

Blueprint Institute

# Logging off

A cost-benefit analysis of land use options for the native forests of the Central Highlands, Victoria



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# About Blueprint Institute

Every great achievement starts with a blueprint.

Blueprint Institute is an independent public policy think tank established in the era of COVID-19, in which Australians have witnessed how tired ideologies have been eclipsed by a sense of urgency, pragmatism, and bipartisanship. The challenges our nation faces go beyond partisan politics. We have a once-in-a-generation opportunity to rethink and recast Australia to be more balanced, prosperous, resilient, and sustainable. We design blueprints for practical action to move Australia in the right direction.

For more information on the institute please visit our website: [blueprintinstitute.org.au](https://blueprintinstitute.org.au)

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# Attribution

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## Lauren Williams

Lauren holds a Bachelor of Science (Hons) in Psychology and went on to complete a Masters in International Development and Public Health (Distinction) from the University of Sheffield. Her research involved collaborating with organisations based in Nepal, South Sudan and London, working on a wide range of social policy and development issues. Following her Masters, she worked for CARE International UK, to campaign for sustainable development projects.

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Tom holds a First-Class Honours in Politics from the University of Sydney, with his thesis examining the conduct of China, and other nations, in elections for United Nations Specialised Agencies. He also has a Bachelor of International and Global Studies, majoring in Political Economy and Government & International Relations from the University of Sydney. He was also selected to work in the Sydney University Policy Reform Project, studied Populism, Authoritarianism and International Relations at the Freie Universität Berlin and Wissenschaftszentrum Berlin (WZB) overseas, and has previous experience working with community social justice organisations.

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Claire holds a Master of International Relations from the University of Sydney with a specialisation in social research. Her thesis examined evolving conceptions of sovereignty and the nature of global environmental agreements. She has also completed a Bachelor of Communication and Media studies. Prior to joining Blueprint she worked in several digital marketing agencies, crafting strategic communication campaigns for clients in the non for profit, financial services and business space.

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Freya is currently completing a dual Bachelor of Commerce (Finance)/Bachelor of Laws at the University of Sydney. Beyond her degree, she is heavily involved in the Impact Investing Society and Conservative Club, and is completing a Law Reform Project for the Justice Reform Initiative. Prior to the Blueprint Institute, she was a Cadet at UBS in the Macroeconomics team. She researched a wide range of topics including fiscal policy, housing, employment, and foreign exchanges.

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Kate holds a dual Bachelor of Economics/Arts degree from the University of Queensland and is continuing her studies with an Honours in Economics in 2022. Her thesis is in the field of behavioural economics to complement a major in psychology in her Arts degree. She has experience working at KPMG in their Policy, Economics, and Public Impact division.

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Jae holds a Bachelor of Politics, Philosophy and Economics (Honours) from the University of Queensland and plans for further postgraduate study abroad. He completed a major of Economics with a focus on behavioural economics, complementing a research background in applied philosophy, geopolitics and public policy. His Honours thesis modelled the behavioural drivers of speculative asset markets, examining the implications for public policy design in the Australian housing market.

# Executive summary

Australia is home to some of the world’s most ancient forests. **The benefits of native species forests are extensive—they are efficient carbon sinks, they are amongst the most biodiverse environments on the planet, and they provide vast quantities of water (and preserve the quality of the water table).**

This paper offers policymakers a blueprint for assessing the true value of our native forests. Recognising the inherent preferencing of the quantitative (particularly when it comes to Expenditure Review Committee processes), **we conduct a comprehensive cost-benefit analysis of conserving the wet forests in the Central Highlands of Victoria.** The Central Highlands has been selected as the case study for this paper—but **our general approach could be applied to any native forest area in Australia.**

**We assess the economic potential of wet forest conservation in the Central Highlands by modelling the value of carbon sequestration and tourism against continued logging.** Our findings clearly demonstrate the economic benefit of an immediate halt to logging of native wet forest in 2022–23, as opposed to the status quo of a delayed exit by 2030. **Specifically, we find that ending logging in 2022–23 will deliver a net benefit valued at \$59 million in present-day dollars.**

Benefits	\$487 million
Costs	\$428 million
Net present value (Benefits less Costs)	\$59 million

**Table 1** Benefits and costs of ending logging in 2022–23, through to 2030

**Source** Blueprint Institute Analysis

**Note** Benefits include avoided costs from logging, carbon sequestration value, and tourism revenue. Costs include forgone logging revenue and costs for developing tourism.

These findings are not entirely novel—prior studies have shown that across key Central Highland industries, the contribution to gross domestic product of water supply (\$310 million), tourism (\$260 million), carbon (\$49 million), and plantation timber (\$30 million) all outperformed native forestry (\$12 million).

Yet these results have been slow to translate to policy action. Presently, the Victorian government has loosely committed to phasing out logging of native forests by 2030. However, this is not legislated—a significant (and intentional) oversight given that existing legislation (The Forests (Wood Pulp Agreement) Act 1996) guarantees that the state-owned VicForests will continue to supply a fixed amount of wood pulp to Australian Paper from native forests across Victoria until 2030. In the meantime, **the native logging industry is propped up by government to protect an ever-decreasing number of jobs and placate misguided pressure from vested interests. Economic protectionism is damaging and regressive at the best of times. This is amplified exponentially when it results in severe environmental degradation.**

The logging industry’s constant refrain in response to legitimate criticism over the dubious economic value of harvesting native timber is to fall back on the “impressive domestic value add from processing and downstream manufacturing” provided by the mills in the region. Yet native timber’s contribution to the domestic processing sector has been on a long downward trend—in the 1920s there were more than 120 sawmills dedicated to processing native timber sourced from the Central Highlands, now there are just five. Furthermore, the plantation sector far surpasses the native timber industry with regard to profitability, efficiency, and employment.

Our native wet forests are at high risk of collapse unless the right policy settings are put in place to protect them into the future. It is critical that policymakers take a more expansive view when assessing land value—that they move away from the ‘what’s in it, what’s on it, how do we sell it’ paradigm that has dominated land valuation methodologies to date.

In response to the findings from our modelling and research, Blueprint Institute calls on the Victorian Government to enact the following changes:

1. Commit to ceasing the logging of native wet forest in 2022–23 (as opposed to 2030),
2. Legislate the ending of native forest logging (to give weight to verbal commitments),
3. Amend or repeal The Forests (Wood Pulp Agreement) Act 1996,
4. Expand land valuation methodologies to include water, carbon storage, and tourism, and
5. Strengthen formal policy mechanisms designed to conserve ancient wet forests.



# Forestry in Australia

The Australian native timber industry has faced a long-term [structural decline](#) for the better part of three decades due to a combination of declining demand, diminishing timber resources, and increasing global competition. Despite significant [government assistance](#) to prop up the industry, log production from native forests has declined precipitously, falling by [44% between 2005 and 2019](#).

In the aftermath of the Global Financial Crisis, a strong Australian dollar coupled with weak demand caused a significant slowdown in the industry from late 2008. Woodchip exports, one of the backbones of the hardwood sector, fell by [33% between 2008 and 2012](#). These trying times were reflected in the 2012 closure of Gunns Limited. Prior to closing, Gunns was one of the largest native hardwood sawmill operators in the Southern Hemisphere, [employing 1,200](#) people before going bankrupt due to falling production and export rates.

