

12 March 2015

Submission to the Review of Performance Targets for Bushfire Fuel Management on Public Land

A: Introduction

The Victorian National Parks Association is a member-based, non-government, organisation dedicated to the protection of Victoria's biodiversity on public and private land, and in the ocean. Since 1952 we have been active in a great many government and other investigations into various aspects of land management.

We have recently been involved in many aspects of fire planning and management in Victoria. For example:

- We were granted 'Leave to Appear' status during the Victorian Bushfires Royal Commission hearings on fuel reduction
- We have been a long-time member of DEPI/DELWP's Bushfire Management Stakeholder Roundtable
- In 2011 we organised a symposium on Fire and Biodiversity in Victoria, in association with the Royal Society of Victoria.

B: Summary

The VNPA supports a planned burn program in Victoria, for both fuel reduction and ecological purposes.

However we believe a hectare-based target has not produced, and cannot produce, the best outcomes for:

- public safety
- protection of infrastructure and built assets
- catchment protection or
- management of Victoria's natural heritage.

We strongly support a risk reduction approach to planning and assessing fuel management across Victoria.

We also believe the planning of management burns should be focussed at a local level, and take into account all other available tools for the reduction of risk to life, property and the environment.

C: A brief history of the 5% burn target

The 5% annual burn target has been recommended by two fire inquiries in Victoria: a 2008 Parliamentary inquiry, and the 2010 Bushfires Royal Commission. However, perhaps because of the often contradictory advice those inquiries received, and the lack of clear evidence that the target would work in a Victorian context, both inquiries recommended monitoring and reporting on a hectare-based target's effectiveness and impacts. Both inquiries effectively asked for this current review.

1/ The Victorian Parliamentary Environment and Natural Resources C'ttee (ENRC) 2008 inquiry

A 5% state-wide annual burn target (c.390,000 ha) of public land was first formally recommended in the ENRC inquiry into *The Impact of Public Land Management Practices on Bushfires in Victoria*. However that recommendation (Rec 2.2) was largely based on flawed evidence supplied to the inquiry:

- The evidence misquoted a reference for burning in some forests in the USA, which actually recommended an annual strategically applied burn target of 1-2% of the landscape if strategically applied, or 2-5% if burns are random. (In any case, applying any target from a totally different forest type on the other side of the world has questionable value.)
- It quoted a Tasmanian paper that recommended burning Button Grass plains at the rate of 3% per annum for fuel reduction, but these plains actually occupied less than a quarter of the landscape concerned. In other words, the Tasmanian paper only recommended roughly 1% of that landscape area to be burned, and in a quite specific habitat type.
- It referred to the burning of Western Australia's Jarrah, Karri and Tingle forests, where the target was a nominal 8% annually, but that target has never been applied to 'all public land' in WA. And those low elevation WA forests are not comparable to most of Victoria's forest types, such as the steep-sloped ash forests, the Mallee, or central Victoria's Box-Ironbark woodlands..

Recommendation 2.3 of the ENRC inquiry recognised the uncertainty of its target recommendation, saying:

"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."

2/ The Victorian Bushfires Royal Commission (VBRC) 2010 final recommendations

The VBRC held an extensive session on the fuel reduction question, bringing in experienced fire managers from Victoria, WA and also from the USA. The VBRC heard the advice of its appointed Expert Panel on fuel reduction over a period of two days.

While expert advice to the VBRC varied considerably, it did not in most cases recommend a single state-wide burn target.

The United States Forest Service's National Director of Fire and Aviation, Jerry Williams, advised the Commission that a single hectare target could encourage managers to opt for the easier, larger burns in remote areas:

"We have a lot of examples in the US where targets have become an opportunity to pick off the low-hanging fruit, so to speak. I believe ... targeting the foothills, eucalypt and high-risk fire regimes at larger sizes, strategically placed across the landscape and treated at adequate intervals across both public and private lands ... were important places to start."

VBRC transcript: T15198:16 Williams

Australian fire behaviour specialists and fire ecologists on the VBRC's Expert Panel were more-or-less unanimous in recommending a hectare-based target for the 'foothill forests' only, and that it should be performed as an experiment:

(Reference numbers refer to the VBRC's transcript.)

52. Mr Tolhurst, for example, said (15246/7-15):

"My understanding of what we were talking about is, if you like, almost a trial sort of use of prescribed burning and we were talking about particularly of progressing this in the foothill forest areas where there would be less contention in terms of the impact of the fire and we knew it was an area of high priority in terms of protection of life and property. So our discussion there was revolving around the first implementation, if you like, of a trial."

Dr Bradstock added (15247/11-20):

"I think what we said was if you went for something around 5 per cent in foothill forests that it was our consensus that at least that would be okay in terms of vegetation responses, though we noted that there is very little information about animals. So that was part of the deal. We reckoned that the vegetation could cope with that; plenty of evidence to suggest that it could. We don't know much about animals. We need to monitor it if you are going to do it. But that's not a reason not to do it."

Dr Clarke agreed (15247/27-15248/4):

"Absolutely. I endorse Dr Bradstock's comment, particularly in relation to fauna and our ignorance of the impact on fauna. But the evidence to date suggests that that doesn't look like a dangerous level in that habitat. I guess the other thing we were emphasizing in 20(b) was we think this is a habitat that's important for human life and values and assets, and one in which a trial could take place without major risk to ecological values, but that we would want to monitor that."

Asked to clarify his position, he added (15248/21-25):

"..I think the panel was of the opinion in this particular habitat type of foothill forest the risk was worth taking, provided there is a commitment to learning as we do it, and that couldn't be said for other habitats about which we know less."

And Mr Cheney (though asking for 8 per cent rather than Bradstock and Clarke's 5 per cent), also agreed that the target applies to the foothill forests. (15250/10-16):

"I would also like to say that the panel agreed that this should be a program, not a trial. The word "trial" has come up, which is tending to say we should confine this to a relatively small area. No, the panel said that we should apply this as a program across the dry foothill forests of Victoria as an area basis, not in one specific area."

And Mr Adams added (15250/31-15251/5):

"But I also think we were quite clear that, as a program, we say that it would take at least 10 years to implement it and that it should be monitored, but it is a program of the five to 10 per cent in the foothill forests, yes, but in the sense of a "trial" we end up on a semantic point."

It is clear that the panel, when clarification was sought by Counsel for the State, was largely in agreement that the proposed target of at least 5 per cent was intended to apply to the foothill forests, and that there was a degree of uncertainty even there which could only be clarified through long-term monitoring.

Dr Clarke submitted a 'clarification of expert opinion' to the Commission shortly after the expert panel hearings. In that statement he makes it very clear that in his opinion:

"The available scientific evidence suggests that annual prescribed burning of 5% may be justifiable in dry eucalypt forest, if the primary goal is appreciable (perhaps 50%) reduction of risk to life and economic assets... on days of severe fire weather. There is also some evidence to suggest that in this particular habitat the ecological consequences of this level of prescribed burning are unlikely to result in irreversible or undesirable change. Since this habitat type is also the one encompassing or abutting the majority of economic assets at most risk from unplanned fire in this state, it would appear to be the habitat type in which the greatest reductions in risk to life and property might be obtained.

"However scientific evidence of the appropriate level of prescribed burning (percentage of the landscape or habitat type) needed to achieve desirable reductions in risk, while avoiding ecological harm, is not available for most other habitat types in the state. Consequently, in my opinion it is inappropriate to apply a target of 5-10% across the public estate of Victoria. Similar risk and ecological analyses to those conducted in foothill forests need to be conducted in other habitats with the goal of setting appropriately tailored targets for these habitats. In the absence of such evidence and analyses upon which to base targets for these other habitat types, there is a need in the interim, for careful and transparent setting of local/regional objectives to justify all prescribed burning activity in those habitats."

The above statement demonstrated that the Commission had reason to be wary of recommending a target applicable to all public land or treatable public land.

Importantly, while the VBRC's final *Recommendation 56* did ask for an annual state-wide fuel reduction target of 5% of public land, the following VBRC recommendations (57 & 58) asked for the capacity to monitor and review the effectiveness and impacts of the target. Clearly, the Commission was allowing a future review of the target should evidence suggest it was not the most effective fuel management goal:

RECOMMENDATION 57

The Department of Sustainability and Environment report annually on prescribed burning outcomes in a manner that meets public accountability objectives, including publishing details of targets, area burnt, funds expended on the program, and impacts on biodiversity.

RECOMMENDATION 58

The Department of Sustainability and Environment significantly upgrade its program of long-term data collection to monitor and model the effects of its prescribed burning programs and of bushfires on biodiversity in Victoria.

3/ The Victorian Bushfires Royal Commission Implementation Monitor

The VBRC, in one of its final recommendations, called for the appointment of an independent monitor of the implementation of all of its recommendations:

RECOMMENDATION 66

The State appoint an independent monitor or the Victorian Auditor-General to assess progress with implementing the Commission's recommendations and report to the Parliament and the people of Victoria by 31 July 2012.

The subsequently appointed VBRC Implementation Monitor (BRCIM), Neil Comrie, looked very carefully at the implementation of the 5% target. His tenure was extended beyond 2012 to produce supplementary annual reports in 2013 and 2014. In his last (2014) annual report he reinforced his earlier criticism of the 5% target:

"The BRCIM's 2012 Final Report advocated that the State reconsider the planned burning rolling target of five per cent and replace it with a risk based approach focused on the protection of life and property. In 2013, the BRCIM went further stating concerns that the 390,000 ha target may not be achievable, affordable or sustainable. The BRCIM's view in relation to this target is unchanged. Area based hectare targets alone will not necessarily reduce the bushfire risk to life and property in Victoria and may have adverse environmental outcomes."

Bushfires Royal Commission Implementation Monitor Annual Report, July 2014, p. 47

D: Strategic difficulties caused by the 5% annual fuel reduction target

1/ The target is very difficult to achieve. According to published Victorian fuel reduction records going back to the 1930s, an annual total of fuel reduction burns has only reached 390,000 ha once, in 1980-81. And in that year (according to conversations with foresters working at that time) those burns were primarily along the ridgetops, yet the whole area was counted as the fuel reduction burn.

(See Attachment 1: Victoria's fire history)

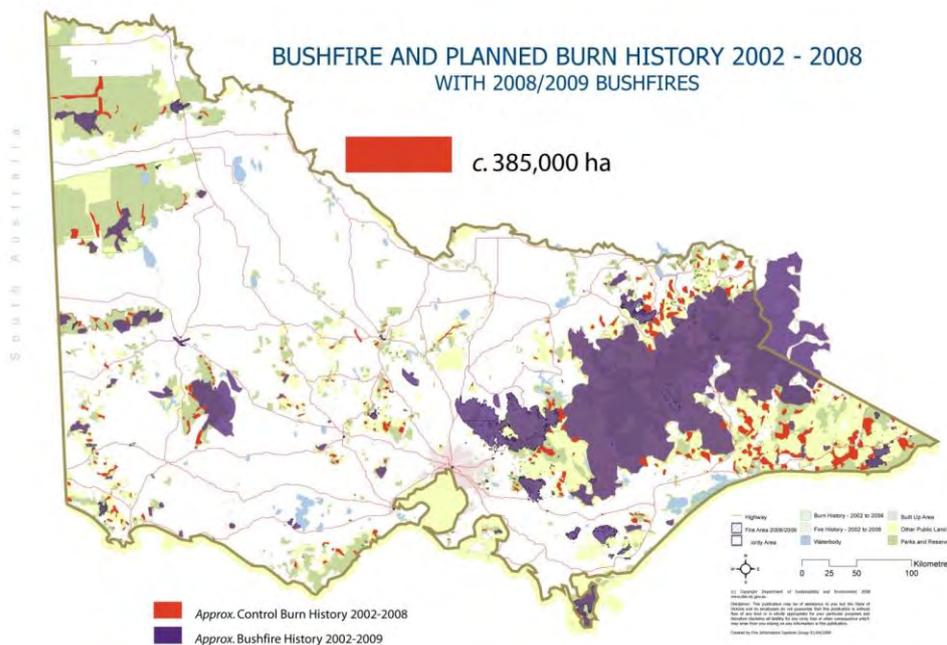
2/ Attempts to reach the 5% target have led fire planners and managers to favour larger burns in remote areas. While remote area burns can usefully reduce risk to life and property in many instances, risk reduction is generally most effective when fuel is reduced close to settlements. The 5% target discourages these local burns, which are difficult, expensive, and contribute little to the state-wide total area. In the most extreme example, large burns have occurred in the Mallee, where risk to life and property is considered to be relatively small. There is abundant evidence to support the relative benefits of local strategic burns. Eg in Bradstock et al “...prescribed fires will be most effective when sited at the urban interface where resultant reduced unplanned fire intensity will be a benefit.”

