

Taking Fire:

The Historical And Contemporary Politics Of Indigenous
Burning In Australia And The Western United States

Daniel Joshua May

August 2020

A thesis submitted for the degree of Doctor of Philosophy of The Australian National University

© Daniel May 2020

All Rights Reserved

Declaration

I declare that this thesis is entirely my own work unless otherwise referenced or acknowledged.

Daniel May

Date

.....

.....

Acknowledgements

This thesis was only possible through the help, advice, and support of many people. Major thanks must go to the members of my supervisory panel. From the very beginning, Professor Tom Griffiths has shared his quiet wisdom and grace. He gave me an appreciation for the craft of writing, provided much sage counsel, and shaped fuel breaks to keep me burning well. I am extremely grateful for his mentorship. Professor Nicholas Brown has been very generous as both a panel member and acting chair. My thesis has greatly benefited from Nick's enviable ease at critiquing an argument and distilling nebulous inklings into ironclad theses. Associate Professor Geoff Cary welcomed me into his fire course and his fire networks, helping me to understand fire science. Geoff once printed and bound my chapters and took them to China with him, which is pretty bloody impressive.

A number of scholars also provided extensive informal mentorship. Professor Don Hankins hosted me for several months, took me on my first prescribed burn, and welcomed a perfect stranger into his world. It was a true privilege to be hosted by Professor Stephen Pyne and for him to patiently answer my many questions and provide very helpful feedback on drafts. It has been a pleasure to collaborate with Dr Tim Neale in various ways, and his work on the intellectual models of fire behaviour prediction has greatly enriched my own conceptualisation. Blame Scott Mooney and Nicholas Rasmussen for getting me started on fire back at UNSW in 2013!

I am very grateful to my colleagues at ANU. It has been a genuine pleasure to be a part of a department with such a collegial and stimulating environment. Major thanks go to the School of History Reading Group in its various incarnations for providing comments on drafts of chapters Four & Five. I'd particularly like to thank Nicholas Hoare, Eamonn McNamara, Emily Gallagher, Scott Dempsey, Alice Rumble, Robyn Curtis, Sam Khaw, Catherine Fisher, Jayne Regan, Michelle Staff, Jess Urwin, Josh Black, Frank Bongiorno, Murray Chisholm, Tania Colwell, Maria Nugent, Annemarie McLaren, Shannyn Palmer, Carolyn Strange, Miriana Unikowski, and school visitors Alex Vlachos and Martin Leer. The Coombs Cohort provided memes and merriment (vale Sem Room D). I am extremely grateful to the School's administrative staff, especially Karen Smith, who answered my dumb questions and helped me through the smoke of ANU bureaucracy. Thanks to the School, Nick Brown, Dr Gareth Knapman, and my students for an enjoyable experience tutoring various courses, which honed my own writing and historical thinking.

Thank you to Inger Mewburn, Victoria Firth-Smith, and all the volunteers and staff for the Thesis Boot Camp which helped me write a chapter in a weekend, and to the PARSa SUAW team for keeping me on track when the world shrunk due to Covid-19. Thanks to Dr Thoy Do & Dr Jillian Schedneck who

provided helpful comments on drafts, and the Academic Skills team for my experience as a Writing Coach which helped sharpen my own writing.

I have been fortunate to participate in a number of workshops, conferences, and collaborative endeavours. A highlight was the ANU Environmental History Workshop. For their historical advice and encouragement, I'd also like to thank Melanie Burkett, Margaret Cook, Gretel Evans, Jarrod Hore, Rebecca Jones, Liam Kane, Sarah McMaster, Ruth Morgan, Libby Robin, Ian Tyrrell, and all the Disaster History co-authors. This thesis crossed the borders of history into all sorts of unexpected territories; my thanks to Richard Baker, Matthew Colloff, Michael Doherty, Darrin Durant, Bhiemie Eckford-Williamson, Dean Freeman, Malcolm Gill, Peter Kanowski, Sean Kerins, Adam Lucas, Shirley Patton (for the nudge!), and Jess Weir.

My research trips in Northern Australia were made very smooth thanks to Mickey Dewar, Francoise Barr, Jeremy Russell-Smith, Charlie Ward, Joanne Wood, and Sam Wells. My research trip to Western Australia was greatly facilitated by Andrea Gaynor's hospitality. I'd like to thank Joe Dortch, Chris Haynes, Lachie McCaw, the McLeods, Carly Monks, Suzanne Prober, Roger Underwood, David Ward, Tracey (Dwellingup History and Visitor Information Centre), Michelle (State Records Office of Western Australia), and Kylie Felix for all their help.

Both my thesis and life were transformed by four months of research in the United States. Thanks to my hosts Eben Lehman and Don Hankins for hosting and handling my Endeavour paperwork requests with grace. Thanks also to California State University (Chico)'s Geography and Planning Department, which hosted me as a Visiting Scholar for 2 and a half months, and Steve Anderson and the Forest History Society, which hosted me for 6 weeks of research and World Cup fever. Thanks to Lincoln Bramwell, Phil Deloria, Jason Howard, Eric B. Kennedy, Jamie Lewis, Ryan Miller, Eugenie Rovai, and the helpful staff at California State Archives, Bancroft Library, and California State Library. Thanks to Brett Goodin, Allesandro Antonello, and Yves Rees for helping make it happen.

This research was supported by an Australian Government Research Training Program (RTP) Scholarship, an Endeavour Research Fellowship (Australia Awards), and the Australian Academy of Science. The School of History provided very helpful travel grants. The Bushfire and Natural Hazards CRC supplied valuable opportunities once I joined as an Associate Student. I travelled a lot for this thesis but made sure to offset the emissions from every flight.

Lastly, I'd like to thank my friends and family. Thanks to Beth, Dan, James, Lochy, Eamonn, Georgia, Kat, Catalina, the trivia team, Mum, Dad, Ben, David, Pat, and Claire for keeping me sane. When my fires burned low, they were always there.

Abstract

Large bushfires in recent years around the world have sparked debate and interest in fire management; a world warming through industrial combustion is a world turning to Indigenous fire practices for solutions. Yet even as Indigenous Australians increasingly assert pyro-identities, non-Indigenous Australians have struggled to understand Indigenous burning practices and the nature of antipodean fire.

This thesis examines the historical and contemporary politics of fire and how they relate to changing understandings of Indigenous burning in Australia and the United States in the 20th and 21st centuries. It examines public and institutional debates after large bushfires, discussions about management of public lands and shifting representations of Indigenous burning through analysis of royal commission transcripts, newspaper articles and other public discourse, policy submissions, institutional archives and academic published material. The thesis explores the relationship of environmentalism to fire and Indigenous burning, the contradictions of 'wilderness' and the politics of race and identity. It charts the development of competing understandings of fire and Indigenous burning in academic disciplines as well as the entanglement of Indigenous burning with the politics of land management and institutional rivalries.