[In Victoria, 19 out of 20 jobs in the forestry sector are based on plantations, and in 2016 there were only 506 full-time equivalent jobs directly employed in the native forest industry](#)—before [large areas of forests](#), planned for logging, were burnt in the 2019–20 bushfires. [As the plantation sector has become more dominant, the volume of exported unprocessed hardwood pulp log has also increased significantly](#). Previous studies have suggested that this is leading to a [decline in local processing jobs](#).

Furthermore, if native forests were preserved for tourism, water supply, and carbon sequestration, the [one third](#) of forestry employees already in roles focused on growing and managing forests could potentially retain sustainable employment opportunities in the sector. As part of their most recent election policy platform, the Greens advocated for an immediate end to native timber logging. [Under their proposal](#), “forestry workers would be redeployed to an emergency and disaster response team.” The Greens are also arguing to process plantation timber in Victoria, presumably to provide a boost to local economies.

Historically, state governments have tried to sustain the forestry industry, while recognising its deteriorating economic outlook. The Forestry Corporation of New South Wales generates [consistent losses](#)—most recently calculated at [\\$441 per hectare](#) in 2021.

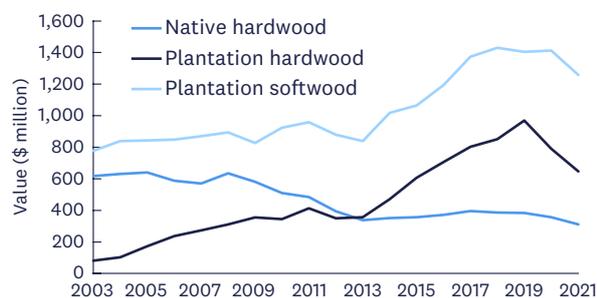
The situation is no different in Victoria. In 2017, the Victorian government spent more than \$40 million to purchase a [beleaguered timber mill](#) in the Gippsland town of Heyfield because it was threatening to close due to reduced supply. [The Parliamentary Budget Office has shown that the Victorian economy would be \\$192 million better off if the native forest logging industry was closed immediately](#). However, the Victorian government has thus far only committed to—but is yet to legislate—phasing out native logging by 2030. Sustainable Timber Tasmania (formerly Forestry Tasmania), ran at an [alarming loss of \\$454 million](#) over 20 years from 1997 to 2017. The Tasmanian forestry industry has been the beneficiary of at least [one billion dollars worth](#) of rescue packages since 1989.

In Western Australia, the state government recently revealed plans to [end native logging from 2024](#), and invest \$350 million in softwood timber plantations to support sustainable West Australian jobs. Their September 2021 announcement argued:

**The ever-increasing impacts of climate change, the importance of maintaining biodiversity and forest health, the need for carbon capture and storage, and declining timber yields mean that it is essential that we act now to protect Western Australia's forests.**

# Splitting a log—The difference between plantation and native forest logging

Plantation forestry involves the [deliberate planting](#) of native or exotic species of trees for commercial timber or environmental purposes. [Plantation species](#) are classified according to the density and hardness of the wood—either hardwood (mostly eucalypts) or softwood (e.g. pines).



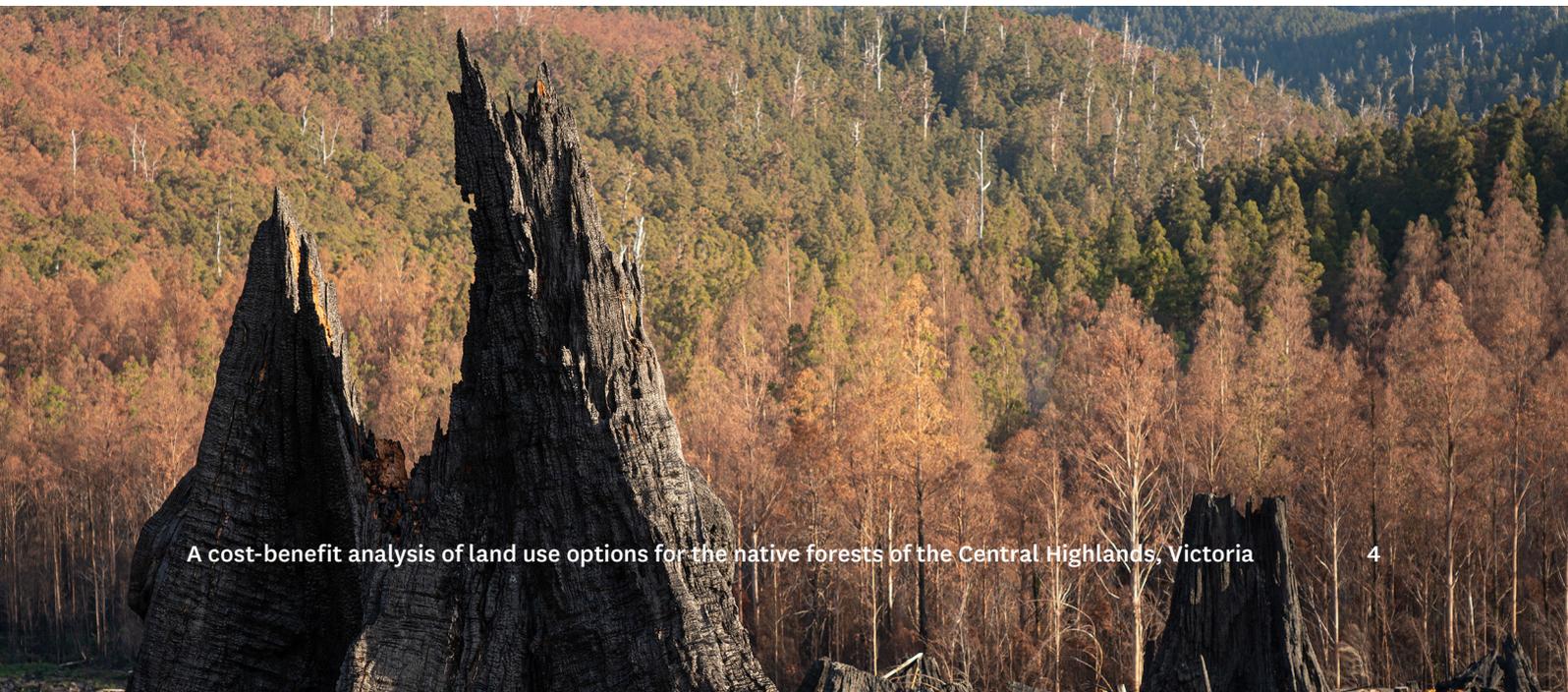
**Figure 1** Value comparison between logs extracted from native forests, hardwood, and softwood plantations (2003–21)

