

**INQUIRY INTO LONG TERM SUSTAINABILITY AND
FUTURE OF THE TIMBER AND FOREST PRODUCTS
INDUSTRY**

Organisation: South East Timber Association Inc. (SETA)
Date Received: 26 May 2021

SETA Submission to the Inquiry into the Long-Term Sustainability and Future of the Timber and Forest Products Industry

Introduction

The South East Timber Association (SETA) was formed in 1988. SETA members are strongly committed to ensuring public forests are available for a range of commercial and recreational activities and expect land management practices will maintain environmental values in the long term.

SETA expects the government to commit to ensuring forest and related policies strike an appropriate balance between social, environmental and economic outcomes, while minimising adverse impacts of policy changes on regional communities.

Background

Timber and all other forest products produced from natural forests are the most sustainable materials we can use for building, communication papers and other uses, if the overall forest estate is managed sustainably.

We cannot have a sustainable timber and forest products industry, unless the forests and plantations that supply the industry are managed sustainably over the long term. Consequently, the SETA submission will focus largely on the regulatory framework and other matters that negatively impact sustainable forest management across all land tenures, particularly native forests.

Given the interconnective relationship of forests across the landscape, sustainable forest management must be viewed across on both public and private land, including the conservation reserve system. Sustainable forest industries must have a sustainable land base. Since the "Comprehensive, Adequate and Representative (CAR) Reserve System was established as part of the Regional Forest Agreement (RFA) process, there has been an ongoing erosion of the State Forest land base available for timber production. Reservation levels of NSW tall forests, under the RFAs exceeded international benchmarks.

The NSW parks and reserves system current occupies 80 percent of the available public land base. State Forest, including areas reserved from harvesting make up the remaining 20 percent. Ongoing activist campaigns to eliminate all native forest harvesting in NSW and the failure of the reserve system to fully deliver protection of biodiversity, has resulted in successive NSW governments continuing to erode the land base available for timber production.

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

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



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Australian vegetation and many plant, bird mammal and reptile species are dependent on regular disturbance by low intensity fire, rather than irregular, catastrophic disturbance by mega fires.

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

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

Forest fuel management and adequate control of introduced predators and herbivores are essential steps towards genuine protection of flora and fauna, that is currently being decimated by increasingly more frequent mega fire events.

Legislation, Regulations and Supporting Policies

Much of the key NSW regulatory framework is written from a terra nullius view of the NSW natural environment. The current natural environment regulatory framework purports to protect scrubbed up forests in declining health, that are an artifact of more than 200 years of European neglect. The authors of this framework exhibit a failure to understand the effect Aboriginal fire management has had on ecological development in NSW.

The Wilderness Act 1987 underpins the principle of forest being "preserved in its natural state" and supports the terra nullius view, rather than active management practiced by Aboriginal people.

The descriptions of "wilderness" developed by the Department of Planning, Industry and Environment (DPIE) and the National Parks and Wildlife Service (NPWS) are provided in **Appendix 1**. Statements including:

"Wilderness landscapes are a reminder of the Australian environment before European colonisation." and "The Wilderness Act 1987 affords declared wilderness the most secure level of protection, requiring it to be managed in a way that will maintain its pristine condition," are just two of the statements that promote the terra nullius view of the NSW biota.

Recommendation 1

As a first step in environmental legislative reform, it is recommended the Wilderness Act 1987 be repealed.

Forest Industry Road Map, Coastal Integrated Forest Operations Approval and "Protected Areas" Management Plans.

The first pillar of the NSW Forestry Industry Roadmap commits to ecologically sustainable forest management through "regulatory modernisation and environmental sustainability."

Unfortunately, SETA members see changes to the native forest regulatory framework continuing to be driven by an eco-political agenda, rather than a framework guided by a



strong understanding of the historical ecological development, of the biota existing on the Australian continent at the time of European arrival.

The terra nullius approach to environmental management of harvesting operations and adjacent "environmentally sensitive areas" is emphasised by the language of conservation in NSW, including "permanent protection," "permanent retention," "long undisturbed patches" and "wilderness."

Museums have found that permanent protection of artefacts is not always possible when fires, floods and storms intervene. Natural ecosystems, are far more exposed to disasters such as mega fires and storms, as well as more insidious degradation. The Coastal Integrated Forest Operations Approvals (Coastal IFOA) fails to provide appropriate fire management protocols and conditions for those areas deemed to be permanently protected.

The Coastal IFOA, continues a tape measure driven regulatory approach to environmental conservation in areas available for timber harvesting. The authors of the Coastal IFOA Protocols and Conditions have not recognised that most species depend on frequent mild fire to maintain their health, resilience and reproductive potential. Under permanent protection a few common species proliferate at the expense of most others and in the absence of regular mild patch burning, three-dimensionally continuous fuels, that promote devastating megafires, predominate at a landscape scale.

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

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

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

This is just one example of a host of flora and fauna species, adapted to frequent low intensity fire, that are sliding to extinction in a largely unmonitored conservation reserve system.

Recommendation 2

It is recommended that the NSW legislation and regulatory framework relating to the natural environment, including the Biodiversity Conservation Act 2016 be redrafted to remove the "permanent protection" myth and install an active environmental management framework.



Forest Health & Ecosystem Decline

Farmers have long understood the role of soil chemistry in determining the success or failure of farming operations. Soil pH (acidity) and overall fertility are key issues that must be addressed, to grow healthy crops and pastures. Farmers know that increasing levels of available aluminium, manganese, copper and zinc, with increasing soil acidity, means unhealthy or dead crops.

In the case of natural ecosystems, much less research has been done to understand the impact of changing soil chemistry on the underlying health of Australia's native forests. Many public land managers and university academics seem to presume that the soils in a "natural" ecosystem are a constant. In the past decade, research into eucalypt forest health has moved more into researching the symptoms of forest decline, rather than the root causes. It is noted that dieback has markedly increased since the recorded level of low intensity burning in NSW dropped by an average 70 percent in the years since 2004. **See Appendix 2.**



Long Unburnt Eucalypt Forest with Shrubby Understorey. Photo 1 Tree Canopy Dominated by Epicormic Shoots. Photo 2 Dead and Dying Eucalypts.