See Attachment 2: Bradstock, R. A. & Price, O. F. (2010). The effect of fuel age on the spread of fire in sclerophyll forest in the Sydney region of Australia. *International Journal of Wildland Fire*.

3/ The VBRC recommendation for a 5% target only applied to public land, yet bushfires make no distinction in regards to land tenure. Fuel reduction programs, and fire management programs, should be planned and conducted strategically across public and private land.

4/ Only planned management burns counted as part of the fuel reduction target, taking no account of fuel reduction caused by bushfires. The annual planned burn target of 390,000ha would have to be achieved regardless of how much of Victoria’s public land burned in bushfires each season. Even though, in recent years, this has been re-interpreted to allow the counting of bushfires if they occur in an already identified planned burn area, the lack of consideration of the fuel reduction impacts of most bushfires makes a mockery of strategic planning for fuel reduction and/or ecological purposes.

In the map below, which shows the area burnt in Victorian bushfires from 2002-2009, and planned burn history from 2008-2009, the red rectangle at the top indicates the actual area, to the scale of the map, of the annual 5% burn target.



(Since 2009, the area of Victoria that has experienced recent fire, due to planned burns or wildfire, has significantly increased.)

5/ The considerable emphasis placed on the burn target, and the controversy surrounding it, have pushed several other important aspects of fire management to the background. In his last report, the VBRC Implementation Monitor Neil Comrie made it clear that:

“...it is important to understand that all 67 VBRC recommendations are inextricably interdependent.”

Bushfires Royal Commission Implementation Monitor Annual Report, July 2014, p. 7

Strategic risk reduction should involve looking at all available tools, and assessing which combination of those tools is best suited to each local situation. For example, far too little emphasis is placed on the need for well-designed private fire shelters (despite an urgent preliminary recommendation from the VBRC), and there is considerable room to increase the capacity for rapid aerial attack in many regions of Victoria. Good fire safety planning would take note of Mr Comrie’s advice that all available fire management tools are inextricably linked.

E: Impacts on Victoria’s natural heritage

Victoria’s code of fire practice lists two primary objectives for bushfire management on public land in Victoria:

- *To minimise the impact of major bushfires on human life, communities, essential and community infrastructure, industries, the economy and the environment. Human life will be afforded priority over all other considerations.*
- *To maintain or improve the resilience of natural ecosystems and their ability to deliver services such as biodiversity, water, carbon storage and forest products.*

While the VBRC made it clear that the protection of human life should be given the highest priority, it also made it clear that both public safety and environmental objectives should be achieved. It called for more research and knowledge so that:

“... more informed and scientifically-based decision making can accompany the development of prescribed-burning regimes that meet conservation objectives as well as accommodating bushfire safety considerations.”

2009 Victorian Bushfires Royal Commission Final Report: Summary. July 2010. P. 15

We have received many reports from across Victoria of ‘fuel reduction burns’ that have little impact on fuel levels, or little public safety purpose, but can cause considerable impact on Victoria’s natural heritage.

This is supported by the department's own 2014 report on the environmental impacts of the burn program that:

"...mapping showed that the overall percentage of land [ie public land across Victoria] below the minimum tolerable fire interval remained at around 50 percent."

Reducing Victoria's Bushfire Risk on Public Land: Fuel Management Report 2013–14
Department of Environment and Primary Industries P.

In DEPI's own assessment of that situation, *"The outcome/activity [biodiversity protection] has not been achieved but is a manageable risk."* (p. 6 of the above report).

Many scientists and fire ecologists would argue against that optimistic assessment that the risk is manageable under the current 5% target scenario. It remains an unprecedented risk to biodiversity across the state.

In a recent report to DELWP on the department-funded Mallee Hawkeye project by La Trobe and Deakin Universities, the impacts of planned burning on biodiversity in the Mallee appear to be considerable. It calls into question the traditionally accepted principle that a broad range of fire age classes of vegetation will account for most species in any ecosystem. Basically, in the Mallee, evidence now shows that many species primarily rely on large areas of long-unburnt bush. The report adds:

"...burning 3-5% per annum in the tree mallee vegetation would lead to a significant decline in some threatened mallee birds."

Mallee Hawkeye project Final Report 2011-2014 *La Trobe University 2014 P. v.*

Victoria's public land supports around 100,000 thousand native species, in something like 300 different vegetation types (or EVCs), each of which has a different response to fires of differing seasons, frequency and severity.

The impacts on biodiversity of applying the 5% annual target across Victoria are too complex for this submission to cover in detail. However there has been broad and consistent concern from the scientific community over the application of the 5% burn target across the state, particularly when a decision to burn has not been governed by any pressing need to protect life and property.

F: Conclusion

The Victorian National Parks Association acknowledges the difficulty of the task facing our fire managers. And it is a task that will become increasingly difficult under the predicted impacts of climate change.

However the hectare-based state-wide fuel reduction target is a blunt policy instrument, which requires significant sharpening. While the need for transparency and accountability is recognised in fire management, a blanket ha target for public land alone does not achieve

this. There is substantial evidence that in fact the policy is doing significant ecological damage, without clear benefits for public safety. A more targeted approach could include consideration of:

- Regional targets based on previous fire history and fire tolerances for key habitat types
- A clearer understanding of the effectiveness of fuel reduction burns in different forest/landscape types
- Private land as well as public land
- Considering all available tools together when planning, including appropriate regional rapid response capacity.

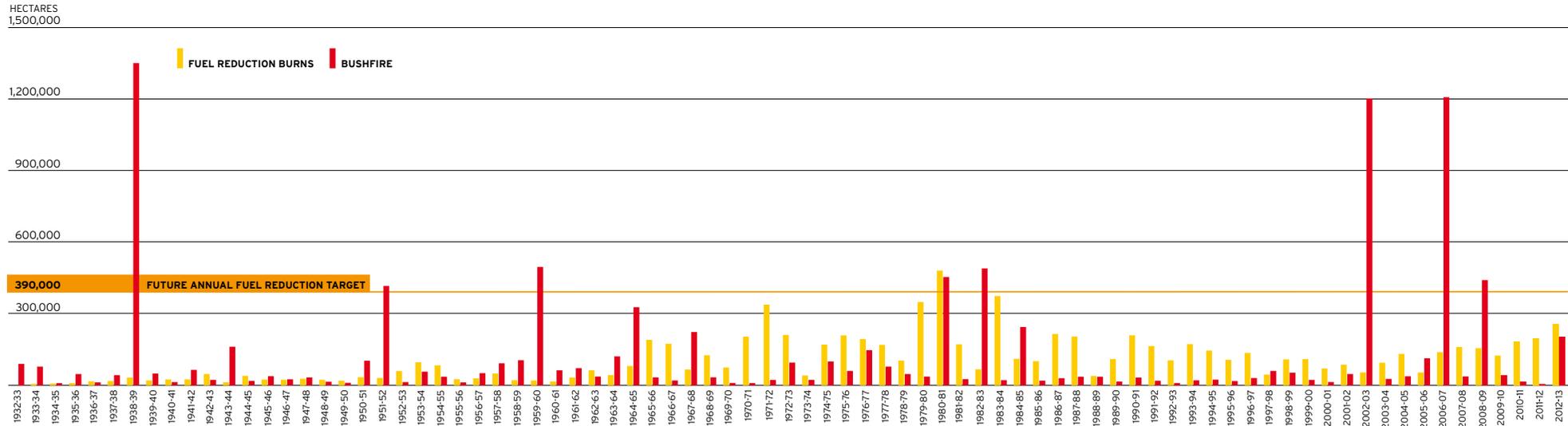
That is why we strongly recommend that the Inspector General of Emergency Management supports the movement away from a hectare-based state-wide fuel reduction target. We believe the adoption of a revised bushfire risk reduction approach, in line with the regional risk-based landscape planning currently being developed by DELWP, will allow:

- useful application of the considerable growth in expertise in fire management in Victoria over recent years
- more effective targeting of budget allocations for fire management
- better protection to the Victorian public
- better protection for property, infrastructure and commercial enterprises
- better protection for our natural areas.

We would greatly appreciate any opportunity to meet with the Inspector General of Emergency Management to discuss this issue further.

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FUEL REDUCTION & BUSHFIRE IN VICTORIA



This graph is derived from the figures below, for fuel reduction burns and bushfires on public land, published in the annual reports of the Forests Commission of Victoria, and its successors. For years before 1974, figures in acres have been converted to hectares. In the few instances where those figures are not included in the reports, they have been provided by the Department of Sustainability and Environment.

Year	Area treated (acres)	Area treated (hectares)	Bushfire (acres)	Bushfire (ha)
1933-34	2,500	1,000	183,723	74,489
1934-35	6,200	2,480	11,309	4,452
1935-36	10,000	4,000	105,951	42,380
1936-37	30,000	12,000	18,861	7,544
1937-38	32,350	12,940	92,584	37,034
1938-39	68,000	27,200	3,370,870	1,348,348
1939-40	38,886	15,554	111,023	44,409
1940-41	49,517	19,807	22,027	8,811
1941-42	50,000	20,000	149,551	59,820
1942-43	106,000	42,400	44,892	17,957
1943-44	20,639	8,256	392,746	157,098
1944-45	87,403	34,961	33,700	13,480
1945-46	47,930	19,172	83,439	33,376
1946-47	46,500	18,600	50,363	20,145
1947-48	56,382	22,553	70,709	28,284
1948-49	46,082	18,433	25,058	10,023

Year	Area treated (acres)	Area treated (hectares)	Bushfire (acres)	Bushfire (ha)
1949-50	37,000	14,800	14,126	5,650
1950-51	73,000	29,200	244,921	97,968
1951-52	64,746	25,898	1,031,379	412,552
1952-53	138,000	55,200	21,499	8,600
1953-54	229,580	91,832	131,218	52,487
1954-55	197,580	79,032	76,218	30,487
1955-56	51,382	20,553	17,755	7,102
1956-57	60,253	24,101	115,340	46,136
1957-58	111,300	44,520	218,457	87,383
1958-59	40,841	16,336	251,009	100,404
1959-60	38,298	15,319	1,229,283	491,713
1960-61	27,451	10,980	144,939	57,976
1961-62	68,584	27,434	167,372	66,949
1962-63	145,629	58,252	79,881	31,952
1963-64	95,375	38,150	291,440	116,576
1964-65	190,633	76,253	807,576	323,030

Year	Area treated (acres)	Area treated (hectares)	Bushfire (acres)	Bushfire (ha)
1965-66	464,579	185,832	71,046	28,418
1966-67	423,894	169,558	38,519	15,408
1967-68	153,722	61,489	547,048	218,819
1968-69	302,594	121,038	121,038	28,643
1969-70	174,645	69,858	12,576	5,030
1970-71	496,851	198,740	11,844	4,378
1971-72	834,930	333,972	42,720	17,088
1972-73	516,384	206,554	226,115	90,446
1973-74	90,901	36,360	45,006	18,002
1974-75		165,919		94,990
1975-76		204,821		55,500
1976-77		188,865		142,712
1977-78		164,763		73,517
1978-79		98,951		42,445
1979-80		345,043		31,826
1980-81		477,158		449,978

Year	Area treated (acres)	Area treated (hectares)	Bushfire (acres)	Bushfire (ha)
1981-82		167,136		20,648
1982-83		62,345		486,030
1983-84		370,000		16,477
1984-85		106,370		240,037
1985-86		96,200		14,778
1986-87		210,792		24,958
1987-88		200,000		30,435
1988-89		34,171		30,744
1989-90		105,500		18,002
1990-91		205,000		27,552
1991-92		160,000		13,512
1992-93		100,000		4,815
1993-94		168,000		16,000
1994-95		141,000		19,000
1995-96		102,300		12,885
1996-97		131,000		25,612

Year	Area treated (acres)	Area treated (hectares)	Bushfire (acres)	Bushfire (ha)
1997-98		40,000		55,500
1998-99		104,000		48,240
1999-2000		105,000		17,712
2000-01		65,800		9,000
2001-02		81,140		42,493
2002-03		49,200		1,200,000
2003-04		90,000		21,978
2004-05		127,000		33,000
2005-06		49,000		108,400
2006-07		134,000		1,205,000
2007-08		156,000		32,364
2008-09		150,999		437,000
2009-10		120,000		37,200
2010-11		188,997		14,031
2011-12		197,149		4,893
2012-13		255,227		201,630

30 April 2020

Inspector General for Emergency Management Inquiry into the 2019-2020 Victorian Fire Season.

