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## **Critique of the main conclusion in the Victorian Parliamentary Environment and Natural Resources Committee (ENRC) inquiry**

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### **SUMMARY**

The ENRC Parliamentary Report on Land Management and Bushfires in Victoria (June 2008) recommended that prescribed burning be nearly tripled to 385,000ha/yr, or 5% of all public land per annum. This proposed level of burning appears to be based at least in part on flawed information provided by the Victorian Government submission to the Inquiry which in turn is based on computer simulations of fire behaviour in Tasmania and America. Apart from the quite different fire environments involved (button grass plains and pine forests) the papers appear to be mis-quoted. The American papers suggested a far lower level of burning; while the Tasmanian research involved burning of 3% of *the button grass plains only* which occupy 23% of the landscape - ie burning of only 0.9% of all vegetation.

Support is also drawn from the 2004 Esplin report which made a broad over-generalisation based on a now out-dated, internal 2002 DSE/ParksVic publication which estimated vegetation fire tolerances. More recent work on vegetation fire tolerances has superseded this publication and predicts longer inter-fire intervals are needed for many vegetation types than was estimated in 2002. Extrapolation was also made from the level of burning in south-west Western Australia.. However this area has relatively uniform mainly dry forests which are not very comparable to many of the forests in Victoria or to its more variable topography.

‘Landscape scale burning’ is proposed to increase the level of burning – a technique that may result in more even-aged vegetation and less, not more of a mosaic. In addition, prescribed burning ‘targets’ do not appear to take into account the areas that have undergone recent wildfires, leaving potential for considerable over-burning in some regions such as the Grampians.

Future levels of prescribed burning should be calculated using all the information now available of the ecological tolerances of vegetation communities and the known needs of fauna. Each year the calculations must be adjusted to take into account recent wildfire and the actual extent of prescribed burning. More research, especially on the needs of fauna, including the age, extent and pattern of habitat post-fire, is essential to fine tune this, with regular review of ecological and fire protection aspects of the whole prescribed burning program.

## THE ARGUMENT AND CONCLUSIONS IN THE ENRC REPORT

The Vic ENRC report (June 2008) recommended that

***“in order to enhance the protection of community and ecological assets, the Department of Sustainability and Environment increase its annual prescribed burning target from 130,000 hectares to 385,000 hectares. This should be treated as a rolling target, with any shortfalls to be made up in subsequent years”*** (recommendation 2.2 ENRC report).

This recommendation was based largely on statements made by the Department of Sustainability and Environment (DSE) in the Victorian Government submission:

*“Recent research from the USA suggests that the placement of fuel reduced areas, in space and time, may impact on the overall effectiveness of a fuel reduction program (Finney 2006, Finney et al 2006). ... The study predicts that for fuel management to significantly reduce the spread and impact of a large fire burning under high fire danger conditions – 10-20% of the landscape would need to be effectively treated in strategic locations at any given time. ... This translates to 2% to 5% of the landscape having to be effectively treated in strategic locations each year. For randomly positioned treatments this is doubled to between 20% and 40%, meaning that 4% to 10% of the landscape would need to be treated annually.*

*Similar research has been conducted in the South-west of Tasmania (King et al 2006). The authors found that each year about 3% of the landscape has to be treated strategically to significantly impact on wildfire size. For random treatments to have the same effects, coverage should be at least 10% burnt each year. Western Australia, which has not experienced a large and damaging fire (such as 1983 Ash Wednesday, the 2003 Alpine fire or 2006/7 Great Divide Fire) since 1961, currently burns about 7.5% of its South-West forest landscape annually”* (Victorian Government submission p 4-5)

Parts of this were repeated unchanged by ENRC:

*“DSE referred the Committee to recent research from the USA which suggests a link between the placement of fuel reduced areas in space and time and the overall effectiveness of a fuel reduction program. DSE concluded that applying the principles of this work to Australia would translate to the treatment of around two to five per cent of the landscape in strategic locations each year to ensure an impact in a large fire situation. DSE also concluded that the same research suggested that for randomly positioned treatments, around four to ten per cent of the landscape would need to be treated each year to have the same effect”.* (ENRC report p 80)

ENRC visited Western Australia and referred to this state’s practices several times in its report including quoting figures from the Western Australian Conservation and Land Management (CALM - now renamed Environment and Conservation) Departmental annual reports:

*“The south west forest regions of Western Australia cover an area of approximately 2.5 million hectares ... The level of prescribed burning ... is significantly higher than the current level in Victoria, with a nominal 200,000 hectare (eight per cent) target applying across the region. While in the 1960s and 1970s the level of prescribed burning ranged from 10 to 15 per cent, this figure dropped dramatically in the late 1990s and early 2000s. For example, in 2001/02 only 74,739 hectares (approximately three per cent) of prescribed burning was undertaken in the south-west.*

*During this time the incidence of large wildfires increased significantly. As a result, the level of burning was restored to the 200,000 hectare nominal target in the mid 2000s.*

*In 2006/07, 330,000 hectares was identified for prescribed burning in the south-west forest regions (approximately 13 per cent), though only 138,600 hectares (approximately 5.5 per cent) was achieved due to a low number of suitable burning days. However, this figure is only slightly lower than the 10 year rolling average of 151,695 hectares (approximately six per cent) for prescribed burning in the region. (p 92-3 ENRC report)*

Use was also made of the 2004 Esplin report:

*“Research cited in the Esplin Report suggested that around 3.3 per cent of the landscape would need to be treated each year to provide for the persistence of native vascular flora. It is therefore clear that the current level of prescribed burning is significantly lower than is required for both bushfire protection and ecological purposes. (p 92 ENRC report and also similar wording on p 86)*

and the 2002 DSE/Parks Victoria Fire Ecology Working Group report:

