



Protecting our living legacies



VICTORIAN
NATIONAL PARKS
ASSOCIATION
Be part of nature

A guide to protecting large
old trees on public land

Protecting our living legacies: a guide to protecting large old trees on public land

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Cover image: A magnificent Mountain Ash (*Eucalyptus regnans*) in Toolangi Forest, Wurundjeri and Taungurung Country. Credit: Jordan Crook

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The Victorian National Parks Association is an effective and influential nature conservation organisation. We've led the creation, oversight and defence of Victoria's natural estate for over 70 years.

We work with local communities, government and scientists to advocate for evidence-based policy to safeguard wildlife, habitat and protected areas. We inspire connections with nature through citizen science, activities, action and education for all Victorians.

We are an independent, non-profit, non-government, and membership-based charity. We're an incorporated association with membership open to all like-minded people.

Our Vision: Victoria is a place with a diverse and healthy natural environment protected, respected and enjoyed by all.

This publication is dedicated to our dear friend and colleague,
Dr Michael Feller (1946-2024).

Michael enjoyed a long and successful career as a forest fire scientist and forest ecologist. He worked for many years in academia, both in Australia and Canada, where he had been a Professor Emeritus at the University of British Columbia.

Michael was an academic of the highest integrity and a scientist's scientist. Michael was also a generous teacher and mentor. He spent time explaining forest ecology to many, with patience and gentleness.

We thank Michael for his work, his wisdom and his knowledge.

VNPA acknowledges the many First Peoples of the area now known as Victoria, honours their continuing connection to, and caring for, Country, and supports Traditional Owner joint-management of parks and public land and waters for conservation of natural and cultural heritage. Our office is located on traditional land of the Wurundjeri people of the Kulin Nation. We offer our respect to Elders past, present and future.

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Messmate (*Eucalyptus obliqua*), Sweetwater Creek Nature Conservation Reserve, Neerim East, Gunaikurnai Country. Jordan Crook

Introduction

A tree may be significant for many reasons – tangible and intangible. Hollow-bearing trees may be habitat for wildlife, trees may be of significant size for their species, or a rare species in outlying populations beyond their natural range. Many trees hold cultural and spiritual importance for First Nations Peoples and communities.

Yet globally, large old trees are in decline.¹ This is being driven by poor management of existing large and old trees compounded by the failure of land managers to grow the next generation of significant trees.

The decline of large and old trees is happening across all land types and tenures; from the suburbs, to farms, state forests and national parks. The loss of large, old and hollow-bearing trees is recognised as a key threat to native forests and woodlands according to Victoria's primary threatened species law, the *Flora and Fauna Guarantee Act 1988* (FFG Act).

Not all Victorian large and old trees are protected. Under state regulations, large trees on public land must meet a very high benchmark to qualify for protection: 2.5m diameter at breast height (DBH, or 1.3m above ground level). This policy ignores the fact that size can be a poor indicator of the age and significance of

a tree. Many species will never grow to that size and growing conditions can produce stunted growth in older trees. Some of the biggest trees on mainland Australia were found in forests scheduled for logging (until 1 January 2024 when the industry was phased out). Until the State Government protects these areas in conservation land tenures, and legislates the end of native forest logging, the threat to these living giants remains.

Many of these trees are theoretically protected from being directly felled in operations, but adjacent logging can expose them to multiple threats, including deliberate removal after being designated 'hazardous', heavy machinery damage and isolation and vulnerability to wind-throw.

Hollow-bearing and significant trees have also been felled and damaged during prescribed burning operations and poorly planned or executed firebreak works.

If the Redwoods of California can bring tourism and economic development,² Victoria too can have this type of nature-based, sustainable tourism enhanced by appropriate track creations and visitor facilities.

Victoria has a decreasing number of impressive old trees spread across

the forest estate. Protecting these trees and installing appropriate visitor infrastructure would bring greater ecological and economic benefits than their destruction and that of the surrounding forests.³

These trees provide vital habitat for many Australian animals, are instrumental in tackling climate breakdown, as well as being living legacies that should be preserved and treasured by the community for many more years to come.

To do this, we must improve the care and management of these living monuments. The management options are well-documented and laid out in this document as well as in countless standards and scientific papers.

We can, and must, find better ways to care and manage large and old, hollow-bearing and significant trees across Victoria's public land estate.

How we care for and manage our large, old and next generation trees matters.

The actions we take today will decide if future Victorians get the chance to stand in the belly of a living giant like the 'Yea Link Survivor' (which can fit 40 people inside it), or watch Lace Monitors sun themselves in hollows of Wellsford Forest's Ironbark trees.





'Hackett Tree', Mountain Ash (*Eucalyptus regnans*), Gentle Annie, Wurundjeri and Bunurong Country. Jordan Crook

A log of claims

Current protections and lack of oversights for significant trees on public land in Victoria are deeply flawed and cannot guarantee their survival as important living legacies and critical habitat.

The following 'Log of Claims' outlines 21 principles that would assist in protecting significant trees across Victoria's public land estate. It aims to incorporate relevant thresholds and procedures from Australian Standards, arboricultural and scientific literature into a practical policy guide.

These claims should be incorporated into relevant policy, regulation and operating procedures and planning. These principles are relevant to the Code of Practice for Timber Production and its associated procedures across public and private land, planning and acknowledgement within the Joint Fuel Management Programs (JFMP), Code of Practice for Bushfire Management on Public Land (2012) and Strategic Bushfire Management Plans and Burn Plans, and any other policies leading to a decline of large old trees.

This document and its recommendations can be used as a relevant reference in the transition out of native forest logging, highlighting the importance of old and old trees for their ecological importance. It can help direct future land tenure changes to incorporate stands of old and significant trees into the protected areas estate and planning of future visitation ventures around these trees.

Native forest logging and logging-like operations

1. Legislate the ban on native forest logging across the whole state on public and private lands.
2. Protect all mapped and unmapped old growth forests across Victoria, as per the State Government's November 2019 old growth forest announcement.
3. Alter the methodology currently used to assess old-growth to one that properly determines old-growth and protects the old-growth estate.
4. Change the definition of large and old trees to incorporate differences in growth rates across all Forest Management Areas (FMAs) and forest types: use DBH values > 1.5 times the Department of Energy, Environment and Climate Action (DEECA) benchmark DBH for the EVC the tree is found in.
5. All large and old trees (DBH > 2m) must be protected with a 100m radius protection zone that is not to be entered by machinery operators.
6. Significant trees and all hollow-bearing trees with DBH smaller than 2m should be protected by an adequate buffer in accordance with the Australian Standards' Tree Protection Zone (TPZ) as a minimum.
7. Areas with high numbers of significant trees should be excluded entirely from logging and firewood operations. This would be defined as areas with three or more such trees per hectare.
8. Include all native forest logging including those on private land in 2024 end of native forest logging commitment.

continued opposite page...