Research published by, Turner et al 2008¹ found: *"The combined data indicate that changes occur in forest soils when there is a long period of exclusion of fire. It is suggested that these changes generally lead to secondary changes, such as in pH and availability of other elements such as aluminium."*

The NSW government recently announced grants totalling \$1.2 million to undertake further research on forest dieback and decline. SETA members are deeply concerned that recipients



of the funding will continue to research the symptoms, such as increasing bell bird numbers, rather than researching the root causes. Bell birds have been blamed for causing the problem, when all they are doing is increasing in population and area coverage as they respond to favourable browse created for lerps, feeding on fresh epicormic shoot produced by stressed eucalypts and those affected by high intensity wildfires.

There is increasing evidence that a lack of burning (disturbance) contributes to decline in forest health and loss of species that are fire adapted. Increased volumes of ground fuels and more understorey, increase forest flammability and increases the risk of mega fires with resultant biodiversity and community devastation.

A major ecological issue that has received little research effort to date and has not been mentioned by the anti-logging and FRB activist academics, including ecologists, is the fundamental impact that tree decline and mega fires have on the flowering capacity of eucalypts and all the insect, birds and mammals that are totally or partly dependent on flowers for their survival.

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

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

See Appendix 3 for a photographic illustration of the impacts of high intensity bush fires on tree crown health and flowering capacity.

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

Recommendation 3

It is recommended the NSW Government direct recently announced forest dieback research funding on the interaction of low intensity fire on forest soil chemistry and ecosystem health.

Fire Management

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

The fires were twenty years in the making, with a chronic shortfall in fuel reduction burn levels since 2004. The lack of fuel mitigations works combined with drought conditions and a standoff approach to campaign firefighting unpinned the disastrous 2019-29 fire season in NSW.

Role of the Bush Fire Co-ordinating Committee (BFCC)

Section 48 sets out the role of the BFCC and states in part:



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(1) The Bush Fire Co-ordinating Committee:

(a) is responsible for planning in relation to bush fire prevention and co-ordinated bush fire fighting, and

(b) is responsible for advising the Commissioner on bush fire prevention, mitigation and co-ordinated bush fire suppression

SETA members are deeply concerned that the BFCC has failed to ensure the Commissioner or the Commissioner has failed to ensure the necessary levels of bush fire mitigation, particularly in relation to fuel reduction burning, have been undertaken. High fuel loads across the majority of the native forest estate, was a major driver of fire intensity and added to the difficulty of controlling many bush fires.

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

Given the responsibility of the Committee to plan and advise the Commissioner on prevention and mitigation, who on the Committee has the scientific expertise to fully understand the full range of benefits to ensure an appropriate balance is struck between bush fire mitigation and emergency response?

Given the decline in fuel reduction burning across the public and private native forest in NSW, from 2003-04, until the current time, what advice did the Committee, provide to the RFS Commissioners to support a reduction in the average annual amount of FRB undertaken in NSW by 70 percent since 2003-04? **See Appendix 2**

Other factors appear to have also impacted on the desire of public land managers to undertake even miniscule levels of FRB. Forest example, the Forestry Corporation of NSW (FCNSW) reported an all-time low FRB of 2,165 hectares against a grossly inadequate target of 19,662 hectares in 2014-15. This low followed two successful prosecutions of FCNSW by the forest regulator in June 2011 and May 2013. One area was subject to low intensity FRB, outside the planned area in 2009 **See Appendix 4** and the second in 2011.

A simple message from this example is that any manager working under the Coastal IFOA or prior instruments, is potentially subject to prosecution for any planning or operational mishaps, despite there usually being little or no environmental harm. If the manager fails to manage fuel accumulations and serious environmental harm occurs due to a high intensity bush fire, no one is sanctioned. This is just one variant of the precautionary principle in action.

By contrast, in the 1980s, SETA members working for the NSW Forestry Commission were involved in fuel reduction burns with a gross area of 2,500 to 3,500 hectares. With a combination of ground and aerial ignition, an area greater than the total program implemented by the FCNSW in 2014-15, could be treated in one day.

In the 2019-20 Rural Fire Service annual report, the FRB target for NPWS remained at 135,000 hectares per annum. This is less than two percent of the gross area of parks and



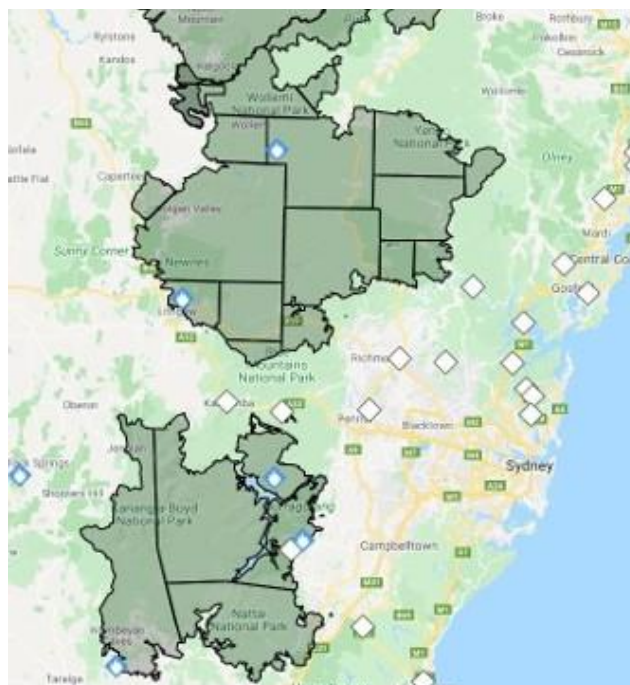
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reserves in NSW. The FCNSW target remained at 21,142 hectares, which is one percent of the gross area of state forests. It is understood these targets are set by the BFCC. As mentioned above, long term fire management experience has shown annual gross areas of FRB need to be 5 to 8 percent of the land base, to adequately mitigate bush fire risk.

