

Logging and Bushfires, Is There a Connection?

In August 2021, a research paper authored by Professor David Lindenmayer and others, titled *Empirical analyses of the factors influencing fire severity in southeast Australia* was published in Ecosphere.

The photo, presumably supplied with the press release, appears to have been taken in some coastal heath type vegetation, not in the tall forests, which are typically subject to timber harvesting. Experienced forest scientists are curious to understand why the authors choose to select a photo that appears to have negligible relevance to the paper being promoted.

Is There is a Connection Between Bushfires and Timber Harvesting?

Bushfires and timber harvesting are connected in that both activities can occur in native forests. Harvesting is highly regulated, with a range of environment protections, including exclusion areas and is confined to a small percentage of the native forest estate. Harvesting does not destroy houses, farms or livestock or totally denude water catchments.

Bushfires are unregulated, and do not respect boundaries of environmental protection areas. In dry summers and particularly in drought conditions, all eucalypt forests are potentially available to be burnt. Bushfires take a devastating toll on flora and fauna, livestock, farm infrastructure, houses, other community assets and at, times, kill and badly injure people caught in the fire path.

The Blue Mountains World Heritage Area (WHA) is "protected" by international and Australian legislation. Most, if not all the WHA has never been subject to harvesting, yet more than 80 percent of the WHA was burnt by the Gospers Mountain and other fires. At more than 512,000 hectares, it is the biggest fire in Australia, to result from a single ignition source.



Image Courtesy of the ABC



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The authors of the paper claim, "*Our analyses suggest that forests managed for timber production near settlements may be at increased risk of high-severity fire.*" However, an absence of harvesting did not protect the unharvested WHA forests from high intensity fire, nor the hundred homes burnt or thousands of residents traumatised by this fire.

Not only did the fire kill millions of birds, mammals and reptiles, only extraordinary efforts saved the less than 200 Wollemi Pines that had survived tens of thousands of Aboriginal management by fire. In addition, the International Union for Conservation of Nature (IUCN) — the official advisor to UNESCO states, "Many species that are attributes of the Outstanding Universal Value of the site were impacted by the fire." The conservation outlook for this site has been assessed as "significant concern." This is a formal downgrade to the second lowest category in the world heritage ratings.

The 2019-20 fires in the Blue Mountains WHA, Kosciuszko National Park and numerous other parks, have resulted in extensive areas of unharvested forests being affected by crown fires and crown scorch. This confirms that per hectare fuel load and the three-dimensional structure of the lower storey or "ladder" fuels should have been considered by the authors.

These factors are directly measurable and can be used to calculate fire intensity, under given fuel moisture and prevailing weather conditions. Time since previous major disturbance is an inexact proxy for fuel load and does not take into account site productivity impacts on stand height nor the impact fuel build up following disturbance.

Stands of a particular age and species are taller on higher site quality than those on low quality sites. At a given fire intensity, a taller stand, whether due to age or site quality is less likely to be subject to less crown burn/crown scorch than shorter stands. The taller the stand, at a given fire intensity and all other things being equal, the lower the risk of crown fire and the lower the apparent "severity" of the fire.

The height of fire affected stands is a variable that can be directly measured. Fire severity is a post event measure of the impact of fire on the burnt forest and the authors do not appears to have taken a key variable, stand height, into account in their analysis.

The use of secondary measures as detailed above, has been a feature of 21st century fire research and has the potential to lead to more speculative modelling and research conclusions than is the case with directly measurable data inputs.

Which is more fire resistant – an unmanaged, untouched forest or a well managed forest?

While government agencies and other organisations regularly pay their respects to Aboriginal elders past, present and emerging, the same cannot be said for the recognition of up to 60,000 years of Aboriginal fire management on continental Australia. The Mabo decision has not yet been translated into Australian environmental legislation or land management.