*“The results from this analysis indicate, however, that overburning is not occurring at either a Statewide or at any bioregional scale. These results suggest that the threat which fire frequency poses to species composition and community conservation in Victoria is in fact from under-exposure to fire; i.e. fire frequency is too low across the landscape”. (quoted by ENRC on p 84)*

From which the ENRC Committee deduced:

***The Committee finds that the frequency and extent of prescribed burning has been insufficient, over a number of decades, for the preservation of ecological processes and biodiversity across the public land estate. An increase in the extent and frequency of prescribed burning for the enhancement of environmental values should therefore be a priority for the Department of Sustainability and Environment and its partner agencies. (Finding 2.2, p 86, ENRC report)***

Putting all this information together the ENRC committee decided;

*“... the Committee considers that there is sufficient evidence currently available to recommend the minimum annual average extent of prescribed burning required on public land. ... recent studies suggest that between two to five per cent of the landscape would need to be treated in strategic locations each year for prescribed burning to be effective as a bushfire suppression strategy. The same studies also suggest that for randomly positioned treatments, four to ten per cent of the landscape would need to be treated each year to have the same effect.” (p 91-92 ENRC report)*

The end conclusion was:

*In the Committee’s view, a minimum average of five per cent of the public land estate should be treated by prescribed burning each year. This would represent an annual target of 385,000 hectares, which is almost three times the current figure. The Committee believes that such a target strikes an appropriate balance between the ecological needs of the public land estate and the imperative of bushfire mitigation for the protection of communities. (p 92 ENRC report and repeated on p 94)*

The method by which DSE suggested it increase by threefold the area burnt each year is by “landscape wide burning”:

*“That (current) 130 000 hectares is going to have to be increased on a scale basis. .... shifting our burning practice to enable a multiple-kilometres-wide area to be treated persistently and consistently over a period of months to ensure that we end up with, hopefully, a mosaic-style burning framework. We are not talking about the relatively small hectareages with 100 per cent burnt black treatment that you have seen to date .... We are talking about something where we might end up with a 50 per cent, 70 per cent, 80 per cent fuel load reduction across a multiple-kilometres-wide area .... We will have to tell the community that, say, from after Easter through until late May to the end of June, access to this area will be restricted for the purposes of a landscape-scale burning activity, ... — within controlled lines but lines of a scale that is out of all proportion to what we currently do.”* (Précis from p 3 and 14, transcript of Vic Government presentation to ENRC, 7 April 2008).

This technique was accepted by the inquiry report:

*“During the Committee’s final public hearing, DSE announced plans to significantly increase the level of fuel reduction and ecological burning. DSE referred to the planned adoption of increased landscape scale burning across “multiple kilometres-wide” areas. The new approach was described as involving a focus on particular regions in a given year, during which a two to three month presence would be maintained by DSE and its partner agencies. In some cases, this would involve maintaining a fire in the region for much of that period and, if necessary, repeated efforts to overcome the vagaries of the weather.”* (p 92 ENRC report)

## **FLAWS IN THE ARGUMENTS**

### **Misuse of American research**

The level of suggested burning by American research is seriously misrepresented, being only 1-2% year of strategic burning or 2-4% of random burning, i.e. less than half that quoted by DSE and subsequently by ENRC (2-5% strategic or 4-10% if random).

#### ***Simulation of long-term landscape-level fuel treatment effects on large wildfires***

***Mark A. Finney<sup>1</sup>, Rob C. Seli<sup>1</sup>, Charles W. McHugh<sup>1</sup>, Alan A. Ager<sup>2</sup>, Berni Bahro<sup>3</sup>, and James K. Agee<sup>4</sup>***

*Using fuel treatment prescriptions that simulate thinning and prescribed burning, fuel treatment arrangements that are optimal in disrupting the growth of large fires require at least 1 to 2% of the landscape to be treated each year. Randomly arranged units with the same treatment prescriptions require about twice that rate to produce the same fire growth reduction.*

(Abstract - Finney (2006))

The other paper quoted by DSE in the Victorian Government submission (Finney et al 2006) is merely a description of the methodology used for the simulations and does not give any estimates.

A possible explanation for the discrepancy with the American papers is that DSE has used a far shorter return of fuel loads in its estimations for Victoria.

On American fuel loads post fire, Finney states:

*“Only a few studies of treatment longevity exist ..... and indicate diminishing benefits beyond about a decade”.* (Finney 2006)

*“ Little is known about how long treatments last, but a few studies suggest that the benefits are limited to 10 to 15 years.”* (Fire Science Brief, Issue 5 February 2008 Page 4)

while for Victoria DSE states

The available evidence suggests that the impact of prescribed burning may still be discernible for up to 10 to 15 years, but the most significant impacts will be in the three to five year period after burning. Surface fuels may recover quickly (within 3 to 5 years), but the reduction in bark and elevated fuels can produce an effect in the longer term by reducing spotting potential and the ability for crown fires to form.

(Victorian Government submission to ENRC, p 3)

Question - Is there a marked difference between return times for pine needle litter fuel loads and eucalypt litter fuel loads? This is possibly unknown.

### **Misuse of Tasmanian research**

The Tasmanian research involved burning of only the button grass plains at a rate of 3% per annum. These plains occupy 23% of the landscape and the remaining 77% were left unburnt - i.e. only 0.9% of all vegetation was burnt/year. It did not involve burning "3% of the landscape" each year as incorrectly stated by DSE.