The BFCC, the RFS Commissioner and public land managers have chosen to ignore this experience and rely on an aerial force of large air tankers, helicopters and light aircraft. There is no evidence to suggest aerial attack made any difference to the run of any fires under extreme to catastrophic weather conditions. In these situations, most aircraft have to be stood down for safety and other reasons. Yet the total bill for aircraft hire for the 2019-20 fire season was more than \$255 million. **See Appendix 2.** In 2018-17, \$42.5 million was spent by the RFS on Aircraft hire and \$8.79 million on mitigation works.

The NSW Environment Minister and the NPWS now have the ignominious record for the largest fire, ever to have burnt from a single ignition point in Australia. The Gospers Mountain fire started in a remote area of the Wollemi National Park, in forests with heavy fuel loads and ultimately burnt 512,626 hectares, of predominantly national park. Were any aerial resources immediately deployed to this fire, to allow ground crews to contain this fire?

Twenty years ago, UNESCO inscribed the greater Blue Mountains area on the World Heritage List for having “outstanding universal value”. In December 2019 and January 2020, megafires swept through 71 percent of the Greater Blue Mountains area. In December 2020, the International Union for Conservation of Nature (IUCN) — the official advisor to United Nations Educational, Cultural and Scientific Organization (UNESCO), officially downgraded the rating of the Blue Mountains World Heritage site. UNESCO — rated the site as being of “significant concern”, which is the second-lowest category.



Wollemi. Blue Mountains, Kanangra Boyd and Adjoining National Parks. Part of the UNESCO Listed Blue Mountains World Heritage Area. Source: Fires Near Me App 9 February 2020



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Over the past 20 years, wildfires have consumed over 5.7 million hectares of the NSW National Parks and reserves (Figure 1). Together, these fires have covered an area equating to 86.5% of all the native vegetation that is formally set aside in NSW to protect native flora and fauna (Figure 2). The NSW Government has been very slow to acknowledge this issue and is yet to act upon it.

It is clear that the protection claimed to be afforded under the Wilderness, National Parks and Biodiversity Conservation Acts is a fallacy. The key provisions of these Acts, Regulations and supporting policies stand in the way of active and adaptive and sustainable forest management. Sustainable forest management must occur across all land tenures, if there is sustainability from environmental and forest industry perspectives.

The increase in fuel loads across the forest landscape has been one of the key factors unpinning the extent of the 2019-20 bush fires. It remains to be seen if the recommendations relating to fuel reduction contained the *Final Report of the NSW Bushfire Inquiry 31 July 2020*, will have any impact on the current gross deficiency of fuel reduction at the landscape level.

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

CSIRO scientist estimated that the 2002/03 fires in southern NSW and eastern Victoria burnt 2.4 million hectares and killed 370,000,000 (370million) birds, mammal and reptiles. The faunal death toll across Australia in 2019-20 has been estimated at 3 billion (3,000,000,000 - WWF).

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

While estimates have been published on the potential faunal death toll, no information is available to quantify the loss of hollow bearing trees across all land tenures. Under the Coastal IFOA, the NSW Environment Protection Authority (EPA) has and will continue to sanction landowners and forest workers if even a single hollowing bearing tree is felled. Despite hundreds of thousands, if not millions, of hollowing bearing trees being burnt to the ground in the 2019-20 fires, the EPA has not raised an eyebrow to this ecological catastrophe. Given the importance of hollow bearing trees for threatened and other hollow dependent species, the loss of this critical resource must be quantified.

Recommendation 4

It is recommended that there is an investigation into the role of the Bush Fire Coordinating Committee to determine if the Committee has delivered its legislated responsibilities and if not, what reforms are necessary to rectify any sort-comings.



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

Recommendation 5

It is recommended that the NSW National Resources Commission provide funding to undertake research to quantify the loss of hollow bearing trees and ensure the fire authorities and research academics that support minimal levels of fuel reduction burning understand the ecological cost of this position.

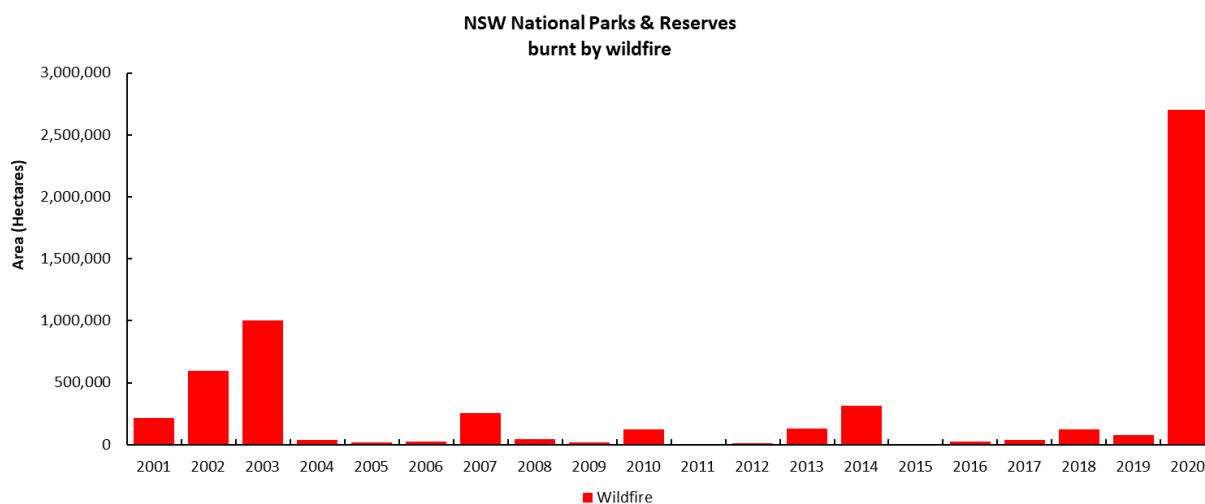


Figure 1 – Annual area of NSW National Parks and Reserves burnt by wildfire over the last 20 years