In NSW, the terra nullius ecological view was confirmed in 1987, with the gazettal of the NSW Wilderness Act. Wilderness is defined in part as:

(1) *An area of land shall not be identified as wilderness by the [Director-General](#) unless the [Director-General](#) is of the opinion that:*



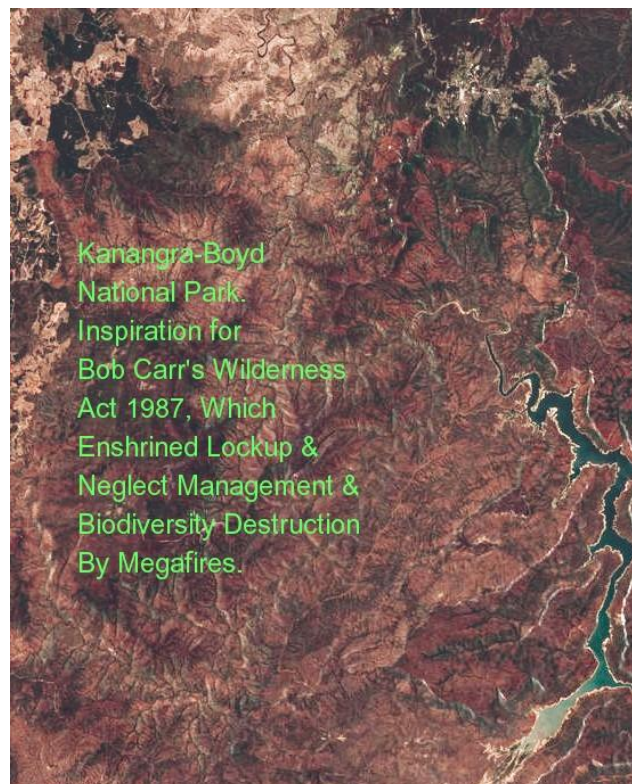
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(a) the area is, together with its plant and animal communities, in a state that has not been substantially modified by humans and their works or is capable of being restored to such a state,

(2) In forming an opinion under subsection (1) the Director-General may consider any relevant circumstance, including:

(a) the period of time within which the area of land could reasonably be restored to a substantially unmodified state.

If the influence of Aboriginal fire management was accepted, the Wilderness Act would either need to be redrafted or else repealed, to allow Aboriginal fire regimes to be restored to designated Wilderness areas



The 2019-20 fires season has demonstrated that unmanaged forest, including "wilderness" areas and associated biodiversity is at risk of being severely damaged by bushfires. As the "precautionary principle," terra nullius regulatory framework and enforcement by terra nullius regulators has encouraged a lockup and neglect management approach, well managed forests are an increasingly scarce commodity.

How can Australian forests, as they are now, be best managed to achieve the best outcome with the least adverse consequences both for the forestry and timber industry and for the environment?

The key to sustainable native forest management in Australia is to restore ecological fire regimes, not the increasingly frequent regime of high intensity bushfires, that destroy rather than restore a healthy environment.

Some academics argue that there is more fire since European arrival. This conclusion is not supported by the extensive historical research documented by Bill Gammage in *The Biggest*



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Estate on Earth and Vic Jurskis in *Firestick Ecology*. It is apparent that some academics do not understand how frequent mild patch burning provides a different charcoal record and ecological impact, compared to intense landscape scale bushfires.

However, research in the Bega Swamp in south east NSW by Paleoecologist Professor Simon Haberle from the Australian National University has provided an analysis of cores from the swamp. He found the sediment, sampled at a very fine resolution, paints a picture of the landscape in freeze frames of every 20 years, stretching back over 15,000 years.

“The results show that the number of samples including charcoal has increased since European settlement, confirming other studies that big fires have occurred more frequently than during the time of Aboriginal land tenure in the Australian high country,” Professor Haberle said.

“It also shows that in the past mega fires only occurred very rarely, once every 4000 years, and that the current situation of big and intense fires is unusual in the long-term history of the region.”

“You see big changes in fire management, because you can look at the charcoal and see what burning regime took place,” he said.

“It was a regular regime, Aboriginal people knew how to keep fuel loads lower.”

“Things that happened in the past can be beneficial, and regular small scale burning in the forest may be a reason for less big fires.”