Through a comparison of the mutual entanglements and divergences of Australian and American fire management and conceptualisations of Indigenous burning, the thesis demonstrates the historical and transnational context of Australian fire. It argues for localised understandings of fire and fire management, perspectives that are attentive to cultural and ecological specificities. Perceptions of Indigenous burning have inspired policy-making and they have also been appropriated for legitimation, with profound consequences for cultural politics and ecological communities. Finally, the thesis charts how Indigenous burning has been transformed in the imagination and discourses of non-Indigenous Australia: from academic curiosity to political incendiary – and, increasingly, to a lived reality.

Contents

Acknowledgements	iii
Abstract	v
Contents	vi
List of Abbreviations	vii
Maps	viii
Introduction	1
1. Australia Chooses Fire Lighting: 1939 Black Friday and the Stretton Commission	27
2. America Chooses Fire Fighting: The Light Burning Dispute and Dismissal of 'Piute Forestry'	62
3. Fire's Lucky Forest? The 1961 Dwellingup bushfires and the 'Australian Strategy'	96
4. Black, White, Red, Green: Kakadu as a Site of Encounters with Indigenous Burning	129
5. Stuck in the Wilderness: The Fire Revolution, 1988 Yellowstone Fires, and Struggles with Native American Burning in Post-War America	170
6. Black Saturday: Deepening Entanglement of Indigenous and Prescribed Burning	208
7. Grand Unified Theories and Beyond: An Analysis of Martin, Flannery, and Gammage	243
8. Taking Back Fire: Cultural Burning and Carbon Credits	269
Conclusion: Lighting The Way Forward	290
Bibliography	297

List of Abbreviations

2009 VBRC	2009 Victorian Bushfires Royal Commission
ANPWS	Australian National Parks and Wildlife Service
BANC	Bancroft Library
CALM	Department of Conservation and Land Management (Western Australia)
CSA	California State Archives
FHS	Forest History Society Library and Archives
NAA	National Archives of Australia
NARA	US National Archives
NLA	National Library of Australia
NTAS	Northern Territory Archives Service
SROWA	State Records Office of Western Australia
USFS	United States Forest Service
WALFA	West Arnhem Land Fire Abatement project

Maps

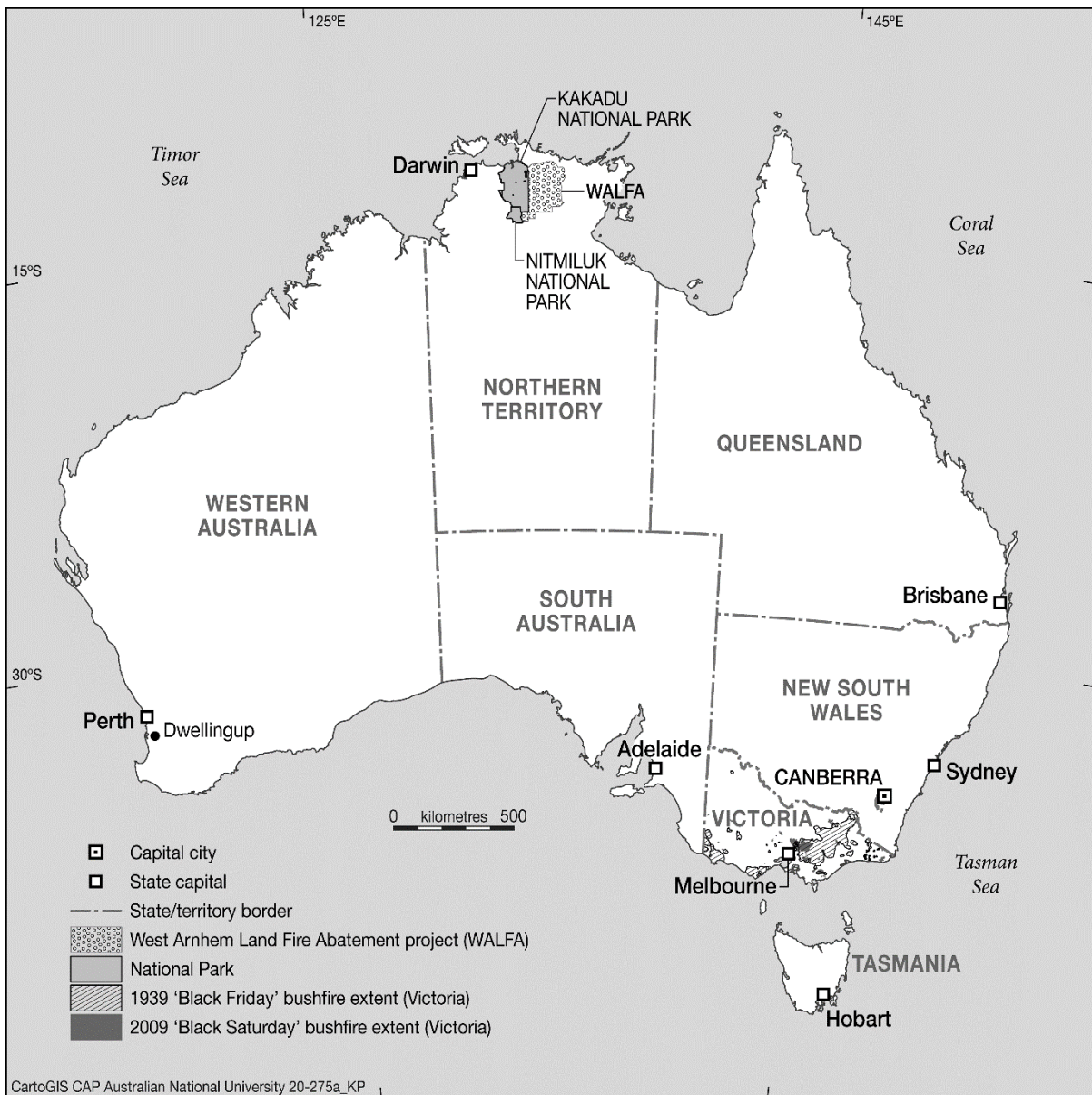


Figure 1: Map of areas and bushfires in Australia examined in the thesis.



Figure 2: Map of areas and wildfires in the United States of America examined in the thesis.