Snow Gum (*Eucalyptus pauciflora*), Mount Cole/Bereep-bereep, Djab Wurrung Country. Jordan Crook

Fire including prescribed burning works

9. Significant trees should be mapped prior to fuel reduction works (including machinery use) and should be protected. This data should be added to a database to monitor them across the landscape.
10. Protection of significant trees (including dead trees) should be decided on science-based prescriptions. Fire and machinery use within buffers should not be permitted.
11. Comprehensive habitat assessments must be conducted by independent experts prior to burning and clearing operations. This will require funding.
12. In bushfire and fuel reduction situations, undertake protection of significant trees by wrapping them in fire retardant materials, as is the practice in the USA (see Appendix F),⁴ or use of sprinklers for areas of high significance as used to protect the Wollemi Pine population in New South Wales during the 2019-20 bushfires.⁵ This is already being done by DEECA in respect to culturally significant trees,⁶ and built infrastructure and must be expanded to large and old trees.
13. Exclusion zones around large and old trees in fire operations areas marked out by barriers or tape to exclude workers, thus reducing the risk without removing the tree. This can be based on measurement of tree height by estimation or electronic clinometer and height meter. Thus, if the tree does fail it will fall into the exclusion zone, where people should not access.
14. Risk-based removal of trees to be based on a quantified tree risk assessment method which applies established and accepted risk management principles to tree safety management, tree physiology, likely hazards and impacts.
15. Removal of significant trees should be reduced and machinery use within buffers must be avoided, except when necessary during times of wildfire.
16. Undertake an independent long-term monitoring project of the impact of fuel reduction works and bushfires on significant trees across all public land. This must run for a significant period of time, 10+ years.
17. Implementation of greater oversight and transparency of DEECA/Forest Fire Management Victoria (FFMV), planning and operations and their impact on threatened species, vegetation communities and critical habitat values such as large and old trees.
18. Give the Office of the Conservation Regulator (OCR) oversight of FFMV.

Management

19. Development – including tracks, infrastructure and strategic firebreaks – should map and protect all significant trees.
20. Pruning of all trees on public land should be limited and, when necessary, comply with AS 4373-2007 Pruning of Amenity Trees, including for seed collection works.

Landscape level

21. Build a GIS spatial layer to map significant trees and areas of significant trees across public land. This should be a living document that has data added and can be used to monitor significant trees across the landscape to be maintained by land managers. Third party records should be included, subject to appropriate verification.



Myrtle Beech (*Nothofagus cunninghamii*), Gentle Annie, Wurundjeri and Bunurong Country. Jordan Crook

What is a significant tree?

We define a 'significant tree' as any hollow-bearing tree, a tree of significant age, size, height or girth/diameter for their species, or a rare species in outlying populations beyond its natural range. This includes both exotic (but non-invasive) and indigenous species native to Victoria.

This document is for public land managers and anyone who wishes to advocate for the protection of significant trees on public land.

It addresses the growing concern among forest scientists, community groups, tree advocates and nature lovers over the loss of significant trees across the public estate. Each week, the Victorian National Parks Association (VNPA) receives numerous emails and phone calls from the public and VNPA members concerned about the loss of these significant trees through fire management works, native forest logging and poor land management decisions.

We hope to highlight the threats to such trees and define better ways to care for and manage them using

the latest scientific and arboricultural knowledge and standards. The proposed management actions will help care for trees and allow them to go through their natural cycles of decline, adaptation and recovery while supporting the wildlife that rely on them, so future generations of Victorians and visitors can experience these ancient living wonders.

The loss of large and old trees is recognised as a key risk to threatened species and communities in the scientific literature, recovery plans and action statements, and even under Victoria's FFG Act, but not enough is done to protect them in the landscape or create the conditions which will enable them to parent the next generation.

Poor on-ground management and a one-size-fits-all approach to regulatory protection along with hazardous tree assessments is leading to the loss of these trees and critical habitat across the landscape, even in protected areas such as national parks. Fuel reduction works substantially increase the probability of collapse of habitat trees. Ongoing land clearing and native forest logging is also

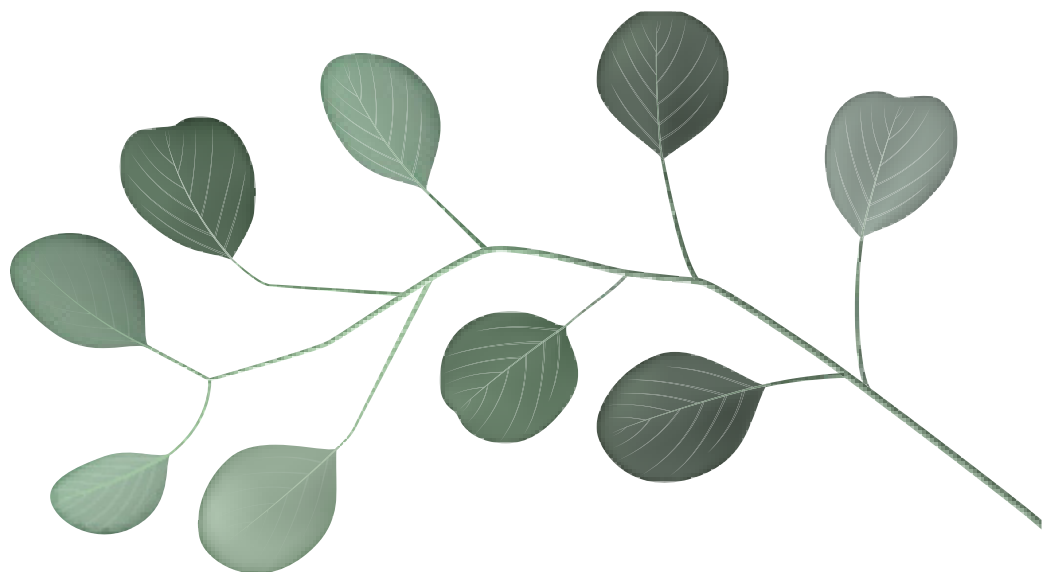
driving the loss of these significant trees. Yet, both on-ground management and legislation has not caught up with the crisis and are not working to reverse the decline.

Our goal is to spark a conversation about how we can better look after and better manage and care for our trees on public land, particularly those significant trees which are large, old, or contain tree-hollows and how we can increase their longevity.

Jordan Crook

*Park and Nature Protection Campaigner,
Victorian National Parks Association
Qualified Arborist*

This report does not seek to make comments or recommendations on the management of culturally significant trees to First Nations communities, such as scar trees, eel smoking or possum farming trees. These trees must be cared for and managed by First Nations people and land managers under specific cultural heritage legislation and protocols. The care and management of these trees should be led by First Nations communities.



Why care about large old trees?

Large old trees are a vital ecological component of urban, rural and forested landscapes in Australia and worldwide. They are an essential part of our human cultural heritage and identity.⁷

Without urgent action, the surviving old tree cohort will soon largely vanish from these landscapes, bringing catastrophic consequences for biodiversity and lessening ecological resilience in the face of climate change. The physical and spiritual quality of our lives will be immeasurably diminished as a consequence.