Regular Low Intensity Fire and Soil Chemistry

In the native vegetated landscape of southern Australia, the regulators along with many fire and ecology researchers generally ignore the role that Aboriginal fire played in the evolution of the forested and grassland landscapes.

Substantial research has been undertaken in the agricultural industry to understand the role of soil pH (level of soil acidity or alkalinity), chemical composition and nutrient availability to crops. The general conclusions are that land management changes soil pH and with lower soil pH (more acidic), less plant nutrients are available to the crop and toxic elements including manganese and aluminium become more available to plants.

Given the imperative to produce food, researchers and farmers clearly understand the need to manage soil acidification and macro and micro nutrients, if healthy and productive crops, orchards and pastures are to produce our food needs.

In contrast, soil science is not as heavily researched in native landscapes. While this lack of understanding does not impact on human food resources, it does impact on food resources and habitat available to insects, birds, mammals and reptiles.

Turner et al in *Forest Ecology and Management 20 August 2008* is one of the few research papers that examines the fundamental drivers of native forest health and productivity.

They found, among other things:

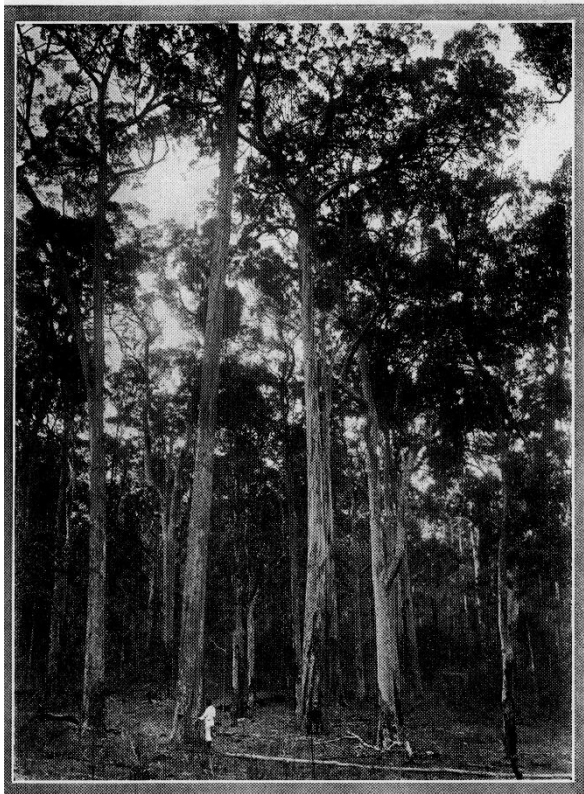
The increases in N/C(Carbon) lead to a reduced soil C/N (Nitrogen) ratio, higher N mineralisation and reduced pH.



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The present study demonstrated that N accumulates with time since fire in dry eucalypt forests at Eden, and that relatively high N, low C/N, low pH and high Al (Aluminium) occurred in three severely declining stands.

Elimination of frequent fire leads to either high intensity fires and tree mortality or long term modification to the soil process leading to reduced tree health and mortality.



Early 20th Century Stand of Mature (150 Years +) Eucalypts With Healthy Crowns & Very Limited Understorey. Regular Burning Continued by Graziers



Early 21st Century Stand of Trees Generally Less than 100 Years Old with Epicormic & Dying Crowns & Dense Understorey. Long-term Fire Exclusion

The Terra Nullius Ecological View – Helping to Push Native Species to Extinction

The terra nullius or wilderness view of conservation in southern Australia is exhibited across most conservation reserves through passive management, also known as management by neglect, of most of the landscape.

Protecting, promoting and restoring wilderness and natural processes across Australia for the survival and ongoing evolution of life on Earth, is a false premise. This "conservation" goal effectively supports the terra nullius ecological view, as it effectively denies the role that Aboriginal use and management of fire played in the evolution of the Australian biota, over a period of up to 60,000 years.

The terra nullius ecological view is exhibited in the constant claim of 'permanent protection' made, whenever land tenure is changed from private, leasehold or state forest, to national park or other reserve status. The concept of permanent protection has been shown time and again to be a falsehood, as passive management ensures repeated high intensity



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bushfires and feral predators and other threats push more and more species in the "permanently protected" reserve system to extinction.