Introduction

Taking Fire: The Historical and Contemporary Politics of Indigenous Burning in Australia and the Western United States

Fire is always political. In 1969, archaeologist Rhys Jones published a paper containing the following words:

It is a thesis of mine that, through firing over thousands of years, Aboriginal man has managed to extend his natural habitat zone...I have been interested in recent weeks to read that a policy of burning-off may be initiated as a new method of forest conservation.¹

Jones's paper helped initiate a wave of academic study revising earlier conceptualisations of Indigenous Australians as nomadic hunter-gatherers who left no trace upon the environment. Jones wrote in a period of intellectual tumult, in the context of the 'discovery' of the deep past of Australia's Indigenous history through the work of archaeologist John Mulvaney, and as Indigenous activists were increasingly asserting their presence.² Jones later acknowledged that his term for this process of land management – "fire-stick farming" – was "not entirely innocent".³ It was intended to provoke reaction against the then-prevailing notion of *terra nullius*, the legal and cultural framework that used a lack of recognisable Western-style agriculture among Indigenous peoples in Australia and parts of North America to justify an assumption that Indigenous peoples did not own their lands.⁴ Furthermore, in the paper, Jones recommended for further reading an article by American anthropologist Omer C. Stewart on Native American burning.⁵ The paper finished by discussing proposals to overturn orthodox forestry doctrine and use prescribed burning in forestry while contemplating recent destructive bushfires.⁶ In these ways, Jones's paper reflected many of the arguments of this thesis: that conceptualisations of pre-contact Indigenous burning reflect changes in how non-Indigenous Australians understand Indigenous Australia more broadly, that these conceptualisations have been

¹ Rhys Jones, "Fire-Stick Farming," *Australian Natural History* 16 (1969): 224–29.

² Billy Griffiths, *Deep Time Dreaming: Uncovering Ancient Australia* (Black Inc., 2018).

³ Rhys Jones, "Mindjongork: Legacy of the Firestick," in *Country in Flames: Proceedings of the 1994 Symposium on Biodiversity and Fire in North Australia*, ed. Deborah Bird Rose, vol. Biodiversity Series Paper No. 3 (Darwin: Jointly published by the Biodiversity Unit (Department of the Environment, Sport and Territories) and the North Australia Research Unit (The Australian National University), 1994), 14.

⁴ Jones, "Mindjongork: Legacy of the Firestick."

⁵ Omer C. Stewart, "Fire as the First Great Force Employed by Man," in *Man's Role in Changing the Face of the Earth*, ed. W.L.J. Thomas et al. (Chicago: University of Chicago Press, 1955), 115–33.

⁶ Jones, "Fire-Stick Farming," 229; Jones, "Mindjongork: Legacy of the Firestick," 14.

profoundly influenced by American experiences, theories, and individuals, and, finally, that such conceptualisations are thoroughly entangled with contemporary bushfire debates.

In this thesis, I examine the historical and contemporary politics of fire and their relation to conceptualisations of Indigenous burning in Australia and the United States in the twentieth and twenty-first centuries. As will be abundantly demonstrated throughout this thesis, understandings of Indigenous burning are socially, culturally, and especially politically constructed. This thesis interrogates the politics of knowledge about fire, demonstrating how Indigenous burning has been conceptualised, understood, and appropriated. It uncovers how these understandings have been drawn upon for political purposes, particularly through the politics of control over ignition. It shows that perceptions of fire have driven and reflected changing relations between non-Indigenous and Indigenous Australians and Americans more broadly. This thesis utilises an approach developed for fire history outlined below, analysing history where fire is recognised as an active agent. This centring of fire's perspective results in a continental vision of fire which emphasises myriad diverse bioregional fire patterns to offer nuanced comparative insights into ecologies and effective policies. I use a form of discourse analysis based on Hajer and Versteeg's work discussed below to examine public policy debates after large bushfires (Big Fires), the politics of day to day Indigenous fire management (Small Fires), and the influence of academic interpretations of Indigenous burning and the ecological place of fire (Fires in the Mind).

A Continental View of Fire

Fire must be regarded ecologically. It has existed on Earth for millions of years and has played a major role in shaping floral communities and their evolution.⁷ Fire can help concentrate or cycle nutrients through soils.⁸ Critically, from an ecological perspective, fire should not be conceptualised as an

⁷ W. J. Bond and B. W. van Wilgen, "Fire, Competition and the Organization of Communities," in *Fire and Plants*, ed. W. J. Bond and B. W. van Wilgen (London: Chapman and Hall, 1996), 148–63; W Bond and J Keeley, "Fire as a Global 'Herbivore': The Ecology and Evolution of Flammable Ecosystems," *Trends in Ecology & Evolution* 20, no. 7 (2005): 387–94; William J. Bond, F. Ian Woodward, and Guy F. Midgley, "The Global Distribution of Ecosystems in a World without Fire," *New Phytologist* 165, no. 2 (2005): 525–538; David M.J.S. Bowman, Jessica A. O'Brien, and Johann G. Goldammer, "Pyrogeography and the Global Quest for Sustainable Fire Management," *Annual Review of Environment and Resources* 38, no. 1 (2013): 57–80; some researchers caution that evolutionary traits in plants apparently adapted in response to fire may in fact be "exaptation" and arose in response to drought conditions, though this is disputed, see S. Don Bradshaw et al., "Little Evidence for Fire-Adapted Plant Traits in Mediterranean Climate Regions," *Trends in Plant Science* 16, no. 2 (2011): 69–76.

⁸ Orpheus M. Butler et al., "The Phosphorus-Rich Signature of Fire in the Soil-Plant System: A Global Meta-Analysis," ed. Shuli Niu, *Ecology Letters* 21, no. 3 (2018): 335-344.

individual event or ignition, but instead through the framework of the ‘fire regime’. There are different understandings of fire regimes, but all essentially seek to conceptualise patterns of fire across space and time, usually comprising components such as fire intensity, seasonality, and frequency.⁹ It can thus be seen that biota are not so much adapted to fire, as they are adapted to particular fire regimes.¹⁰ Indeed, the centrality of fire (in all its forms) to life on Earth can be shown through the ecological argument that pyrodiversity promotes biodiversity.¹¹ Grasping this principle allows for contemplation of the importance of Indigenous burning practices to evolution and distribution on a continental (if not global) scale.

This thesis enacts this principle and seeks to reflect a continental vision of Indigenous burning. ‘Continental’ in this sense constitutes the weaving together of multiple bioregions into a rich tapestry that showcases the diversity and local specificity of fire. Australia and the United States have an impressive diversity of fire regimes; the experience of fire for mountain ash forests might only involve a high intensity fire once every few decades (perhaps even centuries), while the savannahs of the Top End might experience low intensity fires every two or three years, and this diversity of fire regimes equally applies to diversity of Indigenous burning practices.¹² A continental vision of fire incorporates this diversity and local specificity, enabling comparisons to be made between different bioregions. Each chapter of this thesis will demonstrate this by briefly reviewing environmental drivers of fire and local patterns of Indigenous burning for that particular area. As will be demonstrated as a core finding of this thesis, national narratives of fire (natural or Indigenous) are homogenising and inaccurate, and can lead to harmful policy, or restrictive discourses. As Tom Griffiths has written of national bushfire evacuation standards, “we need to abandon the idea of a *national* fire plan and develop ecologically sensitive, bioregional fire survival strategies. We need to move beyond an undifferentiated, colonial sense of ‘the bush’ as an amorphous sameness”.¹³ Geographer Lauren Rickards has criticised the

⁹ A. Malcolm Gill, “Fire and the Australian Flora: A Review,” *Australian Forestry* 38, no. 1 (1975): 4–25; David M. J. S. Bowman et al., “Fire in the Earth System,” *Science* 324, no. 5926 (2009): 482.