Keystone structures

'Large' and 'old' are relative terms because the typical size and age of such trees will vary according to the particular ecosystem, species and local conditions.⁸

What is important is the presence of the physical structures and more complex canopy characteristics that are produced via the confluence of increasing size and age. Advancing decay in large old trees produces many hollows and such trees also develop more complicated, spreading crown structures.⁹ It can take eucalypts from 120 to 220 years before cavities begin to develop.¹⁰

Large old trees not only create cavities and more complex canopy architecture, they may also feature dead limbs, shedding bark, fissures in bark, prominent buttressing and large volumes of woody debris, and supply these elements in relative abundance.^{11, 12}

These physical characteristics are essential to the survival of many organisms, with cavities in particular providing nesting and shelter habitat for reptiles, mammals and birds. Woody debris provides food and cover for many life forms including reptiles, arthropods, mammals, fungi and micro-organisms. Woody debris contributes to carbon storage and nutrient cycling.¹³

Large old trees produce their own microclimate, and increase plant species

richness, soil nutrients and structural complexity.¹⁴ Large old trees cannot be viewed as just bigger renditions of small trees and large young trees cannot replace the functions of large old trees.¹⁵

These unique physical elements, and their role in the survival of many species, has led to large old trees being described as keystone structures.¹⁶

Biodiversity

It follows, then, that the decline of the large old tree population will adversely affect a wide range of plant and animal species and may lead to local extinctions.¹⁷ This decline will have serious implications for biodiversity.¹⁸

Biodiversity is essential to the maintenance of healthy, robust ecosystems and, critically, it enables ecosystems to respond to environmental change.¹⁹

Landscape connectivity and genetic resources

At the landscape scale, scattered large old trees provide vital connectivity for fauna, and genetic connectivity for the trees themselves.

Biota responding to climate change by moving across landscapes may utilise scattered large old trees to do so.²⁰ And these trees may, in themselves, constitute a valuable genetic resource.²¹

Biological legacies – focal points for regeneration

Large old trees confer ecological resilience to the landscapes on which they grow.

Where they persist in fragmented and disturbed landscapes they can act as foci for regeneration and it is for this function that large old trees have been described as biological legacies.²²

In other words, individual trees may constitute focal points from which organisms spread out and from which

restored and more ecologically resilient landscapes can radiate.²³

Large old trees carry out this function of helping ecosystems reorganise and re-establish following disturbance by producing seed, attracting seed dispersers and by modifying the microclimate and soil nutrient status beneath their canopies.²⁴

Higher delivery of benefits and irreplaceability

Trees bestow a wide array of benefits, and, of course, not all are unique to the large old cohort. But, as trees gain size and age, there is an exponential increase in the quantity of the benefits they can deliver. So, relative to younger trees, the capacity of large old trees to provide these benefits is vast.²⁵

Some benefits provided in relatively immense volumes by large old trees in Victoria's Mountain Ash (*Eucalyptus regnans*) forests include flowering and seed production, capture and storage of carbon, biomass accumulation and catchment water yield.²⁶

In this context, the preservation of large old trees within tree populations is considered critically important,²⁷ and such trees can be very hard or virtually impossible to replace because of the length of time they take to reach large old status.²⁸

Time to act

It's time to recognise the functions of large old trees as both crucial structures and as foundations of human well-being, and prioritise their conservation and protection. Amended policy and practice is needed urgently.²⁹ Without such action the disappearance of large old trees and associated organisms will continue to accelerate.

James Shugg

Old Growth tree management expert and Agriculturalist at the Royal Botanic Gardens, Naarm/Melbourne



Measuring a Barrel-tree (*Eucalyptus fastigata*), Brown Mountain, East Gippsland, Gunaikurnai, Bidwell and Monero Country. Jill Redwood



Narrow-leaved Peppermint (*Eucalyptus radiata*), Dandenong Ranges National Park, Wurundjeri Country. Jordan Crook

The importance of large and old trees

Around the world, large old trees hold a special place in human culture and folklore and play a pivotal role in local ecologies – particularly in Australia and for First Nations people and communities. These trees are variously referred to as veteran trees, ancient trees or champion trees but the common thread is the care and admiration each culture and country has for them.

Large and old trees are keystone structures across the landscape, playing unique ecological roles not provided by younger, smaller trees.³⁰ Paddock trees provide a raft of benefits from shading livestock, to providing stopover points for passing wildlife such as microbats, parrots, and reptiles like the Lace Monitor.

Trees that have had time to develop large hollows are habitat for native birds, reptiles, and mammals, and are especially critical in areas where clearing has occurred. Up to 42 per cent of mammals and 28 per cent of reptiles in south-eastern Australia depend on hollows in large and old trees for part

of their lifecycle.³¹ These trees provide more flowers for pollinators, fruit for herbivores, omnivores and seed dispersers, and support hydrological regimes, nutrient cycles, and carbon storage. Large and old trees in a suburban or urban setting provide many of the same benefits but also insight into a time before European colonisation when large and old trees were common throughout the country, providing a living link across generations.

The age and significance of a tree is not always obvious from its size. An old Mallee tree may only grow to two or three metres tall but be older than a towering 60m tall Errinundra Shining Gum (*Eucalyptus denticulata*). Tree Geebung (*Persoonia arborea*) measuring just 19 to 21cm DBH have been aged at 170 to 510 years old using radiocarbon dating.³² This relatively small midstorey tree species, endemic to the wet forests of the Central Highlands, can be just as old (if not older) as the towering Mountain Ash (*Eucalyptus regnans*) surrounding it.

Growing conditions can also produce stunted growth in older trees. This is best observed in alpine areas where the cold, windy conditions prevent trees from growing past a certain height and size. For example, the Mt Stirling Summit Tree, a Snow Gum (*Eucalyptus pauciflora*), stands just over five metres tall but is thought to be at least 320 years old.³³

Large and old trees create recreational and tourism opportunities for regional communities. This isn't a new idea – the Redwoods of California draw millions of people to gaze up at these ancient living wonders, drawing tourism and economic development to the region.³⁴ Large and old trees provide us with long-term benefits and services, and are worth much more than standing as opposed to felling and damaging them for short-convenience.³⁵

Large and old trees should be protected as complex living elements, acknowledging their role sustaining wildlife, as habitats or even entire ecosystems while providing great social and cultural value.³⁶





Threats to significant trees on public land in Victoria

Threats to significant trees include immediate, cumulative and long-term threats from logging, planned burning, root damage, windthrow, bushfire and impacts of climate change. Mitigation and so-called protection often do not consider these long-term threats or are not monitored for effectiveness.

The threats are:

1. Fire and fuel management works
2. Native forest logging and logging-like operations
3. Poor management and planning.



Manna Gum (*Eucalyptus viminalis*), Wombat Forest, Wurundjeri and Dja Dja Wurrung Country. Ron Cattnach

1. Fire and fuel management works

Maintaining public land and its many values is a complex task. And there is no harder task than managing fire and perceptions about fire risk while balancing those values.

DEECA (formerly DELWP) currently manages fire and fire risk across public land through its mega-organisation FFMV, which incorporates staff from Parks Victoria, VicForests and Melbourne Water. However, fire management works undertaken by FFMV are leading to a serious loss of significant trees on public land because of a range of issues and poor decision-making processes. These issues have been raised by VNPA members and the public across all land tenures.

A key driver is the increase in prescribed fire across state forests, national parks and regional reserves. Trees are engulfed by fire, cleared for firebreaks or removed as hazardous during fuel reduction operations.