An example provided by the Threatened Species Scientific Committee (TSSC), in 2016, documented the declining populations of the threatened Southern Brown Bandicoot (SBB), in five reserves, across three states. This example illustrates that flawed "conservation" management strategies create negative environmental outcomes across multiple states. See the table below.

Available quantitative data are summarised in the table below.

Population	State	Decline
Ben Boyd National Park	NSW	44% (1999 to 2008)
Nadgee Nature Reserve	NSW	47% (1999 to 2008)
Port Campbell	Vic	>70% (past 10 years)
Pines Flora and Fauna Reserve	Vic	100% (extirpated around 2006)
Mt Lofty Ranges – northern metapopulation	SA	100% (extirpated around 2009)

Ironically, at the time the TSSC report was published, SBB and Long-nosed Potoroos from burgeoning populations on State Forests south of Eden were being translocated to reintroduce these species to the Booderee National Park near Jervis Bay, south of Sydney.

A significant area of SBB and Long-footed Potoroo habitat, along with the habitat of many other threatened and more common species, has been decimated in the December 2019 and January 2020 wildfires in East Gippsland, Victoria and south east NSW.

Current ideology driven research, consistently fails to grasp the basic actions needed to manage repeated high intensity bushfire risk and modelling assumptions fail to place a value on the broad native vegetated environment. A number of fire and ecological research institutions have failed to deliver scientific advice to the state-run fire and public land management agencies, that would allow the delivery of ecologically sustainable native ecosystem fire management.

Many current fire researchers advocate for fuel reduction operations to be conducted adjacent to human assets State governments and government agencies, are yet to recognise the perverse environmental, social and economic impacts, this research is helping to deliver.

There was hope that the 2019-20 would be the fire season that will force governments to discard failed passive (lockup and neglect) land and minimalist bushfire mitigation policies.

Unfortunately, the outcomes of multiple inquiries have seen the leaders not having the depth of understanding needed to challenge the existing emergency response paradigm and address the failure of declining levels of mitigation works. In some cases, expert advisers, who have been part of the failed system, have been positioned to defend the status quo. Meanwhile, forest and fire scientists, with collective centuries of research and on-ground experience have been ignored, along with the decimation of our biodiversity.

In Victoria, the Safer Together Policy is just one example of failed advice to government, yet the Victorian government continues to defend this failed policy. See the South East Timber Association submission at the link below, that details some of the flawed analysis that the



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Victorian Government and agencies accepted prior to abandoning the 2009 Royal Commission recommendation to fuel reduce a minimum of five percent of the gross area of forested public land in Victoria.

<https://files.igem.vic.gov.au/2021-03/South%20East%20Timber%20Association%20SETA%20105Q.pdf>

Bushfire Mitigation and Management

In 2019-20, over 5 million hectares were burnt by bushfires in NSW. These fires impacted directly on future timber supplies by killing harvestable tree and sub-merchantable size regrowth. Many merchantable trees now, cannot be harvested for "environmental" reasons.

The fires were more than sixteen years in the making, with a chronic shortfall in fuel reduction burn levels since 2004. The lack of fuel mitigations works combined with drought conditions and a standoff approach to campaign firefighting unpinned the disastrous 2019-20 fire season in NSW.

More than 50 years of research and field experience have confirmed that a minimum of five percent and up to eight percent of the forested landscape needs to be fuel reduced, to provide a reasonable level of bush fire mitigation. Numerous inquiries and Royal Commissions, including the 2003 *A Nation Charred: Report on the inquiry in bushfires* and the 1939 and the 2009 Victorian Royal Commission Reports have highlighted the need for adequate levels of fuel reduction burning.

Under the *Rural Fires Act 1997*, the NSW Bush Fire Co-ordinating Committee has legislative responsibility "*for advising the Commissioner on bush fire prevention, mitigation and co-ordinated bush fire suppression.*"

Given the responsibilities of the Committee, who on the Committee has the scientific expertise to provide the Commissioner with advice to ensure an appropriate balance is struck between bush fire mitigation and emergency response?