**Source** [Fenner School of Environment and Society, The Australian National University, ABARES](#)

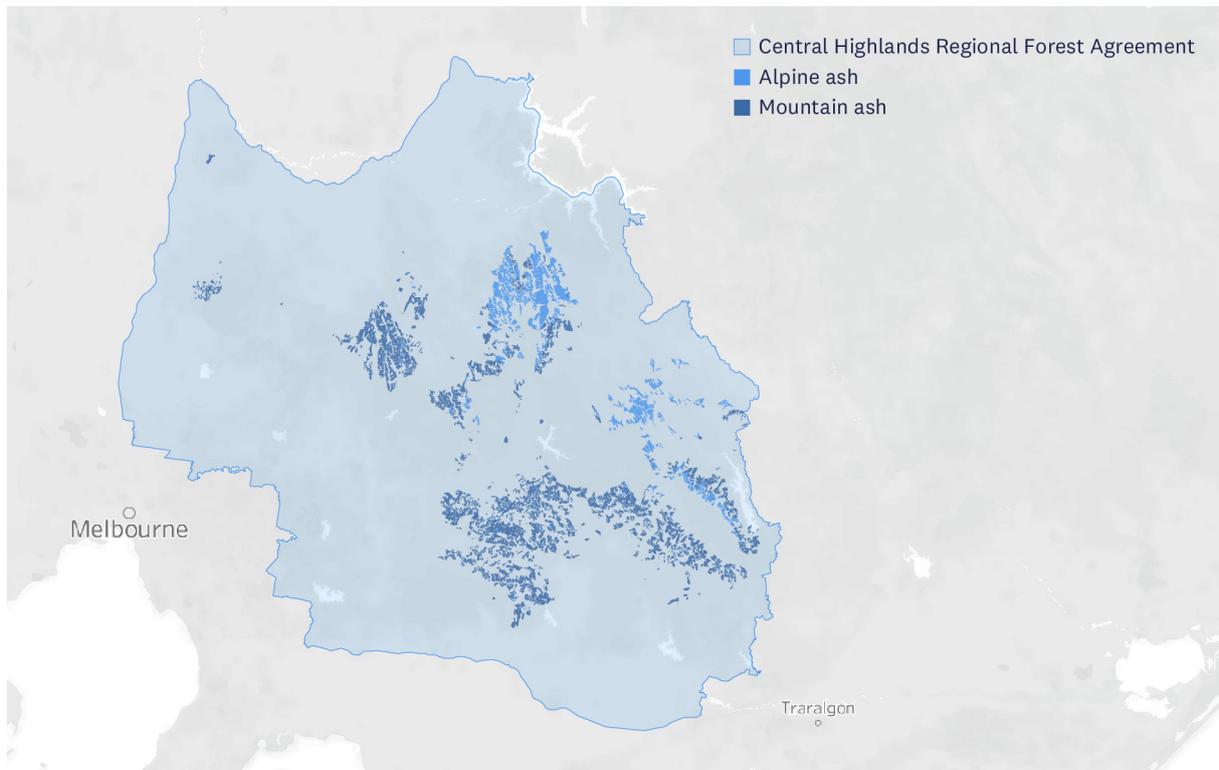
Across the past two decades, the value of native hardwood has stagnated compared with plantation alternatives Australia wide (Figure 1). **Currently, plantations produce over 85% of the logs harvested annually across Australia.** [Projections](#) show that hardwood plantation log availability will remain steady up to 2064 and softwood plantation log availability is projected to recover from the detrimental 2019–20 bushfire season from 2035.

In terms of economics, **plantation timber is outcompeting native timber. By requiring less land area for greater log volume** and value, plantations are far more efficient and productive than native logging. Strategic placement of plantations also means they can play an [important role](#) in aiding sustainable soil production, soil quality, water quality, and salinity mitigation, as well as providing carbon and biodiversity benefits. For example, plantation softwood timber generates **60%** less greenhouse gas emissions than hardwood native timber.

New Zealand provides an excellent example of a rapid transition to a plantation-only forestry industry, ending native forest logging nationally in [2002](#). As outlined, Western Australia has also announced they will end native forest logging in December [2023](#). Plantation forestry is not only practical, it offers a plethora of sustainable employment opportunities for regions and provides the answer to maintaining timber production while preserving our diverse native forests—avoiding ecological collapse and detrimental environmental impacts.



# The wet forests of the Central Highlands, Victoria

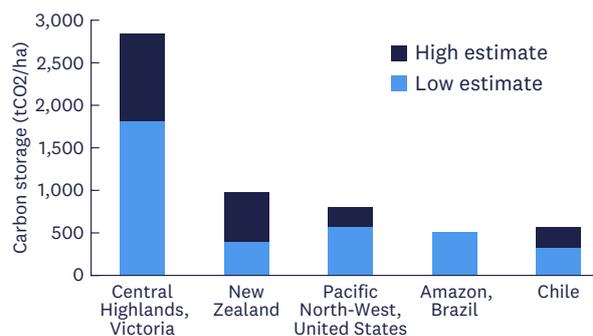


**Figure 2** The areas of ash-type trees that have been logged over the past 60 years in the area of the Central Highlands Regional Forest Agreement, Victoria.

**Source** [Department of Jobs, Precincts and Regions](#)

The wet ash-type forests of the Central Highlands are located in Victoria, 60–120 kilometres east of Melbourne’s CBD, dominated by ash-group eucalypts. Specifically, mountain ash (*Eucalyptus regnans*) and alpine ash (*Eucalyptus delegatensis*)—distinct from the ‘ash’ tree group from the Northern Hemisphere. **These forests support the second-tallest trees on earth and the tallest flowering plants (approaching 100 metres tall). They are also some of earth’s most carbon dense, with up to 1,800 tonnes of above-ground biomass per hectare** (see Figure 3).

The forests are also [crucial for biodiversity](#) conservation and support key populations of endangered species like the Leadbeater’s Possum. Furthermore, the mountain ash forest ecosystem [generates most of the water](#) for the more than five million people in Melbourne, along with many other communities.



**Figure 3** Tonnes of carbon stored per hectare in each locality’s most carbon-dense forests (2009)

**Source** [Fenner School of Environment and Society, The Australian National University](#)

Despite this, approximately [60,000](#) hectares of mountain ash forest have been assigned to VicForests—the [state-owned business](#) managing the harvest, sale, and regrowing’ of native forests. That these endangered ash-type forests constitute the dominant supply—around [65%](#)—of all native logging in Victoria highlights the precarity and recklessness of continued logging in the region.

Victoria’s mountain ash forests have been logged so extensively that they have been listed as [critically endangered](#) and at risk of collapsing by the International Union for Conservation of Nature. At the current rate, [the equivalent of over four Melbourne Cricket Ground’s worth of native forest is being logged in Victoria every day.](#)

## What does the native logging industry look like up to 2030?

Victorian timber workers and their communities are understandably [concerned](#) about the effects of phasing out native logging by 2030. However, [the economic and employment opportunities of alternative land use options far outweigh the benefits of continuing to log the region, especially when considering VicForests’ future prospects and current losses.](#) VicForests 2020–21 annual

report reveals a [net loss of \\$4.7 million](#). This is following a loss in the prior financial year of [\\$7.5 million](#).