In 2016, DELWP found that '[p]lanned burns unambiguously and substantially increased the collapse probability of hollow-bearing trees'.³⁷ The study also found that the collapse rate of hollow-bearing trees in areas mapped as burnt was 19.3 per cent, which is 22.4 times greater than trees in control areas.³⁸ This study only included trees affected by fire and does not account for trees removed after being assessed as 'hazardous' or from roadsides and other areas within the burn site.

Heavy machinery is regularly used in fire management works for firebreak creation and felling of trees, which can then injure surrounding trees and alter local hydrology.

Community groups and organisations have observed a DEECA/FFMV bias towards felling large and old trees rather than excluding the area around significant trees from operations or excluding personnel from entering a possible fall zone where trees or limbs may fall.

Observations of clearing perceived 'hazardous' trees along roadsides and boundaries of parks and reserves as well as deep within bushland and forest

areas subject to fuel reduction burns are common and of great concern.

Roadside vegetation can hold high-quality habitat and significant trees due to roadsides escaping clearing and logging after the European colonisation of Victoria. Some roadsides contain trees and vegetation older than the surrounding forests, and provide the most significant habitat for local wildlife and plants in those areas.

This was highlighted in the Victorian Environmental Assessment Council (VEAC) *Remnant Native Vegetation Investigation* in 2011, which found that 'In the most relictual and fragmented – and therefore most threatened – landscapes of Victoria, a relatively high proportion of remnant native vegetation is in a large number of small patches on public land'. This highlights the importance of roadside vegetation as important public land with high conservation values.³⁹

Hasty assessments of trees as hazardous by DEECA/FFMV is leading to the felling of large numbers of significant trees, because of their perceived risk to workers and the public. Human safety must remain of the highest importance, but risk can be reduced without the felling of a large amount of hollow and large old trees.

Hazardous tree assessments are made without investigating other methods of reducing risk, such as exclusion zones and better planning of fuel reduction burns to reduce the impacts on critical habitat values like hollow-bearing trees. Risk may be minimised by taping the tree off and mechanically reducing fuel through slashing or mowing.

DEECA and FFMVs' criteria for assessing 'killer' and hazardous trees draw attention to perceived hazardous values such as deadwood, scars on the trunk and dead trees.⁴⁰ However, these values also align with characteristics of significant trees and habitat requirements of many wildlife species. Continued removal of these trees above the replacement rate will cause a simplification of the forest and

a significant loss of habitat for hollow-dependent species.

Although DEECA and FFMV have protocols to protect culturally significant trees in areas subject to fuel reduction burns,⁴¹ exclusion zones are not used to protect significant trees of ecological importance even in areas with populations of FFG Act-listed, hollow-dependent threatened species.

The lack of data, monitoring or oversight on the impacts of fire management works on biodiversity values such as significant trees was highlighted by the Victorian Auditor-General's Office (VAGO) in its 2020 report to Parliament, *Reducing Bushfire Risks*.

The VAGO report found that 'With the exception of some isolated case studies, DELWP [now DEECA] does not know the effect of its burns on native flora and fauna.'⁴² This highlights the lack of independent oversight of fire management operations, awareness of ecological management and legal requirements and care within FFMV.

Communications with the OCR in February 2023, about the regulation of log removal operations within Dandenong Ranges National Park following a windthrow event in 2021, established that FFMV fire management operations are essentially unregulated. The OCR stated to VNPA that:

Decisions around DEECA's fire operations, including assurance, are managed through the department ultimately by the Office of the Chief Fire Officer. There is no regulatory body to oversee fire management.

Effective management will not be possible without appropriate oversight and transparency in FFMV's fire management operations and their willingness to improve tree and biodiversity management.

Investment is needed to conduct on the ground and independent habitat assessments and tree assessments prior to fuel reduction works. Such an allocation of funding and willingness is currently lacking.

2. Native forest logging and logging-like operations

As Victoria transitions from native forest logging to fully plantation-based silviculture, the need to plan operations away from significant trees is warranted on both an ecological and economic basis, as significant trees can be a draw card for tourism and improve economic prospects in regional areas.

Post-logging operations are also of concern for large old trees. For example, the destruction of a 300-year-old Tree Geebung (*Perseonia arborea*) in the Central Highlands was detected by citizen scientists in an area being bulldozed for reseeded. With tens of thousands of hectares of failed regenerated forests, the threat to standing trees that survived initial logging and disturbance remains.

Native forest logging and logging-like operations such as post-windfall log collection, 'forest gardening' and fuel-break widening poses a great risk to significant trees on public land. Even

if the trees are not cut down during logging, it is common to see trees retained during operations die after works end.

While their death may not be immediate, due to the resilience of many tree species, the cumulative impacts of logging operations and exposure make it unlikely for retained trees to survive in the long-term.

Causes of post-logging mortality for retained trees include: root damage from machinery, changes in hydrology, compaction of soil, radiant heat, destruction from post-logging regeneration burns and windthrow which remove the protective surrounding vegetation and trees.

An October 2020 risk assessment published by DELWP (now DEECA) found that native forest logging causes the loss of large and old trees through removal and modification of forest

structures. At a landscape level, it reduces the abundance of significant trees due to the typical logging rotation of 80 years.⁴³ The risk assessment also found that the Code of Practice for Timber Production, the legislation that governs native forest logging on public land in Victoria, includes standards and prescriptions to address many of the impacts of logging.

Observations in the field are consistent with what is stated in the risk assessment: these measures are not sufficiently comprehensive or effective to manage all risks to retained trees, with many succumbing to the impacts of logging surrounding them.

As of 1 January 2024, Victorian native forest logging ceased in allocation areas across the east of the state.

Community forestry (predominately active in the west) was suspended by VicForests in February 2024.



FFMV fuel break expansion project, Dandenong Ranges National Park, Wurundjeri Country. Jordan Crook

3. Poor management and planning

Balancing safety hazards, habitat significance, amenity and other values is critical to significant tree management. Achieving this balance requires a specific set of skills that includes knowledge of tree physiology, species-specific resilience to impacts such as root disturbance and fire, and an ability to assess and calculate risks based on the number of people who use a specific area.

Proper management can also reduce future risk of tree failure from disturbance to roots, trunk damage encouraging pathogens and rot, and poor pruning methods that compromise tree structure, vigour and health.

Proactive tree care and management is rare across public land in Victoria, across all land tenures, but would lead to fewer tree failures and issues in the future and decrease the loss of significant trees.

An example of poor tree management is the DELWP/DEECA Reseeding Giants program. This program aims to reseed areas where Ash species were killed after the 2019-20 bushfires or past logging. It involves collecting seeds from trees on public land,⁴⁴ possibly including national parks and other protected areas.

According to a promotional video published in October 2020, to obtain seeds 'the climber will climb the tree. He will declimb to a prescription. About 50 per cent of the crown is taken, as individual branches (our emphasis added).'⁴⁵

It is well-known in the arboriculture industry that a tree should have no more than one third of its canopy removed at a time to avoid stressing and harming the tree as well as affecting the natural growing form of the tree.⁴⁶

Poor pruning can lead to early mortality. It can create poor form and structure. Exposed cut surfaces are left susceptible to pathogens and disease which can enter the heartwood of the tree.