Phase 1: Community and sector preparedness for and response to the 2019-20 summer season

Submission by the Victorian National Parks Association

The Victorian National Parks Association (VNPA) is an independent, non-government organisation dedicated to the protection of Victoria's biodiversity on land and water, and in the ocean.

The VNPA recognises the difficult and dangerous work undertaken by so many volunteers and professionals, over many months, during last summer's fires in Australia. We recognise the considerable cost in lives, health and human welfare, as well as economic costs, to the community; and we recognise the increasing difficulty of managing fire in the Australian landscape as our climate changes.

We also recognise the considerable and growing impacts of frequent and increasingly severe fire on the environment.

The VNPA has a long history of involvement in advocating for effective fire management in Victoria. In recent years our involvement has included (among other things):

- We were granted leave to appear before the Victorian Bushfires Royal Commission (2009), and made substantial submissions to that Commission.
- We are a long-term (and founding) member of the Victorian Government's Land and Fire Management Stakeholder Roundtable
- We made a substantial submission to the Victorian Inspector General for Emergency Management's (IGEM) 2015 inquiry into Victoria's target to burn 5% of Victoria's public land annually.

Primary recommendations for future fire management

1/ Though many improvements in bushfire management have been made in recent years, our lives, the environment and the economy remain increasingly at risk. More of the same isn't the solution.

2/ One area where considerable improvement has been made in Victoria is point of ignition control. This program should be expanded. Radically increased effectiveness of point of ignition control, and secure funding for that, has the potential to reduce the number and frequency of landscape-scale fires. That can:

- Increase protection of human lives
- Increase public health (including benefits for asthma sufferers)
- Increase protection of homes and infrastructure
- Reduce the heavy burden placed on volunteer (and professional) firefighters
- Increase the viability of insurance companies
- Increase the viability of agriculture (reducing both smoke and fire impacts)
- Increase the viability of tourism
- Improve the quality of water catchments
- Reduce carbon emissions and...
- Help long-term recovery of the natural environment, and the plants and animals that depend on it.

3/ There is currently little acknowledgement by government agencies that both fuel reduction burns and wildfire generally reduce fuel for a few years only, before fuel loads can climb to levels considerably higher than pre-burn conditions and stay that way for decades. The actual results from "fuel reduction" burns should be routinely monitored and recorded over time. Current and future evidence-based understanding of fuel responses should be reflected in changes in management.

4/ Fuel reduction burns offer most protection if conducted frequently and close to assets in need of protection, especially in extreme fire weather. This should be a management priority.

5/ When fires do become relatively uncontrollable, approved private bushfire shelters and compulsory evacuation are the two most effective strategies for the protection of human life. Resourcing for these should be a priority.

6/ The maintenance of a full range and extent of tree hollows, and of hollows on the ground, is critical for the future of many animal species in Victoria. Loss of hollows is one of a number of critical habitat features threatened by current fire management. This should be acknowledged, routinely assessed, and taken into account in fuel and fire management.

7/ Long-unburnt (and near long-unburnt) forests and woodlands are now rare in Victoria, and should be protected as critical habitat.

8/ There is a lack of accountability in applying tree-clearing protocols related to safety, emergency management during a fire, and also salvage logging. This should change.

Overview

We are convinced that the truly effective strategies for minimising impacts of fire on public welfare are compatible with environmental protection. There is little, or no, need for a ‘trade-off’ of competing objectives. Business as usual is not the answer – we need a significant, evidence-based, realignment of management tools.

Our submission is focused, to a large degree, on the long-term protection of Victoria’s great natural heritage – currently facing pest plant and animal invasions, habitat fragmentation and climate impacts. Fire has long been part of Victoria’s natural environment, and over some 45 million years, it has largely driven the evolution of such typically Australian flora as the eucalypts and wattles. Many, but by no means all, of our plants and ecosystems depend on occasional fire.

However the increased frequency and severity of fire in recent years is now adding significantly to existing impacts. Over 500 native plant and animal species are listed as threatened under Victorian legislation (Flora and Fauna Guarantee (FFG) Act 1988) and more, well over 2000, are included in the Department of Environment, Land, Water and Planning’s (DELWP) Threatened Species Advisory Lists.

<https://www.ari.vic.gov.au/research/threatened-plants-and-animals> Many more species are in a trajectory of long-term decline, and inappropriate fire regimes are a contributing factor in that situation. *“Inappropriate fire regimes causing disruption to sustainable ecosystem processes and resultant loss of biodiversity”* is now listed as a Potentially Threatening Process under Victoria’s FFG Act.

https://www.environment.vic.gov.au/data/assets/pdf_file/0012/50241/201612-FFG-Processes-list.pdf

In Victoria, there have been four fires extending above one million hectares since the year 1900, and three of those have occurred in the last 20 years. That is consistent with climate change predictions for more frequent severe fires in south-eastern Australia (see [Attachment 1: Victoria’s Fire History to 2020](#)).

A more clearly integrated management approach is needed.

Management tools should not be assessed in isolation. We need to employ a full range of tools and strategies, tailored to local situations, as in the diagram below:



The most important of the tools in the above diagram are likely to be:

1. Improved point of ignition control

- . A very significant additional expansion in aerial fire-fighting capacity, primarily aimed at effective point of ignition control across the landscape.
- . An increase in power line safety, including burying power lines, installation of automatic circuit re-closers, and encouraging local power generation.
- . A comprehensive strategy to deal with arson.

2. Improved fuel and fire management

- . The employment of an evidence-based planned burn program, based on objective, science-based ecological and flammability assessments and on-ground observations of the effectiveness/ineffectiveness of fuel reduction. Importantly, fire can, in well documented cases, cause an increase fuel levels for decades.
- . Concentration of fuel reduction programs close to assets in need of protection.
- . Objective assessment of ecological impacts of fire management on native flora, fauna and essential habitat structures

3. Improved impact control

- . Compulsory evacuation powers, and comprehensive regional and local advance planning for evacuation.
- . Education about and support for private bushfire shelters/bunkers to approved design standards.
- . Stronger planning regulations for new buildings (including requirements for private bunkers).
- . Effective advice and support for ember-proofing existing buildings.

While strategic fuel reduction programs have a role, we do not believe that current programs of broad scale fuel reduction will significantly protect people or the environment. We've relied on them for decades, but the risk reduction they provide remains small. On the contrary, there is strong evidence that the increased rate of fire (planned or otherwise) in the landscape in recent years has actually increased the fuel load.

Just doing more of what we currently do is not the answer we need.

VNPA responses to the Terms of Reference

(ToRs appear in **blue**)

•Effectiveness of emergency management command and control and accountability arrangements in Victoria.

Given the problem of protecting the public, the economy and the environment at a time when climate change and other factors are generating fires of increasing frequency and severity, Victoria does very well in the command and control sphere.

However the seriousness of the situation does demand changes in management effectiveness, and an objective realignment of management actions and priorities. The lack of a body clearly responsible for the full gamut of management priorities and actions makes

accountability difficult. More importantly, that lack must compromise the strategic and efficient allocation of resources.

- **Effectiveness of Victoria's operational response to the 2019-20 fire season.**

We don't yet have a full understanding of the progress of this summer's fires. However it seems that, in regard to the Snowy complex fire, many fires resulting from a series of lightning strikes were fairly quickly controlled, but not all. Those uncontrolled fires seem to have burnt for a month or more in remote country before a large and effectively unfightable fire front developed.

We strongly believe that a radical ramping up of point of ignition aerial control, right across the state, though expensive, would be very cost effective. The cost of just one large fire comes to the billions these days. An initial estimate we have for tourism costs alone is \$2 billion in losses, and a projected \$4.5 billion future loss.

We are concerned that Federal funding for aerial control is not generally available for point of ignition response, but only for fires when there is an imminent threat to human life.

- **Review of the effectiveness of the declaration of a state of disaster under the Emergency Management Act 1986 – including the appropriateness of supporting legislative and administrative processes, communication, and community compliance.**

Potential for questionable use of emergency management provisions

There is a lack of vigilance over some activities that take place under emergency management provisions, especially in regard to tree felling operations.

Within an impacted area of a bushfire, any areas of unburnt vegetation can be crucially important for ecological recovery. However there is a large amount of tree clearing and vegetation removal done in the name of fire prevention and control. Much of this is not done in a transparent way, with little evidence of detailed ecological assessment against national or state environmental laws and policies. While we acknowledge that there are some key safety reasons from removal of hazardous tree, however some operations seem excessive.

There are three different areas of concern:

- Hazardous Tree removal in preparation for prescribed burning (not actually under EM provisions, but still an issue).
- Scale of Emergency Tree/Vegetation removal
- Salvage logging/ salvage clearing after a fire.

Hazardous Tree removal in preparation for prescribed burning

In Victoria, in recent years, there has been an extensive program for the removal of unsafe trees, primarily aimed at protecting fire crews. This has resulted in the loss of thousands of mature trees, including hollow-bearing trees, throughout the state. While we acknowledge the importance of maintaining a safe workplace for crews, the process has generally not taken place under any rigorous guidelines or oversight or consistent with procedures developed for other elements of clearing on crown land.

Since May 2018, roadsides and other clearing on crown land, including lands managed by Parks Victoria, must follow the “*Procedure for the removal, destruction or lopping of native vegetation on Crown land*”. This policy does not however include assessment under national environmental laws and it is not clear if it includes fire preparation works. The procedure aims to “ensure a robust and transparent approach to the removal, destruction or lopping and counterbalance of all native vegetation managed by, or on behalf of DELWP and PV on Crown land”.

It is not clear if the extensive number of trees, many hollow bearing, cleared in preparation for planned burning are assessed, accounted for or “counter balanced” by additional protection elsewhere under this policy.

https://www.environment.vic.gov.au/_data/assets/pdf_file/0033/408489/CrownLandProcedure.pdf

Scale of Emergency Tree/ Vegetation Removal

In particular, the emergency management provisions in place during this summer’s fires have generated an apparently unprecedented clearance of unsafe trees and fire breaks. Emergency Management Act and current native vegetation clearing rules exempt emergency work under specific conditions.

https://www.environment.vic.gov.au/_data/assets/pdf_file/0018/91251/Exemptions-from-requiring-a-planning-permit-to-remove,-destroy-or-lop-native-vegetation-Guidance.pdf

For emergency works, this exemption comprises seven separate parts, each with a specific purpose:

1. Firefighting covers activities required to fight an active bushfire. It does not include activities that are in preparation for a bushfire or after a bushfire has occurred.
2. Planned burning refers to both ecological and fuel reduction burns, and includes the establishment of fire control lines.
3. A fuel break is defined as a strip of land where vegetation has been removed or substantially modified to reduce the risk of bushfires starting and/or reduce the rate of spread and intensity of fire. A fire fighting access track is expressly for bushfire management purposes and not for other purposes. Fuel breaks and firefighting access tracks should be combined where possible, with the total width not exceeding 6 metres. Multiple fuel breaks and/or fire-fighting access tracks cannot be constructed abutting one another where the total width is greater than 6 metres. There must be a clear need for a fuel break and/or a fire fighting access track to protect life and property, in order to rely on this part of the exemption.
4. A strategic fuel break is a fuel break between 6 and 40 metres wide, created for the protection of strategic assets, such as water catchments. To rely on this exemption the fuel break must be established in accordance with a strategic fuel break plan approved by the Secretary to the DELWP.
5. This part of the exemption allows native vegetation removal to be undertaken in accordance with a fire prevention notice or direction issued under the relevant Act, without requiring a permit.
6. This part of the exemption allows native vegetation removal when undertaken to establish a clear zone, or minimise the risk of bushfire ignition from an electrical line, from requiring a permit. Native vegetation removal must be in accordance with the

relevant Code of Practice.

