

Forest Fire Management –Hard Won Lessons Almost Forgotten

The Terra Nullius Trap

The landscape management of fire by Aboriginal people over tens of thousands of years has shaped the Australian biota and the Australian landscape prior to 1788. The use of fire by Aboriginal people has been thoroughly documented by Bill Gammage¹ and Vic Jurskis², among others.

As Europeans spread across the Australian landscape, Aboriginal people were forced from their homelands and Aboriginal fire management was lost and replaced with a predominant view that fire was an adversary rather than an ally.

On 10 October 1835 New South Wales Governor, Sir Richard Bourke, issued a proclamation³ that effectively implemented the doctrine of terra nullius upon which British settlement was based, reinforcing the notion that the land belonged to no one prior to the British Crown taking possession of it.

Consequently, the law followed and almost always applied the principles expressed in Bourke's proclamation. This did not change until the Australian High Court's decision in the Eddie Mabo Case in 1992.⁴

This landmark decision gave rise to important native title legislation the following year and rendered terra nullius null and void. Despite this legal precedence, the Australian fire and ecological legislative framework is underpinned by a terra nullius or wilderness perspective.

One example of the impact of the fire exclusion and terra nullius philosophy on forest ecology and consequently, bushfire risk, is documented by Clement Hodgkinson, surveyor in charge of East Bourke and Vice-President of the Philosophical Institute of Victoria. His report to the Victorian Parliament on the Murray River District in 1856⁵ noted:

"A dense underwood pervades much of the box forest, and I may here remark that the forest land generally, both on the New South Wales and Victorian sides of the Murray, is rapidly deteriorating as regards its grazing capabilities, owing to the great increase of scrub and underwood consequent on the partial cessation of the bush fires which formerly checked their growth."

This observation is relevant to a large portion of the NSW forest and woodland landscape and provides evidence that the three dimensional fuel loads, which have become the norm in much of the NSW forested landscape, are an artefact of over 200 years of fire management neglect and are not representative of the of up to 60,000 years of evolution, shaped by the intelligent use of fire in the Australian landscape.

Lessons Learned

With each major bushfire season, resulting in human casualties and/or major asset loss, those in government or responsible for fire management were forced to reflect on why these disasters occurred.

The 1939 Victorian Bushfires Royal Commission was a landmark report in challenging the terra nullius principle of fire exclusion and beginnings of a focus on bush fire mitigation through the use of managed fuel reduction burning. Numerous inquiries and decades of