In this instance, a program aimed at the recovery of Ash species in fire-affected and logged areas may lead to significant injury to trees. These injuries can affect their future vigour and life expectancy, and in some cases, even lead to trees unnecessarily becoming hazards.

It is critical that public land managers understand and implement AS 4373-2007 Pruning of Amenity Trees and AS 4970-2009 Protection of Trees on Development Sites to manage our trees in a safe, evidence-based way and avoid producing tree hazards in the future.





Mountain Grey Gum (*Eucalyptus cypellocarpa*), Brown Mountain, East Gippsland, Gunaikurnai, Bidwell and Monero Country. June/EEG

Case studies

Significant trees under threat in Victoria

To protect significant trees, you need to know where they are. Thanks to the work of big tree hunters, enthusiasts and citizen scientists many records exist of large, old and significant trees across the state.

The loss of significant trees in state forests has been exacerbated by native forest logging and associated operations such as slash burning and road creation. Although native forest logging ceased in 2024, the risk remains to these living giants.

Using three databases of significant trees,⁴⁷ we analysed the proposed and immediate threats from native forest logging to significant trees across Victoria. The network of trees identified was analysed in relation to the 2021 Timber Release Plan and 2019 Timber

Utilisation Plan. These two plans, published by state logging company VicForests, outline which public forests are scheduled for logging. See Appendix A for method and further information.

We found 162 significant trees listed on databases within or surrounding proposed logging operations across Victoria. These include trees from the Murray River to the tall wet forests of East Gippsland, and the giant Mountain Ash forests of the Central Highlands, only an hour from Melbourne's CBD.

Of these, 95 are now included in the Immediate Protection Areas (IPAs) announced by the State Government in 2019, but they are yet to be legislated. That leaves 67 significant trees in coupes scheduled for logging which are not adequately protected.

Even the Whitelaw Tree on the east side of Mt Baw Baw, the fifth largest tree by volume in Victoria, wasn't safe from logging. Areas close to this living giant remain scarred by past logging operations and may require restoration works.⁴⁸

Case studies discussed here are:

1. **Large trees in areas scheduled for logging:**
 - i. **Brown Barrel (*Eucalyptus fastigata*)**
 - ii. **Tree Geebung (*Persoonia arborea*)**
2. **Planned burns and fuel reduction burns:**
 - i. **Black She-oak and large old trees**
 - ii. **Habitat tree, fuel reduction disaster.**



1. Large trees in areas scheduled for logging

i. Brown Barrel

(*Eucalyptus fastigata*)

LOCATION

Playgrounds Road and Sellers Road, Bendoc State Forest, East Gippsland, Bidwell Country.

SIGNIFICANCE

Found by Goongerah Environment Centre (GECO) volunteer citizen scientists in an area scheduled for logging, this 4 metre diameter Brown Barrel (or Cut-tail Ash) is estimated to be 350 years old. It is the largest known Brown Barrel in Victoria and the only one on the National Trust Significant Tree Register.⁴⁹ The area is also significant as it was not burnt during the devastating 2019-20 bushfires.

THREATS

The tree is in an area scheduled for logging. As a tree over 2.5m DBH qualifying for legal protection, the tree itself won't be felled, but it will not be protected from the impacts of logging which leave large trees isolated in disturbed landscapes and vulnerable to windthrow and post-logging burns.



Brown Barrel (*Eucalyptus fastigata*) Trust Trees

ii. Tree Geebung (*Persoonia arborea*)

LOCATION

Endemic to the Cool Temperate and wet forests of the Central Highlands of Victoria.

SIGNIFICANCE

Modest in stature, these century-old beauties play an essential role in maintaining biodiversity. The Tree Geebung grows to a maximum height of 20m. Mature trees with 19 to 21cm DBH have been aged using radiocarbon dating to between 170 and 510 years old.⁵⁰ These long-standing understorey trees mature very slowly. At 100 years old, they will flower for the first time – only after this age will they flower prolifically.

STATUS

The status of Tree Geebung under the FFG Act has recently been upgraded from Vulnerable to Endangered.⁵¹

THREATS

Tree Geebung is a fire-sensitive species and will typically die in a bushfire. Anthropogenic climate change is increasing the threat of bushfire in its home range, both in terms of bushfire numbers and intensity.

Another key threat is native forest logging and post-logging burns. Once mechanical disturbance or fire destroys a Tree Geebung, its stored seed bank in the soil will usually be triggered, and seedlings grow. However, these seedlings need to grow to maturity (approximately 100 years) before they can flower and fruit again. Any disturbance that destroys them before they are mature will likely cause the species to become locally extinct.

PROTECTIONS FROM THREATS

Mature Tree Geebungs are conditionally protected from logging. The law which governs logging states, 'Protect individual trees with a DBHOB of at least 10cm from disturbance where reasonably practicable.'⁵² Historically, Tree Geebungs have been destroyed along with the other understorey species when logging occurs, due to the vagueness of the prescription⁵³ and the inability or unwillingness of operators to identify them. The trees have no merchantable value and have therefore been seen as dispensable.

In October 2022, Warburton Environment Inc won their Supreme Court challenge and secured protections that include VicForests must survey for and protect detected Tree Geebungs with 50 metre buffers. This sets a precedent for long lived understorey flora species (especially those on the threatened list). Justice Garde stated in his judgement that 'no attempt was made by VicForests to show that it was not reasonably practicable to protect the significant number of Tree Geebungs which have been destroyed in harvested areas through the use of bulldozers and mechanical equipment or by regeneration burning.' VicForests filed an appeal in December 2022, this will be heard in the next few months.



Tree Geebung (*Persoonia arborea*), Big Pats Creek, Wurundjeri Country. Sonia Jane

2. Planned burns and fuel reduction burns

i. Black She-oak and large old trees

LOCATION

Lakes Entrance-Casey Creek planned burn GP-TBO-NOW-0015, Colquhoun State Forest, East Gippsland, Gunaikurnai Country.

SIGNIFICANCE

The forest area includes modelled old growth and is outside the 2019-20 bushfire footprint. Incorporating Lowland Forest, Limestone Box-Forest and Damp Forest EVCs, the area is also a key unburnt refuge for bushfire affected threatened species in East Gippsland. Large hollow-bearing trees and mature forests supporting Yellow-bellied Gliders, Greater Gliders and Masked Owls. It also contains stands of Black She-oak (*Allocasuarina littoralis*), the key food source for the Glossy Black Cockatoo which lost 80 per cent of its habitat in the 2019-20 bushfires.

THREATS

Extensive felling of significant trees and clearing of vegetation occurred before fuel reduction burns in 751.5 hectares of forest within a 14.7km perimeter. All planned burn boundaries are treated with tree removal, including trees that may become hazardous during planned burning. Trees are assessed as being dangerous every 25 or 50m and are removed at these intervals by logging contractors. This is for the purpose of creating a 'safe working plan for FFMV staff to execute the burn'. Hollow-bearing trees are targeted for removal on roadsides as DEECA's own research shows that hollow-bearing trees have a high rate of collapse during planned burns.