VicForests will face an ever-deteriorating financial position should it remain operational through to 2030. It will be forced to harvest marginal coupes that require [progressively higher](#) harvesting and haulage costs—having logged the most-profitable and highest-yield coupes already. What’s more, the cost of compliance with an increasingly inhospitable legal environment looks set to deliver an even larger hit to their bottom line. A [recent court order](#) forcing VicForests to conduct stringent surveys to detect the presence of threatened greater and yellow-bellied gliders provides an illustrative example. The ruling will have great financial repercussions, as the area available for logging will be further reduced and the cost to survey coupes to an appropriate level will skyrocket.

Between now and 2030, VicForests’ continued financial solvency will become increasingly dependent on generous state government grants to cover declining forestry revenue—grants whose spending allocations, distribution, and efficacy are not publicly disclosed or accounted for in [annual statements](#). While accounting is far from their greatest worry, an industry increasingly propped up by taxpayer money should at minimum publicly disclose how it spends such funds.

## Fanning the flames—logging and fire severity

Beyond being damaging to wildlife, harming biodiversity, hastening ecosystem collapse, and massively harming emission reduction targets, logging can add significantly to fire risk. Logging [makes forests drier](#), and therefore more prone to fire, putting the industry’s future at further risk.

During the 2019–20 Black Summer bushfires, there was a [25% increase](#) in fire severity in logged forests compared to forests that were not logged. Scientists have drawn a [direct relationship](#) between the extent of logging activity and the severity of bushfire seasons. Furthermore, there are proposed variations to the predominant

legislation regulating native timber harvesting (the Code of Practice for Timber Production 2014) that experts fear will result in more logging and will “[weaken protection for bushfire-prone areas](#)”.

Recurrent fire also means there is a [low probability](#) of native forests reaching ecological maturity and they [will not reach an age](#) where they are suitable for the production of sawn timber. These forecasts suggest there could be huge [uncertainties](#) in resource availability for the timber industry from native forests in coming years.

# Plucking a number out of the air

## The Victorian government's 10-year contract before phasing out native logging

The Victorian Government would like to have their (timber) cake and eat it too. Current legislation and announcements weave a confusing narrative of both promises to end native logging as soon as possible, and gaps that leave the door open for the industry to continue—all while trees keep being felled.

Twenty-five years ago, the Victorian government signed [The Forests \(Wood Pulp Agreement\) Act 1996 \(the Act\)](#). Up until 2030, the state-owned VicForests will continue to supply a fixed amount of wood pulp to Australian Paper from native forests across Victoria. The Act legislated that Australian Paper must purchase [85%](#) of the assigned log volumes, which is [350,000](#) cubic metres per year until 2030. This legislated contract imposes penalties on Australian Paper for not accepting the required volume. [No other business](#) in the Victorian logging industry has been afforded such legislation, binding the state-owned business to provide fixed log volumes. Other businesses in the industry tend to have short-term contracts that are regularly reviewed to account for supply and demand. A 2018 attempt to revoke the Act and its agreement came in the form of the [Forests \(Wood Pulp Agreement\) Repeal Bill 2018](#), but this Bill was defeated on the floor of parliament.

An early 2020 decision by the Victorian government to extend the Regional Forest Agreement until 30 June 2030 confirmed the continuation of native logging in Victoria right until the conclusion of VicForests' contract. Six months earlier, Daniel Andrews announced

that Victoria would [phase out](#) native logging by 2030—a commitment still yet to be legislated. A [competitive process](#) will be used to allocate timber from mid-2024 to 2030 and thereafter commercial harvesting in public native forests will end in Victoria.

The state government has developed the [Victorian Forestry Plan](#) (the Plan) to help guide this process, and will provide more than [\\$200 million](#) to support this transition across the state. It includes establishing a committee with representatives to help support the transition, alongside plant and equipment redundancy payments, mill site rehabilitation funding, and a \$36-million Regional Growth Fund. Part of the Plan also includes training or retraining services that link workers to future employment opportunities. The government has also committed [\\$120 million](#) for the establishment of plantations in Gippsland, to plant 16 million trees over the next 10 years.

Despite all this effort, as mentioned, the Victorian government is yet to legislate these commitments. Without such legal assurances, the decision to end native logging is vulnerable to retraction. An incoming government could easily overturn a decision, or it could be tempered to appease relevant stakeholders. The government has left themselves the wiggle room to backtrack on these announcements with a change of heart or government—giving forestry stakeholders hope in an unviable industry. This must be addressed for communities, workers, and stakeholders to have the certainty they need.

# Sowing the seeds of a brighter future

## Plantation forestry for the Central Highlands

Plantation forestry offers a future beyond native logging and will open up the region for sustainable development post-2030. In the Victorian Central Highlands area specifically, the contribution of plantation timber to gross domestic product was found to be [more than double](#) that of the native forestry industry.

The plantation growing and processing industry is already a vastly more important part of Victoria's economy than the native forest industry. [Victoria actually has the highest level of plantation wood production and export volume in the country—currently, five out of six trees come from plantations.](#) In 2015, the plantation forestry sector provided approximately [\\$3.26 billion](#) to the state's economy—with the gross regional product estimated at \$1.4 billion.

The Victorian government has pledged to [invest \\$120 million](#) to further expand the plantation sector as native logging declines. The money will be used to plant 16 million trees over the next

10 years in partnership with [HVP Plantations](#). This will be done through the establishment of plantations in Gippsland. However, the Victorian government has acknowledged that new trees will not reach harvestable age [by the 2030 deadline](#) and are “not intended to replace native timber tree-for-tree.” The Gippsland Plantations will begin to [produce](#) pulpplog from 2037 onwards and higher value sawlog from approximately 2047.

Existing plantations are on track to cover most of the timber outputs from native forestry in the Central Highlands—with pulpplog volume [well covered](#). Only sawlog appears unlikely to be fully replaced in time—an output that only makes up [14%](#) of native forestry's timber production in Victoria.

However, there is increasing [preference in Australia](#) for the use of softwood in construction compared to hardwood. Softwood is cheaper and easier to work with—and now makes up about [80%](#) of timber used across the globe.

	Native forest	Plantations
Area available for production (hectare)	264,154	36,316
Volume supplied (m <sup>3</sup> /year)	724,300	539,700
Revenue from timber sales (\$ million)	49	64
Industry value added (\$ million)	12	30
Industry value added (\$/hectare)	46	823

**Table 2** Volume and value of timber from native forests and plantations in the Central Highlands (2013–14)

**Source** [Experimental Ecosystem Accounts for the Central Highlands of Victoria](#), Threatened Species Recovery Hub, Australian National University

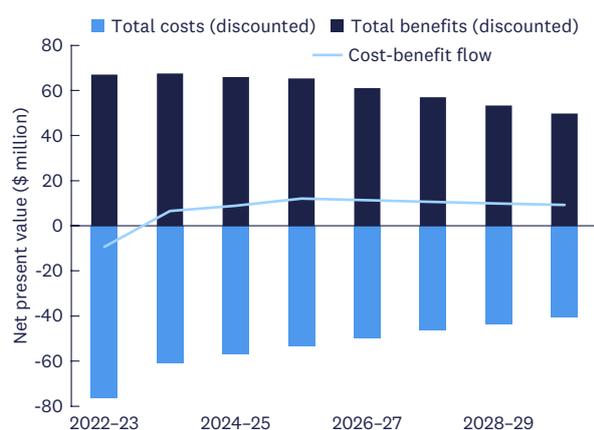
# A cost-benefit analysis of native logging in the Central Highlands

## Can our wet forests be put to better use?

Land use assessments in Australia by policymakers often centre on a quantitatively framed, ‘what’s in it, what can we grow on it’ valuation. While this has driven much of our past profits, this lack of creativity in land use severely handicaps our ability to harness the potential of our unique ecosystems for long-term, sustainable economic success.