7. This part of the exemption allows the removal of native vegetation on public roadsides managed by a responsible road authority to minimise the risk to life and property from bushfire. The road authority must obtain the written agreement of the Secretary to DELWP allowing them to undertake native vegetation removal in accordance with a work plan. The work plan is developed by a multi-agency group in accordance with the requirements of Roadside vegetation management for bushfire risk mitigation purposes.

The guidelines suggest that *“exemptions must be relied upon sparingly. Consider using one exemption to meet multiple objectives”* and *“..any limits for native vegetation removal specified in an exemption are maximum amount, and it is not expected that native vegetation should necessarily be removed up to the limit. The onus is on those relying on the exemption to only remove that vegetation necessary to undertake the activity, use or development”* and *“only remove native vegetation for the purpose specified in the exemption.”*

While we understand that vegetation needs to be cleared during the process of combating fire, however at this stage there appears no detailed assessment of vegetation lost by emergency management activities in the 2019/2020 fire season, either pre or post fire, or when the exemptions under the Emergency Management Act start or finish.

It seems clear that there has been significant areas of clearing along roadsides post fire in East Gippsland and Gippsland, which do not appear to be “expressly for bushfire management purposes and not for other purposes”, as per the exemptions. Rather much of this appear to be driven by commercial interests and handed to the timber industry.



Cox Boundary Track, near Mt Alfred State Forest, East Gippsland. This is just one of many examples of extensive logging under 'emergency management provisions', in the last weeks of the fires in East Gippsland this summer.

Salvage logging/salvage clearing for fire management

It appears that, in case of large scale clearing of the Princes Hwy in East Gippsland, it was approved as in large part a salvage logging operation, which seems inconsistent with the other policies and procedures outlined in native vegetation controls (as outlined above). There is an apparent clash between prescriptions authorized for timber production, including national environmental laws, and undertaking works form emergency response or control <https://www.vicforests.com.au/fire-management-1/vicforests-starts-post-fire-timber-recovery>

The scale of clearing along the Princes Hwy and other roads in Gippsland is significant; the speed at which the works were undertaken post fire raises the questions about the level of ecological assessment undertaken. While native forest logging is exempt from national environmental laws under regional forest agreements, large scale land clearing is not. Likewise "logging" in this instance is unlikely to fit the definition in regional forest agreements as the clearing is intended to be permanent and not re-grown for future harvest.

These inconsistencies undermine community confidence in emergency management systems. At a minimum this Princes Hwy project should have been subject to detailed assessment under national and state environmental laws and relevant "offset" or "counter balance" measures put in place as per native vegetation policy.



Princess Hwy roadside clearing, 25th March 2020: typical of many sections of the Princess highway between Genoa and Cann River, approx. 40kms west of Genoa near Wingan River.

•State evacuation planning and preparedness processes/practices and their effectiveness with an emphasis on remote/isolated communities and Victorian peak holiday season locations.

Evacuation strategies

Victoria belatedly came close to compulsory evacuation in this summer's fires, and the Mallacoota evacuation went well. However we still lack the necessary legal clout to achieve it routinely. Compulsory evacuation is one of the best ways to save lives, and saving lives is the prime objective of fire management.

In Canada and the USA, compulsory evacuation is well-established. In 2006, for example, the 88,000 citizens of the Canadian town of Fort Murray were evacuated in the face of a several hundred kilometre fire front. The town was lost, but everyone lived. All regions should have well-developed evacuation strategies in advance of any fire season. We believe evacuation strategies would best be developed by state and local authorities, however the Commonwealth Government should facilitate the capacity for defense forces to be involved in evacuation plans, well in advance of any future fire event.

•The timeliness and effectiveness of activation of Commonwealth assistance, and Commonwealth resource availability

Commonwealth (including military) support for early evacuations would improve if evacuation plans for rural (or city) communities were established well in advance of any event.

•Preparedness ahead of the 2019-20 fire season; including the effectiveness of regional emergency management work undertaken to inform and educate the community about the coming season, community engagement, impact of lengthening fire seasons, and any relevant legislation, policy and practice.

The 2009 Victorian Bushfires Royal Commission (VBRC) made an urgent interim recommendation for an approved standard design for private bushfire shelters. This standard design was approved before the final VBRC report, so little emphasis was placed on this issue. However, short of evacuation well in advance of a fire, well-designed private shelters are the best way to save lives in the case of severe fire. But the public have not been well-advised of this, shelters are not required in new homes in vulnerable areas, and there has been no support for installing them in existing homes (eg subsidies or interest free loans). This important life-saving strategy should be strongly encouraged and supported by government.

•Consider all challenges and implications for bushfire preparedness arising from increasingly longer and more severe bushfire seasons as a result of climate change.

IGEM inquiry into fuel reduction targets

As ever, after a large fire, there is a call for a high state-wide target for fuel reduction. While a large hectare target for fuel reduction burns may appear to be an obvious solution to the

fire problem, reliable evidence to support that proposition has not surfaced in expert evidence to the various fire inquiries in Victoria over the last decade or so.

Victoria's IGEM inquiry sensibly recommended abandoning Victoria's then statewide fuel reduction burn target of at least 5% of Victoria's public land annually, and replacing it with a risk-based approach to fuel management.

The IGEM review had been prompted by the 2009 Victorian Bushfire Royal Commission (VBRC)'s Implementation Monitor, Neil Comrie. In his 2012 final report, Comrie said that Victoria should replace the 5% burn target "with a risk-based approach". He added that the 5% of public land (i.e. 390,000 ha) target "may not be achievable, affordable or sustainable", and that "it will not necessarily reduce the bushfire risk to life and property in Victoria and may have adverse environmental outcomes".

The VNPA's submission to the IGEM review (See [Attachment 2: VNPA submission to 2015 IGEM inquiry](#)) pointed out that:

- An earlier (2008) Victorian Parliamentary Environment and Natural Resources Committee (ENRC) inquiry was the first to recommend a 5% minimum statewide target for Victoria, however that decision was largely based on flawed or misrepresented evidence presented to the inquiry.
- The 2009 Victorian Bushfires Royal Commission also recommendation a 5% statewide target, however a statewide target was not finally recommended by the Commission's own expert fuel reduction panel. There was, instead, general agreement from the panel for a monitored program of burning 5% of the 'foothill forests' (largely the stringy-bark forests), as an experiment only. One clear reason put forward for *not* applying a statewide target was that it would lead fire planners and managers to reach that target by doing large burns in remote areas, where they were generally less effective, or even counter-productive.
- The 2009 VBRC also called for more research on the topic, so that "*... more informed and scientifically-based decision making can accompany the development of prescribed-burning regimes that meet conservation objectives as well as accommodating bushfire safety considerations*". (VBRC Final Report: Summary. July 2020, P15.

Much has been learnt in the last decade, but we are yet to see a published, peer-reviewed paper that outlines how a large hectare target for fuel reduction burns could actually be achieved. On the contrary, there are now many papers outlining problems with area targets.

Hazard reduction burns

We strongly advise against setting national, or state, area targets for fuel/hazard reduction burning, however the sharing of data and research conclusions between states, territories and the Commonwealth should continue to be encouraged and facilitated.

Many fire managers strongly support broad-scale fuel reduction as the most effective means to mitigate fire, even in relatively remote areas, because their modelling shows that reduced fuel levels at a remote burn site can locally decrease the incidence of crown fire, and hence

reduce the capacity of a severe fire to send embers kilometres ahead of a fire. However a number of peer-reviewed scientific papers published since Black Saturday, and particularly relevant to south-east Australia, seriously question the significance of that scenario, given other factors.

Burning close to assets is most effective

A number of peer-reviewed papers have concluded that fuel reduction close to assets in need of protection, while it may be more difficult to achieve, is the most effective (and the most cost-effective) application.

“Results of this study demonstrate that treatment of fuels at the interface [ie close to buildings] is not only the best means of reducing risk, it is also the most cost-effective.”

T.D. Penman, R.A. Bradstock, O.F. Price. (2013) **Reducing wildfire risk to urban developments: Simulation of cost-effective fuel treatment solutions in south eastern Australia.** Environmental Modelling & Software 52 (2014) 166e175.

“Our results imply that a shift in emphasis away from broad-scale fuel-reduction to intensive fuel treatments close to property will more effectively mitigate impacts from wildfires on peri-urban communities.”

Gibbons P, van Bommel L, Gill AM, Cary GJ, Driscoll DA, et al. (2012) **Land Management Practices Associated with House Loss in Wildfires.** PLoS ONE 7(1): e29212. doi:10.1371/journal.pone.0029212.

“In extreme weather, even 1-year-old patches have a low likelihood of stopping unplanned fires. Fuel age had little influence on the spread of unplanned fires. Consequently, prescribed fires will be most effective when sited at the urban interface where resultant reduced unplanned fire intensity will be a benefit.” ... “Some studies from forests in south-eastern Australia report that fine fuels are back to significant levels (i.e. likely to lead to fire intensities that are unsuppressible) after between 3 and 5 years (Conroy 1996; Adams and Simmons 1995; Morrison et al 1996; Annon 2003; Gould et al 2007). The present study suggests that the modest effect of fuel reduction on ability to stop a subsequent unplanned fire is essentially gone after 5 years.” ... “Under extreme weather conditions, unplanned fires may not be controllable unless they have been recently burnt (Grant and Wouters 1993). Thus it is sensible to place prescribed burns in areas where maximum advantage can be gained from suppression of subsequent unplanned fires: that is, primarily close to the assets that need to be protected.”

Owen F. Price A B and Ross A. Bradstock A. (2010) **The effect of fuel age on the spread of fire in sclerophyll forest in the Sydney region of Australia.** International Journal of Wildland Fire 19(1) 35-45 <https://doi.org/10.1071/WF08167>

“A recently burnt patch may slow or stop an unplanned fire should one occur, but low encounter rates make this unlikely. The most efficient use of prescribed fire is applying it to the immediate proximity of assets, where a resultant reduction in fire intensity can be of immediate benefit in terms of impacts on structures and ease of suppression.”

Owen F. Price, Trent D. Penman, Ross A. Bradstock, Matthias M. Boer and Hamish Clarke. (2012) **Biogeographical variation in the potential effectiveness of prescribed fire in south-eastern Australia**. *Journal of Biogeography (J. Biogeogr.)* (2015) 42, 2234–2245.

Fuel “reduction” can actually cause a fuel increase

Studies have pointed out that fuel reduction burns are generally effective in reducing fuel loads for a few years at most. In the medium-term in many or most forest ecosystem types, fuel is likely to increase for decades before reverting to a low fuel level in the long-term absence of fire.

Each ecosystem responds differently to fire. However a likely progression from low to medium fuel levels pre-fire, to low levels for a few years post fire, to potentially high fuel levels for decades, and eventually relatively low levels again in long-unburnt country is not generally recognised in discussions of fuel management. It should be.