### **Use of an out of date publication quoted in the Esplin Report**

The Esplin report made a broad over-generalisation based on an unpublished, unreviewed 2002 DSE/Parks Vic publication:

*"DSE has used expert opinion and all available data (but this is limited) to determine the interval limits and a suitable average interval for the persistence of native vascular flora in all Victorian vegetation types (Fire Ecology Working Group 2002). Generally the average interval considered ideal for forests is about 30 years. Using this figure, the average proportion of land burnt per year by the combination of prescribed and unplanned fire should be 3.3%" (p78, paragraph 7.49. Esplin Report).*

Esplin, in plucking a single figure from the range for various vegetation types given in the publication, took no account of the area occupied by vegetation types with estimated fire intervals that differed from 30 years. But more importantly, some of the estimates for fire tolerances in this 2002 report are obviously incorrect with estimates for minimum burn intervals for rainforest types as short as 5 years and 50 year maximum burn intervals for vegetation such as chenopod shrubland with no recorded fires at all. This publication appears to be no longer available on the web suggesting that DSE recognises its inadequacies.

Since this publication, the collection of better ecological data on key species in the various vegetation communities has meant the minimum and maximum fire interval tolerances for the various vegetation types (now grouped into 'Ecological Vegetation Divisions' (EVDs)) have now greatly changed. The minimum and maximum tolerable fire intervals are much increased for many of them. It is now recognised that several vegetation types are fire intolerant and/or have no upper limit for remaining unburnt and that 14 of the 32 EVDs are now estimated to need a minimum fire interval of 20 years or more even if the fire is light and patchy (Cheal 2008 unpublished in prep). Thus Esplin's estimate of 3.3% for the "*average proportion of land burnt per year*" for ecological purposes is likely to be a considerable over-estimate. This upward change in fire intervals is not reflected in the ENRC report's discussion of environmental factors (p84-86) which merely notes that development of Ecological Fire Strategies may take another 3-5 years (p85).

In addition, this methodology of using minimum and maximum tolerances for vascular plant communities to design ecological burns, does not take into account fauna needs, about which far too little is known. Unfortunately, plant tolerances are not good indicators for the tolerance of

vertebrates some of which need factors such as a deep litter layer (for instance Mallee Fowl) or hollows in old trees which can be lost in prescribed burns, particularly if these are frequent. Burn regimes based on vascular plant tolerances are also very poor indicators for the survival of invertebrates and fungi. A fire regime that constantly removes fuel is likely to be detrimental to all fungi and fauna dependant on leaf litter. This inadequacy of using plant fire regime tolerances with respect to fauna is at least acknowledged by Esplin (in paragraph 7.49, p80) and by the current ENRC report (p86), but has not resulted in a conservative position save for the recommendation that:

*‘A comprehensive review of the effectiveness of the increased prescribed burning target in meeting ecological and bushfire suppression needs should be conducted every three years’* (recommendation 2.3 ENRC report).

### **Over extrapolation from Western Australian burning**

The south-western region of W.A. has a largely flat topography with relatively uniform mainly dry forests, of which the great majority is Jarrah (over 60%) with far lesser areas of Karri, Tingle and Wandoo. This is not very comparable to the variety of vegetation and topography of public land throughout Victoria. This difference is acknowledged in the ENRC report (p93) but does not seem to have influenced its end conclusions. Although the nominal target in the south-west is 200,000ha (8%) this is not often achieved. It also includes 20-30,000 ha of post logging and other silvicultural burns, which are not apparently included within the Victorian totals. In fact the actual area burnt in south-west Western Australia over the last 10 years is about 150,000ha (see graph p 114 Department of Environment and Conservation Annual Report 2006-7 and ENRC report p 93) – or less than 130,000 when silvicultural burns are subtracted i.e nearer to 5 % /year. The ecological effects of this level of burning in South-western WA (of a largely dry forest) is currently the subject of a research project by the Bushfire Cooperative Research Centre

The inference made by ENRC that WA reduced its targets in the late 90s and early 2000s and then reverted following large fires is incorrect. As in Victoria, drought and hot dry weather conditions severely restricted the amount of prescribed burning and also exacerbated the severity of wildfires that occurred. The ‘target’ for prescribed burning was never changed – rather it became impractical and the control of wildfires more difficult in hotter drier years – a reality that must be faced and which will not be solved by setting higher targets and by degrading biodiversity by unsustainable levels of burning in the milder years.

### **Problems with the proposed “Landscape scale burning”**

“Landscape-wide burning” as described in DSEs verbal submissions to ENRC unfortunately does not mean conducting a mosaic of burns across the landscape of different ages, but rather conducting a single large scale, but (hopefully) patchy burn across a large area, over 2-3 months in selected regions involving, if necessary, the exclusion of public access because of the scale of the operation. This will result in a mosaic of the recent burn and whatever the previous age(s) were there before. After a second rotation of this treatment, it will be largely reduced to only 2 ages which will favour a lesser range of species than a range of ages scattered across the landscape and local extinctions of some fauna could result. If there are dry weather conditions during these large burns there will be less of a mosaic and potentially even more of a problem with fauna as a more single-aged landscape will result.

However, note that DSE has recently softened this approach with “Landscape Mosaic Burns” included in the recently released Fire Operations Plans. The document “Victorian Overview to District Fire operations Planning”(August 2008) on the DSE website under ‘Fire Operations Plans’ describes these as providing a range of burn intensities across an area, (including burn exclusion)

and which will usually take several years to complete. While an improvement from conducting burns over an extensive area in one year, it still means a close cluster of burn ages and does not answer the question of the total amount of burning that should take place over time.