This is very much the case in the Central Highlands, where critically endangered species of global significance live—including Victoria’s faunal symbol, the Leadbeater’s Possum. This land has far more to offer to the Australian people than its timber.

[When you log a forest](#), as well as producing carbon, you lose the economic benefits of its carbon sequestration capacity, reduce water production, and forego potential tourism revenue. Preserving the forests also provides intangible benefits, such as improvements to people’s [health and wellbeing](#), habitats for endangered animals, and improved biodiversity and ecosystem resilience.



**Figure 4** Cost-benefit flow of ending native timber harvesting in 2022 in the Central Highlands, Victoria (2022–30)

**Source** Blueprint Institute Analysis

**Note** A seven percent discount rate is applied.

Yet, even when we put aside these unquantifiable, intangible benefits that (unfelled) forests provide, the economics come out in favour of ending logging as soon as possible. Our cost-benefit analysis assesses the viability of ending logging in 2022–23, compared against a continued, business-as-usual scenario, through to 2030.

### Benefits

Avoided costs from logging	\$365 million
Carbon sequestration value	\$63 million
Tourism revenue	\$59 million
<b>Total</b>	<b>\$487 million</b>

### Costs

Forgone logging revenue	\$403 million
Costs for developing tourism	\$25 million
<b>Total</b>	<b>\$428 million</b>

Net present value (Benefits less Costs)

Benefit-cost ratio 1.14

**Table 3** Cost-benefit analysis for ending logging in 2022–23, through to 2030

**Source** See Appendix

**Notes** Net present value factors in a seven percent discount rate. For technical details on our cost-benefit analysis, refer to the Appendix at the end of this paper.

Similar to [prior research](#), our analysis has shown that immediately ending logging in the Central Highlands and preserving the native forests is the optimal economic choice for the region.

Our cost-benefit analysis concludes that ending logging in 2022–23 would make the region \$59 million better off than continuing to log until 2030.

# Carbon

The change in carbon stock in the Central Highlands—for the logging and logging-free scenarios—were derived from a [2018 paper](#). In the event of continued logging from 2016 to 2065, the study estimated regional carbon stocks would decrease by a total of 16.48MtC, or around 330,000 tonnes of carbon per year.

This means that across the eight years of logging until 2030, 2.64MtC would be lost, equivalent to more than [ten days of emissions](#) from all transport across Australia. Alternatively, by ending logging in 2022–23, we save the same 2.64MtC of carbon stock otherwise lost.

Based on the October 2022 Australian carbon credit unit spot price of \$29.75 per tonne, and a seven percent discount rate, these 2.64MtC have a net present value of \$63 million.

<b>Carbon stock change from logging across 2022–30 (MtC)</b>	-2.64
<b>Australian carbon credit unit spot price (per tonne of CO<sub>2</sub>, October 2022)</b>	\$29.75
<b>Net present value</b>	\$63 million

**Table 4** Net present value of carbon stock saved due to not logging (2022–30)

**Source** [Fenner School of Environment and Society, The Australian National University](#)

## The carbon stock potential of the wet forests

Ending the logging of the wet forests prevents the release of ancient carbon back into the atmosphere, and allows them to grow—maintaining a [vital source](#) of carbon storage and carbon sequestration (the ability to capture and store atmospheric carbon dioxide). While it is widely [acknowledged](#) that both preserving and increasing carbon stocks (the amount of carbon sequestered) in forests is a vital component of mitigation, there is also great economic value in preserving the wet forests for this purpose.

Estimates suggest that Victorian parks could capture and store [21,000 tonnes of CO<sub>2</sub>-e](#) annually through [revegetation](#) programs. Conversely, it has been shown that logging reduces carbon stocks in native forests [more than wildfires](#).

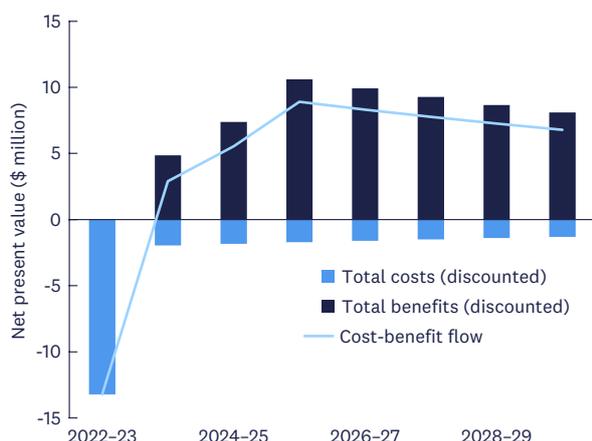
The carbon storage and sequestration capacity of the wet forest of the Central Highlands, in particular, is tremendous. These forests contain the highest density of carbon globally—storing around [1,867 tonnes](#) of carbon per hectare. Moreover, recent models have proposed the volume of carbon is [two to five times higher](#) than earlier estimates.

Despite this immense capacity, the majority of native trees logged go into the [pulpwood and woodchip stream](#), which have [short lifespans](#). The wood then decomposes rapidly, [releasing carbon dioxide](#) back into the atmosphere not long after they have been felled. The current rate of release of carbon dioxide is overwhelming our natural carbon sinks or ‘pools’—like forests, lakes, and oceans. With ecosystems like the Central Highlands wet forests—where mountain ash trees can live for more than [500 years](#)—not felling them now means they can capture and store carbon dioxide for longer, staggering the release of emissions.

The state government is investing somewhat in carbon capture potential through [The Climate Change Strategy 2021–2030](#). However, this investment seems counterintuitive when continuing to log the most carbon-dense region. More needs to be done if we are to seriously grasp the potential economic gain. Australia is the [fourth-best](#) country in the world for forest restoration—one of the [most effective](#) means to mitigate climate change. Ceasing logging and utilising the region for carbon storage highlights a great opportunity for Victoria economically and environmentally.

# Tourism

The tall wet forests within the Central Highlands provide a unique tourism opportunity for Victoria, given their ecology and proximity to Melbourne. Our analysis estimates that increased tourism to the region could provide a value of \$58.7 million with a total cost of \$24.5 million over eight years. This equates to a net present value of tourism for \$34.2 million across the eight years.