IMPACTS

Gippsland Environment Group (GEG) and Friends of Bats and Habitat Gippsland observed and documented the impacts of clearing significant trees. No habitat tree or biodiversity assessment was conducted prior to felling. Boundaries of a partly logged area and areas adjacent to other scheduled logging were bulldozed to protect against the planned burn. Machinery also bulldozed through the Casey Creek tributary, an important waterway in the area. A fuel reduction burn was ignited over two days in April 2021, causing a major loss of old hollow-bearing trees during both the ignition period and in the days



Burnt trees in Casey Creek, Colquhoun State Forest, Gunaikurnai Country. *Lisa Roberts*

afterwards. Even though it was classed as a low intensity planned burn, the loss of hollow-bearing trees was significant. Citizen scientists from GEG and Friends of Bats and Habitat Gippsland observed that old

and hollow-bearing trees were those most affected, even in standing damp green vegetation along the creek. Areas identified as modelled old growth by DEECA lost many significant trees.

ii. Habitat tree, fuel reduction disaster

LOCATION

340 hectares planned burn. Warby-Ovens National Park, Yorta Yorta Country, 2022.

SIGNIFICANCE

Long unburnt forests, high density of large and old trees, including hollow-bearing trees. Endangered species such as Inland Carpet Python in the area.

STATUS

Burn was completed in 2022 by FFMV, 217 large and old trees in a 10 hectare area including hollow-bearing trees killed by fire or felling in operation.

THREATS

FFMV ignored concerns of locals and proceeded with burning operation, and burning lead to loss and damage to large and old trees, protection zones failed because of dryness of fuels leading to the loss of many large and old trees.

PROTECTIONS FROM THREATS

Long unburnt areas which are often open, have relatively low fuel levels and have high densities of large trees should have been excluded from the burning operation and elsewhere minimum 10 metre buffer zones around large and old trees to avoid them becoming engulfed by fire.



Destruction of large old trees by FFMV operations in Warby-Ovens National Park, Yorta Yorta Country

Big trees, little protection

Victorian protections for large trees are woefully inadequate, with significant policy gaps unresolved.

In 2018, then Victorian Environment Minister, Lily D'Ambrosio, announced that 'all native trees across the state greater than 2.5 metres in diameter would also be protected, whether they stood in forests or along roadsides'.⁵⁴ This was later incorporated into the Code of Practice for Timber Production in state forests, but it's unclear if it has also been incorporated into other public land managers planning and assessment methods such as VicRoads, Parks Victoria and FFMV.

This policy neglects to protect many significant trees across the state. Many trees are significant and important despite failing to meet the arbitrary benchmark of 2.5m DBH. Many tree species will never grow this large, for some it's genetically and ecologically impossible.

The use of DBH as a determinant of tree age and significance does not consider the range of species, conditions and local ecological communities in which trees grow, and their significance to a region. Tree diameter radically changes between EVCs, aspect, soil and geology types and rainfall levels. This is acknowledged in EVC benchmarks set by DEECA, which includes ideal averages for large tree DBH and species composition to assist understanding of ecosystem health.

In reality, the changes do not protect large old trees from the impacts of logging operations.⁵⁵ The new management standards are inadequate, vague and do not set any firm or enforceable guidelines for buffers or exclusion zones to retain and protect large trees.

At the time of the announcement, Minister Lily D'Ambrosio stated, 'It's not just about the old trees, there is a requirement that the understorey cluster

associated with habitat trees will also be protected, [with the] understanding that trees on their own don't tell the full story of what goes on in forests.'⁵⁶ Yet, significant trees have not been given any legislated buffers, so they and their surrounds are not protected from the impacts of logging and post-logging operations.

A bare-minimum protection of significant trees would be the implementation of Australian Standard, Protection of Trees on Development Sites (AS 4970-2009). The standard provides guidance on the principles of protecting trees retained on land, subject to development. It lays out stages when protections are appropriate, and when they must be implemented.⁵⁷ It is widely used across most state government sites and embedded in local government planning.

Compliance with the standard requires calculation of a TPZ using the DBH (or 1.4m above ground). Multiplying the DBH by 12 ascertains the size of protection zone required to help maintain the tree's viability and stability.

Scientists who work in the Victorian Central Highlands have recommended that large and hollow-bearing trees in areas subject to native forest logging operations should be protected with a 100m radius buffer zone.⁵⁸ This zone would be larger and more protective than TPZs under AS 4970-2009 and would mitigate 'edge effects', giving greater certainty of tree protection and survival.

The use of a protection zone, be it 100m or to AS 4970, reduces the impacts of machinery use near tree roots and radiant heat from post-logging burns. Both offer more protection than the proposed protections by DEECA that would allow logging to the base of the tree. Not allowing slash to build up within three metres of the tree base is not a sufficient precaution, as this is still close enough to damage the tree.

Protection zones for significant trees in logging areas will not only result in their protection but will also simplify implementation and enforcement of regulations. Enforcement of AS 4970-2009 is regularly undertaken by local government officials and is used across the state. Tree protection zones should also be used to protect significant trees in areas subject to fuel reduction works and other development to protect important trees from damage and death.

Following the 2018 announcement, a Regulatory Impact Statement was commissioned by DELWP to assess the economic impact of proposed changes to the Code of Timber Production, including if the 2.5m DBH tree protection should include a 20m buffer. The assessed 20m buffer falls far short of the scientist-recommended minimum 100m buffer or Australian Standard.

Nevertheless, the Regulatory Impact Statement recommended that no buffer was required to protect large trees, despite acknowledging that large trees were susceptible to being killed by heavy machinery used in close proximity and by the impacts of post logging burns.⁵⁹ The decision appears driven by economic, not ecological, imperatives.

The favouring of the 'no buffer' option for tree protections will lead to the loss and death of large and significant trees in areas impacted by logging operations in the long and short-term.

The assessment was not based on conservation science and made conclusions based on economic impact on logging operations, rather than proposing measures that would actually protect significant trees from logging. This has resulted in almost meaningless protections as the prescription fails to prevent significant trees from being killed by logging operations and post-logging burns.

Failure to protect old growth forests

In November 2019, the Victorian Government announced a policy to protect approximately 90,000 hectares of the remaining mapped old growth forests in Victoria. This included a map of the remaining areas stating they would be excluded from logging. This is not what has occurred.

Since the announcement, DEECA has developed and implemented a field assessment tool based on a new definition of old growth forests,⁶⁰ which makes it harder for areas to qualify for protection. It only includes two forest types: ash and mixed species.

The tool fails to account for different forest types and vegetation communities that may never show the characteristics required to meet the new definition, which focuses on stem or trunk basal area as opposed to late-mature or senescent growth stage crown cover.

Under the new tool definition for old growth, a forest stand can have no more than 15 per cent basal area of trees in the 'regrowth' growth stage category. The category has been broadened to include trees which were previously classified as early mature, meaning more trees are considered regrowth. This could increase the percentages of regrowth basal area, resulting in areas being falsely

disqualified from being categorised as old growth.