### **Current prescribed burning targets do not consider wildfires**

As a reaction to the large wildfires since 2002/3, prescribed burning has been stepped up in some regions. When wildfires are added to prescribed burns, about half of all public land that is suitable for prescribed fire<sup>1</sup> has already been burnt in the last 5<sup>1</sup>/<sub>2</sub> years or about 10% per year. This does not take into account the additional areas burnt for timber regeneration. Rather than an increase, there is instead a need to wind back burning in many regions until fire regrowth matures sufficiently to support a wider range of fauna species.

Any program of prescribed burning must also take into account the degree and pattern of wildfire. At present prescribed burning 'targets' do not take this into account. Taking the Grampians as an example, over 56% of the park is now less than 6 years old and is highly fragmented by recent fire history and yet significant prescribed burns have been undertaken without a clear understanding on what effect this is having on the fauna.

### **WHAT SHOULD WE DO IN THE FUTURE?**

The amount of prescribed burning in the future should be calculated using all the information available of the ecological tolerances of vegetation communities (now grouped in Ecological Vegetation Divisions or EVDs) and the known needs of fauna. The extent of each of the EVDs must be included in the calculations as must wildfires (area and time since fire). All fire sensitive EVDs and those which can exist without fire indefinitely must be excluded from prescribed fire. The burning should be preferentially done where these are strategically useful and elsewhere should be more conservatively undertaken on the longer side of the tolerances of the EVDs and fauna. This (and the avoidance of burning of non fire dependant vegetation) is because wildfire will inevitably impose itself over unpredictable areas of the landscape and if prescribed burning keeps vegetation at the short end of its tolerances, these are far more likely to be breached with detrimental effects on biodiversity. Fire tolerances of EVDs should only be deliberately breached in limited areas where strategic protection of important assets dictates this necessity. Each year the calculations must be adjusted to take into account recent wildfire and the actual extent of prescribed burning. More research, especially on the needs of fauna, including the age, extent and pattern of habitat post-fire, is essential to fine tune this, including using a three yearly review as suggested by ENRC.

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<sup>1</sup> Excluding wet forest, rainforest, native pine and logging regrowth. Note that because of logging regrowth, this area may well be more than the rough estimate of 20% using 'zone 5' burning exclusion zone.

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<http://www.parliament.vic.gov.au/enrc/inquiries/bushfires/transcripts.html>

## Some more extensive relevant extracts:

DSE submission to ENRC inquiry (p 3-5)

### Effect of fuel reduction burning

Victoria has a long history of involvement in prescribed burning and a number of investigations designed to understand and improve performance have been conducted in the Victoria, other Australian States and the United States of America (USA). The evidence is that prescribed burning has been of significant assistance in fire suppression operations on public land. Fuel reduction burning has assisted directly in the protection of high-value assets, including townships, and it has played a role in helping firefighters reduce the area burnt by large and severe wildfires.

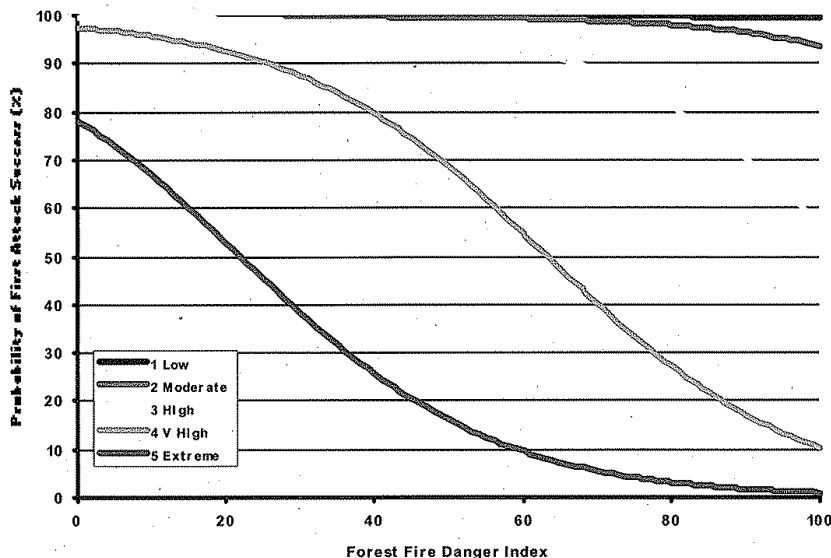
Tolhurst and McCarthy (2001) reviewed numerous fires and found that - as fire danger increases - the weather rather than fuel becomes more important. This explains why it is rare for a fuel reduced area to stop the headfire of a significant wildfire spreading under the Very High and Extreme fire danger conditions. However, under these conditions fuel reduced areas *can* reduce fire intensity, spotfire activity and rates of spread. This, in turn, leads to improved chances of asset protection, and the ability of suppression forces to take positive action as conditions become more suitable (which may include work along fire edges).

Fuel management does provide a measurable effect on the safety and success of fire suppression operations during initial attack. Figure 1 is based on Victorian experience in unplanned fire suppression across a range of overall fuel hazard classes and Forest Fire Danger Indices. The graph shows that certainty of first attack being successful only occurs in low-to-moderate fuel and fire danger conditions, but that fuel hazard reduction does assist across a range of conditions.

The available evidence suggests that the impact of prescribed burning may still be discernible for up to 10 to 15 years, but the most significant impacts will be in the three to five year period after burning. Surface fuels may recover quickly (within 3 to 5 years), but the reduction in bark and elevated fuels can produce an effect in the longer term by reducing spotting potential and the ability for crown fires to form.