**Figure 5** Cost-benefit flow of tourism in the Central Highlands, Victoria (2022–30)

**Source** Blueprint Institute Analysis

**Note** A seven percent discount rate is applied.

This scenario includes an initial investment of \$13.2 million for construction-related costs in the first year—with construction to take place across the first three years. Converting the area for tourism would include the building of park boundaries, multi-day walks, and core infrastructure—including campgrounds, car parks, signage, picnic spots, and amenities. Cost estimates for each of these line items are detailed in the Appendix.

Ongoing costs related to park maintenance and staffing would be approximately \$2.1 million annually. As seen in Figure 5, projected tourism revenue in present-day dollars for 2023–24 is expected to be \$4.9 million which will increase to \$7.4 million in 2024–25, and will reach \$10.6 million in 2025–26 as the park completes construction stages. This equates to \$2.9 million, \$5.5 million, and \$8.9 million in profit respectively when discounting relevant costs.

There is clearly significant potential to monetise the forests in a manner that preserves its unique ecology and natural values. Increased tourism

revenue would be of enormous economic and social benefit to the surrounding regions. Moreover, beyond visitor spending, further non-market benefits—such as improvements to mental and physical health, aesthetic value, and the protection of native habitats and species—add intangible value to the tourism proposal.

## Assessing the tourism potential of the Central Highlands

The wet forests of the Central Highlands are Victoria's [richest ecological asset](#), attracting millions of domestic and international tourists each year. Home to the mountain ash, the largest flowering tree on the planet, these wet forests offer a valuable point of difference compared to other nearby parks. The potential economic value derived from eco-tourism is significant. However, this is being imperilled by continued logging, which threatens the survival of these critically endangered forests.

Tourism directly contributed [\\$5.4 billion](#) to the Victorian economy in 2020–21, despite being down 63.4% from the revised pre-pandemic 2018–19 estimate of \$14.6 billion. When including indirect contributions from tourists, this pre-pandemic estimate doubles to \$29.4 billion. Levels of employment in the sector also saw a significant decrease over the pandemic, dropping by 39.7% from 139,000 jobs in 2018–19 to 109,800 in 2020–21. However, this pandemic-induced decrease in tourism revenue and employment is only temporary, and provides an opportunity for Victoria's tourism industry to regrow stronger if it can capitalise on the returning tourist market.

Preserving forests for the purposes of tourism and outdoor recreational activities has achieved great success internationally. In the United States, the [1964 Wilderness Act](#) designated 54 zones of land to be wilderness areas—a total of nine million acres. Today, this has expanded to [803](#) wilderness areas that cover a total of 111.7 million acres across 44 states. Across America, eco-tourism and outdoor recreation generates [\\$862 billion](#) in economic output and 4.5 million jobs nationwide. At home in Australia, Tropical North Queensland and Townsville saw [\\$4.4 billion in visitor expenditure](#) and a total of 4.4 million visitors in 2019, with the national parks

regions receiving 536,000 visits annually from domestic overnight visitors alone.

Although briefly causing a lull in visitors, COVID-19 lockdowns have [increased](#) the value Melbournians place on their natural environment, and could result in greater visits to national parks compared to pre-pandemic levels. Before the pandemic, tourism was growing steadily in the region—tourism gross value added increased by 4.1% between 2018 and 2019. The most popular recreational activity by tourists included outdoor and nature-based activities. Overall, [18.8 million visitors](#) to Victoria (or 64% of visitors)

participated in nature-based activities in 2019.

Nearby parks, too, have seen recent success in expanding their tourism capacity. In late 2021, the new Grampians Peaks Trail completed construction at a total cost of \$33 million. Within the first month of opening, the Peaks Trail campground received [1,400 reservations](#), with local businesses already planning to hire more staff to cover the increased capacity. By 2025, the park is expected to generate \$6.39 million in value for the local economy as more than 34,000 visitors walk the trails.



# Water

The Central Highlands is home to the [majority](#) of Victoria's water storage reservoirs—including the Maroondah, O'Shannassy, Upper Yarra, Thomson, and Tarago reservoirs. The total storage capacity of the five reservoirs within the Central Highlands is [1,331GL](#). These reservoirs supply water for Melbourne's population of [five million](#) people.

Logging in the wet forest ecosystems of the Central Highlands has a significant impact on the quantity, quality, and seasonal variation of water flows that make up the total supply. Uninhabited forests absorb water, storing it in periods of abundance for release during dry periods. A tree becomes a natural storage container for water through its soil absorption properties, releasing it via its leaves during the evapotranspiration process. Logging disrupts this process and consequently impacts water yield, which refers to the average amount of freshwater that runs off in an unregulated watershed—such as a stream or river—over a specified period of time.

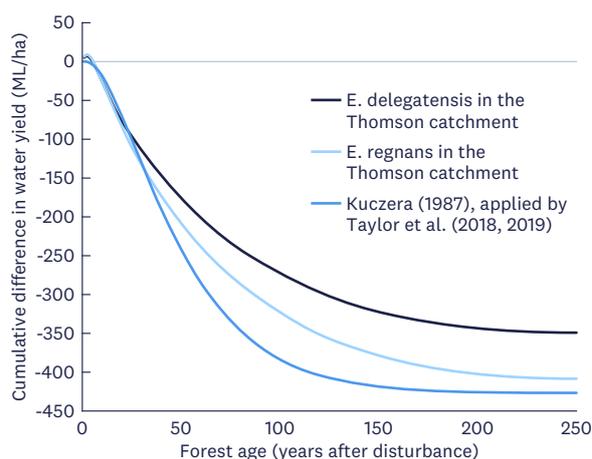
Quantifying the economic value of the increased water yield resulting from an end to logging activities is complicated by the number of environmental variables. Moreover, any impacts can take decades after the period of disturbance to eventuate, meaning an analysis such as ours, which covers only eight years, cannot fully capture the lasting impacts of disturbances to water catchments. As a result, the benefits of not logging on water yield was not factored into our cost-benefit analysis, as it would severely underrepresent logging's detrimental ramifications for water supply.

The Thomson reservoir stores roughly [60% of the water](#) supplied to Melbourne. A catchment collects rainwater, and naturally funnels it into streams and rivers—which feed further waterways, lakes, dams and water reservoirs. Forests play an essential role in filtering the water before it reaches storage reservoirs. When vegetation is removed from a steep slope its filtering capacity becomes nowhere near as effective. VicForests are prohibited from harvesting timber on slopes [greater than 30 degrees](#), as this can cause sediment run-off which can severely jeopardise the water security of Australia's second-largest city. However, VicForests [have systematically violated this regulation](#). Furthermore, the body

charged with ensuring VicForest comply with environmental regulations has been [proven ineffective](#) in a report published by the Office of the Conservation Regulator. The unscrupulous nature of VicForest and their history of thwarting regulations compounds the sense of urgency to bring an immediate end to native logging.

Furthermore, [there is a direct correlation between the age of a forest and the water it produces—catchments with old-growth ash forests yield almost double the water every year, compared with younger forested catchments. Logging hinders the water yield capacity of forests.](#)

In the Thomson catchment, logging could result in an annual [loss of over 14,00ML in water yield by 2030](#). Importantly, logging activity in the catchment can have a significant impact on water yields far into the future (see Figure 6). If logging were to have halted in 2019 in the Thomson catchment, by 2090 there would be [34,059ML in additional water yield gains](#) every year.