¹⁰ Bowman, O’Brien, and Goldammer, “Pyrogeography and the Global Quest for Sustainable Fire Management.”

¹¹ Robert E. Martin and David B. Sapsis, “Fires as Agents of Biodiversity: Pyrodiversity Promotes Biodiversity,” in *Proceedings of the Symposium on Biodiversity of Northwestern California*, ed. R.R. Harris, D.C. Erman, and H.M. Kerner, Wildland Resources Center, Report 29 (Berkeley: University of California Press, 1992), 150–57; this concept and the definition of pyrodiversity is disputed, see David M. J. S. Bowman et al., “Pyrodiversity Is the Coupling of Biodiversity and Fire Regimes in Food Webs,” *Philosophical Transactions of the Royal Society B: Biological Sciences* 371, no. 1696 (2016).

¹² For an attempt to model the diversity of fire regimes in Australia, see Brett P. Murphy et al., “Fire Regimes of Australia: A Pyrogeographic Model System,” ed. Pauline Ladiges, *Journal of Biogeography* 40, no. 6 (2013): 1048–58; though their map has been disputed by Carl R. Gosper, Suzanne M. Prober, and Colin J. Yates, “Continental-Scale Syntheses of Australian Pyromes - Misclassification of South-Western Eucalypt Woodlands Misinforms Management,” *Journal of Biogeography* 43, no. 4 (2016): 858–61.

¹³ Tom Griffiths, “‘An Unnatural Disaster’? Remembering and Forgetting Bushfire,” *History Australia* 6, no. 2 (2009): 35.5.

“habitual universalism of fire in depictions of Australia”, and argued for a “truly continental” view of Australian fire that incorporates both fire-dependent species such as mountain ash and fire-sensitive species such as King Billy Pine (*Athrotaxis selaginoides*).¹⁴ Pyne’s fire history of Australia was loosely structured around Australian states, reflecting his focus upon the constitutional division of responsibilities for environments.¹⁵ Other Australian fire histories have had a local focus, such as that by Christine Hansen and Tom Griffiths.¹⁶ This thesis seeks to explore a continental approach towards fire and Indigenous burning. In this way, this thesis reflects a strong trend for environmental historians to resist the nation as the default unit of analysis.¹⁷

A key fire discourse discussed throughout this thesis is ‘prescribed burning’. As this thesis will demonstrate, prescribed burning is an ensemble of concepts and practices, but a useful initial definition comes from the Australasian Fire and Emergency Service Authorities Council as the “controlled application of fire under specified environmental conditions to a pre-determined area and at the time, intensity, and rate of spread required to attain planned resource management objectives”.¹⁸ Prescribed burning can be done for many purposes; this includes for the disposal of materials left from logging, to encourage or discourage the growth of specific species (including native species targeted for conservation, or grasses desirable for grazing), but most commonly, it refers to the reduction of fuel to reduce the impact of future fires.¹⁹ As will be demonstrated in Chapter Six, several slightly different uses of prescribed burning aim to achieve this goal (such as to reduce ember attack on houses or to create a broad area grid or mosaic of variable fuels to aid suppression). As ecological communities respond differently to prescribed burning for fuel reduction, and are adapted to different fire regimes, its effectiveness varies across different ecological communities.²⁰ Debate

¹⁴ Lauren Rickards, “Goodbye Gondwana? Questioning Disaster Triage and Fire Resilience in Australia,” *Australian Geographer* 47, no. 2 (2016): 132–33.

¹⁵ Stephen J. Pyne, *Burning Bush: A Fire History of Australia* (New York: Henry Holt and Company, 1991).

¹⁶ Christine Hansen and Tom Griffiths, *Living with Fire: People, Nature and History in Steels Creek* (CSIRO, 2012).

¹⁷ J. R. McNeill, “Observations on the Nature and Culture of Environmental History,” *History and Theory* Theme Issue 42 (2003): 8; for a discussion on the creative tension between continent and nation in Australia, see Libby Robin, *How A Continent Created A Nation* (Sydney: University of New South Wales Press, 2007).

¹⁸ Australasian Fire and Emergency Service Authorities Council and Forest Fire Management Group, “Overview of Prescribed Burning in Australasia,” Report for the National Burning Project - Subproject 1, 2015, 9.

¹⁹ A. Malcolm Gill, “Fire Regimes, Biodiversity Conservation and Prescribed-Burning Programs,” *Proceedings of the Royal Society of Victoria* 124, no. 1 (2012): 2.

²⁰ One attempt to quantify this effect is through the concept of “leverage”, see Owen F. Price et al., “Global Patterns in Fire Leverage: The Response of Annual Area Burnt to Previous Fire,” *International Journal of Wildland Fire* 24, no. 3 (2015): 297–306; Stephen J. Pyne, “Introduction - Fire’s Lucky Country,” in *Fire in Ecosystems of South West Western Australia: Impacts and Management*, ed. I Abbott and N. Burrows (Leiden: Backhuys, 2003), 1–8; there is a large body of experimental and empirical body of research behind some aspects of prescribed burning, see Paulo M. Fernandes, “Empirical Support for the Use of Prescribed Burning as a Fuel Treatment,” *Current Forestry Reports* 1, no. 2 (2015): 118–27; some practitioners and researchers

over whether and how much prescribed burning for fuel reduction efficacy varies between different areas will be a key theme discussed in this thesis because, as will be demonstrated, in Australia and to some extent North America, it has become entangled with conceptualisations of Indigenous burning as an ostensibly similar pyro-technology. Prescribed burning is inherently historical.²¹ A prescribed burn conducted for fuel reduction usually is based on the assumption that future bushfires will behave similarly to past bushfires, and as fuel essentially grows back over time, a programme of prescribed burning must be attentive to both prior burns and anticipated future burns.