Case studies involving moderately sized wildfires suggest that the effectiveness of a single burn area is influenced by the proportion of the area burnt within its boundaries. Within strategic burning corridors, the available evidence is that at least 50% and, maybe as much as 60%-80%, of an area should be burnt to be considered effectively treated.

**Figure 1.** Probability of first attack success in different Overall Fuel Hazard (McCarthy and Tolhurst, 1998)



### **Zones and burn units**

In other areas, such as the Ecological Zones described by the Code of Practice for Fire Management on Public Land (Revision 1) 2006, such treatment targets may not be appropriate. Fire should be applied to meet ecological objectives, as well as to fire protection ones. For example, the fire management objectives in Ecological Zones could be achieved by burning drier north and westerly aspects (say 20-40% of the burn area) for several rotations (i.e. where more naturally fire prone vegetation types occur) - followed by less frequent burning of wetter easterly and southern aspects.

Such an approach would:

- increase patchiness or mosaic fire effects;
- target vegetative community requirements and
- assist firefighters involved in initial attacks in remote areas by providing a greater coverage of lower fuel loads in the driest and most difficult sites.

For larger fires burning under very high to extreme conditions, the sum of how individual burning units combine is of equal importance. Recent research from the USA suggests that the placement of fuel reduced areas, in space and time, may impact on the overall effectiveness of a fuel reduction program (Finney 2006, Finney et al. 2006). Predictions are made considering:

- changes in fuel over time;
- likely development of wildfires in those fuels and
- how varying placements of fuel reduced areas may impact on the development of a wildfire.

The study predicts that for fuel management to significantly reduce the spread and impact of a large wildfire burning under very high fire danger conditions - 10-20% of the landscape would need to be effectively treated in strategic locations at any given time. Using the Australian case studies described above and the general principles from this work, for a program to have any impact in a large fire situation:

- 10-20% of a strategic corridor would need to be burnt within the last five years, and
- each burn area within the corridor would need to be at least 50% when prescribed fire was applied.

This translates to 2% to 5 % of the landscape having to be effectively treated in strategic locations each year. For randomly positioned treatments this is doubled to between 20% and 40%, meaning 4% to 10% of the landscape would need to be treated annually.

Similar research has been conducted in the South-West of Tasmania (King et al. 2006). The authors found that each year about 3% of the landscape has to be treated strategically to significantly impact on wildfire size. For random treatment to have the same effects, coverage should be at least 10% burnt each year. Western Australia, which has not experienced a large and damaging fire (such as 1983 Ash Wednesday, the 2003 Alpine Fire or 2006/07 Great Divide Fire) since 1961, currently burns about 7.5% of its South-West forest landscape annually.

### **Environmental factors**

A major reason for the controversy surrounding the appropriate extent of prescribed burning on public land is the level of concern within the community about its environmental impacts. A number of stakeholders expressed concerns that current levels and methods of prescribed burning on public land are harmful to the environment.<sup>266</sup>

However, the Victorian Fire Ecology Working Group (a partnership between DSE and Parks Victoria) has found that biodiversity in Victoria is in fact threatened by the infrequency of current fire regimes:

Inappropriate fire regimes (and in particular too-frequent fire) is commonly regarded as a significant threat to biodiversity in Victoria and indeed, high frequency fire has recently been nominated as a threatening process under the Flora and Fauna Guarantee Act (1988). The results from this analysis indicate, however, that overburning is not occurring at either a Statewide or at any bioregional scale. These results suggest that the threat which fire frequency poses to species composition and community conservation in Victoria is in fact from *under-exposure* to fire; i.e. fire frequency is too low across the landscape.<sup>267</sup>

The challenge of returning fire to the landscape in a way that is consistent with environmental needs has been expressed by David Lindenmayer, Professor of Ecology and Conservation Science at the Fenner School for Environment and Society at the Australian National University, in the following terms:

Most natural fires are very patchy, they leave a very patchy environment and that's critical to the recovery of biodiversity and the environment after fire. The big difference with...back-burning and human fires is that they tend to be very uniform and that creates a very homogeneous environment which is not so good for many species to recover, or recover very quickly from. <sup>268</sup>

DSE's stated approach to solving this problem has been to emphasise the importance of using planned fire in a way that mimics the natural fire regime.<sup>269</sup> DSE has adopted a scientific framework to achieve this which is set out in the *Guidelines and procedures for ecological burning on public land in Victoria* (2004) ("the Guidelines"). The Guidelines are not prescriptive but instead contain a number of "general principles which may be used as a guide to action or decision-making".<sup>270</sup>

The approach outlined in the Guidelines involves using the "vital attributes" (also referred to as "life history") of key plant species to determine the upper and lower tolerable fire intervals for an ecologically appropriate fire management regime. Plant species are categorized according to their Ecological Vegetation Class (EVC), of which there are approximately 300 across the state and which are defined as: "...one or a number of floristic communities that appear to be associated with a recognisable environmental niche, and which can be characterised by a number of their adaptive responses to ecological processes that operate at the landscape scale level."<sup>271</sup>

In the case of ecological burns (i.e. burns with a primary purpose of one or more conservation or related outcomes), the vital attributes approach is implemented through the use of an "Ecological Burn Plan" which is completed prior to the burn.<sup>272</sup>

In the case of each Fire District, and therefore presumably for the majority of broad area burns in zone three, the "vital attributes" approach is to be implemented through an Ecological Fire Strategy (since renamed a "Fire Ecology Strategy").<sup>273</sup> At the time of writing, DSE had yet to finalise its Fire Ecology Strategies, although the Committee was advised that a number had been completed to draft stage.<sup>274</sup>

The Committee understands that the delay in the completion of Fire Ecology Strategies may be due in part to gaps in data collection and in the mapping of EVCs for particular areas. DSE has advised

the Committee that the implementation of Fire Ecology Strategies requires “substantial work” and may take a further three to five years.<sup>275</sup> The Committee has also been advised, however, that a number of Fire Ecology Strategies are now in draft form and are already having an impact on the planning process for prescribed burning.<sup>276</sup> The Committee also notes that DSE has adopted an approach of “adaptive management” to its prescribed burning program to facilitate changes to burning practices in accordance with future research findings.