**Figure 6** Difference in cumulative catchment water yield with age, compared with a mature forest, for *E. regnans* and *E. delegatensis*

**Source** [Hydrology and Risk Consulting Pty Ltd, Natural Hazards Cooperative Research Centre](#)

**Note** Trajectories are designed as used in a [2008 study](#) by Salkin for the Thomson catchment (fitted to Macaque model outputs), compared with the Kuczera curve, which was applied in a later [2019 study](#) by Taylor et al. for all species of ash in the Thomson catchment.

Figure 6 compares previous studies which have examined the impact of native logging on water yield within the Thomson catchment. [A 2019 study](#) by Taylor et al. used a form of modelling known as the Kuczera curve. The authors

argued that ceasing logging in 2019 would, after 45 years in 2065, result in an additional 217ML/ha in cumulative catchment water yield. By comparison, the 2008 study by Salkin concluded that there would be a difference of 162–191ML/ha across different species over the same 45-year period if logging had ceased in 2009–10.

If native forest logging in the Central Highlands was economically viable, it would perhaps make the losses to Melbourne's water supply more palatable. But as our cost-benefit analysis indicates, the native forest logging industry is economically unsustainable. It is therefore in the public interest to leave these forests undisturbed.

## The burning bush—Heightened risk to water yield posed by bushfires

Bushfires can have a devastating impact on water yield. As stated above, the catchments which provide water to Melbourne's five million residents “act like large and very cost-effective water treatment plants, slowly filtering rainfall through the soil before releasing clean water back to rivers and reservoirs.”

However, sourcing water this way makes catchments vulnerable to periodic disturbances caused by bushfires, which can have a significant impact on drinking water quality. After a severe fire, the catchment's ability to filter water is compromised and contamination from soil and ash can follow, resulting in undrinkable water. The risk to the Central Highland catchments is severe. The steep terrain makes these catchments particularly susceptible to post-fire erosion, leading to sediment loads more than 100 times greater than normal. A large fire in the wrong part of the catchment could jeopardise the water security of Melbourne's population. Desalinated water cannot supply the volume that would be required if a fire contaminated the Thomson catchment. Even if desalinated water was a viable option, it comes with considerable environmental and economic cost, due to the tremendous amount of energy needed.

Scientists have shown a positive relationship between logging, and heightened risk and severity of bushfires. Research following the 2009 Black Saturday fires, which affected 28% of Melbourne's total forested catchment area, showed that logged areas were seven times as exposed to the risk of high-severity fire 10 years after logging. One study argued that total reduction in post-fire streamflow across Melbourne's catchments 100 years after the 2009 bushfires was estimated at 12–24GL per year.

Analysis following the 2019–20 bushfires—which burnt over ten million hectares—showed that in some places the risk of high-severity fire was 25% greater in logged forests relative to intact forests. The fires were quickly followed by intense rainfall, which triggered widespread increases in erosion and sediment transport in waterways.

Reduced annual rainfall and increasing temperatures caused by climate change are expected to increase the frequency and severity of bushfires. The elevated fire risk posed by logging is alarming given the devastating ecological consequences of bushfires and risks to communities and water supplies.

# Limitations

## Status quo

Our projection of the net present value of VicForests’ profits, should they continue to log the region up to 2030, is \$38 million. This should be interpreted as an upper bound.

We have made assumptions favourable to VicForests. We have allocated the maximum [harvest level](#) to VicForests, greater than the volume currently harvested. Additionally, harvest volumes have been subject to a decade-long downward trend. Harvest volumes are certain to fall further from 2024. However, because the precise trajectory of the draw-down has yet to be released at the time of writing, we have used the maximum harvest level throughout the eight-year period (2022–30).

Due to the lack of publicly available data with sufficient resolution, our estimate of the future cost of VicForests’ operations in the Central Highlands were based on historical VicForests financial data for costs incurred Victoria wide. Employing the assumption that costs sustained in a given region were roughly proportional to the fraction of sawlog harvested within the region, we were then able to scale the Victoria-wide figures to appropriate levels.

It is very likely that this process resulted in an underestimate of VicForests’ future costs. This is because the most suitable areas for logging—the areas with the greatest timber yields, close by to mills and accessible from existing roads—have already been logged. It is precisely these areas that were associated with the relatively low costs of the past. What has yet to be logged is not only subject to [diminishing yields](#), but will also require progressively greater harvesting and haulage costs to access. Additionally, surveying costs are likely to rise, given [recent](#) legal rulings against VicForests.

## Carbon

The net present value of additional carbon sequestration, in the event native timber logging ceases immediately, varies substantially depending on the carbon price used (Table 5).

Carbon price	Net present value of additional carbon sequestration
ACCU spot price	\$63 million
Emissions Reduction Fund price	\$37 million

**Table 5** Difference in the net present value of carbon stocks in the Central Highlands native forests, by carbon price (October 2022)

**Source** [Australian Carbon Credit Unit](#), [Emissions Reduction Fund](#), Blueprint Institute Analysis

We have elected to use the higher [Australian Carbon Credit Unit](#) spot price in our cost-benefit analysis as it is a marginal price, as opposed to the [Emissions Reduction Fund](#) average price.

We derived the change in carbon stock based on a 2018 [study](#), before the government announced the phaseout of native logging from 2024. Since harvest volumes during our study period will be substantially lower than in the past, the change in carbon stock due to these reduced levels of logging will likely be lower.

## Sensitivity analysis

We conducted a sensitivity analysis to ensure our results were robust to variance in discount rates, timber prices, and harvest volumes. Since our baseline harvest volume projection was already a significant overestimate and an upper bound, we have only conducted a sensitivity analysis with respect to low future logging volumes (Table 6b, 6c).

Low discount rate	Base discount rate	High discount rate
5%	7%	9%

**Table 6a** Sensitivity analysis—Discount rates

**Source** Blueprint Institute Analysis

Timber outputs	Low future logging volume (m <sup>3</sup> )	Low timber price (-15%)	High timber price (+15%)
Sawlog (D+ grade)	120,000	\$105/m <sup>3</sup>	\$142/m <sup>3</sup>
Pulplog	340,000	\$65/m <sup>3</sup>	\$88/m <sup>3</sup>

**Table 6b** Sensitivity analysis—Timber outputs

Source Blueprint Institute Analysis

	Baseline (seven percent discount)	Five percent discount	Nine percent discount	Low future logging volume	Low timber price (-15%)	High timber price (+15%)
<b>Benefits (millions)</b>	\$487	\$518	\$459	\$395	\$487	\$487
<b>Costs (millions)</b>	\$428	\$454	\$404	\$341	\$376	\$480
<b>Net present value (millions)</b>	\$59	\$65	\$54	\$54	\$111	\$7
<b>Benefit-cost ratio</b>	1.14	1.14	1.13	1.16	1.3	1.01

**Table 6c** Sensitivity analysis—Results

Source Blueprint Institute Analysis

In all cases, the net present value of immediately ceasing native timber logging remains positive, indicating our results are robust. Relative to the baseline, there is little variance in results in response to differing discount rates and logging volumes.