The above photograph, taken adjacent to Kinglake National Park (Victoria), and typical of fuel levels in that immediate area before the Black Saturday fire, speaks to two important points reinforced by a number of scientific studies quoted below:

- a) *Recently burnt woodland adjacent to the photographed area was thick with understory shrubs, however in the photographed long-unburnt area, any previously fire-generated undergrowth had senesced, leaving a long-standing, low ground fuel condition. The full “fire/fuel scenario over time” sequence, included by Jenny Barnett in her (VNPA’s) submission to Victoria’s 2007 Parliamentary Inquiry into the Impact of Land Management Practices on Bushfires in Victoria can be seen in (See [Attachment 3: Fire sequence Kinglake](#))*
- b) *Despite this relatively low fuel level, the woodland here burnt with explosive severity on Black Saturday 2009, killing the photographer, Jenny Barnett, VNPA’s long-standing advocate for evidence-based fire management. That scenario is supported by scientific studies saying extreme weather, not fuel, is the prime cause of bushfire fatalities.*

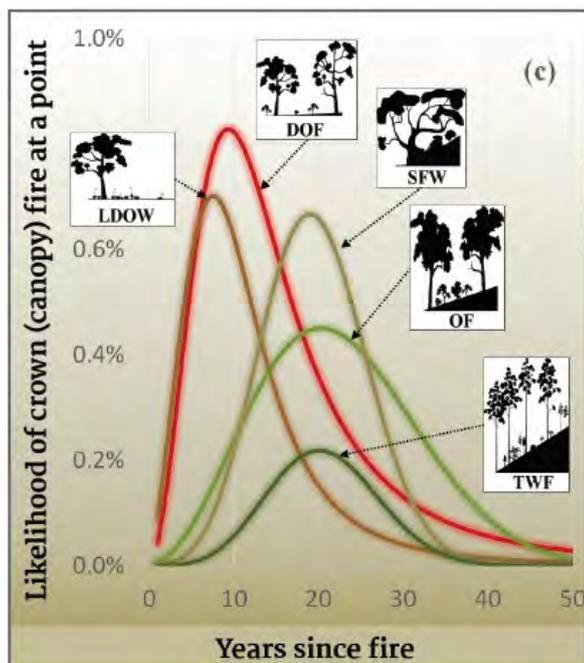
A study of fire history in south-eastern Australia’s alpine region, commissioned by the Australian Alps National Parks (a co-operative body consisting of park agencies in NSW, the ACT and Victoria), comprehensively assessed that history.

“Apart from low, dry open woodland where there was insufficient data to detect a trend, all forests were most likely to experience crown fire during their period of regeneration. The implications of this are significant for the Alps, as increasing fire frequency has the potential to accelerate by producing an increasingly flammable landscape” and “Across the Australian Alps, recently burnt forests have been on average more flammable than mature forests, consistent with historic observation and the mechanistic understanding arising from plant growth and species’ change.”

Philip J. Zylstra. (2018) **Flammability dynamics in the Australian Alps**. Austral Ecology (2018)

The above paper includes this diagram (below, with our commentary), indicating increases in the likelihood of a canopy fire in five different forest types over a 30-50 year post-fire period.

How fire can increase fuel



Immediately after a fire, understory flammable shrubs etc are largely gone (year zero here), so any new fire is unlikely to generate enough flame height to reach the canopy. However the shrub layer quickly regenerates after a fire, soon greatly increasing the possibility of a canopy fire developing. In long-unburnt forests, the flammable shrubs die off, reducing the likelihood of a canopy fire.

LDOW = Low, dry open woodland.
 DOF = Dry open forest.
 SWF = subalpine forest and woodland.
 OF = Open forest.
 TWF = Tall wet forest.

Source: Zylstra, PJ. *Flammability dynamics in the Australian Alps*. Austral Ecology 2018.

A number of other papers confirm those findings.

“The influence of prescribed burning on subsequent fire behaviour diminishes within 2 to 10 years.”

Nicholas Wilson, Geoffrey J. Cary and Philip Gibbons. (2018) **Relationships between mature trees and fire fuel hazard in Australian forest.** International Journal of Wildland Fire 2018, 27, 353–362

“Overall fuel hazard was higher in forests and woodlands burned 6–12 years previously than those unburned for at least 96 years” and “Frequent burning can maintain forest understorey in an early successional ‘shrubby’ state, leading to higher overall fuel hazard than forests where a lack of fire is associated with the senescence of shrubs.”

Kelly M. Dixon, Geoffrey J. Cary, Graeme L. Worboys, Julian Seddon and Philip Gibbons. (2018) **A comparison of fuel hazard in recently burned and long-unburned forests and woodlands.** International Journal of Wildland Fire. July 2018.

And a paper co-authored by eight south eastern Australian fire behavior scientists and fire ecologists has drawn attention to the importance of avoiding simplistic fuel flammability models. There is evidence that repeated fire in some ecosystem types can produce a greater abundance of more flammable plant types.

“Our study found that for these sites, plant traits were more important for predicting flame height than was surface fuel load.”

Zylstra P, Bradstock RA, Bedward M, Penman TD, Doherty MD, Weber RO, Gill AM, Carey GJ. (2016). **Biophysical Mechanistic Modelling Quantifies the Effects of Plant Traits on Fire Severity: Species, Not Surface Fuel Loads, Determine Flame Dimensions in Eucalypt Forests.** PLoS ONE 11(8): e0160715. doi:10.1371/journal.pone.0160715

We need to look more closely at the actual (rather than the assumed) effects of planned burns in different ecosystems, and take good note of the relative effectiveness/ineffectiveness of fire at reducing fire intensity and severity. Actual fuel reduction is hard to achieve at a landscape scale, as burns would have to be done at short intervals to avoid a large build up of fuel. Given the now increasingly significant weather and safety limits to frequent broad-scale burning, we have not seen any convincing evidence that the amount of fuel reduction needed to achieve consistently low fuel levels at a landscape scale is actually achievable.

Weather trumps fuel levels as driver of fire

Other research has shown that extreme weather is the prime driver of large uncontrollable fires, not fuel levels.

“Fatalities were dominated by a few bushfires that have occurred under catastrophic weather conditions. These conditions should be used as the context for discussing appropriate defensive actions for communities faced with a bushfire threat.”

Raphaele Bianchi, Justin Leonard, Katharine Haynes, Kimberley Opie, Melissa James, Felipe Dimer de Oliveira. (2014) **Environmental circumstances surrounding bushfire fatalities in Australia 1901–2011.** Environmental Science & Policy 37 (2014) 192-203.

“An increase in fuel treatment, such as prescribed burning, may reduce crown fire risk but it has also been shown that fire severity in these fires was not reduced by recent burning (reduced fuel) under very severe weather.”

Owen Price, Ross Bradstock. (2013). **Landscape scale influences of forest area and housing density on house loss in the 2009 Victorian Bushfires.** PLoS One, 8 (8), e73421-1-e73421-6.

A 2012 paper looked specifically at evidence from Victoria’s Black Saturday fires in this respect:

“The results suggest that recently burnt areas (up to 5–10 years) may reduce the intensity of the fire but not sufficiently to increase the chance of effective suppression under severe weather conditions. Since house loss was most likely under these conditions (67%), effects of prescribed burning across landscapes on house loss are likely to be small when weather conditions are severe. Fuel treatments need to be located close to houses in order to effectively mitigate risk of loss.”

Owen F. Price, Ross A. Bradstock. (2012) **The efficacy of fuel treatment in mitigating property loss during wildfires: Insights from analysis of the severity of the catastrophic fires in 2009 in Victoria, Australia.** Journal of Environmental Management, Volume 113, 30 December 2012, Pages 146-157

Ignition management is critical

A number of papers point out that an increased emphasis on ignition management (i.e. aerial attack capability, power line management, arson vigilance etc.) should be receiving attention in fire management policy and planning.

“The findings demonstrate that year-to-year variation in weather and the success of ignition management consistently prevail over the effects of fuel management on area burned in a range of modelled ecosystems.” ... “Weather and ignition management effort were more important than fuel management approach and effort in determining total area burned in five landscape fire models. Modelled area burned decreased with increasing levels of ignition management effort in all models. Increasing effort in a random fuel reduction approach resulted in decreased areas burned in the model systems but the effects were unimportant compared with that of varying weather and level of ignition management.”

Cary, G. J., Flannigan, M. D., Keane, R. E., Bradstock, R. A., Davies, I. D., Lenihan, J. M., Li, C., Logan, K. A. & Parsons, R. A. (2009). **Relative importance of fuel management, ignition management and weather for area burned: evidence from five landscape-fire succession models.** International Journal of Wildland Fire, 18 (2), 147-156.

“Despite policy imperatives to expand fuel treatment, a reduction rather than an elimination of risk will result. Multifaceted strategies will therefore be required for the management of risk.” ... “Feasible fuel treatment strategies are likely to leave considerable residual risk in many Australian forested ecosystems and this risk may be expected to increase in the future. Explicit recognition of this fundamental conclusion and its attendant consequences, including costs, will be needed to build a more comprehensive approach to the management of risks to people and their infrastructure.”

R.A. Bradstock, G.J. Cary, I. Davies, D.B. Lindenmayer, O.F. Price, R.J. Williams. (2012) **Wildfires, fuel treatment and risk mitigation in Australian eucalypt forests: Insights from landscape-scale simulation.** Journal of Environmental Management 105 (2012) 66e75.

We believe that the importance of this last point, that we need to be increasingly looking at a range of strategies, especially on ignition control, cannot be underestimated. Fuel reduction has a role, but it is an over-valued management tool, especially in regard to effectiveness in severe fire weather when most lives can be lost.

While an open and objective review of the relative effectiveness of fuel reduction burns is long overdue, a look at the history of the recent fire around Mallacoota (in a map produced by the VNPA using data currently available to us) raises a few issues. (See Attachment 4: **Burn history around Mallacoota**). Mallacoota was one of the townships most seriously affected by Victoria's fires this last summer, with a large part of the population having to be evacuated by sea. The map shows a concentration of planned burns around the north-eastern edge of the township – the sort of strategy that many scientific papers recommend. However those planned burns weren't very recent, the most recent being a number of relatively small burns in 2013, 2015 and 2016 – a full 7, 5 or 4 years before this summer's fire. Other planned burns (and some 1980s bushfires) took place many more years ago. Unfortunately Forest Fire Victoria rarely documents the rate of recovery of fuel after planned burns; it would be useful to have accurate records of the extent to which fuel had returned after those 'strategic' Mallacoota burns.

This is the problem: the most effective burns, close to assets, are the most difficult to do and are likely to be left undone so long as plans and policies encourage broad landscape burns across the state. Strategic close-to-asset burns are the most effective, but contribute little to any statewide hectare target. (This summer's fire appears as black diagonal cross-hatching in the map.)

Timber harvesting can increase the fire risk

There is substantial evidence that timber harvesting, especially in Victoria's tall Ash forests, has also contributed to the flammability of forests.

“Stands of Mountain Ash trees between the ages of 7-36 years mostly sustained canopy consumption and scorching, which are impacts resulting from high-severity fire. High severity fire leading to canopy consumption almost never occurred in young stands (less than 7 years) and also was infrequent in older (more than 40 years) stands of Mountain Ash.”

Taylor C., McCarthy M.A., Lindenmayer D.B. **Nonlinear Effects of Stand Age on Fire Severity.** Conservation Letters, July/August 2014, 7(4), 355-370

•In the context of bushfire preparedness, assess the readiness and responsibilities of statutory agencies, Local Government and State Government bodies.

In response to Black Saturday, the Victorian Bushfire Royal Commission (VBRC) made a number of recommendations about building standards, land use planning and public infrastructure, which have been implemented to varying degrees, some barely at all, in the subsequent years.

A VBRC recommendation that power lines should be buried has not been followed, due to cost. Rather, automatic circuit reclosers have been installed across the network. Unfortunately a recommendation has never been made to keep power generation close to remote assets (wind, solar generation etc), which would avoid the need for vulnerable long transmission lines. Undergrounding should be considered in new developments, in high risk areas.

The VBRC made a number of recommendations, which lead to a range of planning and building control including the 10/30 and 10/50 rules. There were 19 recommendations in this category (Rec 37 to 55). These included improved mapping of bushfire prone areas, more efficient regulation regarding vegetation management around buildings, and a requirement for new buildings to meet specific construction requirements in bushfire prone areas.