A limitation of the “vital attributes” approach on which draft Fire Ecology Strategies are based is that it does not currently account for the effects of planned fire regimes on fauna.<sup>277</sup> The Committee notes, however, that this issue is likely to be the subject of future research. The Esplin Report cited a figure of around 3.3 per cent as the proportion of public land in Victoria that should be burnt each year for ecological purposes. This figure was based on research conducted by DSE’s Fire Ecology Working Group, which found that the ideal average interval between fires for Victorian forests is about 30 years.<sup>278</sup> Since it is based on an ideal average fire interval for all Victorian forests, this figure apparently accounts for the fact that a proportion of the public land estate is unsuitable for prescribed burning. As noted in the introduction to this chapter, approximately 6.2 million hectares of the total 7.7 million hectares of the public land estate is suited to prescribed burning.

It is important to note that the figure of 3.3 per cent was based on an estimate of the *average* fire interval for the whole landscape. In many areas, the *actual* interval between successive fuel reduction/ecological burns is significantly shorter; in some areas it is longer; and in some areas fire is excluded altogether. As the Committee discusses below, the average figure may provide a broad indication of the minimum level of ecological burning required on public land in Victoria, albeit one which may be superseded by future research.

#### **Finding 2.2:**

**The Committee finds that the frequency and extent of prescribed burning has been insufficient, over a number of decades, for the preservation of ecological processes and biodiversity across the public land estate. An increase in the extent and frequency of prescribed burning for the enhancement of environmental values should therefore be a priority for the Department of Sustainability and Environment and its partner agencies.**

<sup>266</sup> See for example: Wombat Forest Care, *Submission*, no. 186, 4 June 2007; Otway Conservation Council, *Submission*, no. 197, 6 June 2007; Goongerah Environment Centre, *Submission*, no. 195, 5 June 2007; Environment East Gippsland Inc., *Submission*, no. 225, 4 June 2007; M. Killeen, *Submission*, no. 235, 1 August 2007; C. Copley, *Submission*, no. 244, 18 September 2007; J. Whadcoat, *Submission*, no. 246, 29 August 2007; P. Crisp, *Submission*, no. 248, 11 September 2007.

<sup>267</sup> Department of Natural Resources and Environment and P. Victoria, *Analysis of Disturbance of Fire on Public Land in Victoria: Fire Ecology Working Group*, Department of Sustainability and Environment, Melbourne, 2002, p. VIII.

<sup>268</sup> Australian Broadcasting Corporation, 'Firestorm', viewed 18 April 2008, <<http://www.abc.net.au/4corners/content/2007/s1870141.htm>>.

<sup>269</sup> Department of Sustainability and Environment, *Gippsland Burning News: Autumn 2008*, Department of Sustainability and Environment, Melbourne, 2008, p. 3. Chapter 2: Prescribed Burning In Victoria

<sup>270</sup> Department of Sustainability and Environment, *Guidelines and procedures for ecological burning on public land in Victoria*, Department of Sustainability and Environment, Melbourne, 2004, pp. 4-10.

<sup>271</sup> Department of Sustainability and Environment, 'Ecological Vegetation Class (EVC) Benchmarks for each Bioregion', viewed 6 April 2008, <<http://www.dse.vic.gov.au>>.

<sup>272</sup> Department of Sustainability and Environment, *Guidelines and procedures for ecological burning on public land in Victoria*, Department of Sustainability and Environment, Melbourne, 2004, p. 15.

<sup>273</sup> Department of Sustainability and Environment, *Guidelines and procedures for ecological burning on public land in Victoria*, Department of Sustainability and Environment, Melbourne, 2004, p. 21.; Department of Sustainability and Environment, *Code of Practice for Fire Management on Public Land*, Department of Sustainability and Environment, Melbourne, 2006, p. 10.

<sup>274</sup> Department of Sustainability and Environment, *personal communication*, 15 January 2008.

<sup>275</sup> Department of Sustainability and Environment, *Submission*, no. 168E, 4 April 2008, p. 3.

<sup>276</sup> Department of Sustainability and Environment, *personal communication*, 15 January 2008. Inquiry into the Impact of Public Land Management Practices on Bushfires in Victoria

<sup>277</sup> B. Esplin, M. Gill and N. Enright, *Report of the Inquiry into the 2002-03 Victorian Bushfires*, Department of Premier and Cabinet, Melbourne, 2003, p. 80.

<sup>278</sup> B. Esplin, M. Gill and N. Enright, *Report of the Inquiry into the 2002-03 Victorian Bushfires*, Department of Premier and Cabinet, Melbourne, 2003, p. 78.

### **The required extent of prescribed burning**

Determining the appropriate extent of fuel reduction and ecological burning on public land is a complex issue and one which is unlikely to be finally resolved by the current Inquiry. Moreover, the Committee recognises that any conclusions it makes on this issue will be subject to the findings of future research. Nevertheless, the Committee considers that there is sufficient evidence currently available to recommend the minimum annual average extent of prescribed burning required on public land.