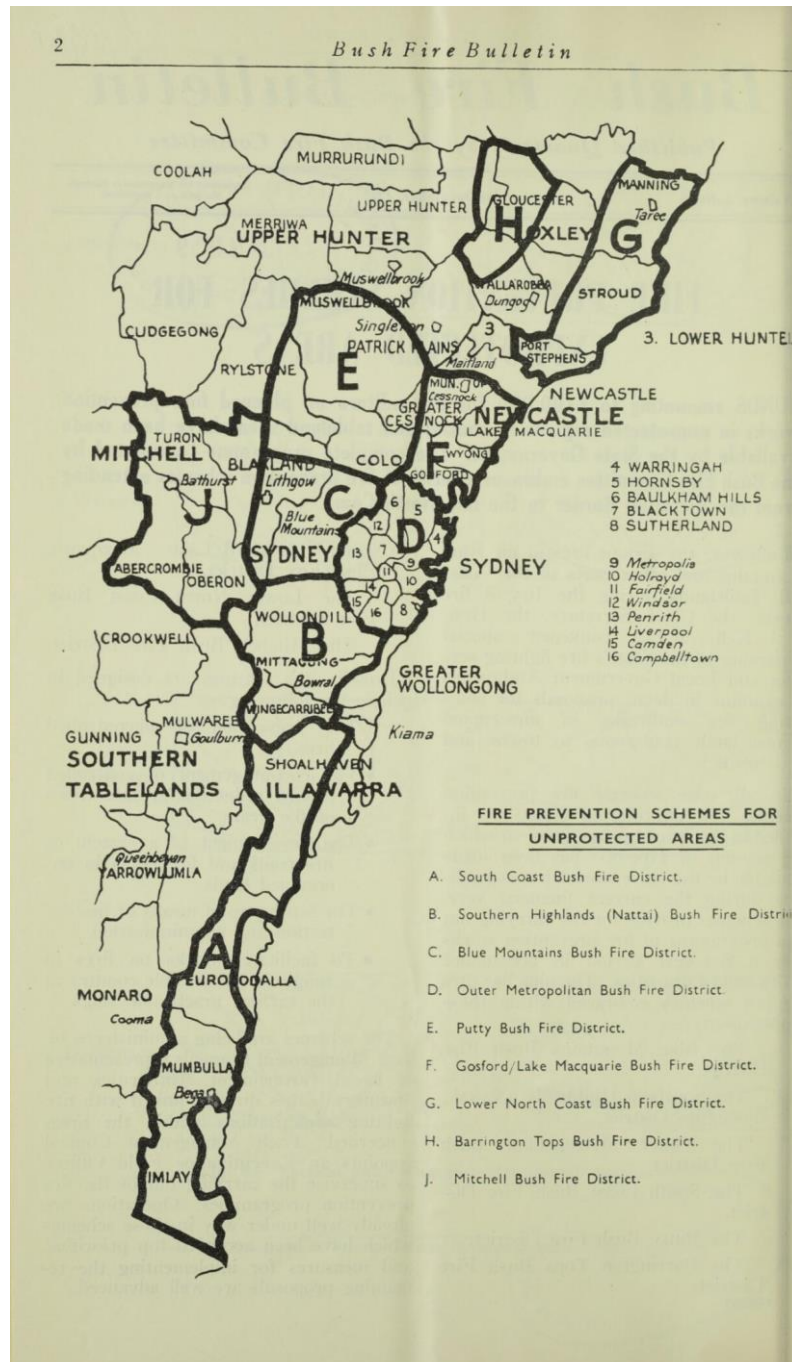


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experience, has confirmed that regular low intensity fire across the landscape has bushfire mitigation, forest health and ecological value.⁶

A More Organised Approach to Bushfire Mitigation in NSW

In NSW, there were large bushfires in south east NSW during 1951-52 and 1953-54. However, moves to undertake bushfire mitigation works on a large scale, including remote areas did not commence until late 1958, when 100,000 pounds (\$200,000) was made available by the state government, to be used on planned fire prevention works in unprotected regions in coastal and tableland areas.⁷ Nine fire prevention schemes were established as shown on the map below.



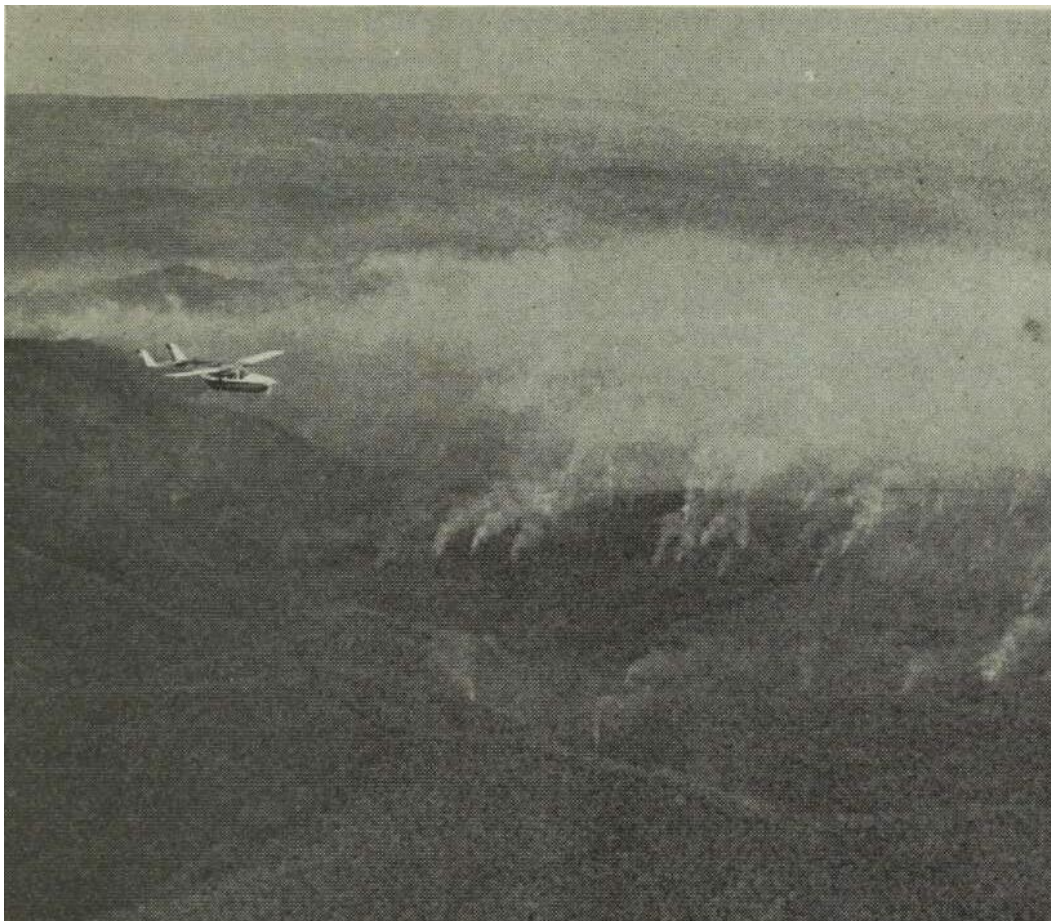
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Annual funding for an initial five year period, was committed, after serious fires in the Blue Mountains and other parts of the coast and tablelands in the summer of 1957-58. The schemes were designed to encourage controlled hazard reduction, develop a system of fire trails and fire breaks, set up fire detection and communication systems and facilitate early attack on fires in rough and inaccessible country.