Efforts to Reconstruct Pre-Contact Indigenous Burning

There is a large and diverse body of academic work which describes or seeks to reconstruct pre-contact Indigenous burning practices in Australia and North America. This academic work has driven much of the discourse of Indigenous burning, so it is essential to establish the methods and concepts used. Each chapter introducing a new geographic area of analysis will briefly review the information relevant to that area, but it is necessary to broadly characterise such work in general. Indigenous fire practitioners and academics have themselves sought to describe their own practices or those of their ancestors, such as Gurrgoni speaker and fire ecologist Dean Yibarbuk in Arnhem Land,²² Tagalaka descendant and cultural fire practitioner Victor Steffensen,²³ Karuk/Yurok ecologist Frank Lake in northern California,²⁴ and Miwko? (Plains Miwok) pyrogeographer Don Hankins in central California.²⁵ In recent years, there have been growing numbers of collaborative efforts led by non-Indigenous researchers working with Indigenous peoples published, such as with Gundjeihmi and Gunwinggu speakers in west Arnhem Land,²⁶ Ngadju peoples in the Great Western Woodlands,²⁷ and Martu fire

emphasise the placement of burns, such as Craig Loehle, "Applying Landscape Principles to Fire Hazard Reduction," *Forest Ecology and Management* 198, no. 1–3 (2004): 261–67.

²¹ Tim Neale has argued that scientific knowledge of bushfire in Australia more broadly is "essentially historicist in character"; see Timothy Neale, "Digging for Fire: Finding Control on the Australian Continent," *Journal of Contemporary Archaeology* 5, no. 1 (2018): 82.

²² D. Yibarbuk et al., "Fire Ecology and Aboriginal Land Management in Central Arnhem Land, Northern Australia: A Tradition of Ecosystem Management," *Journal of Biogeography* 28, no. 3 (2001): 325–43.

²³ Victor Steffensen, *Fire Country: How Indigenous Fire Management Could Help Save Australia* (Hardie Grant Travel, 2020).

²⁴ Frank K. Lake et al., "Returning Fire to the Land: Celebrating Traditional Knowledge and Fire," *Journal of Forestry* 115, no. 5 (2017): 343–53.

²⁵ Don L. Hankins, "The Effects of Indigenous Prescribed Fire on Riparian Vegetation in Central California," *Ecological Processes* 2, no. 24 (2013).

²⁶ Jeremy Russell-Smith et al., "Aboriginal Resource Utilization and Fire Management Practice in Western Arnhem Land, Monsoonal Northern Australia: Notes for Prehistory, Lessons for the Future," *Human Ecology* 25, no. 2 (1997): 159–95.

²⁷ Suzanne M. Prober et al., "Ngadju Kala: Australian Aboriginal Fire Knowledge in the Great Western Woodlands," *Austral Ecology* 41, no. 7 (2016): 716–32.

practitioners in the Western Desert of Australia.²⁸ Nevertheless, the much broader bodies of work seeking to reconstruct pre-contact burning patterns often ignore the knowledge and voices of contemporary Indigenous peoples,²⁹ preferring to rely upon insights drawn from palaeoecological and written sources. Most focus only upon Indigenous burning practices prior to colonisation – the history of Indigenous burning since colonisation is rarely investigated.

Many of these academic attempts at reconstructing past Indigenous burning practices rely upon climate or environment ‘proxies’, and can range over timescales from decades to tens of thousands of years.³⁰ For instance, vertical changes in pollen grain proportions in sediment cores can be interpreted as evidence of historical vegetation change (known as ‘palynology’).³¹ Similarly, changes in ash and charcoal have been used to argue for changes in fire regimes.³² Changes in sedimentation and erosion patterns have also been read as proxies for human landscape manipulation.³³ More direct proxies use contemporary distribution of vegetation and fauna to argue for historical burning patterns.³⁴ One of the better known proxies is the study of tree growth rings (‘dendrochronology’) and fire scars, though dendrochronology has been used less in Australia than North America as fewer

²⁸ R. B. Bird et al., “Niche Construction and Dreaming Logic: Aboriginal Patch Mosaic Burning and Varanid Lizards (*Varanus Gouldii*) in Australia,” *Proceedings of the Royal Society B: Biological Sciences* 280, no. 1772 (2013): 20132297–20132297.

²⁹ Henry T. Lewis and M. Kat Anderson, “Introduction,” in *Forgotten Fires: Native Americans and the Transient Wilderness*, ed. Henry T. Lewis and M. Kat Anderson (Norman: University of Oklahoma Press, 2002), 4; D. M. J. S. Bowman, “Tansley Review No. 101: The Impact of Aboriginal Landscape Burning on the Australian Biota,” *New Phytologist* 140, no. 3 (1998): 386.

³⁰ The best entry to these efforts can be found in the impressive but sadly dated Bowman, “The Impact of Aboriginal Landscape Burning”; see also I. Lunt, “Grazed, Burnt and Cleared: How Ecologists Have Studied Century-Scale Vegetation Changes in Australia,” *Australian Journal of Botany* 50 (2002): 391–407.

³¹ For many years, palynology in Australia relied upon just three pollen cores; see Bowman, “The Impact of Aboriginal Landscape Burning,” 395; Bruno David, Simon G. Haberle, and Donald Walker, “Peopled Landscapes: The Impact of Peter Kershaw on Australian Quaternary Science,” in *Peopled Landscapes: Archaeological and Biogeographic Approaches to Landscapes* (Canberra: ANU Press, 2012), 3–26.

³² For instance see Manu P. Black and Scott D. Mooney, “The Response of Aboriginal Burning Practices to Population Levels and El Niño–Southern Oscillation Events during the Mid- to Late-Holocene: A Case Study from the Sydney Basin Using Charcoal and Pollen Analysis,” *Australian Geographer* 38, no. 1 (2007): 37–52; A. Peter Kershaw, Sophie C. Bretherton, and Sander van der Kaars, “A Complete Pollen Record of the Last 230 Ka from Lynch’s Crater, North-Eastern Australia,” *Palaeogeography, Palaeoclimatology, Palaeoecology* 251, no. 1 (2007): 23–45.

³³ For example Eric W. Portenga et al., “A Late Holocene Onset of Aboriginal Burning in Southeastern Australia,” *Geology* 44, no. 2 (2016): 131–34; Nicolas Darrénougué et al., “A Late Pleistocene Record of Aeolian Sedimentation in Blanche Cave, Naracoorte, South Australia,” *Quaternary Science Reviews* 28, no. 25–26 (2009): 2600–2615.