As noted above, recent studies suggest that between two to five per cent of the landscape would need to be treated in strategic locations each year for prescribed burning to be effective as a bushfire suppression strategy. The same studies also suggest that for randomly positioned treatments, four to ten per cent of the landscape would need to be treated each year to have the same effect. Research cited in the *Esplin Report* suggested that around 3.3 per cent of the landscape would need to be treated each year to provide for the persistence of native vascular flora. It is therefore clear that the current level of prescribed burning is significantly lower than is required for both bushfire protection and ecological purposes. In the Committee's view, a minimum average of five per cent of the public land estate should be treated by prescribed burning each year. This would represent an annual target of 385,000 hectares, which is almost three times the current figure. The Committee believes that such a target strikes an appropriate balance between the ecological needs of the public land estate and the imperative of bushfire mitigation for the protection of communities.

During the Committee's final public hearing, DSE announced plans to significantly increase the level of fuel reduction and ecological burning. DSE referred to the planned adoption of increased landscape scale burning across "multiple kilometres-wide" areas.<sup>306</sup> The new approach was described as involving a focus on particular regions in a given year, during which a two to three month presence would be maintained by DSE and its partner agencies. In some cases, this would involve maintaining a fire in the region for much of that period and, if necessary, repeated efforts to overcome the vagaries of the weather. DSE also announced its intention to move away from reporting the total hectares treated each year as the sole measure of its prescribed burning program, towards the increased use of "multiple measures". One such measure cited by DSE was the percentage of the area treated within each kilometre-wide burning area (e.g. whether 50, 70 or 80 per cent of such an area was treated).<sup>307</sup>

### **Prescribed burning in Western Australia**

The south west forest regions of Western Australia cover an area of approximately 2.5 million hectares, consisting of Jarrah, Karri, and Marri trees. The broadly similar geographic and climatic conditions between south-west Western Australia and Eastern Victoria are often cited as providing a basis for comparison between the approaches to prescribed burning adopted by the two states.

The level of prescribed burning undertaken in south-west Western Australia is significantly higher than the current level in Victoria, with a nominal 200,000 hectare (eight per cent) target applying across the region.<sup>308</sup> While in the 1960s and 1970s the level of prescribed burning ranged from 10 to 15 per cent, this figure dropped dramatically in the late 1990s and early 2000s.<sup>309</sup> For example, in 2001/02 only 74,739 hectares (approximately three per cent) of prescribed burning was undertaken in the south-west.<sup>310</sup> During this time the incidence of large wildfires increased significantly. As a result, the level of burning was restored to the 200,000 hectare nominal target in the mid 2000s.

In 2006/07, 330,000 hectares was identified for prescribed burning in the south-west forest regions (approximately 13 per cent), though only 138,600 hectares (approximately 5.5 per cent) was achieved due to a low number of suitable burning days.<sup>311</sup> However, this figure is only slightly lower than the 10 year rolling average of 151,695 hectares (approximately six per cent) for prescribed burning in the region.<sup>312</sup>

Fernandes and Botelho note that prescribed burning constraints differ between south-eastern and south-western Australia, citing south-west Western Australia's drier and more predictable weather; milder topography and relatively uniform forests as allowing "larger, safer, and more effective burns that can be conducted more times per year".<sup>313</sup> The Committee recognises that the constraints in south-west Western Australia differ from those in Victoria and that, as such, prescribed burning programs adopted in Western Australia may not readily lend themselves to direct comparison with Victoria. Despite these differences, the Committee strongly supports the view that Victoria should adopt a similar broadscale approach to prescribed burning as is currently practised in Western Australia. While it may or may not be appropriate to treat a similar proportion of the Victoria public land estate by prescribed fire, the Committee welcomes the recent decision by DSE to adopt the Western Australian approach of landscape scale burns.<sup>314</sup>

<sup>306</sup> P. Harris, Secretary, Department of Sustainability and Environment, *Transcript of evidence*, Melbourne, 7 April 2008.

<sup>307</sup> P. Harris, Secretary, Department of Sustainability and Environment, *Transcript of evidence*, Melbourne, 7 April 2008

<sup>308</sup> Department of Conservation and Land Management (WA), *Annual Report 2003-04*, 2004, p. 21.

<sup>309</sup> Department of Conservation and Land Management (WA), *Annual Report 2003-04*, 2004, p. 22.

<sup>310</sup> Department of Conservation and Land Management (WA), *Annual Report 2001-02*, Department of Conservation and Land Management, Perth, 2002, p. 61.

<sup>311</sup> Department of Environment and Conservation (WA), *Annual Report 2006-07*, Department of Environment and Conservation (WA), Perth, 2007, p. 114.

<sup>312</sup> Department of Environment and Conservation (WA), *Annual Report 2006-07*, Department of Environment and Conservation (WA), Perth, 2007, p. 117.

<sup>313</sup> P. M. Fernandes and H. S. Botelho, 'A Review of Prescribed Burning Effectiveness in Fire Hazard Reduction', *International Journal of Wildland Fire* vol. 12, no. 2, 2003, pp. 121-122.

<sup>314</sup> P. Harris, Secretary, Department of Sustainability and Environment, *Transcript of evidence*, Melbourne, 7 April 2008.

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**The CHAIR** — Thanks very much for that, Mr Harris. Over the period of months that we have been conducting these investigations we have heard in probably the majority of evidence that the level of prescribed burning we are doing at the moment — you touched on that — has been inadequate and that there have been a number of reasons for that, including different policy over a number of years and different attitudes by the community and by industry to protecting timber resources as well, so there has been a bit of variability about the amount of burning going on in the past and what are the appropriate levels. Do you have a figure at the moment?

