

# TO SAVE FORESTS AND LIVES WE NEED TO DESTROY UNTRUE BUSHFIRE MYTHS

John Cameron<sup>1</sup>, 4<sup>th</sup> October 2023

## 1. Background

Fuel reduction by controlled burning was first officially sanctioned by the Stretton Royal Commission following the 1939 Black Friday bushfire that killed 71 people. Then the Victorian Bushfire Royal Commission (VBRC) recommended at least 5% of the forest be fuel reduced each year, following the 2009 bushfire that killed 179 people. These Royal Commissions with wide terms of reference gathered factual evidence and recommended practical solutions to mitigate future disasters, but unfortunately implementation has been lacking.

Following the 2019-20 'Black Summer' bushfires both the Victorian Inspector General for Emergency Management Inquiry and Australian Royal Commission into National Natural Disaster Arrangements ignored vital evidence, failed to present all the facts and missed opportunities to recommend practical improvements, particularly on mitigating bushfires.

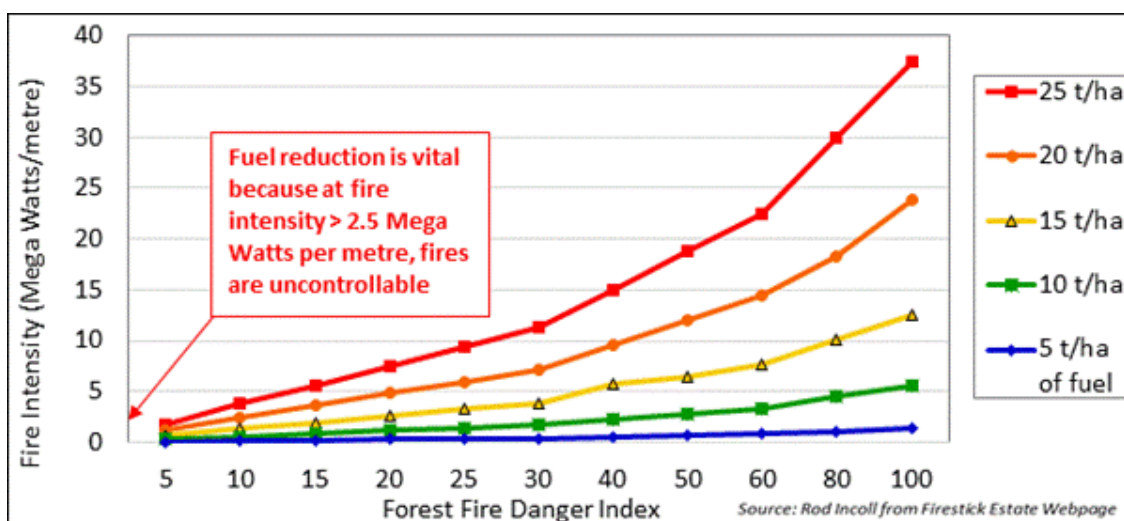
The focus of both these 'inquiries' was on managing disasters rather than preventing disasters. Both 'enquiries' effectively deflected accountability away from ineffective policy and practise. Key submissions that identified shortcomings and offered practical solutions were largely ignored. An opportunity to learn from Western Australia's world best practise fire mitigation was lost.

Both 'inquiries' did not undertake a forensic examination of bushfire mitigation, promptness of fire detection and efficiency and effectiveness of initial attack. Key evidence from experts in fire behaviour, land management and effective integration of fuel reduction and fire suppression strategies was largely ignored. This report delves into some of the shortcomings and dispels some myths.

## 2. Fuel and climate impact fire intensity but only one is controllable

Area burnt, lives lost and difficulty of suppressing wildfires is determined by fire intensity. Fire intensity is influenced more by available fuel (dry fine surface and near surface leaves, bark and twigs) than by forest fire danger index (climate, weather and drought factor). Crown fires develop at ca. 10 MW/m (Figure 1).

Figure 1: Fire intensity is influenced more by the available fuel than by climate or fire weather