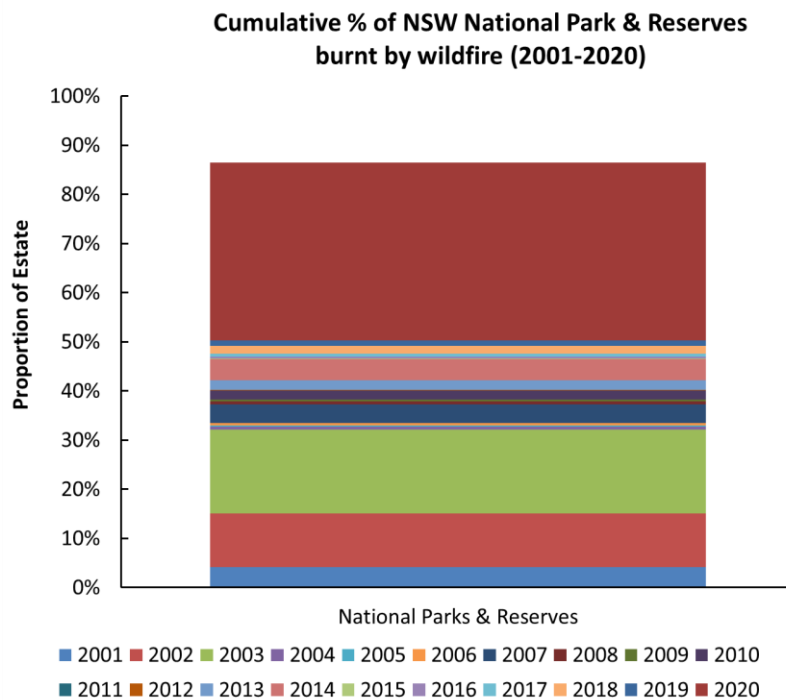


Figure 2 – Cumulative proportion of NSW National Parks and Reserves burnt by wildfire over the last 20 years.

The failure to adequately mitigate high intensity mega fire risk directly affects wood supply available from native forests in state forests and private property. This occurs as more of the conservation responsibility is shifted to these tenures, as Environment Ministers and bureaucrats seek to expand the informal parks and reserves system through instruments such as the Coastal IFOA and the now defunct State Environmental Planning Policy (Koala Habitat Protection) 2019.

Despite the failure of lockup and neglect "environmental protection" measures, Environment Ministers and bureaucrats, with support from ill-informed parliamentary members seek to impose this failed management regimes across all forested land tenure through multiple regulatory and policy instruments.

Climate Change Catchment Water Yield

We are told to expect a hotter and drier as atmospheric CO₂ levels continue to increase. We have expectations that our native forests can store more CO₂, even though stand and understorey density are at unprecedented levels.

There are millions of hectares of post fire regeneration using more water than mature or thinned regrowth native forests reducing catchment water yield from national parks, state forests and private property. Despite a desire to maintain or increase environmental flows, regrowth forests, are left to self-thin. This reduces catchment water yield and individual trees are under greater water stress and grow more slowly than trees in forests that have been thinned. These un-thinned forests take much longer to produce large hollow bearing trees than thinned forests.

Following the 2003 wildfires, CSIRO³ researchers undertook research to determine the potential impact of the bush fires that burnt 700,000 hectares of forest in North East



Victoria. The study did not include the water yield impact of bush fires, which burnt over a million hectares of the main range in NSW and the ACT at the same time as the Victorian fires.

Dr Richard Benyon stated *"The worst case scenario is by the year 2020, there will be a reduction in water yield from that area of about 80,000ML (80,000,000,000 litres) each year. We didn't take into account the affect of change, if there is any change in climate . . . then reductions could be increased."* **See Appendix 5.**

The regeneration from these fires would take up all of the water projected to be returned to the Murray River, as a result of Victorian water saving initiatives over the 20 years from 2003. Despite this advice, there has been no management of this regrowth, or the regeneration resulting from the 2007 high intensity bush fires that affected additional areas of the Murray River catchment. Water quality in high intensity fire affected areas is degraded for years, when wildfires remove all ground cover from ridge lines to riversides.

Western Australian research in the Wungong Catchment near Perth, by the WA Water Corporation has highlighted that increasing catchment water yield by thinning the regrowth, costs about 25 percent of the cost of water produced from desalination and has a range of other benefits. Wildlife ecologists have also highlighted the benefits of thinning for species, including birds of prey. **See Appendix 6.**

Recommendation 5

It is recommended that major thinning and post-harvest fuel management trials be undertaken in State Forests. Monitoring of key environmental parameters are to be monitored with a view to implementation of similar operations in parks and reserves in future. Large scale operations will create additional water flows for responsibly managed environmental flows and commercial irrigation.

Conclusion

The remaining native biota in Australia is trapped in a terra nullius environmental regulatory framework, that will underpin the next wave of flora and faunal extinctions, unless there is a fundamental rethink as to how truly ecologically sustainable management is delivered.

The fundamentalist lockup and neglect non-management approach must be replaced by active and adaptive management, with low intensity ecological burning at the heart.

A recent comment by a ranger working alongside the Australian Wildlife Conservancy, to restore habitat of the Threatened Northern Bettong highlights this critical issue from a traditional owner perspective. He said *"We need to bring the land back to its former glory. The only way to do that is with fire."*

Major blockages to this reform include activist charities who have monetised their environmental views through opposition to any form of native forest harvesting or other commercial use of native forests and opposition to fuel reduction burning.

The charities receive support from activist academics and land managers who also promote a wilderness/terra nullius land management approach and seem to hold the view that every tree is precious, regardless of the overall ecological condition of any grove of trees.



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NSW must take a lead in altering the course of the current ecological Titanic, if we are to avoid another wave of faunal extinctions. Any future climate variability is another reason to act, not a reason to do nothing or continue to implement the same failed ecological policies.

Submission lodged on behalf of the South East Timber Association Inc.

Peter Rutherford BSc (Forestry)

I am available to provide verbal evidence to the inquiry.

References

1. Turner, Lambert, Jurskis and Bi Long term accumulation of N in soils of dry mixed eucalypt forest in the absence of fire Forest Ecology and Management August 2008.

https://www.researchgate.net/publication/240413224_Long_term_accumulation_of_N_in_soils_of_dry_mixed_eucalypt_forest_in_the_absence_of_fire

2. Moore, Ruthrof, Craig, Valentine, St J. Hardy and Fleming

<https://www.publish.csiro.au/bt/BT15004>

3. Benyon CSIRO Forest BioSciences (Full Paper not accessible) See Appendix 5 for more detail.

<https://csiropedia.csiro.au/bushfire-impact-on-water-yields/>



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Appendix 1

Department of Planning Industry and Environment Description of Wilderness

Wilderness areas are large areas of land that remain essentially unchanged by modern human activity. Almost all declared wilderness is within national parks and nature reserves and are actively managed for fire, pests and weeds as are other parts of the reserve system.