The Rural Fire Service annual reports state "*Hazard reduction remains a high priority for the NSW Government and is a major program that contributes to the protection of lives, property and the environment.*"

The targets reported for the two largest public land management agencies in NSW are National Parks & Wildlife Service (NP&WS) 135,000 hectares or less than 1.9 percent of the estate and the Forestry Corporation of NSW (FCNSW), 21,142 hectares or less than 1.2 percent of the estate. Decades of research and experience have shown these targets are a fraction of area that needs to be done to provide a reasonable level of protection to both biodiversity and human assets.

Another factor appears to have also impacted on the desire of FCNSW to undertake a relatively minor FRB program. The FCNSW reported an all-time low FRB of 2,165 hectares in 2014-15. This low followed two successful prosecutions of FCNSW by the NSW forest regulator in June 2011 and May 2013, for infringements of rules relating to FRB.

A simple message from this example is that FCNSW is potentially subject to prosecution for any planning or operational mishaps, despite there usually being little or no environmental harm. No such sword hangs over the NP&WS or any land manager that does no mitigation.



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If FCNSW and NP&WS fail to manage fuel accumulations and serious environmental harm occurs due to a high intensity bush fire, no one is sanctioned. This is just one perverse outcome of the current fire and forest management regulatory framework.

The following table would suggest that the current FRB target of less than 1.9 percent of the gross area of the NSW parks and reserves system, being subject to FRB, does not provide the necessary level of mitigation needed to protect park environmental assets.

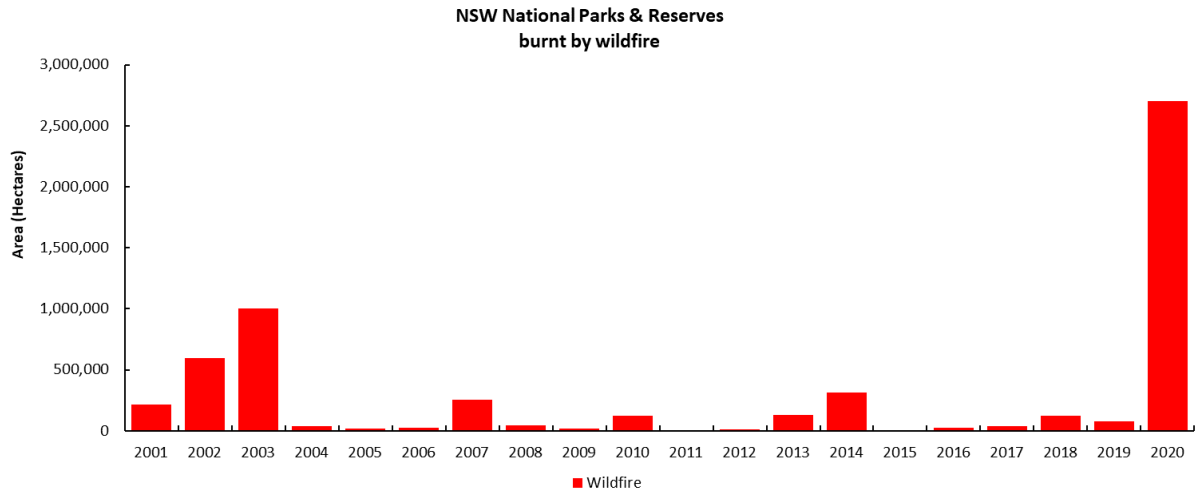


Figure 1 – Annual area of NSW National Parks and Reserves burnt by wildfire over the last 20 years