³⁴ A. Malcolm Gill, “A Review of Fire Regimes of the Forested Region of South-Western Australia with Selected Examples of Their Effects on Native Biota,” in *Australian Fire Regimes: Contemporary Patterns (April 1998–March 2000) and Changes since European Settlement*, ed. Jeremy Russell-Smith et al., . . . Australia State of the Environment Second Technical Paper Series (Biodiversity) (Canberra: Department of the Environment and Heritage, 2002), 1–19; Paul W. Foreman, “A Framework for Testing the Influence of Aboriginal Burning on Grassy Ecosystems in Lowland, Mesic South–Eastern Australia,” *Australian Journal of Botany* 64, no. 8 (2016): 626.

species are suitable for this research.³⁵ There are also less commonly used proxies such as phytoliths (silica particles left in soil which can indicate historical changes in grass distribution).³⁶

The inherent uncertainties in using such methods, and the implications for many debates mean they have been heavily disputed; such uncertainties provide fuel for the debates over contemporary policy discussed in this thesis. There is concern from some researchers that Indigenous burning patterns may be “invisible” through palaeoecological records.³⁷ For instance, Indigenous burning may not have greatly shifted fire frequency, but rather shifted seasonality of fire, whereas charcoal records may only really reflect high intensity bushfires.³⁸ One article using palaeoecological proxies has been used to argue that fire-stick farming on the scale envisioned by Jones did not occur; yet the article itself claims only that changes in charcoal deposition observable tens of thousands of years after the event did not coincide with the estimated arrival of Indigenous Australians.³⁹ Much academic research on environmental proxies has been driven by debate over the cause of the extinction of Pleistocene megafauna in Australia and North America; Chapter Seven will discuss how such debate is entangled with Indigenous burning. Other research has been driven by interest in ecological restoration, a movement which can hide deeply ideological assumptions and affiliations.⁴⁰

There are also accounts utilising ethnography (often mixed with ecological approaches), which have had mixed acceptance from scholars in other disciplines, contributing further to the controversies

³⁵ Matthew Brookhouse, “Eucalypt Dendrochronology: Past, Present and Potential,” *Australian Journal of Botany* 54, no. 5 (2006): 435–49; J.C.G. Banks, “The Use of Dendrochronology in the Interpretation of the Dynamics of the Snow Gum Forest” (PhD thesis, Canberra, The Australian National University, 1982).

³⁶ Rand R. Evett and Rob Q. Cuthrell, “Phytolith Evidence for a Grass-Dominated Prairie Landscape at Quiroste Valley on the Central Coast of California,” *California Archaeology* 5, no. 2 (2013): 319–35; Brent E. Johnson et al., “Exploring the Traditional Use of Fire in the Coastal Mountains of Central California,” *JFSP Research Project Reports* 74 (2010).

³⁷ Christopher I. Roos, Grant J. Williamson, and David M. J. S. Bowman, “Is Anthropogenic Pyrodiversity Invisible in Paleofire Records?,” *Fire* 2, no. 3 (2019).

³⁸ Philip E. Higuera et al., “Peak Detection in Sediment - Charcoal Records: Impacts of Alternative Data Analysis Methods on Fire-History Interpretations,” *International Journal of Wildland Fire* 19, no. 8 (2010): 996–1014; it has also been suggested that the long range of transport of charcoal in high intensity bushfires renders localised interpretations of palaeoecological proxies suspect, see Craig Woodward and Heather Ann Haines, “Unprecedented Long-Distance Transport of Macroscopic Charcoal from a Large, Intense Forest Fire in Eastern Australia: Implications for Fire History Reconstruction,” *The Holocene* 30, no. 7 (2020): 947–952; it is worth noting that some Indigenous Australians assert that there were no high intensity bushfires in Australia prior to colonisation, see Steffensen, *Fire Country: How Indigenous Fire Management Could Help Save Australia*; while others acknowledge that palaeobotanical evidence demonstrates high-intensity bushfires occurred in Australia prior to European contact, see Greg Lehman, “Turning Back the Clock: Fire, Biodiversity, and Indigenous Community Development in Tasmania,” in *Working on Country: Contemporary Indigenous Management of Australia’s Lands and Coastal Regions*, ed. Richard Baker, Jocelyn Davies, and Elspeth Young (South Melbourne: Oxford University Press, 2001), 308–19.

³⁹ S.D. Mooney et al., “Late Quaternary Fire Regimes of Australasia,” *Quaternary Science Reviews* 30, no. 1–2 (2011): 28–46.

⁴⁰ Lilian M. Pearce, “Affective Ecological Restoration, Bodies of Emotional Practice,” *International Review of Environmental History* 4, no. 1 (2018): 167–89.

explored in this thesis. Some ethnographies focus exclusively on fire,⁴¹ while others incorporate Indigenous burning into broader analyses.⁴² This includes ethnobotanical work.⁴³ The use or acceptance of ethnographic approaches by many physical and biological scientists has been limited, often due to an assumption (sometimes explicit, as will be shown in this thesis) that the burning practices observed by ethnographers were “corrupted” by European contact and are thus somehow less legitimate, especially in regions of Australia and North America which were colonised earlier.⁴⁴ Métis and Cree fire scientist Amy Cardinal Christianson surveyed recent social science work on contemporary Indigenous burning, and found it was limited due to epistemological differences, confusion about appropriate ethical guidelines, and the time required to build sufficiently robust relationships.⁴⁵

Some researchers have tried to use more traditional historical source material to reconstruct pre-contact burning practices, which has also driven interdisciplinary dissent, especially given implications for contemporary debates. This can include the use of historical aerial photography to show fire scars in deserts before sustained contact,⁴⁶ or matching historical and ethnographic depictions with Geographic Information Systems technology.⁴⁷ Most historical attempts include the observations of

⁴¹ For example see C.D. Haynes, “The Pattern and Ecology of Munwag: Traditional Aboriginal Fire Regimes in North-Central Arnhemland,” *Proceedings of the Ecological Society of Australia* 13 (1985): 203–14; Richard Kimber, “Black Lightning: Aborigines and Fire in Central Australia and the Western Desert,” *Archaeology in Oceania* 18, no. 1 (1983): 38–45; Omer C. Stewart, *Forgotten Fires: Native Americans and the Transient Wilderness*, ed. Henry T. Lewis and M. Kat Anderson (Norman: University of Oklahoma Press, 2002).

⁴² For example, see R. Levitus, “Change and Catastrophe: Adaptation, Re-Adaptation and Fire in the Alligator Rivers Region,” in *Culture, Ecology and Economy of Fire Management in North Australian Savannas: Rekindling the Wurrk Tradition*, ed. Jeremy Russell-Smith, Peter J. Whitehead, and Peter Cooke (Collingwood: CSIRO Publishing, 2009), 58–79; Rhys Jones, “Hunters in the Australian Coastal Savanna,” in *Human Ecology in Savanna Environments* (New York: Academic Press, 1980), 107–46; Richard Baker, *Land Is Life: From Bush to Town - The Story of the Yanyuwa People* (Allen & Unwin, 1999); Deborah Bird Rose, *Nourishing Terrains: Australian Aboriginal Views of Landscape and Wilderness* (Canberra: Australian Heritage Commission, 1996).

⁴³ Beth Gott, “Aboriginal Fire Management in South-Eastern Australia: Aims and Frequency,” *Journal of Biogeography* 32, no. 7 (2005): 1203–8; M. Kat Anderson, *Tending the Wild* (Berkeley, California: University of California Press, 2005).