Our results are considerably more sensitive with respect to variance in timber prices. A substantial

increase in timber prices in the range of 20+% could tip the net present value of ceasing native timber logging into the negative. However, the significance of this finding should not be overstated. It is not only extremely unlikely that timber prices remain permanently elevated, but we have also made a range of assumptions favourable to VicForests bottom line throughout the cost-benefit analysis.



# Appendix

## Modelling for status quo of logging through to 2030

Our status quo scenario assumes continued native timber logging in the area defined by the Central Highlands [Regional Forestry Agreement](#) through to 2030, at which point, according to the Victorian government’s [announcement](#), native timber harvesting will cease.

The [Victorian Forestry Plan](#) currently calls for maintenance of existing timber supply contracts until 2024. From 2024 to 2030, the Victorian government plans to gradually phase down native timber harvesting levels.

Unfortunately, a detailed trajectory of the native timber phasedown has yet to be made publicly available at the time of writing. In the absence of this information, we have elected to base our projections of native timber harvesting in the Central Highlands on the most recent [harvest level forecast](#), as published in August 2021.

This forecast sets out the maximum D+ grade sawlog volume available for harvesting in each financial year in the Central Highlands region at 108,000 cubic metres of ash species, and 52,000 cubic metres of mixed species.

Ash sawlog (m <sup>3</sup> )	Mixed species sawlog (m <sup>3</sup> )	Pulplog (m <sup>3</sup> )
108,000	52,000	450,000

**Table 7** Maximum allowable harvest levels per financial year in Central Highlands RFA (2022–30)

**Source** [Department of Jobs, Precincts, and Regions](#), Blueprint Institute Analysis

Our modelling assumes the maximum volume of sawlog is harvested each year until 2030. Pulplog is predominantly a [residual by-product](#) of the harvesting process after higher-grade products such as sawlogs have been segregated. As such, we have calculated pulplog volume at 450,000 cubic metres per year, derived from the [historical relationship](#) between pulplog and sawlog yield.

Sawlog (D+ grade, \$/m <sup>3</sup> )	Pulplog (\$/m <sup>3</sup> )
\$126	\$78

**Table 8** Average price of hardwood native D+ sawlog and pulplog (FY2020–21)

**Source** [ABARES](#), Blueprint Institute Analysis

Price estimates for hardwood native timber were calculated using [data](#) from the Department of Agriculture, Fisheries, and Forestry, inflated to 2022 price levels using the [producer price index](#) for wood product and pulp, paper, and converted paper product inputs.

Cost projections for harvesting operations were based on VicForests’ [2020–21 annual report](#), adjusted for inflation. Due to the absence of publicly available financial information with a finer resolution, we used the proportion of sawlog volume harvested in the Central Highlands as a proxy to scale VicForests’ Victoria-wide costs to a level consistent with our study area.

Our projected harvest levels—and the associated sales revenue—should be interpreted as a strict upper bound. That is to say, revenue derived from native timber harvesting in the Central Highlands will assuredly be substantially below our projections. Harvest levels have fallen precipitously over the past decade, continuing a long-term downward trend. As of 2019, the Central Highlands yielded just [112,000 cubic metres](#) of ash and [45,000 cubic metres](#) of mixed species sawlog. And, as mentioned above, the Victorian government plans to further phase down harvesting levels from 2024. Moreover, an unexpected event such as a bushfire could again drastically reduce the amount of harvestable timber, as has occurred in the past.

We made a deliberate choice to calculate an upper bound in order to show that, even with favourable assumptions, native timber harvesting in the Central Highlands does not constitute an optimal use of the land.

Input	Value
Discount rate	7%
Native logging ceases	2030
Revenue from expected logging	\$54,126,800/year
Other income	\$8,977,321/year
Production expenses	\$32,911,430/year
Roading expenses	\$4,877,415/year
Regeneration expenses	\$1,427,205/year
Labour costs	\$8,442,314/year
Depreciation and amortisation	\$4,061,468/year
Other operating expenses	\$5,456,822/year

**Table 9** Status quo inputs for native logging in the Central Highlands

**Source** Blueprint Institute Analysis

## Carbon

Our valuation of additional carbon sequestration as a result of ceased native timber logging in the Central Highlands was based on a [2018 ANU study](#). The study also focused on the Central Highlands region and used spatial data to determine the effect of logging on carbon stocks.

In the event of continued logging from 2016 to 2065, the study estimated regional carbon stocks would decrease by a total of 16.48MtC, or around 330,000 tonnes of carbon per year.

Valuation of this amount of carbon sequestration is unavoidably imprecise. There is no one uniform carbon price in Australia, and the trajectory of prices is subject to market fluctuations and unpredictability. During its most recent auction in April 2022, the average price per tonne of contracted carbon abatement was [\\$17.35](#). By contrast, Australian Carbon Credit Units were auctioned at a spot, or marginal, price of [\\$29.75](#) in October 2022.

Carbon prices	Values
Australian Carbon Credit Unit marginal price	\$29.75
Emissions Reduction Fund average price	\$17.35

**Table 10** Difference in domestic carbon price (October 2022)

**Source** [Australian Carbon Credit Unit, Emissions Reduction Fund](#), Blueprint Institute Analysis



# Tourism

Construction projects include the building of park boundaries, multi-day walks, and core infrastructure. Estimates for each of these line items are detailed below.

Variables	Value	Units
Area	60,000	hectares
Park infrastructure	12	\$/hectare
Trail	50	kilometres
Trail cost	200	\$/metre
Maintenance	5	\$/metre
Boundary	500	kilometres
Boundary fencing	5,000	\$/kilometres
Construction timeline	3	years
Park worker average wage	80,000	\$/year
Park workers required	20	workers
Visitors in Year 1	40	% of total visitors
Visitors in Year 2	65	% of total visitors
Visitors in Year 3–8	100	% of total visitors
Visitors	100,000	visitor nights
Visitor spend	130	\$/visitor night
Discount rate	7%	
Years	8	

**Table 11** Tourism modelling inputs

**Source** Blueprint Institute Analysis

The establishment of a 50-kilometre trail would cost \$10 million assuming an estimated cost of \$200 per metre—modelled on the construction of the [Grampians peak trail](#) which cost an average of \$192 per metre.

Core park infrastructure such as tracks, signage, interpretation signs, picnic sites, and campsites are vital to attract increased tourism. We have inferred a cost of \$12 per hectare based on a [relevant case study](#). Therefore, assuming an area of 60,000 hectares, (the area of mountain ash forest currently assigned to VicForests) a \$720,000 initial investment would be needed in the construction of core park infrastructure.

A cost of \$5,000 per kilometre was used to estimate the expenditure involved in the construction of a boundary fence. This figure was derived from examples of [previous park establishments](#). Assuming a boundary of 500 kilometres, the cost would be \$2.5 million. For this, and all initial construction projects listed above, we assume a three-year timeframe—consistent with [previous, comparable modelling](#).

