

**SUBMISSION TO THE VICTORIAN REGIONAL FOREST AGREEMENTS
MAJOR EVENT REVIEW FOLLOWING THE 2019-20 BUSHFIRES.**



Submission by

THE INSTITUTE OF FORESTERS OF AUSTRALIA [ABN: 48 083 197 586]

and

AUSTRALIAN FOREST GROWERS [ABN: 39 000 649 904]



GPO Box 1272, Melbourne, VIC 3001

Website: www.forestry.org.au

Telephone: (03) 9695 8940

Email: admin@forestry.org.au



Summary

The Institute of Foresters of Australia and Australian Forest Growers (IFA/AFG) is an independent professional association of forest scientists, managers and growers who work in native forests, plantations and provision of environmental services. IFA/AFG members have extensive experience in forest and fire management through roles as land managers, employees of emergency service agencies, and as volunteer fire fighters. The IFA/AFG is committed to the principles of sustainable forest management and applying these principles to generate environmental, economic and social outcomes in all types of forests. This submission is based on contributions from members who are highly experienced foresters and forest scientists from the public and private sectors who have worked for many years in forest and fire management and research.

We welcome the opportunity to contribute to this Review. The IFA/AFG supports the concept of RFAs as durable, long-term, strategic agreements between the Australian and state governments to support sustainable forest management and provide for protection of Matters of National Environmental Significance (MNES) under the federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

However, the RFAs and the National Forest Policy Statement only remain useful if they truly reflect a *shared* vision for forests, the evolving environmental, social and economic situation and emerging scientific knowledge. Currently, we lack a cohesive shared vision for forest management, with ongoing politicisation and polarisation over forest management that is resulting in bureaucratic paralysis and sub-optimal outcomes for forests and for society (Jackson et al, 2021).

The bushfires of the summer of 2019-20 were unprecedented in their scale and impact on forests, wildlife and people. Fires impacted all types of forests: protected areas, multiple use public forests, private native forests and plantations. The extent and severity of these fires are a wake-up call for policy makers, land and fire management agencies and the public. In a future where weather and climatic conditions for these types of fires will become more frequent, we cannot continue to manage our forest landscapes in the compartmentalised way we have over the last 30 years. We need a new vision for forests, based on a holistic world view that incorporates land management principles and knowledge of Traditional Owners and embraces the diversity of needs and interests in Victoria's forests.

This vision should be built upon genuine partnerships empower the wider use of fire and other silvicultural tools to protect and care for country based on combined experience and knowledge of forest managers, forest scientists and Traditional Owners. The current management approach - to partition forests into relatively small, intensively managed areas for timber and a largely passive, hands-off 'protection' strategy to the rest - is not consistent with the holistic world view of Traditional Owners *and is not working*. Withdrawal of resources and management capacity from most of our native forests is resulting in forests with reduced resilience, declining condition and large areas facing complete changes in species composition. Compounding these matters is a lack of monitoring, which means we have little information on the overall health of our forests, or the status of species that depend on them. The current philosophy and management approach is also resulting in forests in which wildfires are more difficult to suppress, with subsequent devastating impacts on forests, species, people and assets.

The recently modernised Victorian RFAs specify the need for ongoing active management of forests. It is time to give serious intent to that objective, to design a *new silviculture* for Victorian native

forests and invest in implementing this to create forests that are more diverse, more resilient and with greater long-term capacity to provide the cultural, environmental and economic values Victorian expect from our forests.

The term ‘silviculture’ may invoke images of traditional timber harvesting and forest exploitation. However, this is not the case. Silviculture is the toolkit of forestry - *the science and craft of creating, managing, conserving, using and caring for forests*. Using silviculture gives people the capacity to appropriately manage forests to meet ecological, social and economic needs. Silviculture can work to restore and enhance forest values, health and resilience in the face of climate change¹.

To implement these practices, local people who live near forests and depend on them for their livelihoods, need to be given greater say and involvement in how they are managed. As Australia’s Traditional Owners say: ‘country needs people’. More people working on country year-round, actively managing forests across all tenures to regularly monitor forest conditions, provide greater flexibility and capacity to use fire when conditions are suitable, and be in place to suppress potentially dangerous fires at an early stage.

We have a narrow time window to implement better forest management. Rapid regrowth of trees and shrubs following the Black Summer fires means that within 10 years it will be very difficult to implement cultural burning and other forms of management. These large areas of even-aged regrowth will be more vulnerable to future fire events, which may lead to a vicious cycle of large and severe fires and decreasing forest resilience.

To achieve more and better active management, the Australian Government needs to change from being a passive observer to being an active and informed partner and investor in forest and bushfire management. National leadership is required to ensure we have the capacity and resources to prepare effectively for an increasingly flammable future. Current Federal funding in land management and conservation programs is ad-hoc, short-term, poorly integrated and poorly targeted. An integrated, long-term ‘whole-of-country’ approach to investment by both levels of government is required to ensure our forests, and the communities that depend on them, are resilient to key threats of climate change, increasing drought, wildfires, weeds, feral animals and disease.

Recommendations

- The Federal and Victorian Government develop a new joint funding program to provide resources and capacity for ongoing, **active forest management** across all land tenures (public, private and conservation)
- Forest and Fire Management Victoria move from a reactive seasonal ‘fire-fighting’ focus to **employ more people year-round** to use fire and other tools to manage forests for fire mitigation and resilience
- The Federal and Victorian Government jointly fund **Traditional Owner groups to develop and apply locally appropriate approaches** to land and fire management, to heal cultural knowledge and expand the Working for Country program to support Indigenous-led Ranger Programs in Victoria.