⁴⁴ Bowman, “The Impact of Aboriginal Landscape Burning,” 389; Joe Dortch, “Reconstructing Aboriginal Impacts on Australian Forests,” in *Proceedings of the 6th National Conference of the Australian Forest History Society*, ed. M. Calver (Rotterdam: Millpress, 2005), 2; Fred Cahir et al., “Winda Lingo Parugoneit or Why Set the Bush [On] Fire? Fire and Victorian Aboriginal People on the Colonial Frontier,” *Australian Historical Studies* 47, no. 2 (2016): 239.

⁴⁵ Amy Christianson, “Social Science Research on Indigenous Wildfire Management in the 21st Century and Future Research Needs,” *International Journal of Wildland Fire* 24 (2015): 190–200.

⁴⁶ Neil D. Burrows et al., “Evidence of Altered Fire Regimes in the Western Desert Region of Australia,” *Conservation Science Western Australia* 5, no. 3 (2006): 272–84.

⁴⁷ Imogen Wegman, “‘A Truly Sublime Appearance’: Using GIS to Find the Traces of Pre-Colonial Landscapes and Land Use,” *History Australia* 17, no. 1 (2020): 59–86; R. Bliege Bird et al., “The ‘Fire Stick Farming’ Hypothesis: Australian Aboriginal Foraging Strategies, Biodiversity, and Anthropogenic Fire Mosaics,” *Proceedings of the National Academy of Sciences* 105, no. 39 (2008): 14796–14801.

European colonists and explorers, or of colonial artworks.⁴⁸ These have been particularly controversial among physical and biological scientists, due to different disciplinary conventions, approaches, and assumptions – as will be discussed in Chapter Seven.⁴⁹ A particularly notable example of such controversies over the appropriation of burning for contemporary political ends was ignited when the NSW Farmer’s Federation published a booklet in 1995 which attempted to conflate the portrayed impact of Indigenous burning creating open savannahs in pre-contact NSW with contemporary agricultural land clearing.⁵⁰ The booklet also drew upon palaeontologist Tim Flannery’s theories of Pleistocene megafauna extinction published in the popular monograph *The Future Eaters*, and attracted a furious response from botanists due to its perceived political influence.⁵¹ Historian Bill Gammage’s recent monograph *The Biggest Estate on Earth* has also generated vigorous debate, as will be discussed in Chapter Seven.⁵² Both examples demonstrate the resonance that can be achieved by those who appropriate historical work on pre-contact burnings to influence contemporary policy debates.

Indigenous Burning: Some General Principles

Indigenous burning practices, pre-contact and contemporary, relevant to the area under examination, will be explored in each chapter as appropriate, in order to fully demonstrate the diversity and

⁴⁸ For example see Grace Karskens, “Fire in the Forests? Exploring the Human-Ecological History of Australia’s First Frontier,” *Environment and History* 25, no. 3 (2019): 391–419; Cahir et al., “Why Set the Bush [On] Fire?”; Bill Gammage, *The Biggest Estate on Earth: How Aborigines Made Australia* (Crows Nest: Allen & Unwin, 2011); R.J. Fensham, “Aboriginal Fire Regimes in Queensland, Australia: Analysis of the Explorers’ Record,” *Journal of Biogeography* 24, no. 1 (1997): 11–22; Noel Preece, “Aboriginal Fires in Monsoonal Australia from Historical Accounts,” *Journal of Biogeography* 29, no. 3 (2002): 321–336.

⁴⁹ Ron Hateley, *The Victorian Bush: Its “Original and Natural” Condition* (Melbourne: Polybractea Press, 2010); Barbara Mactaggart, Johannes Bauer, and David Goldney, “When History May Lead Us Astray: Using Historical Documents to Reconstruct Swampy Meadows/Chains of Ponds in the New South Wales Central Tablelands, Australia,” *Australian Geographer* 38, no. 2 (2007): 233–52; Sylvia J. Hallam, “Peopled Landscapes in Southwestern Australia in the Early 1800s: Aboriginal Burning off in the Light of Western Australian Historical Documents,” *Early Days: Journal of the Royal Western Australian Historical Society* 12, no. 2 (2002): 177–91.

⁵⁰ D. G. Ryan, J. E. Ryan, and B. J. Starr, “The Australian Landscape—Observations of Explorers and Early Settlers” (Sponsored by the NSW Farmer’s Association, Wagga Wagga: Murrumbidgee Catchment Management Committee, 1995).

⁵¹ Tim Flannery, *The Future Eaters: An Ecological History of the Australasian Lands and People* (Sydney: Reed New Holland, 1994); J. S. Benson and P.A. Redpath, “The Nature of Pre-European Native Vegetation in South-Eastern Australia: A Critique of Ryan, D.G., Ryan J.R. and Starr, B.J. (1995), *The Australian Landscape: Observations of Explorers and Early Settlers*,” *Cunninghamia* 5, no. 2 (1997): 285–328; see also D. M. J. S. Bowman, “Future Eating and Country Keeping: What Role Has Environmental History in the Management of Biodiversity?,” *Journal of Biogeography* 28, no. 5 (2001): 549–564; Tom Griffiths, “How Many Trees Make a Forest? Cultural Debates about Vegetation Change in Australia,” *Australian Journal of Botany* 50 (2002): 375–89.

⁵² Gammage, *The Biggest Estate on Earth*.

sophistication of practice across the continents of Australia and North America. As will be argued throughout the thesis, especially in Chapters Six and Seven, universalist interpretations and portrayals of Indigenous burning are not only historically inaccurate but ecologically and culturally harmful. Some general principles can be discerned, however, to anchor the reader before discussion of local specificities. Aboriginal Australians were not the only Indigenous peoples to deliberately and systematically use fire prior to European colonisation, as Indigenous peoples across the globe have used fire to greater or lesser extents.⁵³ This thesis focusses upon Australia, while exploring and uncovering the influence of discourses of Native American burning upon Australian fire discourses. It is also essential not to overstate the evolutionary impact of Indigenous burning. Anthropogenic fire has been shown to cause changes in plant seed traits, but while Indigenous Australian burning almost certainly extended the range of some species and may have caused the extinction of others, it has not exerted a long enough presence – even at 65,000 years or so – to shape the evolution of the majority of Australia’s diverse biota.⁵⁴

Indigenous Australians may describe an astounding variety of individual reasons for burning, or describe burning as fitting within a larger holistic framework. Some of the material purposes for burning include hunting large and small fauna,⁵⁵ creating and sustaining diversity of ecological niches (implying that for this particular formulation, pyrodiversity promotes biodiversity),⁵⁶ shaping vegetation for ease of hunting or promotion of grazing,⁵⁷ promoting and encouraging the growth of edible or useful plants,⁵⁸ clearing areas of snakes and pests,⁵⁹ and protecting fire-sensitive resources.⁶⁰

⁵³ Mary R. Huffman, “The Many Elements of Traditional Fire Knowledge: Synthesis, Classification, and Aids to Cross-Cultural Problem Solving in Fire-Dependent Systems Around the World,” *Ecology and Society* 18, no. 4 (2013).