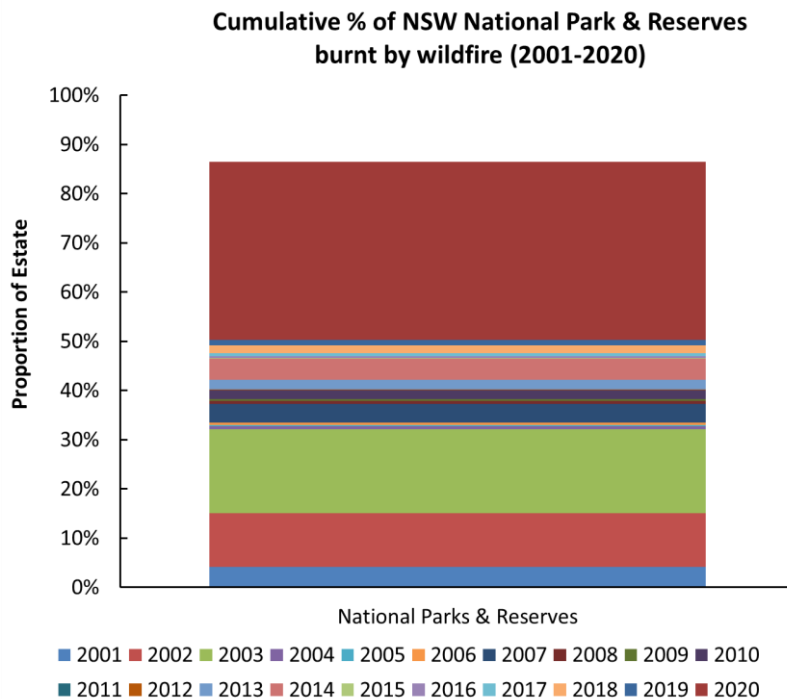


Figure 2 – Cumulative proportion of NSW National Parks and Reserves burnt by wildfire over the last 20 years.

Given the interconnective relationship of forests across the landscape, sustainable forest management must be viewed across both public and private land, including the conservation reserve system. Sustainable forest industries must have a sustainable land



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base. Initial reservation levels of NSW tall forests, under the RFAs significantly exceeded international benchmarks. Since the "Comprehensive, Adequate and Representative (CAR) Reserve System was established as part of the Regional Forest Agreement (RFA) process, there has been an erosion of the State Forest land base available for timber production.

The NSW parks and reserves system currently occupies 80 percent of the available public land base. State Forest, including areas reserved from harvesting make up the remaining 20 percent. Less than half the state forest area is available for harvesting.

Despite a century or more of timber production, biodiverse state forests continue to be transferred to national parks, to shore up conservation objectives, including koala protection. When will government and conservation bureaucrats ask, if multiple use state forests are delivering conservation outcomes to the same or higher level than national parks, why is there a need to change land tenure?

To protect and improve the forests, all forests must have active and adaptive management, that recognises the Australian biota has evolved under active Aboriginal management for tens of thousands of years. Prior to European arrival, much of the Australian environment was not "long undisturbed." Fire was a primary agent of disturbance.

Aboriginal landscape scale use of fire must be reinstated, if the ground and understorey fuel levels are to be managed and forest health restored. NSW is currently on track to subject most public native forest to a catastrophic mega bushfire cycle, which regardless of changing CO2 levels, would not occur if Aboriginal people had continued to manage the forests.

The NSW mega bushfire record over the past 18 years has confirmed that the supposed "protection" of biodiversity, by simply transferring public land from state forest to national park, has been a false and misleading political position and a deeply flawed conservation policy position.

Forest fuel management and adequate control of introduced predators and herbivores are essential steps towards genuine protection of flora and fauna. The principle of active and adaptive management should apply to parks and reserves, state forests and private native forests.

A number of 21st century fire academics, who hold influential positions when it comes to advising governments and implementing policy, argue that fuel reduced areas do not stop fires on catastrophic days, so any fuel reduction burning should be concentrated close to assets.

What these "experts" and ecologists ignore is the fact that during bushfire events, fire intensity in low fuel areas is lower than in untreated areas and consequently, these areas offer refuges for birds, mammals and reptiles that would otherwise be incinerated. Lower fire intensity also reduces the risk of canopy scorch or crown fires and provides some protection to understorey threatened species. Large hollow bearing trees are also less likely to burn down.



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Native Forest Low Intensity Burn May 2010, April 2013 and May 2016. Photo May 2016.