¹ Professor Patrick Baker of The University of Melbourne recently presented an excellent summary of some the benefits of silviculture to the Royal Society of Victoria, in his talk “Changing forests in a changing climate – What might the future hold?”. Viewable at: https://www.youtube.com/watch?v=gRVJWXt_Vo&t=32s (accessed 27/08/2021)

- The Victorian Government **review and remove legal and administrative barriers** restricting access to land and implementation of cultural fire and land management practices.
- The Victorian Government **develop clear policies and strategies to manage fire-sensitive forest communities**, in particular immature ash forest at risk of conversion to other forest types. This requires processes to accurately determine the extent of impacted by high intensity wildfire and ongoing technical knowledge, management capacity and seed stocks needed to enable their rapid recovery.
- The Victorian Government invest in more locally driven research to **evaluate alternative silvicultural approaches**, including forest thinning, mechanical fuel treatments, mosaic burning, accelerated habitat and other forest restoration techniques at a landscape scale.
- The Victorian Government carefully consider the **consequences of further expanding conservation reserves** without accompanying financial resources and capacity for active forest, fire and fuel management.
- The Review Panel recommend support for **genuine, open dialogue** involving Traditional Owners, community members, government, NGO's and researchers on the best way forward to restore forest health and improve resilience to future fires.
- The Victorian Government commit to **far stronger, structured formal involvement** of local communities in management of their nearby forest with measurable accountable improvements in management.



1. Background

Regional Forest Agreements (RFAs) are long-term agreements for meeting the respective responsibilities of Federal and state governments in forest management. They were developed to guide the multiple use of Australia's forests, seeking to balance economic, social and environmental values by setting obligations and commitments for forest management that deliver:

- ecologically sustainable forest management
- a permanent forest conservation estate to provide for the protection of Australia's unique forest biodiversity, and
- certainty of resource access and supply to industry.

The RFAs were intended to provide a framework for actively managing public forests at a landscape level. 5 year-yearly reviews have not completed on time, and the last independent review on the report on progress of the Victorian RFAs² highlighted that many stakeholders and community members had lost faith in them. This faith was further eroded with the Victorian Government policy announcement to exit native forest harvesting by 2030, which occurred before the RFA modernisation consultation process was completed. The current Major Event Review of the five Victorian RFAs, triggered by the 2019/20 bushfires, will be a first test in establishing and building trust in 'modernised' RFAs.

² *Independent Review of the Report on Progress with Implementation of the Victorian Regional Forest Agreements (RFAs): Period 3 – 2009-2014*. Viewable at: <https://www.agriculture.gov.au/sites/default/files/sitecollectiondocuments/forestry/rfa/vic-rfa-period3.pdf> (accessed 18/08/2021)

2. Extent and severity of the 2019/20 bushfires within RFA regions

The sheer scale of the 2019/20 bushfires poses enormous challenges to public land managers, especially in terms of future forest composition and structure, and the resources, both physical and financial, needed to actively manage these forests for multiple values as they regenerate.

Australian forests have evolved and adapted with the occurrence of fire, and the ability of a forest to regenerate is complex. However, the scale, frequency and impact of forest fires in Victoria has increased dramatically since European arrival and the disruption of traditional practices used by Traditional Owners³. This trend has notably accelerated over the past 20 years, with eight landscape-scale (>100,000 ha) fires in Victoria, three of which were over 1 million hectares (**Figure 1**). Factors contributing to this trend include declining rainfall (particularly the millennium drought) and increasing temperatures associated with climate change and changed forest management regimes, with reduced levels of prescribed burning from 1986 to 2000 (Morgan et al 2020), particularly so in the RFA regions most impacted by the 2019/20 fire season (East Gippsland, North East and Gippsland RFAs; **Figure 2**). An expanding rural-urban interface that is increasingly exposed to bushfires, and the increased complexity and politicisation of land management, pose further challenges to effective, active and adaptive management to mitigate such fires.

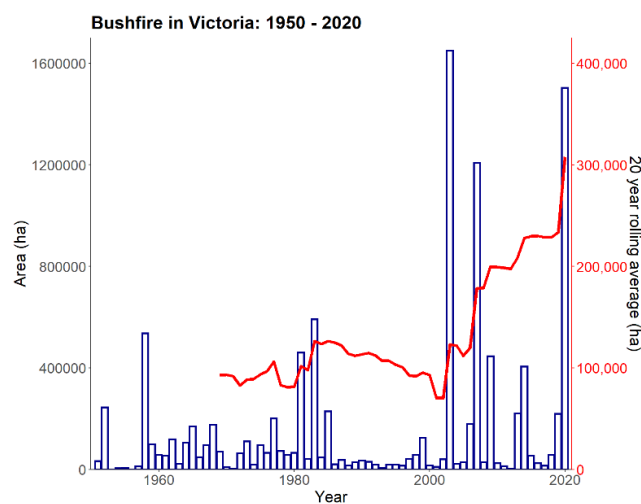


Figure 1. Extent of bushfire in Victoria between 1950 and 2020. The red line indicates the rolling 20-year average of bushfire in the landscape, which in 2020 is three times higher than the rolling average between 1970 - 2000.