Wilderness areas provide a range of ecological, cultural and human benefits to society. They support large populations of plants and animals which can adapt and evolve over time. They contain many significant Aboriginal sites and places. Wilderness landscapes are a reminder of the Australian environment before European colonisation.

Wilderness must be managed in a way that maintains its wilderness values and pristine condition by limiting activities likely to damage plants, animals and cultural heritage.

NSW National Parks & Wildlife Service Description of Wilderness

<https://www.nationalparks.nsw.gov.au/conservation-and-heritage/wilderness>

Wilderness areas are large, natural areas of land which, together with their native plant and animal communities, remain essentially unchanged by modern human activity. They allow the natural processes of evolution to continue with minimal interference, which protects the existing biodiversity in a functioning natural system.

This is important because the loss of species can have adverse impacts on the entire system.

Wilderness areas also often contain sites that are important to Aboriginal people, their landscapes a reminder of the Australian environment before colonisation.

Wilderness areas represent the largest, most pristine areas in the state's reserve system. The Wilderness Act 1987 affords declared wilderness the most secure level of protection, requiring it to be managed in a way that will maintain its pristine condition. Nearly all declared wilderness is within national parks and nature reserves and it is actively managed for fire, pests and weeds.

Worldwide wilderness is a scarce and diminishing resource which needs protecting to ensure it will be available for the benefit and enjoyment of future generations. The declaration of wilderness not only acknowledges the conservation significance of these areas but also their aesthetic and spiritual significance. NSW is one of the few developed places in the world where wilderness still exists and is among the first Australian states to legislate for wilderness protection.



Appendix 2

Area of Annual Fuel Reduction Burning ex Rural Fire Service Annual Reports and Earlier Sources

SOURCE: RFS ANNUAL REPORTS			AREA OF FUEL REDUCTION BY BURNING & MECHANICAL MEANS (Ha)										
Year	Cost of RFS (\$'000)	Fire Mitigation (\$'000)	RFS*	BFMC/PP	NP&WS	FCNSW	Crown Land	Councils	Other Govt	Total FR	Total FRB Only #	Aircraft Hire (\$'000)	
1996-97				570,000						570,000	431,320		
1997-98				660,000						660,000	499,423		
1998-99				570,000						570,000	431,320		
1999-2000				474,009						474,009	358,684		
2000-01				589,319						589,319	445,939		
2001-02				581,825						581,825	440,268		
2002-03				457,947	42,827	54,504	20,624	938		576,840	436,496		
2003-04				178,776	65,451	75,540	2,801			322,568	244,088		
2004-05					36,377	36,403	943	22,652	883	109,885	79,378		
2005-06					32,026	38,008	1,286	31,387	1,388	107,742	71,861		
2006-07					8,892	43,716	911	25,495	1,385	104,238	78,012		
2007-08					21,656	49,514	30,719	2,503	9,701	124,556	98,198		
2008-09					8,897	60,117	30,652	2,456	8,908	123,335	103,686		
2009-10					16,758	95,673	36,216	5,786	4,181	174,706	154,504		
2010-11					7,398	58,092	10,884	4,195	31,573	117,633	74,858		
2011-12					9,702	49,791	19,703	8,677	34,757	138,211	89,884		
2012-13					13,220	209,594	21,468	4,955	20,310	11,945	252,734		
2013-14					10,819	114,154	7,259	4,222	16,066	4,702	136,102		
2014-15					25,957	8,936	116,251	2,165	3,770	15,707	130,911		
2015-16					34,282	11,348	205,889	34,022	8,188	14,864	264,927	\$ 4,267	
2016-17					7,929	7,906	86,942	17,332	5,391	140,646	115,223	\$ 29,355	
2017-18					18,531	10,047	102,121	9,054	14,887	147,626	129,472	\$ 38,405	
2018-19					-	6,187	137,764	34,079	9,144	199,248	184,294	\$ 42,553	
2019-20					-	5,674	29,400	2,811	4,220	55,548	34,189	\$ 255,510	
FR Percentage Reduction 1997-2004 to 2005-2020			72% FRB Percentage Reduction 1997-20-04 to 2005-20								70%		
			Average FR 1997 - 2003 (Hectares)		574,570		Average FRB 1997 - 2003 (Hectares)				434,779		
			Average FR 2004 - 2020 (Hectares)		161,307		Average FRB 2004 - 2020 (Hectares)				131,901		
FR Percentage Reduction 1st to 2nd Decade			42% FRB Percentage Reduction 1st to 2nd Decade								35%		
			Average FR 2000 - 2009 (Hectares)		311,432		Average FRB 2000 - 2009 (Hectares)				235,661		
			Average FR 2010 - 2019 (Hectares)		179,434		Average FRB 2010 - 2020 (Hectares)				153,291		
* RFS fuel reduction areas are part of the land management agency totals.													
# Mechanical FR is not reported separately for 1997-2004. Mechanical & other means averaged 25 percent of the total area fuel reduced from 2005-09. Total fuel reduced areas for 1997-2004 have been discounted by 25 percent to provide a conservative FRB only estimate.													



Appendix 3

Tree Crown Health and Flowering Potential Following High Intensity Bush Fires



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



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



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



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



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Appendix 4

Background to the Office and Environment (OEH) Prosecution of FCNSW June 2013

Forests persecution

Last Thursday's Magnet carried a story on page two about a successful prosecution of Forests NSW by the Office of the Environment and Heritage relating to a hazard reduction burn that escaped into a smoky mouse exclusion zone.

Forestry was fined over \$5000 and ordered to pay the OEH's costs of \$19000.

As a recent retiree from forestry, I know a little bit about the circumstances of the burn that brought about the prosecution, but which didn't make it into the OEH's media release.

It was undertaken in May 2009, just four months after a large wildfire burnt several thousand hectares less than a kilometre to the west in the South East

Forests National Park.