Above FRB Area Burnt by the High Intensity Border Fire 4 January 2020. Rough Bark Charred, Upper Canopy Still Green, Dramatic Drop in Fire Intensity Due to Low Ground Fuels and Scattered Understorey.

Tree Crown Health and Flowering Potential Following High Intensity Bush Fires

A major ecological issue that has received little research effort to date and has not been mentioned by the anti-logging and anti-fuel reduction burning academics, including ecologists, is the fundamental impact that tree decline and mega bushfires have on the



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flowering capacity of eucalypts and all the insect, birds and mammals that are totally or partly dependent on flowering eucalypts for their survival.

Research published by Moore et al 2016 found: *"Altered abiotic and biotic conditions can influence the condition of trees that can, in turn, affect tree reproductive cycles. However, the **potential impact of tree decline on reproductive cycles has rarely been examined.***

We found that bud production, flowering and fruiting was correlated with tree condition: healthier trees were generally associated with higher reproductive effort. Time since last fire was also strongly related to the reproductive efforts at both locations."

Aside from the ecological impact, the decline in eucalypt flowering along with the general lock out of European bees from national parks greatly reduces overwintering capacity for the honey bee industry. More importantly, bees are critical for pollinating many food crops and a drop in hive numbers poses a potential threat to food security.



Red Bloodwood in the Fuel Reduced Area, Also Burnt by the Border Fire. Full Crown Flowering
April 2021



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April 2021 Immediately Adjacent Non-Fuel Reduced Forest Burnt by Border Fire in January 2020. Flowering will be Absent for a Decade or Longer. In Epicormic Dominated Crowns, Flowering will be Depressed by up to 90 Percent Compared to Healthy Forest.

In the early 1980s, SETA members observed the emergence of numerous small terrestrial orchids in forests subject to autumn low intensity fuel reduction burning south east of Bombala. These orchids are extremely delicate, with a flower stem between 10 to 15 centimetres in length. The areas where the orchids grew, have largely remained unburnt since 1983 and were transferred to the National Parks Estate over 20 years ago.

These areas were burnt by the Rockton bushfire in January 2020. In the second half of 2020, enquiries were made to local NPWS staff to find out if post fire monitoring had determined if these orchids had survived 20 years of permanent protection and the subsequent bushfire. The simple response was, we didn't know there were any there!



Small Native Orchid. Common in Fuel Reduced Forests. Smothered to Death in Long Unburnt Forests



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Harvesting Regulatory Controls

Legislation, regulations and operational controls relating to native forest harvesting must be reformed to promote active and adaptive conservation management in forests used predominantly for conservation and also in forests used for timber production.

NSW continues to take a tape measure driven regulatory approach to environmental conservation in areas available for timber harvesting. The authors of the Coastal IFOA Protocols and Conditions have not recognised that most species depend on frequent mild fire to maintain their health, resilience and reproductive potential.

Under permanent protection a few common species proliferate at the expense of most others and in the absence of regular mild patch burning, three-dimensionally continuous fuels, that promote devastating mega bushfires, predominate at a landscape scale. The tape measure rules are a significant impediment to managing "features" such as rocky outcrops and ecotones, where many threatened flora species grow.

The protocols and conditions are structured to make it relatively easy to penalise anyone who infringes the tape measure rules, regardless of whether or not environmental harm has been caused. Tape measure driven conditions and protocols fail to deliver sustainable forest management and also fail to provide the adaptive management framework needed to maintain or restore threatened species and ecological communities within forests used for timber production.

Can Harvesting or Forest Management Mitigate the Risk of Bushfires?

Timber and all other forest products produced from natural forests are the most sustainable materials we can use for building, communication papers and other uses. We cannot have a sustainable timber and forest products industry, unless the forests and plantations that supply the industry are managed sustainably over the long term.

Harvesting combined with appropriate postharvest fuel management will mitigate bushfire risk. Thinning of regrowth from prior harvesting or bushfires events opens the stand canopy and reduces understorey density, thus reducing the risk of crown fires or flaming understorey scorching the tree canopy during bushfire events.