³ Summarised by A/Prof Michael Shawn-Fletcher in the 2020 Narrm Oration. Viewable at: <https://www.youtube.com/watch?v=sK7gGVhss7w&t=3s> (accessed 02/08/2021)

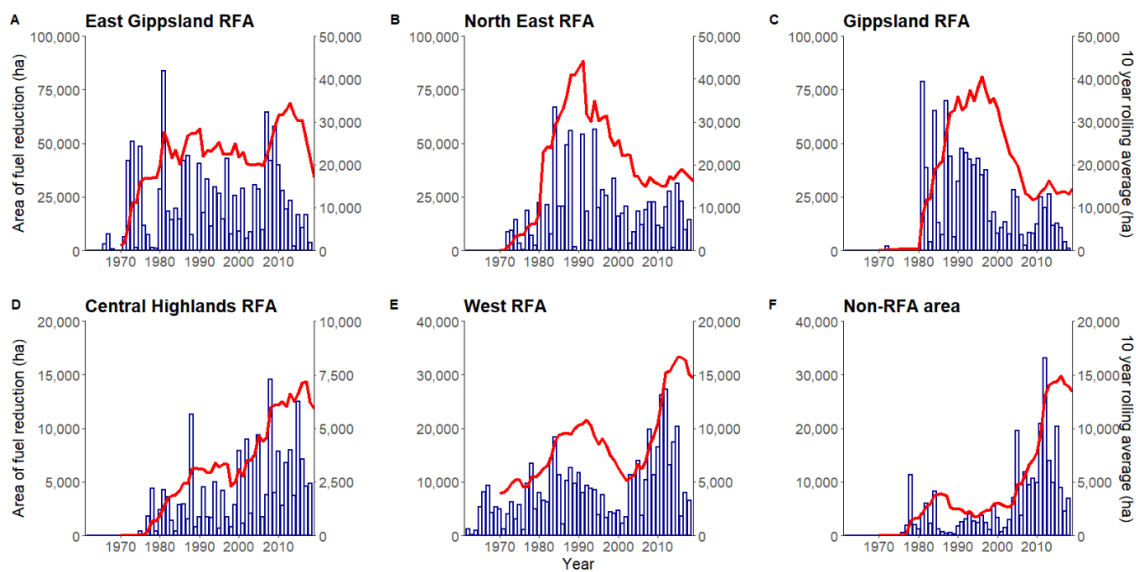


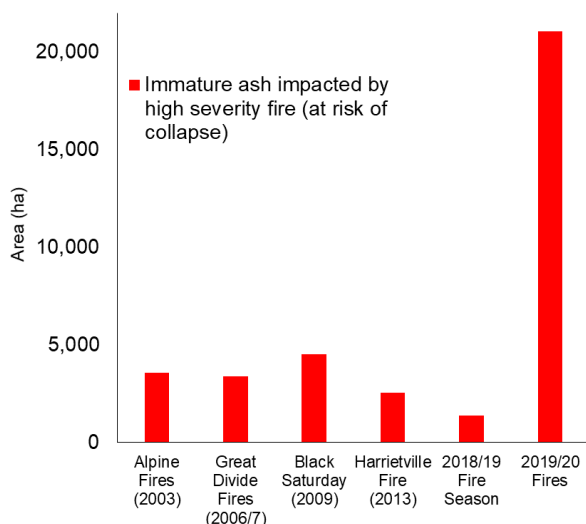
Figure 2. Patterns of fuel reduction burning across Victoria's RFA regions, 1960 - 2020. The three RFA regions impacted by the 2019/20 season are the top row, ie East Gippsland, North East and Gippsland RFA. The red-line indicates the 10 year rolling average of extent fuel reduction burning in each RFA.

The IFA/AFG is concerned at the growing incidence of large and damaging bushfires in Australia. These are having severe detrimental impacts on forested water catchments, commercial tree plantations, productive regrowth forests, biodiversity values and a wide range of forest amenity values important to the community. In particular, the IFA/AFG is especially concerned about the extent of impact on immature ash forests of the 2019/20 fires and the declining capacity in the Victorian Government to restore and manage these forest types. The Major Event Review Summary Report representation of the actual extent of immature ash forest impacted by high severity fire is inaccurate. The summary report underestimates the total extent of immature ash impacted by high severity fire by roughly half – with the actual figure being over 21,000 ha, 11,500 ha of which was sown (see Case Study Box 1).

Minimising the impact of catastrophic wildfire is paramount to maintaining the current diversity and structure of our forests. This can be achieved more cost effectively using active management because such management delivers better access, maintains a skilled and experience workforce with equipment generally on-site or nearby to initiate an effective first response to minimise the area and intensity of the fire.

Box 1. Case Study: Alpine Ash forests, severe wildfire and a policy vacuum

Ash forests are some of the most iconic and highly valued forest types in Victoria and have been impacted by the severe fire seasons in Victoria. Ash forests are typically killed by high severity fire and regenerate from seed; this regrowing forest does not produce seed for 15 – 20 years meaning the forest type is vulnerable when immature to recurrent fire.



Over the last 20 years, the size and severity of bushfires has meant that there is an extensive area of immature ash forests regrowing across the landscape. Following most of the large fires in the last 20 years, immature ash has been impacted and has required intervention in the form of resowing or replanting to ensure the persistence of these forests. However, the scale of this issue in 2019/20 was unprecedented, and over four times larger (Figure 3).

Figure 3. Extent of immature ash forest impacted by high severity fire in previous fire seasons compared to the extent impacted in 2019/20.

Extent for 2003, 2007, 2009, 2013 and 2018 sourced from publicly available, peer reviewed and consultant information.