The Planning and Building System Improvements included reviewing the statutory tools for regulating development on small lots in high bushfire risk areas. This included changes to planning provisions relating to native vegetation removal for bushfire-related purposes. For more information on the framework see:

https://www.cfa.vic.gov.au/documents/20143/202133/royal_commission_implementation_plan.pdf/

In 2011 a new entitlement was introduced to clear vegetation without a permit and reduce fuel loads around homes by using the “**10/30 right**”, which would apply until the new planning provisions for bushfire and vegetation removal were implemented. As of 2019 an amendment made in November 2011 is still in force, but slightly expanded, which includes provisions for a “**10/30 and 10/50 rule**” for clearing around houses constructed before 10 September 2009. See: <https://www.planning.vic.gov.au/policy-and-strategy/bushfire-protection/vegetation-management-for-bushfire-protection>

These rules include:

- The removal, destruction or lopping of any vegetation within 10 meters of an existing building used for accommodation and the removal, destruction or lopping of any vegetation, except for trees, within 30 meters of an existing building used for accommodation applies to the whole State except for metropolitan areas (in general).
- The removal, destruction or lopping of any vegetation within 10 meters of an existing building used for accommodation and the removal, destruction or lopping of any vegetation, except for trees, within 50 meters of an existing building used for accommodation applies to any land that is covered by the Bushfire Management Overlay.
- The removal, destruction or lopping of any vegetation for a maximum width of four meters either side of an existing fence on a boundary between properties in different ownership that was constructed before 10 September 2009 applies to the whole state except for metropolitan areas (in general).

Since the Victoria Bushfire Royal Commission, native vegetation regulations in Victoria have been changed twice. The last review was initiated in 2015, with new regulations being put in place in 2017. Under the current rules, in addition to **10/30 and 10/50 rule** here are currently 34 exemptions for clearing, which do not require a permit including Emergency Works and Roadsides

https://www.environment.vic.gov.au/_data/assets/pdf_file/0021/91146/Guidelines-for-the-removal,-destruction-or-lopping-of-native-vegetation,-2017.pdf

While we strongly recommend fuel reduction activities close to homes and other assets, these 10/30 and 10/50 rules have led in some places to significant clearing of native vegetation, some of it high conservation significance, and much of it has not been assessed before clearing, or attempted to avoid, minimise or offset which is required for other clearing activities.

Importantly, the clearing of native vegetation close to assets is of little value if the structures it is intended to save is highly vulnerable to ember attack. There are now clear recommendations for 'ember-proofing' buildings, and clear guidelines for buildings in areas vulnerable to fire. A requirement for clearing should be subject to appropriate ember-proofing of buildings.

The Royal Commission also made Recommendation 42 *"The Department of Sustainability and Environment develop and administer a collective offset solution for individual landholders who are permitted to remove native vegetation for the purpose of fire protection"* It would appear that the intention of this recommendation has not been delivered as "no collective offset solution" has been provided for areas cleared under the 10/30 and 10/50 rules.

The Bushfire Royal Commission Recommendation 46, which focused on resettlement strategies and voluntary buybacks, was the only recommendation from the Royal Commission that the government did not originally accept, even in principle. The rejection of Recommendation 46 *"The State develop and implement a retreat and resettlement strategy for existing developments in areas of unacceptably high bushfire risk, including a scheme for non-compulsory acquisition by the State of land in these areas"*, could have had value in very high risk areas, and should be re-considered for implementation in a strategic and focused way.

•Review of all opportunities and approaches to bushfire preparedness, including different methods of fuel and land management (for example 'cool burning', mechanical slashing, integrated forest management, traditional fire approaches) to protect life and property as well as ecological and cultural values.

Some issues around Indigenous land and fire management

Our comments here are based on our best understanding; we can't, of course, speak for local Indigenous understanding of Country.

The VNPA supports knowledge-based fire management, and there is little doubt that before European occupation Indigenous Australians incorporated fire management techniques learnt from observation over a very long time. Their management included the use of fire to manipulate the landscape to favour a local range of food and fibre resources, and to allow

easy passage through more inhospitable areas. As far as we can ascertain, there is little resemblance between current planned burn practices in Victoria and traditional Indigenous burning.

However, there is currently quite a range of understandings of the nature of Indigenous fire practices, and some are highly questionable. In particular, the claim by some that Aboriginal Victoria was broadly maintained as an open, low-ground-fuel condition by Indigenous burning as a uniform pattern across the state is not supported by evidence.

The best non-Indigenous authority we know of for an understanding of Victoria's landscape at the time of European occupation is a book published in 2010 by the late Ron Hateley, a lecturer in ecology at the Victorian School of Forestry at Creswick. He had searched all available records of early colonial 'exploration', and discovered that Aboriginal people had, indeed, employed a range of burning practices across Victoria, and that much of the landscape was native grassland and open woodland (though applied fire would have been only one of several causes for that).

Importantly he also found that large areas of Victoria's forests were so thick with undergrowth it hopelessly entangled early white explorers. Among his abundant references indicating thickly forested undergrowth across much of the state, Hateley quotes an account from James Tuckey, First Lieutenant of the *Calcutta*, anchored in 1803 near present day Sorrento in Port Phillip Bay: "*... we found the country grows still more impenetrable, vast fields of shrub as prickly as furze arresting our progress every moment*".

The Victorian Bush: Its "Original and Natural" Condition. Ron Hateley, 2010

<https://trove.nla.gov.au/work/37181019?selectedversion=NBD45488513>

Aboriginal people, before and shortly after European occupation of Victoria, applied fire for a range of purposes, in different seasons in a range of ecosystem types. Generally, it seems, their burns were smaller, cooler and more controllable than the large, single purpose planned burns currently employed across the landscape. There is no evidence we have seen that they broadly burnt the entire landscape, and its multitude of habitat types. It would be a huge and difficult task to extend cool, controllable burns over the broad landscape.

Currently, DELWP/Forest Fire Victoria fuel reduction burns are constructed under a great range of 'prescriptions'.



This fuel reduction burn in Central Victoria's Box-Ironbark country may have been similar in intensity and severity to Indigenous burning practices.



The above extensive 2019 prescribed fuel reduction burn near East Gippsland's Radar Hill is unlikely to resemble Indigenous burning practices.

Some issues we must also consider in relation to Indigenous burning include:

- The appalling treatment of Aboriginal communities since European occupation of Victoria has led to a loss of some of the depth of knowledge about local fire management.
- While there is abundant evidence that pre-European Victoria had large areas of open grasslands, and also woodlands with a grassy understory, most of that land is now farmland. In the two maps below (Victoria's pre 1750 vegetation types; and current native vegetation extent), the second map shows that almost all of the pre-

Programs working with Traditional Owner groups are increasingly being introduced by DELWP and Parks Victoria. We should learn whatever we can from the historical burning practices of Aboriginal communities, and from their concern for and care of Country; learning, surely, is the key here. The VNPA supports these programs for both cultural and environmental reasons. And we support the Victorian Traditional Owner Cultural Fire Strategy: the Victorian Traditional Owner Cultural Fire Knowledge Group (2019) (e.g. on p. 7: “Cultural burning is Right Fire, Right Time, Right Way and for the right reasons, according to Lore”). <https://knowledge.aidr.org.au/media/6817/fireplusstrategyplusfinal.pdf>

Indigenous burning evolved from knowledge gained through repeated observation of the effects of different burns in different times in different locations. In that sense, it differs little from western science – tested observations of the behaviour and effects of fire. This is, to a large degree, the process missing from much current fire management in Victoria. Observation of the return of fuel levels, and the plant species that return after burns, is rarely undertaken by our fire managers.

• **Consideration of the effectiveness of Victoria’s Code Red day arrangements and their application in practice.**

Our understanding is that warnings of Code Red days work fairly well. However most Victorians remain unsure of the terminology for the range of fire weather warnings.

• **In considering effectiveness of Victoria’s operational response to the 2019-20 fire season, IGEM should particularly consider:**

◦ **effectiveness of the State’s response priorities, including primacy of life**

The over-riding priority for fire management is, rightly, the protection of human life. But unfortunately Forest Fire Victoria, in its planning, actually uses buildings as a surrogate for human life. Why anyone would need such a weak surrogate for such a critical and clear objective is a mystery; it’s possible to save buildings but lose lives, and possible to lose buildings while saving lives.

If we drop the surrogate, at least two life-saving options come into the picture that are far more effective than ‘fuel reduction’ burning:

- Compulsory evacuation
- Private bushfire shelters/bunkers

The ‘buildings for lives’ surrogate should be dropped, and something like the attention fuel reduction gets should be given to evacuation strategies and private shelters.

◦ **effectiveness of public information and warning systems, including cross-border coordination and communication**

Cross-border coordination and communication seems to work well, but can always be improved. Importantly, given the scale and extent of this summer’s fires, relying on the capacity to share staff and resources comes into question, as resources were clearly needed in all eastern states.

◦**impact of increasingly longer fire seasons on the ability to prepare, deploy and sustain efforts directed towards emergency events in Victoria**

There are two issues here:

- The exhaustion of crews (especially volunteers) during a long fire season
- Work that is not being done while crews fight fires (eg DELWP and Parks Victoria staff are taken away from other land management tasks, such as pest plant and animal management, for long periods of time).

Given predictions that fire seasons will get worse still, we probably need a larger professional fire fighting force. They could also be trained in other duties such as pest plant and animal management. This would seem to be a sensible avenue for boosting regional employment.

◦**impact of providing Victorian responder officers to other Australian jurisdictions to assist with emergency events (as early as September 2019 this summer season)**

As mentioned above, this is becoming increasingly difficult. States can't securely rely on other states (or international crews etc) for timely assistance. Victoria should be self-sufficient, including developing aerial ignition control capacity across the state.

◦**availability and utilisation of private assets and resources (including plant equipment) to support emergency preparedness and response**

Expansion of point of ignition control

Effective ignition control has the potential to:

- Increase protection of human lives
- Increase public health
- Increase protection of homes and infrastructure
- Reduce the heavy burden placed on volunteer (and professional) firefighters
- Increase the viability of insurance companies
- Increase the viability of agriculture (reducing both smoke and fire impacts)
- Increase the viability of tourism
- Improve the quality of water catchments
- Reduce carbon emissions and...
- Help long-term recovery of the natural environment, and the plants and animals that depend on it.

That has to be a very strong return on any solid investment.



Improved point of ignition control across the state would involve a considerable investment, but potentially bring far greater benefits socially, economically and environmentally.

We note the report in the Sydney Morning Herald of February 28, 2020, quoting ex-fire chiefs saying that current Federal funding arrangements are effectively “*preventing emergency services from water-bombing small fires before they turn into mega blazes that destroy homes and kill people*”. They pointed out that “*Federal funding can flow to state governments under the Disaster Recovery Funding Arrangements with up to 75 per cent of costs covered - but only in “extraordinary” circumstances when firefighting was targeted at “imminent” risks to lives and property*”. <https://www.smh.com.au/politics/federal/ex-fire-chiefs-say-ridiculous-bushfire-funding-stymies-waterbombing-20200228-p545dz.html>

The Commonwealth has a role in funding state programs, particularly for expensive infrastructure such as capacity building for aerial attack on points of ignition. Again, however, those programs are most effectively designed and administered by the states and territories, where local knowledge is critical.

It is critical that that funding criterion be replaced with funding arrangements that facilitate strong deployment for point of ignition control right across the landscape. That means not just funding for an appropriate range of aircraft, but also for the necessary supporting infrastructure and training. (We note here Victoria’s sensible initiative in developing aerial fire-fighting capacity at night, when many fires start and when control efforts can be most effective. That capacity should also be expanded.)

Landscape-scale ignition control programs would mean developing the capacity to get two or three aircraft to an ignition point within about 15 minutes, even in remote areas. This would not just mean radically expanding investment in and deployment of a full range of aircraft, but expanding crew training, establishing the necessary infrastructure (including water sources) and making use of effective lightning detection networks and satellite sensing capacity etc.