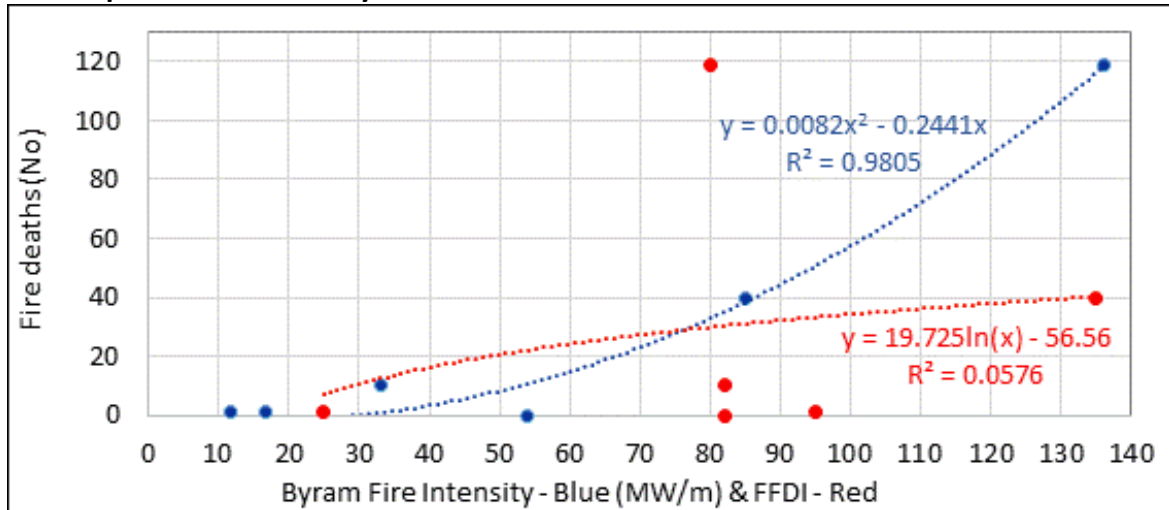


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### 3. Fuel rather than climate is the key driver of lives lost

Lives lost from wildfire whether they be humans, livestock or rare and endangered fauna are more related to fire intensity than Forest Fire Danger Index (FFDI). Analysis of separate fires that comprised the 2009 tragic Victorian bushfires and the 2005 Pickering Brook wildfire in WA, indicated that the number of lives lost, was more strongly related to fire intensity than the Forest Fire Danger Index – FFDI (Figure 2).

Figure 2: Impact of fire intensity and Forest Fire Index on bushfire fire deaths<sup>2</sup>

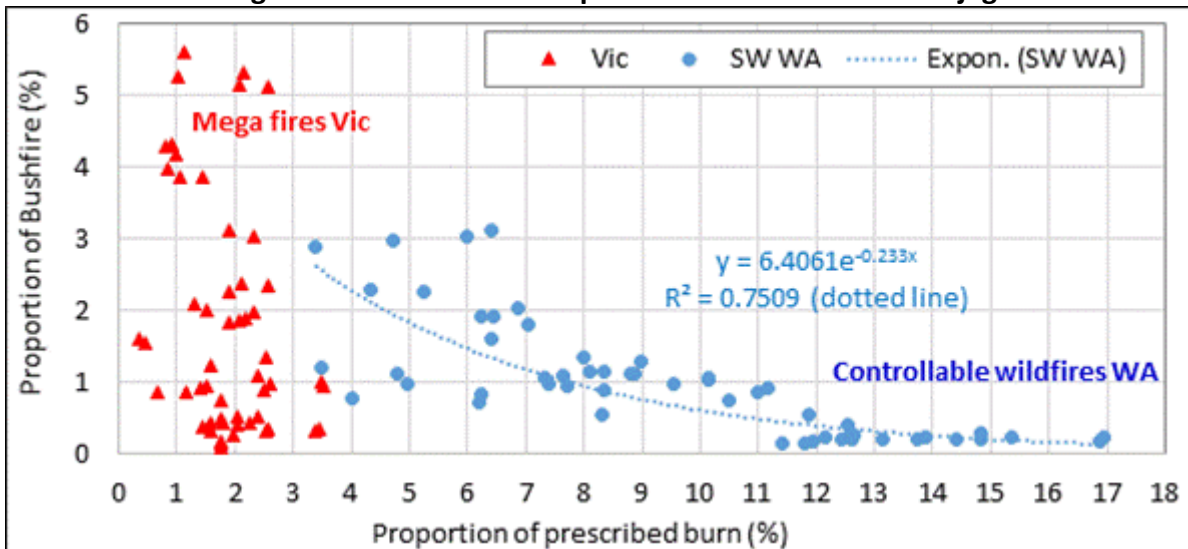


Fire intensity is influenced by the age, composition and amount of fuel, whereas Forest Fire Danger Index takes no account of the age and quantity of fuel. When it comes to saving lives reducing fire intensity by reducing the age and amount of fuel are vital.

### 4. Sixty two year real world research shows fuel reduction is effective

Victoria’s ‘mega’ fires over the last 20 years were predictable and preventable, if Government placed greater store on a proven relationship between the extent of low intensity fuel reduction fire and its relationship to the extent of high intensity wildfire, known as the “Sneeuwjagt curve” (Figure 3).