We have got a target of 120 000 hectares a year. Places like Western Australia do significantly more than that. The majority of evidence we have heard around prescribed burning is that we need to significantly improve on that. The issue is: what is a reasonable level, and for what purpose? Do we do fuel reduction for fuel reduction purposes to say we meet the targets, or do we actually do what WA argues for, in effect? The environment and conservation department there is around managing for fire protection and for ecological burning as well, which seems to have a lot more focus. Do you have a figure that government needs to work with? Are we talking about 250 000 hectares a year, or are we talking about something significantly more than that? Are we talking about a percentage of Crown land being burnt in order to meet ecological and fire protection objectives?

**Mr HARRIS** — Thank you for that. I think we are talking about all of the above, not just limited to an increase from — I think you short-changed us — our target of 130 000, which we achieved last year. As you know, our spring burning season is not our largest burning season, so we are a little bit ahead of where we were this time last year for burning, but it all depends on the weather conditions.

That 130 000 hectares is going to have to be increased on a scale basis. From our perspective it is not so much about saying we should double it or increase it according to some concept that says we have met a certain number of hectares. What we are talking about here is shifting our burning practice to enable a multiple-kilometres-wide area to be treated persistently and consistently over a period of months to ensure that we end up with, hopefully, a mosaic-style burning framework. I think you are probably familiar with that terminology. What that will require is advice to the community well in advance that we plan to undertake such a monumental scale of burn. It will require planning inside the government so that the resources are available to do it. It will require planning from the community to ensure that we are able to effectively carve out such a large area from human access for a period, and that we engage closely particularly with the CFA and other voluntary support organisations to ensure that the risks are effectively managed in response to that.

Part of the scale we are talking about here across the landscape involves formal Parks land management responsibilities, and we will need Parks cooperation to ensure that, for example, we close a portion of the park to make sure there are no people involved; we do it well in advance; we offer a lot of notice; and we effectively protect that whole community area by treating that with fire through a period of perhaps two or three months consistently and persistently throughout autumn to ensure that we end up with this scale of change. We are not talking about the relatively small hectareages with 100 per cent burnt black treatment that you have seen to date, which we do not always undertake. We are not talking about that; we are talking about something where we might end up with a 50 per cent, 70 per cent, 80 per cent fuel load reduction across a multiple-kilometres-wide area with a large level of community engagement behind it and with a consistent and persistent effort from the agencies to keep the fire running, as it were, through that autumn period, even though weather conditions are likely to put it out, to ensure that we end up with that treated district.

**The CHAIR** — I guess the main issue and the question is: in order to protect national parks we have got to introduce more fire — the community is going to have varying responses to that, because they see fire as damage rather than fire as a benefit to the environment; and Peter in his introduction spoke about the need to take community with you. I am just wondering: is there a greater contribution you can make to us about the type of strategies you need to put forward to take community with you? Resources and personnel on the ground is one of them, but can you add anything more really around that? It is really a major education and communications campaign to tell the community why it is important to do it, so they are prepared to accept the smoke and to accept the risk that is attached.

**Mr HARRIS** — And probably to accept the lack of access to an area for a sustained period as we go about persisting in trying to make the fire do its job. Because we planned to do these in autumn when the weather might actually defeat us, we will just go back to burn, burn and burn again until competing weather cleans us up, and we have no possibility of going on into winter. But we will have to tell the community that, say, from after Easter through until late May to the end of June, some period like that, access to this area will be restricted for the purposes of a landscape-scale burning activity, because we obviously cannot afford to have people going out there and camping that weekend if we are going to let a fire wander through that part of the landscape — within controlled lines but lines of a scale that is out of all proportion to what we currently do.

We will have to start out, as I said, two months beforehand. Communities will have to be made aware that we are proposing a treatment of this scale for this area and that access will be restricted. They will have to know what kind of resourcing we will have on stand-by to manage the risks, they will have to know what sorts of activities we will be undertaking, and they will have to know, probably, who they are, in effect, competing with. Because if we do start out with two or three areas in Victoria 12 months out, which we potentially want to treat but which will settle down eventually into one, then there will be some community disappointment, such as, ‘You didn’t treat us because you decided to do the southern Otways this year’, because it is safer to do that area, as an example.

What we will have to do, I think, is take the people we have who are very good in the face of a major fire threat with what the community is facing today and tomorrow, and we will convert that into what we plan for you to face in three months, six months, nine months time, and we will work through a plan where we will start out with one community meeting and then have another one a few months later, but as we get closer they will probably be fortnightly, just to tell people that we are planning the start-up.

For example, this year we brought the start-up early for the burning program; if we decided the opportunity was there for the landscape scale we would have to have done our communications effort so well to be able to say, ‘We said to you we might start it after Easter but we have decided that we are going to do it pre-Easter’. Then we will get a response, if it is a nice park and camping area, that maybe that is not a good idea. But we will run with the burning option until we are told we simply cannot.

Extract from *Transcript of evidence*, page 7, ENRC hearing, Omeo, 29 November 2007 (Ewan Waller, chief officer, fire and emergency management, Department of Sustainability and Environment):

**Mr WALLER** — I see the two big fires as a great opportunity. The fuel loads have now been pushed right down, and there is a great opportunity to come in behind that and burn large areas. I am supporting what David is saying about doing it right and doing it properly, but there is a great opportunity now, and we have to grab that opportunity. Nature has had its run, so now we have got to come in behind that very strongly.