The schemes were administered by local Management Councils representing Local Government Authorities and Statutory bodies linked with fire fighting bodies in each area. Local Councils and the NSW Forestry Commission, were the key agencies involved in administering the schemes. The layout of the nine schemes were based on surveys, carried out by the NSW Forestry Commission from 1954 to 1957.

By 1970, there were 11 schemes and funding had been maintained at \$200,000 per annum. In the first 5 year period up to 1963, 3,300 miles (5,300km) of fire trails had been constructed. By 1970, with funding continuing at about \$200,000 each year, there were eleven schemes and the fire trail network had increased to 8,046 kilometers.⁸

Following the bad fire season of 1968-69, the focus was shifted from fire trail construction to more fuel reduction, particularly the use of fixed wing aircraft dropping capsules on a grid pattern over extensive areas of forest.



Looking east towards the coast near Bega. The aerial ignition tests of controlled hazard reduction proved that large areas could be quickly treated for 15 to 20 cents per hectare⁹



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In late April and early May 1968, two areas of 4,800 and 5,660 hectares were control burnt from the air. Danny Christopher, executive officer of the South Coast Fire Prevention Scheme, with assistance from officers of the Forestry Research Institute, Canberra, supervised the operation. The areas were bounded by fire trails, which had been fuel reduced prior to the aerial burn. Ground crews identified the boundaries and patrolled the perimeter.

Is More Frequent Low Intensity Fire Better for the Ecological Health of Forests, Than Irregular Large Scale High Intensity Bushfires? Who are the Real Experts?

In June 1972, the first terra nullius opinion was voiced in the Bush Fire Bulletin by two botanists from the Royal Botanic Gardens and National Herbarium Sydney. The botanists were objecting to a number of comments made by a volunteer bushfire brigade member in an earlier article titled Science Fights Bushfires.

The botanists acknowledged that *"The ability of some of the Australian bush, and many species, to "recuperate after fire" is well known. To imply that this characteristic has evolved in the time of human settlement (50,000 years maximum) is extremely unlikely."*

With regard to the effects of high intensity summer bushfires compared to the ecological effects of low intensity fires in other seasons, the botanists expressed the opinion that: *"These will be damaging to flora and fauna (using any definition of "damage")."*

Natural fires generally (if not always) occur during hot, dry, windy weather in summer, or at least the hotter months. It is this regime to which our plants (and animals) are presumably adapted. To state or suggest that winter hazard reduction is a substitute for, or equivalent to, summer wildfire is quite ludicrous. Most plants and animals have growth rhythms which reflect seasonal conditions and to superimpose a completely alien fire regime may well be more devastating than the occasional "10 year" crown fire.¹⁰

These botanists failed to understand that "natural" fires post European arrival have generally burnt in much heavier fuels than was the case under Aboriginal management. Fire intensity, in fine fuels (less than 6mm in diameter) of 20 or more tonnes per hectare (t/ha) is much higher than is the case with fires under the same weather conditions in fuels of 5 to 10 t/ha.