That fire was contained on its eastern edge along Ben Boyd Road, which is the boundary between the National Park and State Forest.

Forestry fire fighters, along with RFS volunteers, worked on that fire for about two weeks, including over the weekend of the Victorian bushfires.

Thanks to their efforts, the fire did not escape from the National Park to threaten the communities of Lochiel and Nethercote less than 10kms to the east.

The "destruction" of a 60ha area of smoky mouse habitat by an escape from a hazard reduction burn in May was nothing to what might have happened but

for the efforts of forestry staff the previous January.

And how does the Environment Department express their gratitude?

By taking Forestry to court and then circulating an inflammatory media release through the local papers.

There had not been a single record of a smoky mouse in the area burnt by the escape since 1997.

In a community such as ours, where there are already widely diverging views on the merits of both Forestry and National Parks, it is unnecessarily divisive and, in the circumstances, offensive, for the OEH to act as it has.

**Brad Hyde
Nethercote**

Media Report of the OEH Prosecution of FCNSW

Forests NSW found guilty of harming endangered mouse habitat



Smoky Mice are rare for a number of reasons. They are fussy about both their food and their habitat, which makes them incredibly rare. Smoky Mice feed on truffles and prefer ridge sites with specific soil and diverse heath vegetation. The species occurs in Victoria, ACT and New South Wales from coastal areas to the escarpment, but the specific combination of all habitat factors is quite uncommon. Suitable habitats are few and far between and so are the mice. Source: National Parks and Wildlife.

Forests NSW has been convicted and fined \$5600 and ordered to pay costs of \$19,000 by the Land and Environment Court after pleading guilty to an offence that resulted in significant potential harm to the habitat of a threatened species on the State's South Coast - the critically endangered Smoky Mouse.

The court ordered that in lieu of paying the fine, Forests NSW is to pay \$5600 towards funding a program to monitor the Smoky Mouse in South East Forest National Park for three years.

The Office of Environment and Heritage (OEH) prosecuted Forests NSW for burning around 60 ha of a 70 ha exclusion zone which was specifically set up to protect the habitat of

the Smoky Mouse, which has since been listed as a critically endangered animal.

The NSW Minister for Environment, Robyn Parker said the O'Farrell Government expects an independent regulatory process, where Government agencies face the same rigorous standards and the same force of law as industry when it comes to environment protection.

"This should not have happened and the loss of a substantial area of this endangered animal's habitat was completely avoidable if the right systems had been in place," Minister Parker said.

"I have reinforced to the Office of Environment and Heritage (OEH) that it should be active as well as

independent in its regulatory obligations to protect the environment - no matter who they are investigating."

This is the first threatened species prosecution of Forests NSW under an Integrated Forests Operations Approval (IFOA), said Lisa Corbyn, Chief Executive of the Office of Environment and Heritage.

"The Office of Environment and Heritage is building an active crown forestry compliance and enforcement program to help protect threatened species, water quality and aboriginal cultural heritage damage from logging."

"This includes undertaking regular spot checks of Forests NSW logging operations and responding to concerns and questions

raised by the community," said Ms. Corbyn.

"In this instance Forests NSW were found to have breached their Threatened Species Licence for the Nullica State Forest which stipulates that around 880 ha of Smoky Mouse habitat is to be maintained in exclusion zones."

"A subsequent investigation by the OEH determined that Forests NSW had lit a post logging burn and did not take adequate steps to prevent it from burning into the nearby exclusion zone," she said.

Forests NSW pleaded guilty to the breach of its threatened species licence in Nullica State Forest and has taken steps to ensure that these types of incidents don't happen again.

The Court heard that

when officers from the Office of Environment and Heritage (OEH) were in the area conducting routine field survey work, they observed a fire burning in one of the Smoky Mouse exclusion zones in Nullica State Forest.

Further investigations revealed that the destruction of the exclusion zone was preventable, and was the result of internal communication breakdowns within Forests NSW.

The Smoky Mouse was listed as an endangered species in 1995 under the Threatened Species Conservation Act.

It was subsequently escalated to Critically Endangered in 2010 as its population and distribution had been reduced to a critical level.



Appendix 5

Herald Sun (Wednesday, 23 January 2008)

THE 2003 alpine fires could reduce flows into the Murray River by more than 80,000 megalitres a year by 2020, scientists have predicted.

And the reduced flows could continue for decades, severely reducing water supplies for irrigated agriculture and towns and cities.

Research by CSIRO Forest Biosciences found forest regeneration after the 2003 bushfires in Victoria's alpine region would significantly decrease water yields from a key Murray-Darling Basin catchment area.

Forest Hydrology principal researcher Richard Benyon said the reduced yields were a result of younger trees using more water and thickening forest coverage.

Dr Benyon said the study focused on the burnt area in the alpine catchment, which supplied 38 per cent of the Murray's water.

"The worst-case scenario is by the year 2020 there will be a reduction in water yield from that area of about 80,000ML each year," he said.

"Because we have had a drought on top of this too, there has been substantially reduced flows already.

"We didn't take into account the affect of change, if there is any change in climate . . . then reductions could be increased."

Fire regrowth drains catchments

Science Alert (Wednesday, 23 January 2008)

While forest fires can often result in an initial increase in water runoff from catchments, it's the forests and bush growing back that could cause future problems for water supplies by reducing stream flows.

In the summer of 2002-03, bushfires burnt through 700,000 ha of forests in northeast Victoria. This region supplies 38 per cent of the water that flows into the Murray-Darling River, the main source of water supply for much of Australia's irrigated agriculture, the city of Adelaide and many towns along the river.

In a country where wildfires are prevalent and water supplies are at a premium, understanding the impact of wildfires on the water catchments is vital. A study by CSIRO Forest Biosciences has helped shed light on how impacts of fires might be more accurately estimated in future.

"Understanding the long-term impact of fires on water yield from major catchments is critical to understanding the long-term security of water supplies to cities, farms and the environment," says Dr Richard Benyon of CSIRO Forest Biosciences.

"The study demonstrated a promising technique for catchment managers to more accurately predict changes in stream flow following wildfire, not only in northeast Victoria, but elsewhere in Australia."

CSIRO remote sensing specialists analysed Landsat satellite images from before and after the 2003 fires to accurately map changes in the forest cover from which changes in water availability were predicted.