Figure 3: Victorian mega fires could have been predicted from the “Sneeuwjagt curve”<sup>3</sup>



<sup>2</sup> Derived from wildfire intensity data in L. McCaw et al (2009). Victorian Bushfire Research Response, Final Report to VBRC Oct 2009. And J. J. Hollis et al (2011). The effect of fireline intensity on woody fuel consumption in Southern Australian Eucalypt fires. Aust. Forestry V74, No 2.

<sup>3</sup> Cameron J N (2021). Inquiry into Ecosystems decline in Victoria, public hearing by Zoom 26 August 2021. The figure is updated from Sneeuwjagt (2011), 'The Effectiveness of Prescribed Burning in the Control of Large Eucalypt Forest Fires', Fifth International Wildfire Conference, South Africa and based on 61 years of actual data (1962-2022) from Agency annual reports for the entire forest in both regions (rolling 4 year average with 4 year lag).

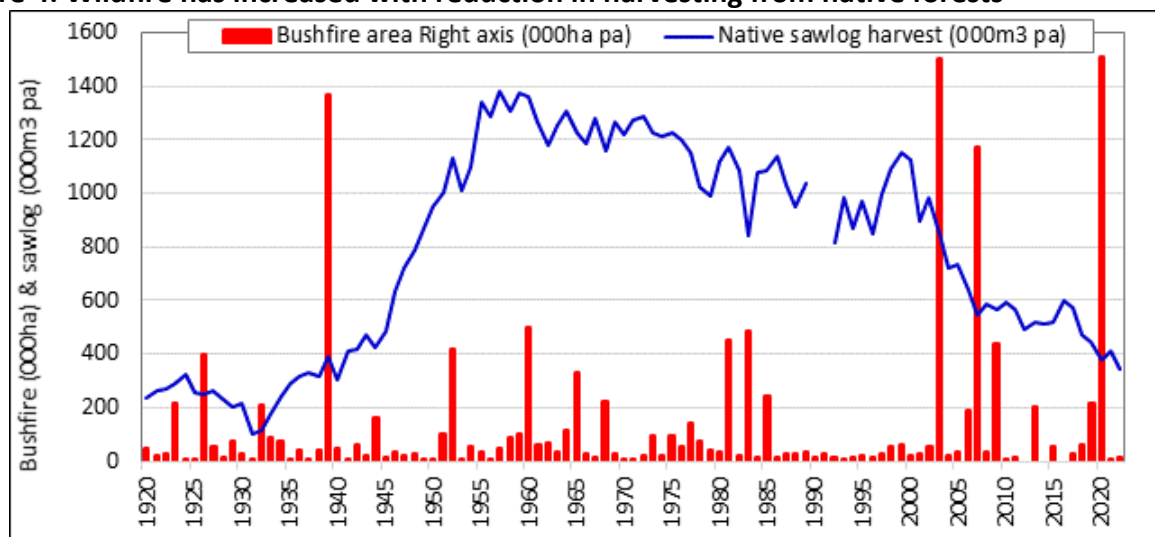
**Figure 3** presents the results of a large scale experiment under real world conditions across millions of hectares over a 61 year period, which embraces changing climate and substantial advancements in equipment to suppress bushfires. The SW WA data quantifies the impact of well managed fuel reduction (e.g. ‘landscape’ plus ‘interface’) and its integration with effective bushfire suppression. It debunks the theory that low amounts of prescribed burning only at the ‘interface’ with communities is required. While Victoria gets lucky under moist summers (e.g. La Niña), under dry summers (e.g. El Niño) our luck runs out.

The objective function should be to keep fires small which requires strategic fuel reduction of sufficient scale, coupe size and location so that fuel reduced areas are closer to points of ignition. The absence of this was unfortunately demonstrated with fatal results in November 2019 in East Gippsland following lightning strikes in old fuels a long way from the prescribed burns at the community ‘interface’. A major limitation of some academic fire models is the lack of rigorous back-testing against long range real world data.

## 5. Wildfire has increased as forest harvesting has declined in Victoria

Contrary to misguided belief that harvesting makes native forests more fire prone, the real world evidence shows this myth is not supported by fact. The increase in Victorian megafires has been associated with a substantial reduction in native sawlog harvesting (**Figure 4**). Harvesting in the 1950’s would have resulted in about 12,500 ha pa, or about 100,000 ha (1.3% of the forest) of fuel reduced regeneration under 8 years.