The IFA/AFG acknowledges the excellent work by Department of Environment, Land, Water and Planning (DELWP) and VicForests in resowing of 11,500 ha of immature ash forest following the 2019/20 fires. This was the largest such sowing event undertaken in Victoria’s history, and a world leading forest restoration effort⁴. However, it is of serious concern that over 10,000 ha of ash forest is not likely to recover following the fires (Forest Solutions 2021). Such a significant conversion of forest to either non-forest shrubland, or to forest dominated by non-ash species, represents a significant impact on the public land estate, on habitats and ecosystem services provided by these forests. It is not clear how these areas will be managed in future. More broadly, the Victorian Government’s position on managing ash forests is unclear, given that it is very likely significant areas of immature ash, both in State Forests and National Parks, will continue to be impacted in recurrent fire events. This needs a clear strategy with capacity and resources available to implement it. The Government needs to ensure that systems, processes and capacity are in place to maintain adequate seed stocks to deal with events such as the 2019/20 fires. This has long been advocated by Victorian foresters (Ferguson, 2011) and should be a recommendation of the Major Event Review panel. This strategy needs to indicate how ash will be managed in the face of increasing fire frequency and intensity; conditions when forests will be restored and when they will not and the decision making behind this; and approaches to optimise forest diversity and age structure and minimise the impacts of severe fire prior to the fire. Without a plan or vision for these forests, we risk losing them bit by bit.

⁴ Summarised in a short video by DELWP, “Reseeding Giants – reseeded the Ash forests”. Viewable at: https://www.youtube.com/watch?v=BEfCE22q8aU&list=PLeKjYbOq6-l4JPqRndVh_Qaz4LQSwFsxh (accessed 30/08/2021)

3. Impacts of the 2019/20 bushfires on the comprehensive, adequate and representative (CAR) reserve system

The 2019/20 bushfires severely impacted many forest species and their habitats. While extensive forest areas suffered severe impacts, the fires were not uniform. No single severity class accounted for >40% of the area burnt in a vegetation community and 14.8% of the area burnt with high severity (Collins et al 2021). Given this variability and the fact many of the vegetation types and wildlife species are fire-adapted, these fires may not actually represent as significant an impact on conservation values as suggested by their massive extent and as reflected in the significant community and scientific concern generated in the wake of the fires (See Ruchel et al, 2020). Data is not available to fully understand these fire impacts. More investment in data collection and monitoring is needed. The value of this cannot be overstated. For example, the recent re-assessment, using the Common Assessment Method, of over 2000 species under the Flora and Fauna Guarantee Act 1988 has resulted in 1597 species (78% of species assessed) increasing in threatened status from their previous listing on DELWP Advisory Lists. Many of these assessments cited the perceived, estimated or predicted impacts of the 2019/20 bushfires as a major cause of increased extinction risk. Many of these assessments call for increases in habitat protection. Due to the lack of monitoring data and short timeframe post-fire within which these species were assessed, the assessments were largely based on expert elicitation. Forest dependent plant and animal species in Australia are highly dynamic and have the capacity to respond to disturbances. To effectively secure the future of these species, better understanding is needed of the impacts on populations and habitats **and** their recovery potential and the role of active forest management in supporting recovery.

We can learn from previous bushfires in Victoria to understand the recovery capacity of species in areas affected by high-intensity fires. The Leadbeater's Possum is an indicative case study. The 2009 Black Saturday fires impacted Leadbeater's Possum habitat. It was hypothesised that the area burned in 2009 would not be suitable habitat for the possum due to the structure of the forest at the time of the fire (Blair, 2017). However, as of 2021, there have been approximately 260 detections of Leadbeater's Possum in forest under 20 years of age; 80 of these in forest regenerating from 2009 (Figure 4).

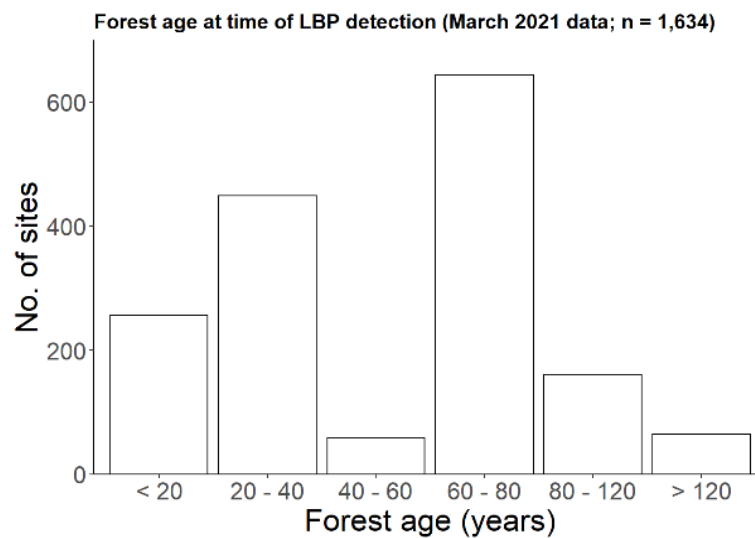


Figure 4 Analysis of Leadbeater's Possum sites against forest age at time of detection. Most detections occur in 60-80 year-old forests, which includes 1939 regrowth. The low number of detections in 40 – 60 year old forest may reflect the limited extent of this age class in the Central Highlands. Data sourced from publicly available Victorian Government data and forest age information, where available.

Insights such as these are only possible with a medium and longer-term monitoring of habitat and forest condition and animal populations **across the forest estate** rather than at particular long-term locations. The IFA/AFG therefore argues strongly for improved and expanded monitoring that provides data for forest managers and the community to understand impacts of bushfires on habitats and species. More widely based, systematic collection of field-based data and local monitoring, in combination with modelling and mapping, can provide insights into the capacity of the CAR reserve system to provide for protection of rare, threatened or endangered species.

