, as a resource (e.g. logging and tourism), and for protection and maintenance of biodiversity, then we must reach a compromise between these often conflicting management objectives. How we achieve these outcomes should be determined by experts in their field such as ecologists, fire ecologists, zoologists, botanists and other scientists, rather than politics, public opinion, economics and vested interests dominating management objectives. Only after conservation measures can be adequately addressed, could other management practices be implemented. Therefore forest management and fire management must be determined by strenuous scientific investigation, with sound scientific proof which can justify management decisions.

The Gippsland Environment Group wish to see best practice environmental management dictating management of public land. As biodiversity is our greatest and most important asset, then forest management should be able to show that biodiversity is maintained or enhanced (as stated in relevant codes of practice). There is considerable legislation requiring the government to ensure species protection, yet currently many of the management practices are further threatening already Threatened species. At this stage the government, cannot be shown to be adequately addressing these essential monitoring programs which are essential in determining and designing best management practices on public land.

Our forests have been so badly degraded due to the past management of our forests for resources, with little thought of the long-term impacts they could be causing. Our forests have been managed for their resources, rather than for the native flora and fauna species which inhabit them. With significant environmental protection legislation, surely we should see forest management dictated by the life history attributes and responses of our native species, rather than visited interests jeopardising species protection.

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