**Figure 4: Wildfire has increased with reduction in harvesting from native forests<sup>4</sup>**



A team of eminent forest scientists lead by Peter Attiwill<sup>5</sup> refuted the proposition that logging makes some types of forests more prone to increased probability of ignition and increased fire severity, as follows:

*We find no support for that argument from considerations of eucalypt stand development, and from reanalysis of the only Australian study cited by Lindenmayer et al. In addition, there is no evidence from recent megafires in Victoria that younger regrowth (<10 years) burnt with greater severity than older forest (>70 years); furthermore, forests in reserves (with no logging) did not burn with less severity than multiple-use forests (with some logging). The flammability of stands of different ages can be explained in terms of stand structure and fuel accumulation, rather than as a dichotomy of regrowth stands being highly flammable but mature and old-growth stands not highly flammable. Lack of management of fire-adapted ecosystems carries long-term social, economic, and environmental consequences.*

<sup>4</sup> Derived from Annual Reports of Forests Commission and successors from 1920 to 2022.

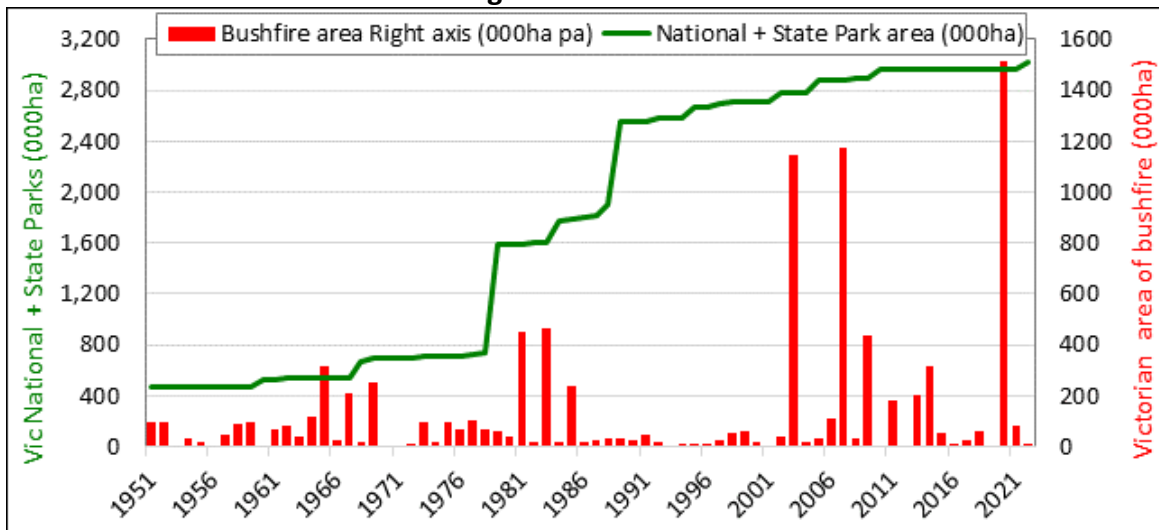
<sup>5</sup> P. Attiwill, P. F. Ryan, N. Burrows, N. P. Cheney, L. McCaw, N. Neyland and S. Read (2013). Timber Harvesting Does Not Increase Fire Risk and Severity in Wet Eucalypt Forests of Southern Australia. Conservation Letters, A journal of the Society for Conservation Biology.

Dense regeneration less than 5 years old may not burn at all even under extreme conditions due to the absence of a continuous layer of surface fuel, and shading that restrict the drying of surface fuels, as shown with photo evidence following the Victorian 2009 Black Saturday bushfire.<sup>5</sup> The decline in harvesting has reduced the number of highly experienced frontline first attack fire fighters close to the action - fewer harvesting contractor crews and their equipment.

## 6. Wildfire has increased with growth of State and National Parks

The increased area of Victoria’s forest under State and National Parks has been associated with an increase in the area burnt by wildfire (**Figure 5**). This is attributed to reduced emphasis on fuel reduction, poorer access for fire fighters and compromised initial attack and suppression.