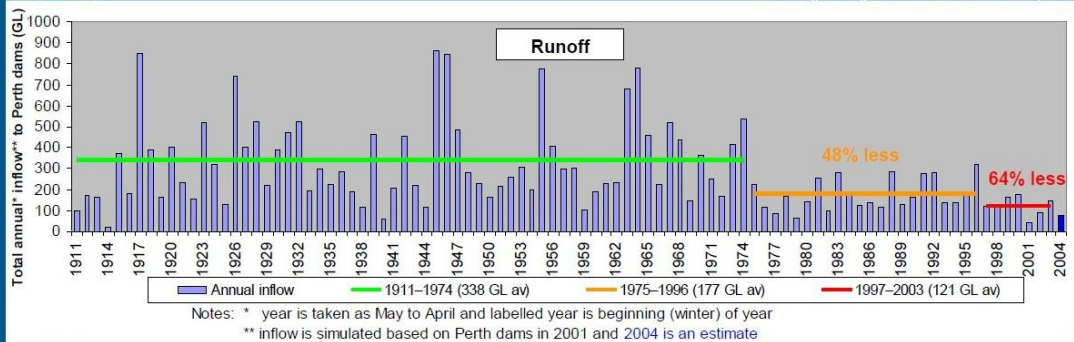
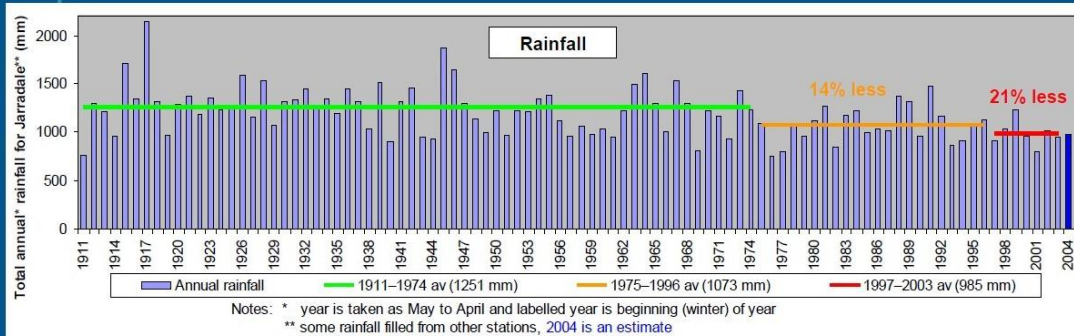
Initially, the loss of vegetation as a result of the fires meant the burnt areas used less water so there was more entering streams because it was not being used by the trees, however, this short-term effect does not last. As the forest grows back and the young trees consume more water, substantial reductions in water yield from the catchment can be expected over coming decades.



Appendix 6

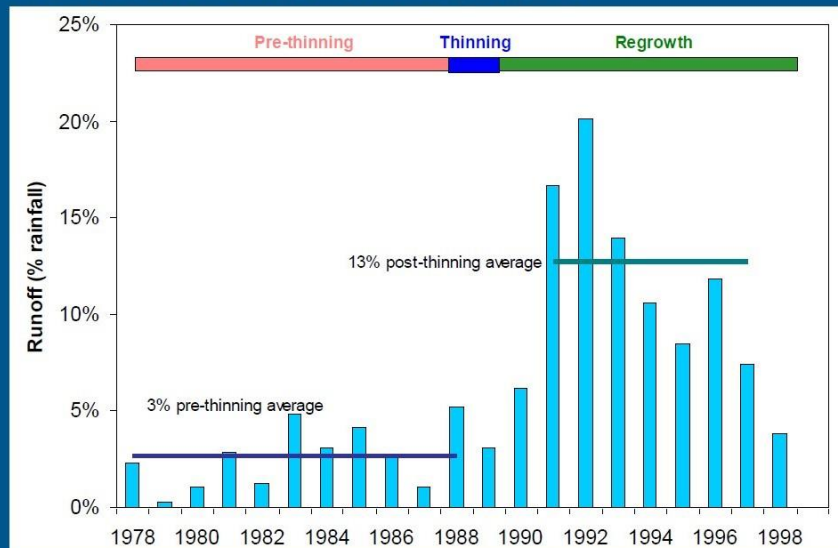
Thinning in the Western Australian Wungong Catchment

A variable and drying climate



Thinning regrowth forest increases runoff

Increase of water yield shown from 60 ha research trial
Thinning from 37 m²/ha to 15 m²/ha basal area



1190 mm rainfall average during study, and no change in salinity

Graph from Higgins research catchment, South West Western Australia



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Thinning improves forest and run-off

Change forest structure towards a mature state



Mature forest (c. 1895)

Good water run-off



Regrowth forest (now)

Poor run-off



Actively managed forest

Improved run-off

Images of northern jarrah forest

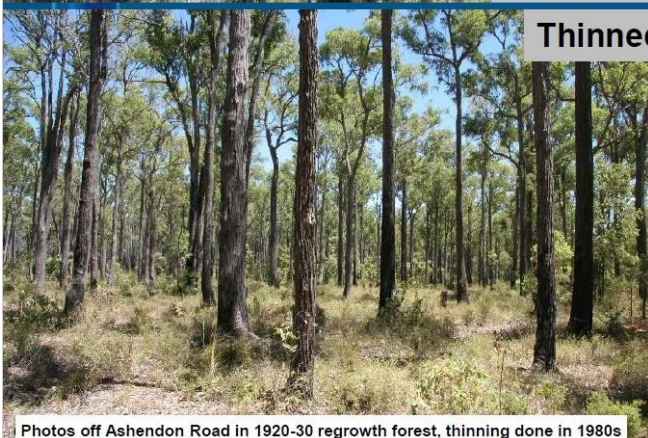


Non-commercial thinning



Colin Terry, 2005

Unthinned (before)



Thinned (after)



- Thinning
- Potential crop tree
- Stump
- Cull tree
- Primary and secondary habitat trees

Adapted from Bradshaw (1987)