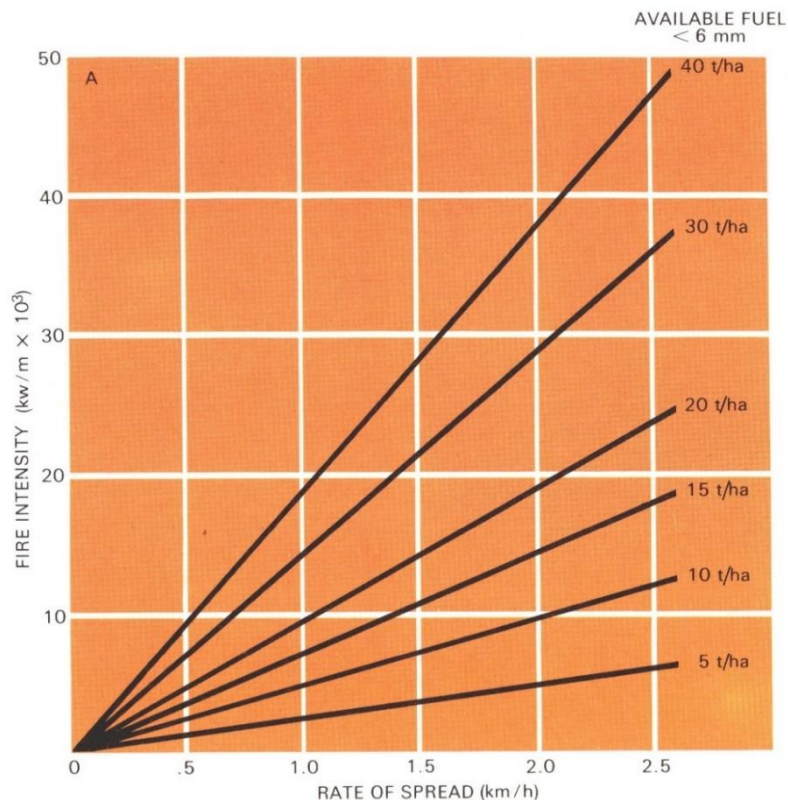
In 1966, A. G. McArthur¹⁰ wrote, *" Many ecologists think of fire as being an all-destroying mechanism, whereas in many instances desirable ecological changes can be brought about by the judicious use of the correct fire intensity. It is unfortunate that little distinction has been made between the damage done by a high-intensity wildfire or firebreak burn, and that done by a prescribed fire burning in the recommended intensity range."*

Today, the failure to understand fire physics and flow-on ecological impacts of repeated (less than 20 year return time) high intensity bushfires appears to continue to be poorly understood by many influential ecologists and fire researchers.

McArthur also noted, *"The New South Wales Forestry Commission has estimated that it requires a prescribed burning programme that covers only one-quarter of the total area of dedicated forest. Thus on a five-year burning rotation a prescribed burning programme covering 5 per cent of the total forest area would be sufficient to provide adequate fuel modification."*



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Increasing Fire Intensity and Rate of Spread of Bushfires, with Increasing Fuel Load¹¹

A fuel reduction burn, under appropriate weather conditions and using an appropriate lighting pattern, should have a maximum heat output of about 500 kilowatts per metre (kW/m) of fire front. Flame height would generally be below 1.2 metres and flame depth would be about 2.5 metres. A bushfire burning in ground fuel loads of 25 t/ha spreading at 1.8 kilometers per hour has the potential to be a crown fire, with a flame depth of more than 60 metres and a fire intensity of about 25,000 kW/m .¹²



The Area inside the Black Square has Material up to 6mm, Equivalent to a Fine Fuel Load of 20.32 tonnes per Hectare. The Fuel Load of 6mm to 20mm is Equivalent to 10.6 Tonnes Per Hectare.