**Figure 5: Wildfire has increased with the growth of State and National Parks in Victoria<sup>4</sup>**

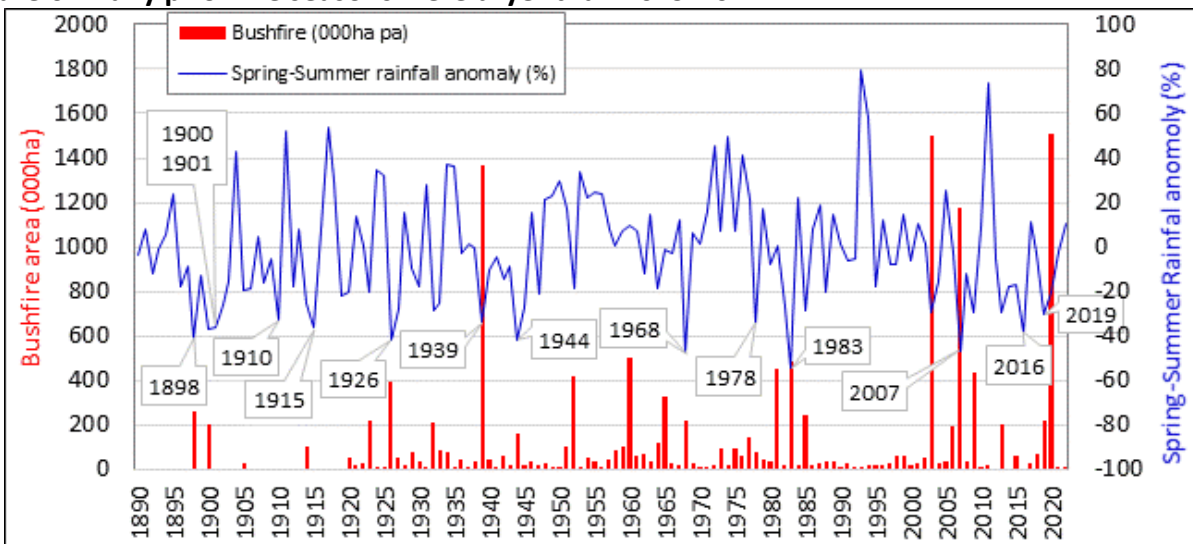


Locking up forests in reserves has delivered reduced fuel reduction, access tracks for firefighters closed or poorly maintained and compromised initial attack and suppression. Firefighters report a serious reduction in maintenance of access tracks in parks which has impeded direct attack and bushfire suppression.

## 7. Climatic conditions have been worse than Black Summer 2019-20

The Victorian summer temperature anomaly and the spring-summer rainfall anomaly were not unprecedented in 2019-20. Conditions have been drier on about 13 previous occasions (**Figure 6**).

**Figure 6: Many prior fire seasons were drier than 2019-20**



The rainfall data in **Figure 6** is the mean of 11 Victorian weather stations for which about 130 years of long term rainfall data was available.

Mean summer temperature anomaly was hotter in 1898 and 1900 during the federation drought (and 1790-1793 in Sydney<sup>6</sup>) than in 2019-20. Analysis of long term climatic data showed wildfire area was more related to drought than summer temperature. Analysis of wildfire loss and rainfall and temperature anomalies over 130 years do not support claims of unprecedented conditions caused by climate change.

The Keech Byram Drought Index (KBDI)<sup>7</sup> for Mount Nowa Nowa, Orbost, Gelantipy, Hotham and Omeo was below the critical level of 60 for a month after initial ignition of the East Gippsland Black Summer fires on 20-21 November 2019. The Forest Fire Danger Index (FFDI) at 3pm incorporating the KBDI and weather conditions was below 30 at the same locations for 2.5 weeks after initial ignitions<sup>8</sup>. Bushfire suppression is normally feasible with daily maximum FFDI's of 30, particularly considering that the 3pm reading is close to the daily maximum. It is generally much lower early in the morning and later in the afternoon.

At the East Gippsland 2019-20 bushfire, observed fire behaviour included rate of spread up to 4km/hr, fire spotting of over 20km/hr and upper level PuroCU/CB activity. This 'Pyro fire storm' activity increases the risk for the fire to grow through either increased downdraft wind against prevailing surface wind, as well as new lightning strikes – both causing more spot fires. All these fire behaviours are consistent with high intensity fire burning in old and heavy fuels.

## 8. Acknowledgements

I thank David Packham OA, Dr Neil Burrows, Dr Phil Cheney, Vic Jurskis, Frank Batini, The Bushfire Front and Forest Fire Victoria for advice and information that assisted with this report. I acknowledge the gallant efforts of all our firefighters, emergency services and support staff who work hard under difficult circumstances and put their lives on the line to save us from tragedy. It is time to ensure that these people no longer have to 'grapple' with inappropriate policy and procedures that do not support efficient, nor effective bushfire mitigation and suppression.

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<sup>6</sup> Jurskis, V. (2016). Fire stick ecology. Connor Court.

<sup>7</sup> KBDI is an empirical estimate of soil dryness or moisture deficiency.

<sup>8</sup> Salkin, O (2023). Preliminary reconstruction of the eastern Victorian Black Summer Fires, November 2019 – February 2020. B&NH CRC