In assessing the continuing adequacy and performance of the CAR reserve system, the role of fire-affected forests in providing a continuum of biodiversity and habitat benefits needs to be considered. Fire does not necessarily lower the conservation or biodiversity value of a given patch of forest. A burnt forest is still a forest – it has inherent capacity to recover, and fire may favour some species, stimulating plant germination and providing improved forage or hunting capacity for birds and mammals. The resilience and dynamics of forests and forest-dependent species needs to be considered in any assessment and monitoring of the likely long-term impacts of these fires on conservation values. Many elements will quickly return to the forest. Being burnt, therefore is not automatic justification to increase the reserve system to compensate for perceived 'losses' of habitat. In fact, some forest elements and communities will benefit from the 2020 bushfire, and these also need to be identified. For example, whilst fire causes significant loss of hollow-bearing tree resource across the landscape, it also acts to accelerate the creation of new hollows in damaged trees (Adkins, 2006).

Expanding the CAR reserve system also provides no guarantees for improving biodiversity outcomes when they are subject to other pressures such as climate change. For example, the only reported local extinctions of the Greater Glider in NSW have occurred in National Parks (Lindenmayer et al. 2018; Maloney, 2007; Smith & Smith, 2020) and climate change is driving a contraction of suitable habitat for this species in Victoria (Wagner et al. 2020).

Restricting active management in special protection zone or formal reserves may limit capacity to restore and enhance forest habitats. Increasing conservation reserves in response to the fires may give the appearance of improving conservation outcomes but may limit capacity to maintain forest health and biodiversity. A more nuanced approach is required to assess fire impacts on conservation status. The IFA/AFG recommends an adaptive management approach, using designed experiments at the landscape scale with different types of active management practices in forests and monitoring the outcomes to assess the effects of these practices on species and values of interest.

4. Impacts on forest industries

The bushfires, the Federal Government's Homebuilder scheme and the Covid-19 pandemic have seen a severe supply shortage of timber across Australia and internationally - in 2021 domestic supply of softwood and hardwood timber in Australia was severely constrained and demand is not being met⁵. The 2019/20 fires, led to large scale losses of plantation resources as well as native forests; and this loss of plantation timber and fibre will exacerbate Australia's timber shortage into the future.

The Victorian Government's Forestry Plan to stop harvesting in native forests from 2030 and concentrate timber production in a small area of plantations carries very high risks for future wood supply under a changing climate. As we saw in the 2019/20, forest plantations are very vulnerable to fires. 129,000 ha of plantations burnt across South-eastern Australia, 7 percent of the national total. In NSW, for example, 25 percent of Forestry Corporation of NSW plantation estate was lost (representing 25% of the companies' revenue) and there are now stranded softwood plantation assets without a market in Grafton, after the only softwood sawmill burnt down⁶. Protecting such assets into the future will require active management of surrounding native forests for fire mitigation and investment in pest, weed and disease management

Australia already has a heavy reliance on imports of both softwood and hardwood sawn timber to meet domestic demand, leaving Australia vulnerable to the uncertainty of international trade (prices, availability, foreign exchange etc) and unintentionally contributing to unsustainable damage of forests overseas. Domestic demand is predicted to continue to grow and, as such, an increasing domestic supply will be required, or else we will need to increase our imports, with their concomitant risks. However, the realistic potential for significant growth and new establishment of plantation assets in Australia is minimal under current policy settings and economic conditions (Whittle, 2019), notably due to challenges of procuring large areas of suitable, arable land; challenges of meeting investor return requirements from greenfield plantations, and; the long rotation periods (indicatively 30-50+ years) required to grow plantations that can replace native forest timbers⁷.

⁵ <https://www.abc.net.au/news/2021-07-02/timber-industry-cant-keep-up-with-housing-boom/100261344> (accessed 27/08/2021)

⁶ Information on the Forestry Corporation of NSW website: <https://www.forestrycorporation.com.au/operations/fire-management/fire-impact-of-2019-20> (accessed 27/09/2021)

⁷ ABARES Outlook 2021 conference proceedings relating to "Growing the plantation estate". Available at: <https://www.agriculture.gov.au/abares/outlook/program/2021-growing-plantation-estate> (accessed 27/08/2021)

Additionally, the impacts of the 2019/20 bushfires on native forest timber resources will take time to determine. Forest timber resource modelling is a complex process (Baker et al 2016). Available and suitable forest is determined after accounting for broader conservation needs, water catchments, recreation and other values, accessibility and suitability in terms of species and wood qualities. Within this area, planners need to consider the volume of wood each area is expected to provide at the time of harvest based on forest productivity and timber yield, market requirements, wildlife habitat requirements, fire and other disturbance events and recreation and aesthetic values. Typically, these constraints can reduce the estimated wood volume from the strategic wood supply model by 20-30% (Baker et al 2016). After bushfire, a fire scaling factor reduces volumes based on forest type to reflect loss from fire damage and mortality based on fire severity and dominant species. Once the available area and volume are determined, sustainable timber supply estimates are based on modelled scenarios, commercial commitments and realities, and logistical considerations (Baker et al 2016). This is further complicated by the timber allocation process in Victoria, which sets out the areas available to the government operator, VicForests, limiting flexibility to redistribute harvesting in response to major events. VicForests has supply contracts for sawlog and pulpwood based on these estimates.

The impact of fires on timber resources available to industry requires consideration of these factors. 1.44 million hectares of forest was burnt in 2019/20 in Victoria (61% in multiple-use public forests and 34% in conservation reserves). East Gippsland forests were most affected (70% of the fire-affected area), with lesser impacts on Gippsland and the North East regions. Of the forests potentially available for wood production and impacted by fire (0.65 million hectares in total), most (94%) were mixed-species forests. Past assessments (Australian and Victorian Governments 2019) indicate that about 60% of the total mixed species area in East Gippsland was considered suitable for wood production, without taking into account regulatory requirements and species-specific protections.