There have been many successful aerial point of ignition interventions, but to the best of our knowledge they have not been followed by modelling the likely path of an escaped fire, and its likely impact on lives, property and the economy. This would establish beyond doubt the

cost-effectiveness of these interventions, and their capacity to save lives. For example, a fire that started on Black Saturday in Quarry Road, Ferntree Gully (at the foothills of Victoria's Dandenong Ranges) was successfully extinguished by a helicopter at the point of ignition. If that fire escaped, it could have extended the Black Saturday havoc through the highly populated Dandenongs, but there has been no modelling of that fire's likely progress and likely loss of life and economic costs.

Aerial point of ignition capacity should be supported by strategies for:

- Avoiding power line failure (burying lines, installation of automatic circuit re-closers, and encouraging local power generation etc.)
- Increased action (both social and enforcement) on arsonists
- Increased community education.

Improving ignition point control will be very costly, but that investment is needed if we are to reduce the number and extent of mega-fires. An investment capable of reducing the frequency and great cost of large, uncontrollable fires, would produce economic, social and environmental dividends. Stopping just one large fire at its source could save billions of dollars.

◦[planning and response mechanisms to protect biodiversity threatened by bushfire](#)

Impacts of current fire management on biodiversity

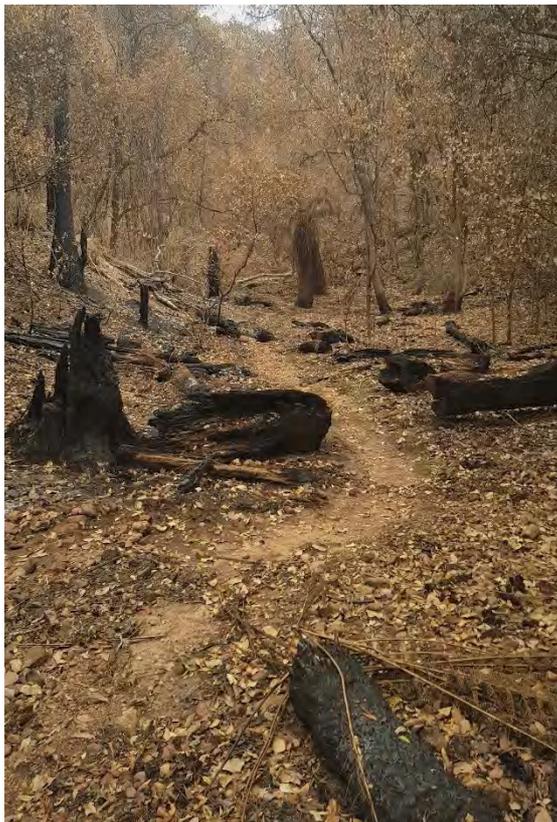
Fire has always been part of the Victorian landscape, indeed it has driven the evolution of much of the typical 'Australian flora' over the last 45 million years or so. Many Victorian plants have developed resilience to fire, and some plants actually depend on occasional fire. However resilience always has limits, and there is abundant evidence that those limits are being reached, due to increased wildfire, and increased management burns.

The impact of increased fire frequency and severity

The most striking evidence of that from last summer's fires in East Gippsland is the number of rainforest pockets that have burnt. Rainforests (botanists prefer them to be called 'fire-free forests'), are remnant ancient Gondwanan forests that have largely sheltered from fire in deep valleys; they have little resilience to fire, take a long time to recover, and can be destroyed (replaced by eucalypt forests) by repeated fire.



Long-unburnt warm-temperate rainforest near Bruthen.

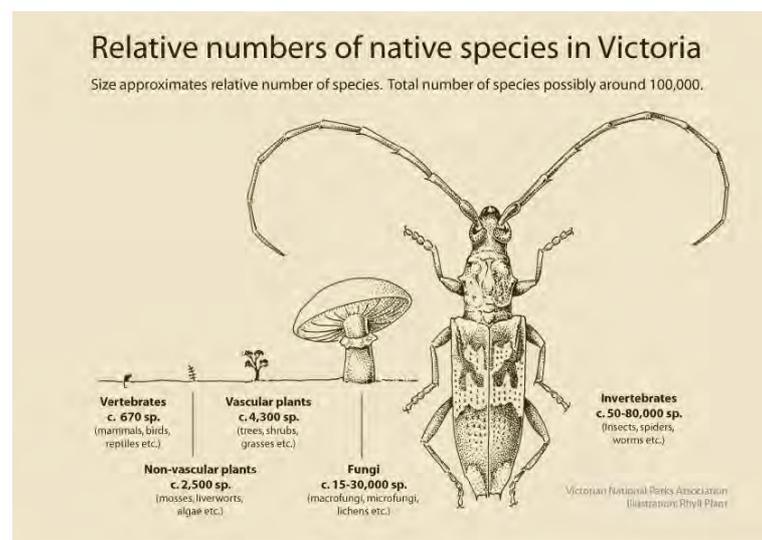


The same warm-temperate rainforest near Bruthen after the 2020 fire. (Photos Tom Crook)

The impact of the 2020 fire on East Gippsland's many pockets of warm-temperate rainforests has been close to catastrophic, especially as some, including Victoria's largest patch at Jones Creek, have now suffered repeated fire and are unlikely to recover (especially under the current climate scenario).

But repeated fire can also challenge the recovery of many fire-adapted species. Snow Gums, for example, can quickly re-sprout from a large underground lignotuber when an occasional alpine fire has killed the above-ground parts of the tree. Yet three fires in recent succession can weaken and kill them. This scenario has happened now around The Horn in Mount Buffalo National Park, and in the southern parts of the Bogong High Plains in the Alpine National Park.

While people see a remarkable re-greening of the landscape after a fire, the situation is not as simple as that; there are many plants and animals that struggle from frequently repeated fire. There are approximately 100,000 different native species in Victoria, most of which are insects and fungi; the larger native animals and plants total around 5,000 species. Most have very specific habitat requirements which can be impacted by frequent fire.



Relative numbers of native species in Victoria (compiled by VNPAS from a range of published sources)

Loss of hollows and other essential habitat features

Many studies have recognized the importance of maintaining or improving the presence of a large range of tree hollows in the landscape. The presence of hollow logs on the ground is also a critical habitat feature for many species, and once lost can take a very long time (decades to a century or more) to become re-established.

Many birds, for example, rely or largely depend on hollows, and a population of any particular species will need an abundance of hollows of a particular size, shape and orientation within their preferred habitat. Victorian birds that make use of or depend on hollows, include:

Australian Wood Duck, Pacific Black Duck, Pink-eared Duck, Grey Teal, Owlet-nightjar, Brown Falcon, Nankeen Kestrel, Glossy Black Cockatoo, Red-tailed Black Cockatoo, Yellow-tailed Black Cockatoo, Major Mitchell's Cockatoo, Gang-gang Cockatoo, Galah, Long-billed Corella, Little Corella, Sulphur-crested Cockatoo, Rainbow Lorikeet, Little Lorikeet, Purple-crowned Lorikeet, Musk Lorikeet, Australian King Parrot, Superb Parrot, Regent Parrot, Cockatiel, Crimson Rosella, Eastern Rosella, Australian Ringneck, Blue Bonnet, Red-rumped Parrot,

Mulga Parrot, Elegant Parrot, Turquoise Parrot, Scarlet-chested Parrot, Budgerigar, Powerful Owl, Barking Owl, Southern Boobook, Sooty Owl, Eastern Barn Owl, Masked Owl, Laughing Kookaburra, Sacred Kingfisher, Red-backed Kingfisher, Dollarbird, White-throated Treecreeper, White-browed Treecreeper, Brown Treecreeper, Chesnut-rumped Thornbill, Southern Whiteface, Striated Pardalote, Tree Martin.

Victorian mammals that frequently use or completely rely on hollows in trees or on the ground include:

Short-beaked Echidna, Yellow-footed Antechinus, Brown Antechinus, Dusky Antechinus, Spot-tailed Quoll, Brush-tailed Phascogale, Southern Brown Bandicoot, Mountain Brushtail Possum, Common Brushtail Possum, Pygmy Possum, Leadbeater's Possum, Yellow-bellied Glider, Sugar Glider, Squirrel Glider, Greater Glider, Feathertail Glider, Yellow-bellied Sheath-tail Bat, Southern Freetail Bats, White-striped Freetail Bat, Gould's Wattled Bat, Chocolate Wattled Bat, Eastern False Pipistrelle, Large-footed Myotis, Lesser Long-eared Bat, Gould's Long-eared Bat, South-eastern Long-eared Bat, Inland Broad-nosed Bat, Eastern Broad-nosed Bat, Inland Forest Bat, Large Forest Bat, Southern Forest Bat, Little Forest Bat.

Many other animals, including reptiles, amphibians and a large range of invertebrates also rely on hollows.



Fuel reduction burns, as well as bushfires, can reduce the abundance of hollow logs on the ground, a critical habitat feature that can take many decades, or more than a century, to reappear. This 'Radar Hill' fuel reduction burn took place in East Gippsland in 2019.

The need for appropriate fire regimes has been acknowledged in a Potentially Threatening Process listing in Victoria's Flora and Fauna Guarantee (FFG) Act – the highest available threat listing. And that threat listing has been strongly justified by the following quoted scientific studies in south eastern Australia, published since Victoria's Back Saturday Royal commission. Frequent fire can adversely affect many important habitat components of forests and woodlands.

One study, published by Victoria's Department of Environment Land, Water and Planning (DELWP) specifically associated fuel reduction programs with impacts on vertebrates. While fire can create hollows, it more commonly destroys them:

"Tree hollows are a key habitat component for some 300 Australian vertebrate fauna species, of which a third have formal conservation status (Gibbons and Lindenmayer 2002)." ... "This study has demonstrated that planned burns in Gippsland increase the collapse risk of HBTs [hollow-bearing trees] significantly and, by implication, are likely to cause loss of habitat for hollow-dependent fauna in areas where hollows are needed."

Lucas Bluff. (2016) **Reducing the effect of planned burns on hollow-bearing trees**. Victorian Government Department of Environment, Land, Water and Planning, Melbourne, February 2016.

Another DELWP study highlighted the importance of a broad range of fire age classes (time since fire), allowing the ongoing development of tree hollows and other habitat features.

"For birds the strongest relationships related to fire frequency, with nectarivores responding negatively to frequent fires, and two other guilds showing weaker positive responses. Ground nesting birds were scarce at sites that had been burnt below the minimum Tolerable Fire Interval." .. "The study examined a subset of the biota and so a precautionary approach is warranted to fire planning and implementation, taking account of other studies and future work dealing with groups such as lichens, fungi, owls, arboreal mammals, microbats and invertebrates." ... "Frequent burning will benefit some plant and bird groups and disadvantage others (and probably also mammals). Hence it is important to continue generating a mix of fire regimes across the landscape, and a mix of age-classes."

Annette Muir, Josephine MacHunter, Matthew Bruce, Paul Moloney, Garreth Kyle, Kasey Stamation, Lucas Bluff, Phoebe Macak, Canran Liu, Geoff Sutter, David Cheal and Richard Loyn. (2015). **Effects of fire regimes on terrestrial biodiversity in Gippsland, Victoria: a retrospective approach**. Arthur Rylah Institute for Environmental Research, DELWP 2015.

A number of other studies have found similar results:

"Charring effects on hollow formation, increasing hollow size but decreasing overall hollow presence, demonstrates the complex effect of fire on this resource."

Mitchell G. Stares, Luke Collins, Bradley Law and Kristine French. 2018) **Long-Term Effect of Prescribed Burning Regimes and Logging on Coarse Woody Debris in South-Eastern Australia**. *Forests* 2018, 9, 242; doi:10.3390/f9050242.

"We conclude that low intensity prescription burns may cause levels of destruction of hollow-bearing trees that are substantial enough to warrant immediate attention from managers."

Harry Parnaby, Daniel Lunney, Ian Shannon and Mike Fleming. (2010) **Collapse rates of hollow-bearing trees following low intensity prescription burns in the Pilliga forests, New South Wales**. *Pacific Conservation Biology* 16(3) 209 – 220.

“Our work highlights the need for management of fire regimes to be complemented by an understanding of the underlying environmental gradients and key elements of habitat structure that influence resource availability for plants and animals.” ... “Time since fire influenced vertebrates, particularly bird abundance, more than plants. Of species that responded to time since fire, most were associated with older fire ages.”