The focus on crown cover and basal area and stem or trunk ratios is a departure from the original definition of old growth forests in the JANIS Reserve criteria within the National Forest Policy Statement, which only looks at growth stages in crown cover.⁶¹

Professor Emeritus Michael Feller, Faculty of Forestry, University of British Columbia, strongly criticised the lack of protection of old growth forests in his assessment of the current old growth assessment tool, stating:

...as a result of current government policies, neither old-growth trees nor old-growth forests are properly protected in Victoria. While the Victorian government has made big announcements about old-growth, there are major flaws in old-growth assessment methods and large tree protection.⁶²

In December 2020, in a trial in the Victorian Supreme Court,⁶³ the Flora and Fauna Research Collective challenged the legality of DELWP's new old growth assessment tool. During cross-examination, DELWP's own expert witness, Dr Peter Woodgate, admitted the tool is flawed and deviates from his original definition of old growth

forest. As it currently stands, old growth forests will continue to be exploited for logging.⁶⁴

Deputy Secretary, DELWP Forests section, Christine Ferguson, was also cross-examined. While she claimed the tool would protect old growth forests, she did not know how or when it would be used, who would be using it or, when pressed, whether it would even work.

During the trial it was also revealed that the DELWP old growth tool looks to be copied from an earlier VicForests old growth identification tool. Even the photos in the documents are the same. Using a tool based on a policy developed by VicForests, an agency with a commercial interest in continued logging rather than forest protection based on conservation science, is extremely inappropriate.

At time of publishing (March 2024), the Fauna and Flora Research Collective is still waiting for the final judgment to be handed down. In the meantime, the tool is currently being used by VicForests and DEECA, and mapped and unmapped areas of old growth forest continue to be impacted by so-called fire management operations, overzealous seed extraction, firewood removal including the felling of trees and native forest logging operations subject to government and policy change.



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ANZECC	Australian and New Zealand Environment and Conservation Council
AS	Australian Standards
DBH	diameter at breast height
DBHOB	diameter at breast height over bark
DEECA	Department of Energy, Environment and Climate Action, Victoria (<i>from 2023</i>)
DELWP	Department of Environment, Land, Water and Planning, Victoria (<i>to 2022</i>)
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i> (Cwth)
EVC	Ecological Vegetation Class
FFG Act	<i>Flora and Fauna Guarantee Act 1988</i> (Vic)
FFMV	Forest Fire Management Victoria
FMA	Forest Management Area
FOI	Freedom of Information
GECO	Goongerah Environment Centre
GEG	Gippsland Environment Group
HBT	hollow-bearing tree
IPA	Immediate Protection Area
JFMP	Joint Fuel Management Program
OCR	Office of the Conservation Regulator
RFA	Regional Forest Agreement
TPZ	Tree Protection Zone
TRP	Timber Release Plan
TUP	Timber Utilisation Plan
VAGO	Victorian Auditor-General's Office
VEAC	Victorian Environmental Assessment Council
VNPA	Victorian National Parks Association

Appendices

A. Assessment of significant trees across the public land estate at risk of logging operations

Methods: We undertook GIS analysis using VicForests approved Timber Release Plan (2021) and Timber Utilisation Plan (2019) and the three databases to detect the significant trees across the public land estate at risk of logging operations.

The three databases are the National Trust's Significant Tree Register, National Register of Big Trees and Victoria's Giant Trees by Brett Mifsud overlaid on the Timber Release Plan (2021) and Timber Utilisation Plan (2019).

B. Register of Significant Trees (National Trust)

Species	National Trust Code	Coupe	Note
<i>Eucalyptus fastigata</i> (Brown Barrel/Cut-tail)	TBC	Within 892-509-0002 off Sellars Rd, Errinundra Plateau	7.85m girth Largest known of the species
<i>Elaeocarpus holopetalus</i> (Black Olive Berry)	T11048	Within 838-508-0015	
<i>Eucalyptus regnans</i> (Mountain Ash)	T12346	Within 346-508-0001	
<i>Eucalyptus camalduelensis</i> (River Red Gum)	T11488	Within 106-004-0030/TUP	
<i>Eucalyptus denticulata</i> (Errinundra Shining Gum)	T11972	Within 30m 480-504-0035	Whitelaw tree
<i>Eucalyptus denticulata</i> (Errinundra Shining Gum)	T12344	480-504-0035	Hairy Maclary, 10.7m circum.

C. National Register of Big Trees

No trees from the National Register of Big Trees were found within or beside areas threatened by logging operations. Current status of threats to trees listed on the national register:

Significant tree	Status
River Red Gum Coupe (106-004-0030)	Thinning from below occurred in Log Season 2015-16
Mountain Ash Roadline Coupe (346-508-0001)	Road exists but road widening/upgrades for logging yet to occur
Black Olive Berry Coupe (838-508-0015)	No logging has occurred (with the exception of historical Single Tree Selection)
Brown Barrel/Cut-tail Coupe (892-509-0002)	Scheduled for logging December 2021

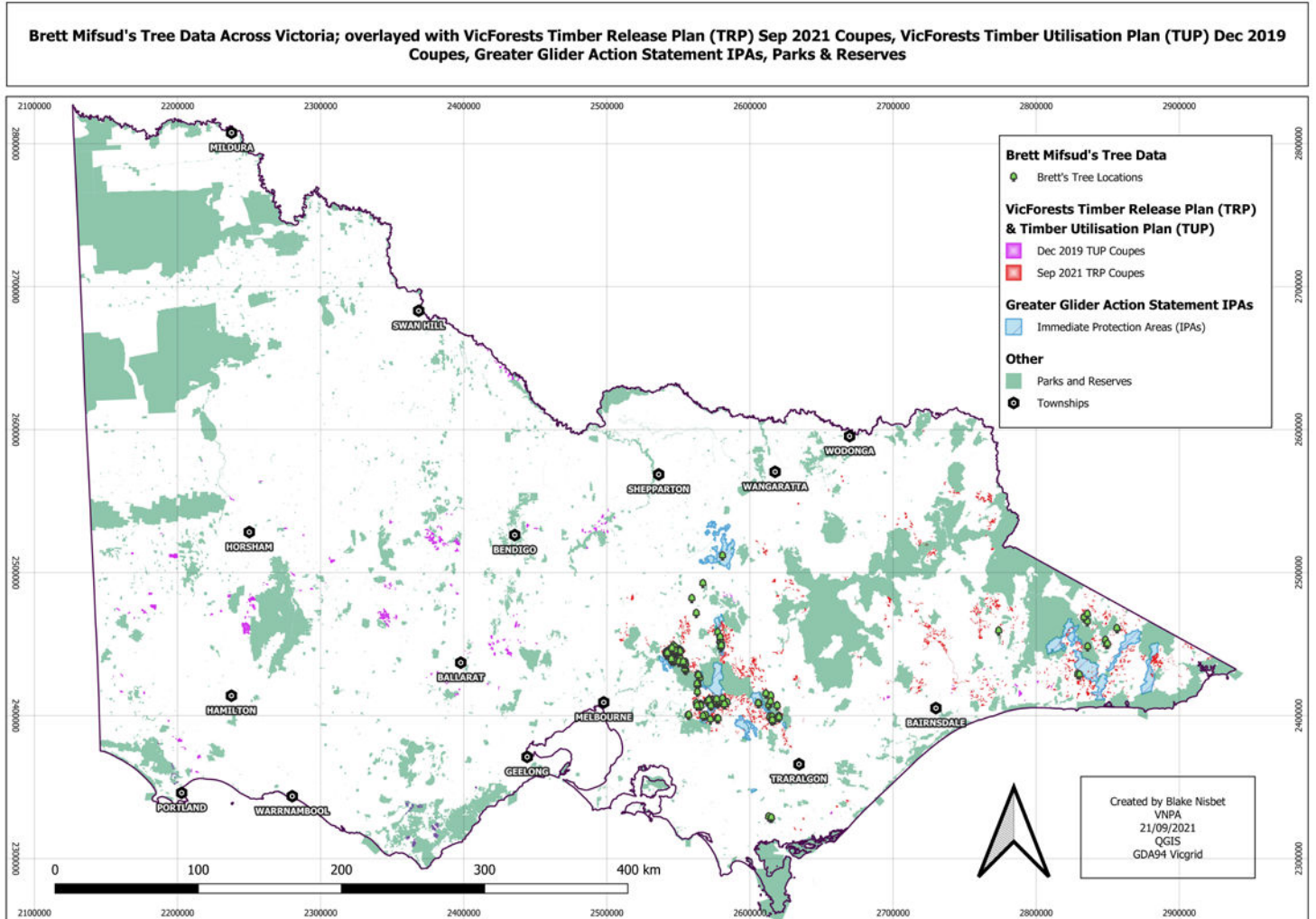
More about the National Register of Big Trees available at nationalregisterofbigtrees.com.au