Fuel reduction burning following harvesting of mature forest or thinning of regrowth mitigates bushfire risk. Another key element the harvesting industry brings, is the heavy machinery and skilled operators needed to fight bushfires. It should be concerning to emergency fire management agencies that this critical resource has been whittled away as the native forest industry has been cut back over the past 30 years.

Unfortunately, the heads of emergency service empires don't appear to be concerned, as they pressure state and federal governments for more large air tankers and other aerial assets. These are not an effective replacement for on-ground equipment.

On 4 January 2020, a southerly change pushed uncontrolled fire fronts out of Victoria into NSW. A fire burning in the Coopracambra National Park in Victoria crossed into NSW and burnt through private property and the South East Forest National Park. The photo below shows the thinned and fuel reduced private native forest.



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Despite the high intensity fire being favoured by a 12-15 degree uphill slope, once the fire entered the fuel reduced area, intensity dropped and despite the coppice regeneration on the stumps being scorched, most tree crowns in the upper canopy remained green.



35 year Old Regrowth Subject to a Post Thinning Low Intensity Fuel Reduction Burn May 2017



Thinned and Fuel Reduced Regrowth Forest in the Path of a High Intensity Bushfire. Photo taken Six Weeks After the 4 January 2020 Bushfire



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Nearby South East Forest National Park Mature and Regrowth Forest. This Forest Burnt at the Same Time the Forests in the Photos Above. Over 30 Years of Fuel Accumulation Resulted in a High Intensity Fire and Full Crown Scorch.

Conclusion

In southern Australia, whether native forests are subject to harvesting or left untouched, if appropriate landscape scale forest fuel management is not undertaken, high intensity bushfires at a mega scale can occur in any summer, particularly when there are two or more years of below average rainfall. Any climate change effects are a reason to do more mitigation by fuel reduction.

The increase in fuel loads across the forest landscape over the past 15 to 20 years has been one of the key factors unpinning the extent of the 2019-20 bush fires. The loss of emergency fire managers and co-ordinators skilled in the art of direct attack and tactical and strategic backburning between blow-up days, has been another factor in the scale of the 2019-20 fire season.

There are a number examples across eastern NSW, from the Queensland to the Victorian borders, where fires started in remote areas and have heavily impacted farms, rural communities and the fringes of regional centres and cities. These fires have had a massive impact on biodiversity across more than 4 million hectares of NSW native forests.



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CSIRO scientists estimated that the 2002/03 fires in southern NSW and north eastern Victoria burnt 2.4 million hectares and killed 370,000,000 (370million) birds, mammal and reptiles. The faunal death toll across Australia in 2019-20 has been estimated at 3 billion (3,000,000,000 -WWF). This casualty rate is unsustainable, even for some more common species, let alone the growing list of threated flora and fauna species.

The current arguments put forward by fire research academics that fuel reduction burning should be concentrated adjacent to human assets give no thought to mitigating the bushfire risk on the state's biodiversity assets. Consequently, it is these assets, protected by legislation, but in reality undefended from mega bushfires, that pay the ultimate price for neglect of bushfire mitigation.

While estimates have been published on the potential faunal death toll, no information is available to quantify the loss of hollow bearing trees across all land tenures. This loss will have a century long impact on hollow dependant species.

Under the Coastal IFOA and prior instruments, the NSW Environment Protection Authority (EPA) has sanctioned landowners or forest workers for felling one or two trees containing hollows of negligible ecological value.

Despite potentially hundreds of thousands of hollowing bearing trees being burnt to the ground in the 2019-20 fires, no government land managers or regulators have raised public concern of this ecological loss in the parks and reserves system. Given the importance of hollow bearing trees for threatened and other hollow dependent species, the loss of this critical resource must be quantified and programs to mitigate bushfire risk put in place.

While numerous academics and journalists run an ongoing campaign against the ongoing highly regulated harvesting of a fraction of the native forest estate, catastrophic unregulated threats go without comment or research effort.



One of an Unquantified Number of Large Hollow Bearing Trees Burnt to the Ground in 2019-20

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South East Timber Association Secretary



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