3,000 to 4,400 ha of forest has been harvested each year in Victoria since 2010-11 (Australian and Victorian Governments 2019) using a range of silvicultural systems. The proportion harvested in East Gippsland has declined, from 47% to 20% , and 724 ha was harvested in 2016-17. At this rate of harvesting, 7,000 – 8,000 ha is required to maintain wood supply to mills in that region until 2030. This is a relatively small proportion of the total area suitable for harvesting.

While the timber industry could potentially be maintained at this level in perpetuity despite this large fire event, a new approach to timber utilisation that is sensitive to the impacts of the 2019/20 bushfires and based on new silvicultural models that integrate with forest restoration at the landscape scale is required (Box 2).

Such a move could yield some hardwood timber for local communities and create forests with improved structural diversity, improved habitat for biodiversity, restoring species mixes and multiple ages where appropriate. This would create forests in which it is easier to implement practices such as cultural burning, and create forest structures with higher resilience to future wildfires and provide more equitable resource access to other forest users, such as the apiary industry.

Under current policies, large-scale native forest timber harvesting on public land in Victoria is to cease in 2030. Beyond this time, the Government should consider more creative options for timber sourcing from biodiverse plantings, native forests on private land and new silviculture on public land that is more dispersed, available now, and lower risk. There are also opportunities to appropriately salvage timber after storm events, road building and strategic fire breaks programs that can assist

Victoria to assist in alleviating current timber shortages and to meet our own domestic demand for timber to minimise our reliance on imports.

Box 2: The need for active management and a new silviculture for Victorian native forests

Active forest management is a key ‘tool’ that can be used to help the ecological recovery of forests, while also managing them to ensure they continue to provide the services that the public expects from them. For example, management of fuel is an important component of active forest management, whether through prescribed fire or mechanical treatments. Where appropriate, these measures can be employed in sections of the native forest estate which have burned severely and are likely to regenerate with dense regrowth and increase fuel hazard in the short and medium term – as has been observed to have occurred after high severity fire elsewhere (Gordon et al, 2016).

Active forest management can improve forest health and resilience, support local industries, and makes the forest safer. As a result of frequent short-interval intense fires over the last two decades, ineffective fuel management, and a history of industrial-scale timber utilisation, both State Forests and National Parks have disproportionate components of the following:

1. *Dense Ash regrowth that is at risk from future fires and/or loss of forest health, as discussed in Case Study Box 1.*
2. *Ash forest at the point of population collapse due to repeated fires.*
3. *Mixed species forests with limited structural diversity*

Mixed species forests usually develop complex multiple-aged structures but are regrowing as single-age regrowth with limited structural diversity due to frequent high intensity fires (Fairman *et al.* 2019) and, since the 1980’s until recently, use of even-aged silviculture⁸. Compounding damage can be inflicted by repeated burning on fire-tolerant regrowth stems, leading to impacts on forest health (Fairman *et al.* 2019).

A new approach is required to achieve forest restoration at the landscape scale. This should include prescribed fire, cultural burning and other silviculture like thinning and gap creation (patch cutting) to bring back structural diversity, encourage biodiversity, return age and species mixes, and habitat. These structural changes are critical to increasing the forests’ resilience to fires by reducing fuels and modifying tree density and encouraging more large trees across the landscape.

⁸ <https://www.vicforests.com.au/what-is-certification/http-www-vicforests-com-au-what-is-certification-fsc-standard-fsc-2020-vicforest/fsc-2020-vicforests-controlled-wood-roadmap> (accessed 27/08/2021)

5. Social and other economic impacts

The East Gippsland community has suffered through repeated dangerous and damaging major fire events from the 2003 Alpine fire, 2006/7 Great Divide fire, Mt Ray 2014, Orbost 2014 and 2020 Black Summer fires. There have been deaths, many homes lost, farms burnt out and all forms of infrastructure damaged. While the community has proven repeatedly to be resilient, the events have shaken community confidence to live and invest in East Gippsland. There are significant mental health problems from these repeated events, which are now compounded by COVID-19 restrictions and lockdowns.

The community know that unless there is significant improvement in the management of forests, fires will happen again and again. There must be active, grounded, pragmatic, adaptive, local and regional management based on agreed long term plans that will better protect the community and the forest. Clearly the community needs and deserves a change to the current approach.

Forests impacted by the 2019/20 fires provide important resources for local communities and industries. These community and industry members also have strong commitment to the protection, health and productivity of the forests. The importance of forest industries to the health and diversity of forests is often poorly understood and underestimated. Forest managers and timber industry employees were important players in fire response, protecting lives, housing and infrastructure and have used their expertise to assist forest recovery after fires.

The Inspector-General for Emergency Management in the Victorian Government Inquiry into the 2019/20 bushfires (Pearce 2020), noted submissions from interest groups and community members indicating concerns over the relationship between timber harvesting and bushfire risk, but also the potential for harvesting and the presence of personnel to reduce aspects of fire risk. It was observed that:

'The timber industry provides an important support capacity to fire management in Victorian forests with a skill set, knowledge base and operational experience in forest landscapes. The cessation of native forest harvesting by 2030 poses challenges for the fuel management program and bushfire response capacity across the state (Observation 4.3).'