D. Victoria's Giant Trees, by Brett Mifsud

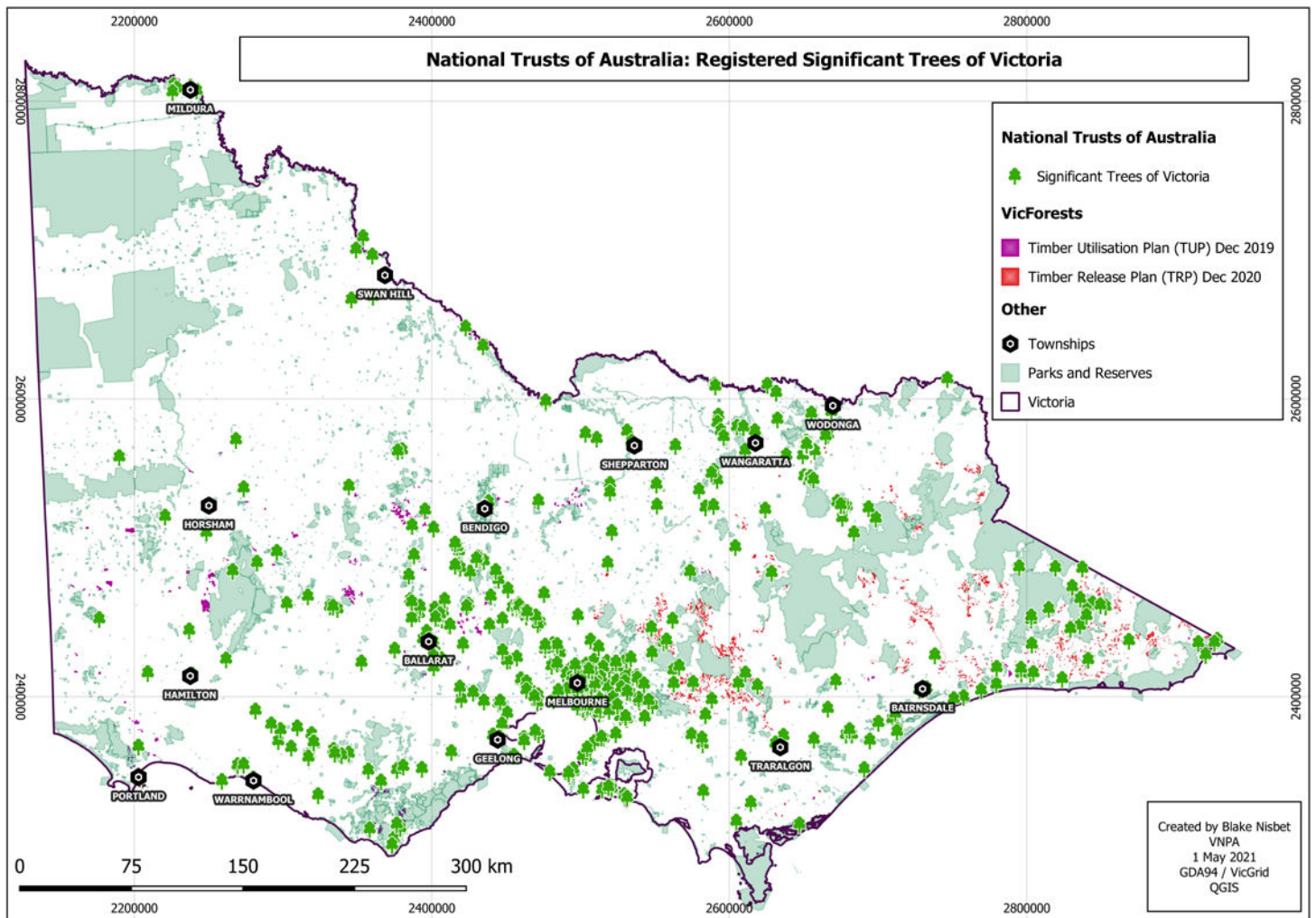
Of the tree data collected by Brett Mifsud, there are 156 trees within and beside logging coupes, 95 of those are now protected within Interim Protected Areas (IPAs).

If we exclude coupes listed as current regeneration (presumably logging has finished), there are 80 trees within 'scheduled' TRP coupes, 48 of which are now within the IPAs. That leaves 32 trees in scheduled coupes which are not protected.

Find out more about Brett's work at victoriasgianttrees.weebly.com



E. Map of National Trust trees



F. Wrapping trees in fire retardant materials

General Sherman is an 84m Giant Sequoia (*Sequoiadendron giganteum*) in located in Giant Forest in Sequoia National Park, California. In 2021, the General Sherman Tree was one of numerous Giant Sequoias wrapped in a protective aluminium material during the KNP Complex Fire. While Giant Sequoias are fire-dependent and able to withstand the heat of moderate fires with their thick, insulating bark, more severe fires have damaged or killed many large trees in the past. Thus, additional precautions were taken to prevent fire from burning into tree bases and igniting vulnerable fire scars – signs of the many previous fires these trees have survived. *Source: NPS*

Firefighters and Natural Resource Specialists wrap the General Sherman Tree with fire retardant material to help protect it from an oncoming fire.
Elizabeth Wu, National Park Service



G. Staked and taped off exclusion zone

Exclusion zones around large and old trees in fire operations areas can be marked out by barriers or tape to exclude workers, thus reducing the risk without removing the tree. The exclusion zone can be based on measurement of tree height by estimation or electronic clinometer and height meter. Thus, if the tree does fail it will fall into the exclusion zone, where people should not access.





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Cap Mountain Grey Gum (*Eucalyptus cypellocarpa*), Morwell National Park, Gunaikurnai Country. Jordan Crook