Photos by Colin Terry



Photos off Ashendon Road in 1920-30 regrowth forest, thinning done in 1980s

Diagram of non-commercial thinning



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Flora in Wungong Catchment

- Studies by Mattiske Consulting
 - 293 taxon in central and eastern Wungong catchment
 - 28 rare and priority species
 - 3 of the rare species listed as endangered
 - 1 of the rare species is listed as vulnerable
 - Mostly in scarp or near rocky outcrops
 - Unlikely to be damaged
 - Thinning in past forest trial shown not to change flora



Thelymitra stellata

Photos: A.P. Brown, L. & M. Greave

Diuris micrantha

Photos: A.P. Brown, L. & M. Greave & B. Jackson

Photos: Western Australian Herbarium

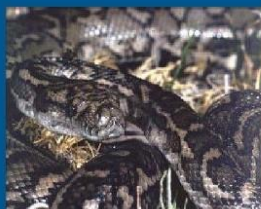


Fauna in Wungong Catchment

- Review of potentially significant fauna by Ninox Wildlife Consulting
 - 211 species could occur (25 mammals, 15 frogs, 47 reptiles, one aquatic tortoise, and 123 birds)
 - 6 listed as rare, threatened or endangered
 - 10 listed as vulnerable
 - threatening processes seen as: fragmentation of habitat, feral animals, loss of microhabitat (eg. logs), more weeds and inappropriate burning regimes



Red tailed black cockatoo



Carpet python (Photo: CALM)



Chuditch (Photo: CALM)



Fauna and habitat trees

- Tree hollows are very important for habitat
- Habitat trees with hollows are good for water
- Thinning will produce larger and earlier hollows
- Marri as good or better than jarrah
- Suitable trees more than
 - 50 cm diameter
 - 110 years old (70 years with thinning)
- 17 species totally reliant for breeding
 - 8 have small home ranges
 - smallest: treecreeper, kingfisher, phascogale
 - medium: rosella, red capped parrots
 - Large: baudins and red-tailed cockatoo, possum



Photo by Colin Terry



Is this anything new?

- Forest management by thinning is **not** new



- ~8000 ha ring barked around Mundaring Weir early 1900s (proposal in high rainfall zone – unlike most of Mundaring)
- 70 ha thinned near Jarrahdale 1928
- tens of thousands hectares ring barked 1930s
- 15 500 ha thinned with hormone herbicide 1960-70s
- tens of thousands hectares thinned using glyphosate since 1987 (typically 3000-4000 ha/year, 43 000 ha to 2000)



Photos: Notching thinning operation by Colin Terry)

Photos (Carl Grant – Alcoa): Cut-stump thinning operation)



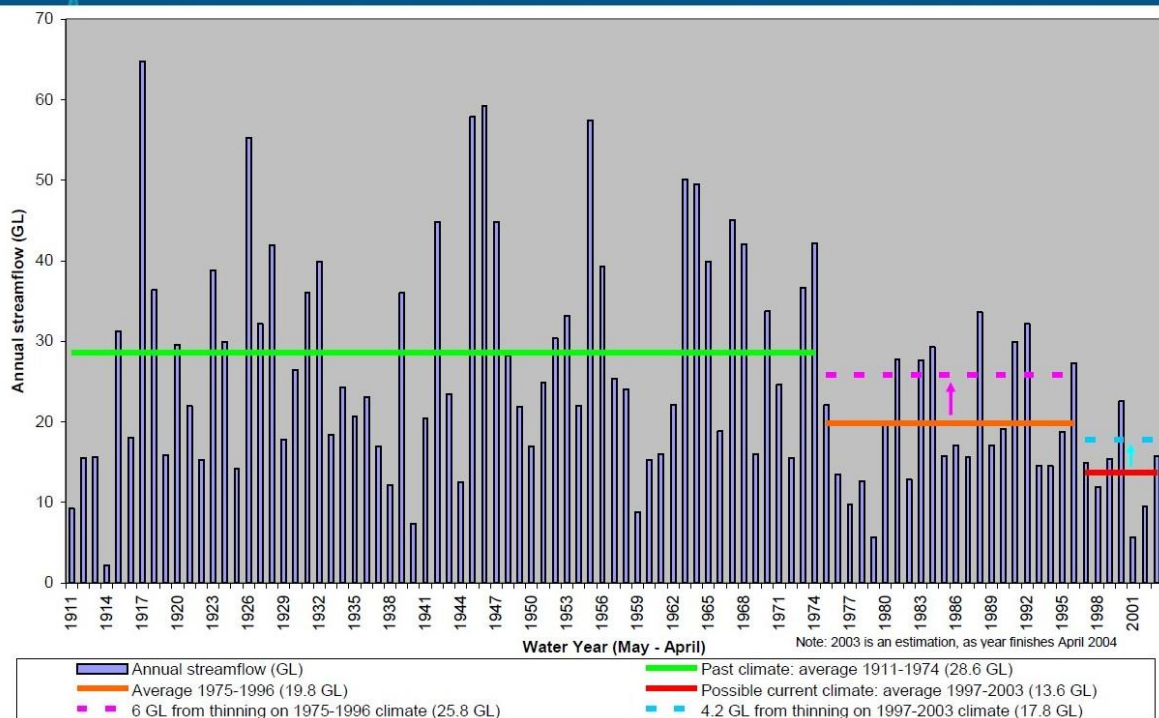
Water, environmental and ecological monitoring

1. Monitoring of Stream Flow, Water Quality and Chemicals
2. Aquatic Flora/Fauna Biodiversity
assessment of macro invertebrates, fish, abundance of dominant aquatic habitats, and stream banks and vegetation status
3. Terrestrial Flora
measurement of change in under story by monitoring diversity, abundance and plant cover
4. Terrestrial Fauna
monitoring of birds, mammals (kangaroos, foxes and mice) and reptiles (snakes and lizards)
5. Remote Sensing
measure change in biomass and leaf area
6. Research on Dissolved Organic Matter, turbidity and colour
7. Dieback mapping



Wungong Catchment streamflow

Impact of proposal on streamflow for different climate scenarios



SouthEastTIMBERassociation



Colin Terry, 2005

Image of thinned jarrah near Jarrahdale (thinned in foreground, with unthinned in background)

Photo by Colin Terry

**Sustainable
catchment
management?**

What do you think?



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