The strongly centralised model of forest management where issues and sometimes everyday decisions are referred back to the centre is failing rural communities and proper management of the forest. There is a lack of local accountability and the basics of forest management like burns as promised and track maintenance just don't get done. Local communities at the forefront feel impotent as there is no solid consistent structure for their involvement let alone empowerment on what is happening (or more truly, not happening) around them. We are recommending that a formal structure is introduced around empowerment of the local communities to lead, inform and help drive actions and accountability in local forest management.

6. Cultural and heritage values

The Summary Paper gives little attention to cultural values. Many Indigenous and European cultural values were severely impacted by the Black Summer fires. The revised Victorian RFAs specifically acknowledge the cultural obligations and responsibilities of Traditional Owners under their cultural lore, including spiritual, mythological, religious and cultural practices and legal rights to partner in land, cultural heritage, and natural resource management on Country. Thirty percent of forests in

Victorian RFA regions is under some level of control by Traditional Owners, either jointly under formal agreements or in informal regimes on public and private land.

The RFAs commit the Victorian Government to empowering Traditional Owners in forest management on their country and implementing a Cultural Landscapes Strategy and Country Plans. Cultural fire is an important tool for Traditional Owner management. Many have called for the wider use of cultural fire following the last summer's devastating bushfires. The Traditional Owner cultural fire strategy and new partnerships between Traditional Owners and land management authorities are helping reintroduce cultural fire and support land management aspirations of Traditional Owners.

Revised RFAs also recognise Traditional Owner rights to generate economic, environmental, cultural and social benefits from the management and use of Country and to develop sustainable funding to meaningfully partner in forest management.

The IFA/AFG urges the review panel to advise governments to give effect to this recognition in the RFAs and actively support Traditional Owners across Victoria in exercising their cultural law, support the implementation of whole-of-country plans and support self-determination of economic development opportunities.

7. Relationship between fire and timber harvesting

In a commentary article in soon after the 2019/20 fires, Lindenmayer et al. (2020), contended that the bushfires were 'made worse' by logging and associated forest management and that 'logging of forests has had profound effects on these fires' severity and frequency'. No evidence from the 2019/20 bushfires was presented in the article.

A recent study assessed 32% (2.35 million ha) of the area burnt across three regions (two in NSW and one in eastern Victoria) (Bowman et al. 2021) and found that more than 44% of the native forest area burnt suffered severe canopy damage. By far the most dominant factors in determining high fire severity were broad spatial factors (mostly topographic), followed by fire weather (expressed as Forest Fire Danger Index), This ranking was broadly the same across the three study regions. Timber harvest in the last 25 years, in combination with, or separate from, recent burning, was ranked low in importance. This reflected the limited extent of recent timber harvesting with 4.5% of the area burnt in Victoria.

Results of another recent study (Lindenmayer et al 2021) supported this ordering of importance in factors driving fire severity but suggested a modest curvilinear trend in probability of fire severity stand age following disturbance. The science on this topic remains uncertain and more research is required to determine the nature of these relationships and opportunities to reduce fire severity using new silvicultural practices, as discussed below.

8. Impacts on ecosystem services

The level of expertise, scientific knowledge and technology that is applied to monitoring state forest resources managed for timber production in Victoria is leading edge and world class best practice. In contrast, the large areas of forest reserved within the National Park estate have had minimal subsequent monitoring or research to establish whether the objectives of reserving these ecosystems with respect to either biodiversity values or conservation of endangered species and ecosystems have been met. Even some of the most basic forest knowledge needed for effective management is missing from datasets that describe National Park ecosystems. For example, the

distribution of Ash-type forests is not accurately known in some Parks, impacting the effectiveness of any post-fire forest, habitat or species interventions, or other ecological performance monitoring that may be required.

Water quantity is expected in the longer term to fall between 8 to 12% for East Gippsland streams with higher falls in the smaller catchments and areas burnt at high intensity (SKM, 2009). This is on top of falls in flows already due to the hotter and drier climate over recent decades. For example, the Mitchell River flow has declined by at least 15% over historical flow records.

Water quality decreases significantly after fires and can become undrinkable even for stock as happened along the Buchan and Tambo rivers after the 2020 fires (SKM, 2008). The Tambo River ran black for many months after the 2020 fires and with log jams forming in the stream even after only a moderate storm event.

Water yield from burnt forests is expected to decline as forests recover and a dense regrowth utilises an increased proportion of ground water. Landscape level thinning as part of a wider forest restoration program will have benefits such as higher water yields from catchments (Bren *et al.* 2010; Hawthorne *et al.* 2013).

Invasive weeds and pest generally increase after fires although there may be an initial decline. For example, many deer die in these big fires then numbers quickly build feeding on the scrub growth. Weeds flourish on the bared soils.

9. Silviculture for habitat and ecosystem services

Improving outcomes for ecosystem services requires silviculture to improve structural diversity. For example, Thinning can be used to achieve multiple forest management objectives, including water yield, habitat development, plant conservation, drought stress, and reduced fire risk. Foresters in south-eastern Australia have extensive experience for developing and applying thinning systems for timber production (Fagg 2006; Bassett *et al.* 2013), and this experience can be used to develop thinning for ecological and fire management purposes. Some progress in Victoria has been made to develop ecological thinning systems to enhance biodiversity in private native forests (Bassett & Robinson 2010) and public native forests (Pigott *et al.* 2010; Crocker 2018). Thinning has been widely recognized as a key forest management action in adapting to a hotter, drier future (Keenan, 2015, 2017).

To achieve this, a *new style of silviculture* is required, integrating forest recovery at the landscape level with timber harvesting opportunities, designed to maintain higher levels of canopy retention, maintain biodiversity at the local-level, and allow various industries and values to coexist in a diminishing resource based on shared objectives. Development of this type of adaptive silviculture has already started in Victoria, resulting in improved biodiversity and social outcomes where they have been applied (VicForests 2019; VAA 2017).