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Changing Critical Skill Levels

From the 1950s until the 1990s, forest managers from the Forestry Commission (FC) of NSW provided the backbone of the state incident controllers and fire line managers in much of the forested areas of NSW. Incident management was decentralised and FC NSW staff worked closely with local government and other stakeholders. As swathes of state forest have been transferred to national parks over the past 25 years, the number of professional fire fighters with strategic and operational decision making skills have declined.

Regulatory Framework

Parallel to the steady wind down in the skilled professional incident control foundation, the Rural Fires Act 1997, centralised bushfire mitigation and control into what has become an emergency response centric frame. Controllers are often far removed from the fire front and emmeshed in a bureaucratic shroud. The remote and layered approval process has inhibited timely and knowledgeable strategic and operational decision making.

Without timely and informed decisions, bushfires that could have been controlled in the initial or intermediate phases, have been managed into uncontrollable mega-fires. During the 2019-20 bushfire emergency, time and again, permission to undertake strategic and tactical backburns was denied for reasons including, "we do not want any more fire in the landscape," "the fire front is too far from the control line" and "we can't hold backburns." Consequently, biodiversity, farmers and rural communities have paid a massive price.

Bushfire Research in the 21st Century - Undoing Forty Years of Applied Science?

Driving through deathly quiet forests in eastern Australia, burnt on an unprecedented scale and intensity in recent years, one might ask what has hundreds of millions of dollars in bushfire research delivered for forested landscapes?

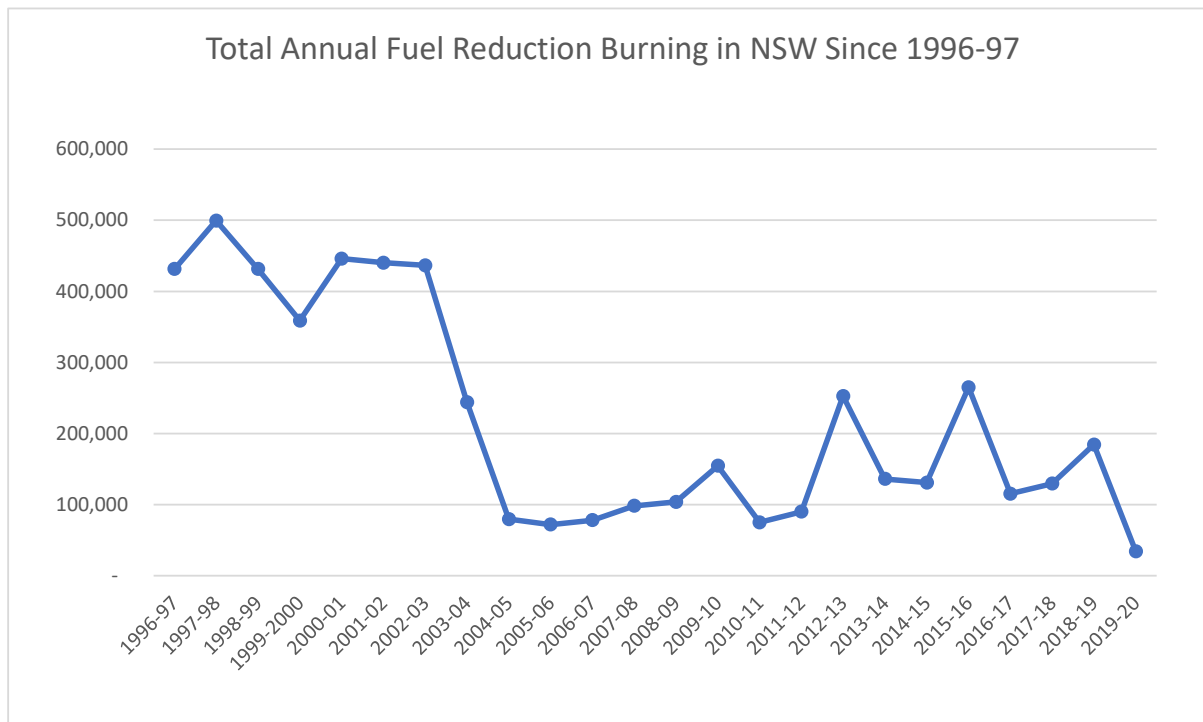
A number of fire research academics have steadily undermined the research findings of earlier generations of scientists such as McArthur. As the detailed assumptions and workings of current computer generated outputs are not publicly available, it is difficult to find fault in models, other than at the final output level. However, some common themes in a significant amount of published research include:

- A primary focus on fire controllability during the blow-up days, to downplay the value of fuel reduction burning in bushfire mitigation and control;
- Ignoring the value of fuel reduction burning in aiding bushfire control on all the other days and nights of the fire season, which are not blow-up days;
- Downplaying the historical record of Aboriginal fire management, to justify a minimal fuel reduction burning policy, focussed adjacent to human assets. This policy has been shown to provide inadequate protection to human assets and results in biodiversity decimation by high intensity bushfires across the landscape;
- A focus on secondary measures such as time since logging or other disturbance, rather than using measurable inputs such as ground fuel loads and ladder fuel structure, to feed into fire spread models.

During the 2019-20 Black Summer bushfires in NSW, many experienced fire practitioners raised the issue of the declining levels of fuel reduction burning in NSW. Data from 1996,



including data from the NSW Rural Fire Service annual reports from 1999-2000, show a decline in the gross area subject to fuel reduction burning in NSW over the past 20 years.



Consequently, forest fuel loads across the broad landscape were at unprecedented levels. Lack of fuel reduction meant charring of rough barked species was minimal, so spotting potential was also at unprecedented levels. Drought conditions meant fuels were fully cured across much of the landscape and fully available for immediate combustion.

Bushfire Mitigation – What do the New "Experts" Say?

Despite this obvious decline in fuel reduction, during an ABC Radio National interview on 7 January 2020, a fire research scientist and landscape flammability expert stated:

"We've got a simple reality. We've got record drought conditions, allowing for fires that have broken all records. So far beyond what we've seen and this comes at the peak of a record period of prescribed burning."

"It's completely false to say that there's been a lack of prescribed burning. Prescribed burning rates have increased markedly in NSW. The last decade has seen more than twice the amount of prescribed burning compared to the decade before and in all the mapped records of prescribed burning across NSW national parks, it's the highest decade."

"All of the studies so far have shown that prescribed burning is effective, if done within about 500 metres of assets."¹³

The graph above and the detailed annual area burnt numbers in the table below show that prescribed burning rates have not increased markedly in NSW. In earlier decades, experienced bushfire fighting managers have seen first hand that fuel reduction in remote and less remote areas has been a key tool in preventing fires reaching human assets.

Despite the failure of land management authorities to undertake adequate bushfire mitigation burning, following the 2019-20 mega-fire season, dotted across the forest



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landscape are patches of green crowned forests and surviving biodiversity, that show fuel reduction burning can make a difference, even on days of catastrophic fire danger.

SOURCE: 1999 on 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		
1996-97				570,000						570,000	431,320		
1997-98				660,000						660,000	499,423		
1998-99	\$78,505			570,000						570,000	431,320		
1999-2000	\$84,129			474,009						474,009	358,684		
2000-01	\$93,200			589,319						589,319	445,939		
2001-02	\$179,218			581,825						581,825	440,268		
2002-03	\$240,989			457,947	42,827	54,504	20,624	938		576,840	436,496		
2003-04	\$141,074			178,776	65,451	75,540	2,801			322,568	244,088		
2004-05	\$152,269		24,390	12,627	36,377	36,403	943	22,652	883	109,885	79,378		
2005-06	\$177,519		15,759	3,647	32,026	38,008	1,286	31,387	1,388	107,742	71,861		
2006-07	\$253,294		13,003	8,892	23,840	43,716	911	25,495	1,385	104,238	78,012		
2007-08	\$223,312		19,517	21,656	49,514	30,719	2,503	10,464	9,701	124,556	98,198		
2008-09	\$247,234		26,443	8,897	60,117	30,652	2,456	12,304	8,908	123,335	103,686		
2009-10	\$316,080	\$7,207	44,531	16,758	95,673	36,216	5,786	16,091	4,181	174,706	154,504		
2010-11	\$307,470	\$12,040	14,717	7,398	58,092	10,884	4,195	31,573	5,491	117,633	74,858		
2011-12	\$286,771	\$6,507	28,748	9,702	49,791	19,703	8,677	34,757	15,583	138,211	89,884		
2012-13	\$374,110	\$10,226	26,408	13,220	209,594	21,468	4,955	20,310	11,945	281,492	252,734		
2013-14	\$412,051	\$6,877	40,319	10,819	114,154	7,259	4,222	16,066	4,702	157,222	136,102		
2014-15	\$311,185	\$4,253	25,957	8,936	116,251	2,165	3,770	15,707	5,329	152,157	130,911		
2015-16	\$326,590	\$5,724	34,282	11,348	205,889	34,022	8,188	14,864	11,089	285,401	264,927		
2016-17	\$357,679	\$8,432	7,929	7,906	86,942	17,332	5,391	19,030	4,045	140,646	115,223		
2017-18	\$371,370	\$8,077	18,531	10,047	102,121	9,054	7,216	14,887	4,302	147,626	129,472		
2018-19	\$585,122	\$8,793	-	6,187	137,764	34,079	3,794	9,144	8,281	199,248	184,294		
2019-20	\$993,031	\$5,427	-	5,674	29,400	2,811	4,220	7,742	5,701	55,548	34,189		
FR Percentage Reduction Between 1997-2004 to 2005-2020					72%		FRB Percentage Reduction Between 1997-2004 & 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		
21 st Century FR Percentage Reduction 1st to 2nd Decade					42%		21st Century 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 1996-2004. Mechanical & other means averaged 25 percent of the total area fuel reduced from 2005-09. Total fuel reduced areas for 1996-2004 have been discounted by 25 percent to provide a conservative FRB only estimate.													