Kelly, L. T., A. Haslem, G. J. Holland, S. W. J. Leonard, J. MacHunter, M. Bassett, A. F. Bennett, M. J. Bruce, E. K. Chia, F. J. Christie, M. F. Clarke, J. Di Stefano, R. Loyn, M. A. McCarthy, A. Pung, N. Robinson, H. Sitters, M. Swan, and A. York. (2017). **Fire regimes and environmental gradients shape vertebrate and plant distributions in temperate eucalypt forests.** *Ecosphere* 8(4):e01781. 10.1002/ecs2.1781

“Longer-term impacts of prescribed burning will be strongly influenced by the return interval, given the slow rate at which some structural components accumulate (decades to centuries)” and “Replacement of components such as large logs, first requiring older trees with large trunks/limbs, potentially requires a century or more ... A key point is that, despite being relatively mild and patchy, prescribed burns may continue to influence forest structure for more than a century into the future ... More than 150 years of European settlement and diverse land use has left the box-ironbark forests of southeast Australia in a highly disturbed and simplified state, with structural components such as large logs and deep litter layers being extremely scarce (ECC 1997).”

Greg J. Holland, Michael F. Clarke, and Andrew F. Bennett. (2017) **Prescribed burning consumes key forest structural components: implications for landscape heterogeneity.** *Ecological Applications*, 27(3), 2017, pp. 845–858.

A series of studies over many years has looked at the declining habitat features of Victoria’s Ash forests. To quote just one of those papers:

“Large trees with cavities provide critical ecological functions in forests worldwide, including vital nesting and denning resources for many species.” ... This large cavity tree crisis in Mountain Ash forests is a product of: (1) the prolonged time required ([greater than] 120 years) for initiation of cavities; and (2) repeated past wildfires and widespread logging operations.” ... “Significant negative ecological consequences will arise from the Mountain Ash-wide absence of large cavity trees [including] impaired key ecosystem processes like the recruitment of large logs to the forest floor. In the particular case of Mountain Ash forests, a paucity of large-diameter dead trees will deplete the nesting and denning resources required by, ~ 40 species of cavity-dependent vertebrates in these ecosystems.”

Lindenmayer DB, Blanchard W, McBurney L, Blair D, Banks S, Likens GE, et al. (2012) **Interacting Factors Driving a Major Loss of Large Trees with Cavities in a Forest Ecosystem.** *PLoS ONE* 7(10): e41864. <https://doi.org/10.1371/journal.pone.0041864>

Inappropriate fire regimes

A recent (August 2018) paper, looking at the causes of endangered species Australia-wide, lists inappropriate fire regimes as one of the most significant impacts on these species.

“Since European occupation, many areas have experienced dramatic changes in fire regime, ranging from reductions in the incidence of fire to increases in the frequency, extent and

intensity of fire.” ... We highlight that if Australia is to conserve its globally significant biodiversity, a better-planned response supported by adequate funding and effective policy and legislation is urgently needed.”

Stephen G. Kearney, Josie Cawardine, April E. Reside, Diana O. Fisher, Martine Maron, Tim S. Doherty, Sarah Legge, Jennifer Silcock, John C. Z. Woinarski, Stephen T. Garnett, Brendan A. Wintle and James E. M. Watson (2018) **The threats to Australia’s imperiled species and implications for a national conservation response**. Pacific Conservation Biology. CSIRO <https://doi.org/10.1071/PC18024>

Increased fire in the landscape (both bushfires and planned burns) over recent years has resulted in a significant depletion of older age classes, and these are very hard to re-establish once lost. As DELWP fire ecologist David Cheal pointed out in 2010, in a page of caveats to his extensive report on suitable growth stages for different habitat types:

“Early growth stages can be created far more easily than can late (mature) stages. Recently burnt vegetation can be created in a single season. Some important habitat features occur only in mature to senescent vegetation and thus take decades, or even centuries, to develop.”

David Cheal (2010) **Growth stages and tolerable fire intervals for Victoria’s native vegetation data sets**. Fire and adaptive management report no. 84. DELWP 2010

Protection of remaining long-unburnt areas is now crucial

A number of papers have been published recognizing the importance of protecting long-unburnt (or near long-unburnt) vegetation.

“For example, the long-unburned sites in our study area are disproportionately more important for reptile and mammal richness and abundance than those with a shorter time-since-fire” and “Regardless what management action is applied for reducing overall fuel hazard, our results suggest that long-unburned forests should be protected from fire”.

Kelly M. Dixon, Geoffrey J. Cary, Graeme L. Worboys, Julian Seddon and Philip Gibbons. (2018) **A comparison of fuel hazard in recently burned and long-unburned forests and woodlands**. International Journal of Wildland Fire. July 2018

“Additionally, prescribed burns carry significant side effects, such as ecological harms, both through degrading faunal habitat (Catling et al. 2001; Andersen et al. 2005) and disadvantaging some plant species that require long fire-free intervals to complete their life cycle.”

James M. Furlaud, Grant J. Williamson, and David M. J. S. Bowman. (2017) **Simulating the effectiveness of prescribed burning at altering wildfire behaviour in Tasmania, Australia**. International Journal of Wildland Fire.

“Our review reiterates the vulnerability of ‘fire sensitive’ obligate seeder forests, but also highlights similar threats to ‘fire tolerant’ resprouter forests posed by multiple recurrent wildfires of high severity.” ... “Our review highlights that even in forest types well adapted to

fire the consequences of increasing wildfire frequency are worth renewed and directed attention.”

Thomas A. Fairman, Craig R. Nitschke and Lauren T. Bennett. 2015) **Too much, too soon? A review of the effects of increasing wildfire frequency on tree mortality and regeneration in temperate eucalypt forests.** International Journal of Wildland Fire. 14 September 2015.

“There is little evidence for any ecological benefit from the planned burns, at least in the short term. ... In contrast, there is evidence that burning results in depletion of habitat resources for a range of faunal species.” ... “Given the commitment to increased levels of burning on public land annually, it is critical to undertake strategic planning to develop a vision and target for the post-fire, age-class structure of these forests. ... A high priority is to determine those areas to be maintained as the ‘long unburnt’ growth stage.”

Greg Holland, Andrew Bennett, Mike Clarke and others (2015) **Box-Ironbark Experimental Mosaic Burning Project.** Report to the Department of Environment, Land, Water and Planning and Parks Victoria, 2015.

And a paper assessing claims of biodiversity impacts after the 2003 alpine fire in Victoria and NSW pointed out that frequent fire in that landscape was historically uncommon. Frequent fire, rather than severe fire after long intervals, was more likely to adversely impact alpine plants and animals.

“We conclude that infrequent extensive fires are a feature of alpine Australia. For both the flora and the fauna, there is no quantitative evidence that the 2003 fires were an ecological disaster, and we conclude that the flora and the fauna of alpine Australia are highly resilient to infrequent, large, intense fires.”

Richard J. Williams A H , Carl-Henrik Wahren B , Arn D. Tolsma C , Glenn M. Sanecki D I , Warwick A. Papst B , Bronwyn A. Myers E , Keith L. McDougall F , Dean A. Heinze G and Ken Green. (2008) **Large fires in Australian alpine landscapes: their part in the historical fire regime and their impacts on alpine biodiversity.** International Journal of Wildland Fire 17(6) 793-808 <https://doi.org/10.1071/WF07154>

Importantly, these impacts from inappropriate fire frequency must be placed in the context of other current and future impacts on biodiversity, such as pest plant, feral animal and pathogen invasions, habitat fragmentation, logging, stock grazing and a growing range of recreational impacts. The growing list of threatened species in Australia is a function of the observed downward trajectory of many common species. Even Kookaburras are now in decline in Victoria.

Catchment and marine impacts

There are also significant issues of river health, and subsequently catchment health. Erosion is common after fire and, when flooding rains follow a severe fire event, that impact can be considerable.



Siltation of the Tambo River, East Gippsland, when heavy rain followed the 2020 fires.

A new report from the Australian Marine Conservation Society, *The impacts of bushfires on coastal and marine environments*, has highlighted the impacts of bushfires on estuaries and the marine environment.

“Research has shown that when the nutrients, ash, debris, sediments and metals released by bushfires are washed into waterways, they can remove the feeding and breeding areas of aquatic animals, clog the gills of fish, and undermine the breathing of filter feeding animals such as mussels. The contaminated sediment slug can slowly work its way downstream to the coast, harming aquatic life along the way... Metals such as copper, zinc, lead and mercury, and other contaminants released by the bushfire, could change the physiology and behaviours of marine animals and work their way up the food chain.” and ...

“More bushfires will likely worsen the scale of degradation of coastal and marine habitats, such as seagrass meadows and mangroves, and the decline in water quality of major estuaries, threatening the future of commercial and recreational fishing (and related tourism) and aquaculture.”

Smyth C. **The impacts of bushfires on coastal and marine environments: A review and recommendations for change.** Report to the Australian Marine Conservation Society (2020). https://www.marineconservation.org.au/wp-content/uploads/2020/03/Bushfire-Report_February-2020_Final-full-for-web-1.pdf

◦effectiveness of the existing workforce model to support response, relief and recovery.

As mentioned above, there is a need for an increased year-long fire management capacity (both people and infrastructure, including aerial capacity) that does not overly rely on volunteers, or on the re-deployment of PV and DELWP staff who should be doing their

regular tasks. Flexibility for staff to engage in pest management control seems sensible. That expansion can only help regional employment.

•Review support available to staff and volunteers in terms of mental health and wellbeing.

People engaged in fire management and control should have all the support they need. A more adequate capacity to manage fire must help here.

•Consideration of the adequacy of existing administrative and funding mechanisms in place at a state level to support the operational response efforts.

See comments about aerial capacity, and inadequate federal funding arrangements, above.

•In considering the timeliness and effectiveness of activation of Commonwealth assistance, and Commonwealth resource availability, IGEM should particularly consider:

◦effectiveness of current national resource sharing arrangements when multiple and simultaneous fire events are occurring

As above, last summer's fires demonstrate the need for an adequate Victorian fire response capacity. According to Australia's constitution, the states have responsibility for the management of Crown Land. And in a country as large as Australia, a Federal agency would be unlikely to possess the local knowledge necessary for effective land/fire management. We believe the role for the Commonwealth is one of facilitating co-ordination, and delivering supporting funding, especially in relation to:

- Effective deployment and funding for aerial point of ignition capacity.
- Facilitation of evacuation strategies.
- Fire management planning across state and territory borders (though this generally works well along Victoria's borders).

We believe it should primarily be the states which plan for, establish and perform fire mitigation strategies, and plan for and establish deployment of aerial capacity and ignition control in their territory.

◦effectiveness of existing governance arrangements supporting access to Commonwealth and State air fleets

This needs significant reform. See earlier comments.

◦use and integration of Australian Defence Force assets into Victoria's emergency response and relief operations.

There is room to improve co-operation in fire planning between the states and the Commonwealth. This should be developed by setting up an agreed and adequately resourced consultative process, dealing with all aspects of fire resourcing and management, including deployment of defence forces.

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Attachment 3: The full “fire/fuel scenario over time” sequence, included by Jenny Barnett in her (VNPA’s) submission to Victoria’s 2007 *Parliamentary Inquiry into the Impact of Land Management Practices on Bushfires in Victoria*.

Therefore the impact on fuel loads by fires is complex, with differing effects on ground fuels, shrubs and bark, all of which vary between forest types. The real test of how long fuel reduction is effective for is best seen by how they perform in the field in different forest types when interacting with wildfires, rather than by just by looking at theoretical fuel loads.



Shortly after fire in Kinglake National Park near Steels Creek in 1983



One year after fire in Kinglake National Park near Steels Creek



Three years after fire in Kinglake National Park near Steels Creek



Four years after fire in Kinglake National Park near Steels Creek



Twenty-four years after fire in Kinglake National Park near Steels Creek



Nearby area in Kinglake National Park near Steels Creek burnt about forty-three years ago