This thinking is now well advanced in Europe and the USA (Stanturf & Mansourian 2020; Pommerening & Murphy 2004). The IFA/AFG therefore recommend further development of this new silviculture as part of active management promoted under the RFA, as a matter of urgency, with monitoring and review undertaken with the objective of routine application as soon as possible. A new economic imperative and model is required to enable this, with significant investment from government to realise restored forest environments.

However, current Victorian examples of thinning are small scale. A more significant landscape-level approach is required, especially in a time of changing climate. A combination of thinning and uneven-

aged silvicultural systems, such as gap creation in dense regrowth followed by selective planting and/or direct sowing of seed where required, has the potential to restore eucalypt species mixes, return a multi-aged structure, and develop a healthier forest ecosystem over time that enhances biodiversity outcomes.

These constructive silviculture works can also fashion forests that are more resilient to fire and easier to attack at an earlier stage following ignition, including a restoration silviculture approach that includes thinning (Keenan *et al.* 2021; Bales & Conklin 2020; Horner *et al.* 2010) and more prescribed burning. It is important to base burning activity partly on cultural burning approaches. A mix of both landscape-level thinning and prescribed burning can actively reduce forest fuel levels and increase resilience to fire sooner. There must be far more investment in fire management and mitigation on the landscape scale. Virtually all the fires that do damage originate in national parks or state forest. The State, as the manager of public forests, has the responsibility to work to minimise this impact.

Understanding what other countries like USA, Canada and some European nations are achieving in forest restoration gives valuable insight to what can also be achieved in Australia at the landscape level. For example in the USA, in response to similar global challenges such as mega-fires, climate change and a rapidly evolving set of native forest objectives, federal-state programs have been developed with shared objectives and targets and implemented at the landscape scale. This approach is required in Australia. In these programs, treatment projects are identified using a detailed planning framework that seek to identify restoration opportunities within the landscape, then plan, implement and monitor them. Across the USA, 23 specific projects are being implemented, representing restoration ambitions for 1.6 million ha of vulnerable forest. These forests are primarily on public lands managed by the Forest Service and many involve indigenous peoples (Stanturf & Mansourian 2020).

Forest restoration and recovery techniques used in the US are very diverse but include all the silvicultural approaches that could be tested here in Australia, such as widespread use of prescribed fire, all forms of thinning (uniform, from above, from below), varying species mixes and age-structural restoration using gap creation, planting and sowing seed. It is noteworthy that some projects include a component of timber removal and other biomass for local industries which helps fulfil sustainable development goals of supporting human livelihoods and sustainable industries.

Of particular interest is a large-scale restoration project undertaken in Canada's national parks and historic reserves known as the Conservation and Restoration (CoRe) programme, with at least half the restoration undertaken in collaboration with indigenousness communities or partners. The CoRe program recognises the role of restoration silviculture in Parks, helping to restore species at risk by improving habitat using active management. This approach seeks to restore natural fire regimes by reducing tree density using 'patch cutting' and a range of thinning techniques that mimic natural disturbances, and prescribed burning. These actions seek to restore overstorey tree species mixes where unnatural monocultures have dominated and improve structural diversity and forest resilience to climate change and related crisis events such as wildfire and native insect outbreaks (Stanturf & Mansourian 2020).

Similar restoration silviculture approaches are required in Victorian National Parks. Note, this is not a call to open up commercial timber harvesting in our Parks. Rather, it is a call to consider more creative ways of restoring health, resilience and ecosystem function into protected area forests that are currently suffering. Parks Victoria's policy has developed in recent years to at least undertake episodic post-fire forest recovery as practiced in State forests (Bassett *et al.* 2015) and has undertaken a tenure-blind joint project with Melbourne University to identify Ash forests at risk (PV 2019) – of which the spatial outcomes were applied by DELWP following the 2019/20 fires to help prioritise sowing areas and mitigate forest loss. However, as identified for State forests impacted by mega-fires, this is just the beginning and an active approach to managing forest structures and fire regimes throughout a forest's life span is required across the landscape, regardless of tenure.

This new approach requires extensive dialogue among all actors to decide on appropriate ways forward in a time of high uncertainty about future environmental conditions. After large-scale wildfires in the United States for example, new types of partnerships have formed (e.g., <https://restoringtherockies.org/about/>) to find common ground between parties with very diverse views on forests on the best ways to reduce wildfire risks, increase forest resilience and protect forest biodiversity and function in the face of climate change. Similarly, in southern Australia, the scale and impact of the mega-fires megafires of 2019/2020 have challenged status quo approaches to wildfire risk mitigation in the coming years.

Dialogue is needed between key government agencies, NGO's, independent forest restoration specialists and Australia's First Nations people on the best way forward. The IFA/AFG recommends that such dialogue include a thorough landscape-level assessment to identify opportunities for forest restoration using a range of active management tools presented in this paper.

10. Conclusion

The IFA/AFG believes there needs to be a significant improvement in forest management underpinned by a shared vision for forests that is inclusive of all tenures. This must include investment, long term planning, accountabilities, fire prevention on a landscape scale, stronger local and regional management and in genuine partnership with Traditional Owners.

The impacts of the 2019/20 bushfires present both a challenge and opportunity for how we manage forests covered by the RFAs. While the immediate challenges of managing fuel loads, timber shortages and forest recovery over such a vast area is pressing, the opportunity is to increase active forest management to promote healthy, resilient forests and communities into the future.

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