Data in the Table above, from 1999 – 2000 to Present has Been Drawn From NSW Rural Fire Service Annual Reports.

Conclusion

Over the past 20 years, the bushfire mitigation debate has been captured by:

- Career bureaucrats, more focussed on building emergency response empires, than setting and implementing effective levels of fuel reduction burning;
- Academics more focussed on delivering eco-political agendas than quality bushfire science;
- Successive governments that ignore the voices of experienced fire practitioners and accept the flawed advice of 21st century self-proclaimed experts; and
- When the inevitable bushfire disasters occur put inquiries into the hands of the unknowing, advised by those who are part of the problem.

Current evidence suggests that centralising fire mitigation and fire fighting operations under the Rural Fires Act 1997, has failed to deliver improved emergency management outcomes, despite ever growing levels of funding, equipment and air support.



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Our forests, biodiversity, rural property owners, communities and urban fringes will continue to be impacted, more than necessary, by high intensity bushfires, while ever governments choose to ignore the advice of those who understand the management and mitigation of bushfires at the landscape level and instead, accept the advice of the new experts.

References

1. Bill Gammage, The Biggest Estate on Earth – How Aborigines Made Australia; Allen & Unwin 2011
2. Vic Jurskis, Firestick Ecology – Faidinkum Science in Plain English; Connor Court Publishing 2015
3. Governor Bourke Proclamation 1835;
<https://www.migrationheritage.nsw.gov.au/exhibition/objectsthroughtime/bourketera/index.html>
4. High Court of Australia Mabo and Others v. Queensland (No. 2) (1992) 175 CLR 1;
<http://www6.austlii.edu.au/cgi-bin/viewdoc/au/cases/cth/HCA/1992/23.html>
5. 1856 Parliament of Victoria, Report on the Murray River District, in Reference to its Geology, Soil, Prospective Resources, Proposed Means of Inter-communications, Etc; Surveyor Clement Hodgkinson
6. John Turner et al Long term accumulation of nitrogen in soils of dry mixed eucalypt forest in the absence of fire; Forest Ecology and Management June 2008
7. Bush Fire Bulletin, Published quarterly by the Bush Fire Committee; Volume 3 No.6 1st December 1958
8. Bush Fire Bulletin, Published quarterly by the Bush Fire Committee; Volume 8 No. 2 June 1970.
9. Bush Fire Bulletin, Published quarterly by the Bush Fire Committee; Volume 7 No.5 September 1968
10. Bush Fire Bulletin, Published quarterly by the Bush Fire Committee; Volume 8 No. 10 June 1972.
11. A. G. McArthur Prescribed Burning in Australian Fire Control; Australian Forestry, Volume 30 Issue 1 1966
12. R. H. Luke & A. G. McArthur, Bushfires in Australia; Australian Government Publishing Service Canberra 1978
13. ABC Radio National 7 January 2020



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