⁵⁴ S. Gómez-González et al., “Anthropogenic Fire Drives the Evolution of Seed Traits,” *Proceedings of the National Academy of Sciences* 108, no. 46 (2011): 18743–47; Jon E. Keeley et al., “Fire as an Evolutionary Pressure Shaping Plant Traits,” *Trends in Plant Science* 16, no. 8 (2011): 406–11; Bradshaw et al., “Little Evidence for Fire-Adapted Plant Traits in Mediterranean Climate Regions”; Bowman, “The Impact of Aboriginal Landscape Burning.”

⁵⁵ J.C. Altman, “Manwurrk (Fire Drive) at Namilewohwo: A Land-Management, Hunting and Ceremonial Event in West Arnhem Land,” in *Culture, Ecology and Economy of Fire Management in North Australian Savannas: Rekindling the Wurrk Tradition*, ed. Jeremy Russell-Smith, Peter M. Cooke, and Peter J. Whitehead (Collingwood: CSIRO Publishing, 2009), 195–211; Matthew J. Colloff, *Flooded Forest and Desert Creek: Ecology and History of the River Red Gum* (Collingwood: CSIRO Publishing, 2014), 115.

⁵⁶ Bird et al., “Niche Construction and Dreaming Logic.”

⁵⁷ Gammage, *The Biggest Estate on Earth*.

⁵⁸ D. M. J. S. Bowman, M. Garde, and A. Saulwick, “Fire Is for Kangaroos: Interpreting Aboriginal Accounts of Landscape Burning in Central Arnhem Land,” in *Histories of Old Ages: Essays in Honour of Rhys Jones*, ed. Atholl Andersen, Ian Lilley, and Sue O’Connor (Canberra: Pandanus Books, 2001), 61–78; Colloff, *Flooded Forest and Desert Creek: Ecology and History of the River Red Gum*.

⁵⁹ M. Garde, “The Language of Fire: Seasonality, Resources and Landscape Burning on the Arnhem Land Plateau,” in *Culture, Ecology and Economy of Fire Management in North Australian Savannas: Rekindling the Wurrk Tradition*, ed. Jeremy Russell-Smith, Peter J. Whitehead, and Peter M. Cooke (Collingwood: CSIRO Publishing, 2009), 102–94.

⁶⁰ Prober et al., “Ngadju Kala.”

Indigenous Australians also burned (and burn) for non-material purposes, including the protection of sacred sites,⁶¹ a sense of obligation to ‘clean’ country,⁶² and for emotional wellbeing.⁶³ Any acknowledgement of burning must also include exploration of decisions *not* to burn; for instance during the dry season in Central Arnhem Land some flowering plants are left unburnt to supply bush honey.⁶⁴ As will be explored in Chapters Two and Five, a similar diversity of burning practice was exercised (and is exercised today) by Native Americans prior to colonisation.

As stated, each chapter of this thesis which introduces a new area will briefly explore the shape and patterns of Indigenous burning specific to that area, but some general patterns must be established to support the arguments of this thesis. The first is that there was (and is) great diversity of burning practice - Indigenous Australians and Native Americans burned their country in many different ways.⁶⁵ Even within one particular group’s country, fire was used differently for different vegetation communities, often being more common near camp sites and along travel routes,⁶⁶ or achieving maximum leverage when used along the edges between different ecological communities (sometimes called ‘ecotones’).⁶⁷ Similarly, many researchers adopt an unconscious assumption that Indigenous burning had a consistent impact or was much the same throughout the vast pre-colonial period – perhaps this could be called an unconscious assumption of uniformitarianism. Geographer Lesley Head argued in 1989 there was no *a priori* reason for this assumption; the ‘intensification’ hypothesis that Indigenous Australians expanded their toolkit and population within the last few thousand years, or the vast environmental changes caused by the glacial-interglacial transition at the end of the Pleistocene would also imply potential for changes in burning.⁶⁸ Typically, Indigenous burning is portrayed as consisting of fires of low intensity and affecting only small areas, but it is important to note that some Indigenous societies allow for high intensity burns as a “corrective” method to undo prior neglect.⁶⁹

⁶¹ Jones, “Hunters in the Australian Coastal Savanna.”

⁶² Henry T. Lewis, “Management Fires vs. Corrective Fires in Northern Australia: An Analogue for Environmental Change,” *Chemosphere* 29, no. 5 (1994): 949–63.

⁶³ Prober et al., “Ngadju Kala.”

⁶⁴ Bowman, Garde, and Saulwick, “Fire Is for Kangaroos: Interpreting Aboriginal Accounts of Landscape Burning in Central Arnhem Land.”

⁶⁵ For instance, Ngadju burning in the Great Western Woodlands was “characterised not by the prominence of fire typical of many Australian landscapes but rather by the selectivity of its use”, see Prober et al., “Ngadju Kala,” 728.

⁶⁶ Bird et al., “The ‘Fire Stick Farming’ Hypothesis.”

⁶⁷ Gammage, *The Biggest Estate on Earth*, 199; Anderson, *Tending the Wild*, 331.

⁶⁸ Lesley Head, “Prehistoric Aboriginal Impacts on Australian Vegetation; An Assessment of the Evidence,” *Australian Geographer* 20, no. 1 (1989): 41.

⁶⁹ Lewis, “Management Fires vs. Corrective Fires in Northern Australia: An Analogue for Environmental Change.”

Fire History

Each chapter will begin by briefly reviewing the relevant academic literature, but it is necessary to situate this thesis within the emerging field of fire history. I define fire history as the study of how human history has shaped and been shaped by fire. This thesis contributes to this field through explorations of changing conceptualisations of fire, the influence of such conceptualisations upon policy, practice, and culture, and the ecological and political influence of particular fires. Most academic research on fire tends to be either physical or biological rather than cultural in nature,⁷⁰ and fire history is notably under-theorised – as Stephen Pyne has somewhat facetiously noted, “the only fire department on a university campus is the one that sends emergency vehicles”.⁷¹ Fire history should include the histories, geographies, and biota of fire regimes, but ultimately seeks to begin with fire itself as a means “to understand humans better”.⁷² Other fire histories have explored cultural histories of fire,⁷³ histories of urban fires,⁷⁴ administrative histories of institutions which respond to and govern fire,⁷⁵ social histories of communities which experienced fire as disasters,⁷⁶ histories of fire science,⁷⁷ and used fire to expose political priorities and class divides.⁷⁸ Beyond a commitment to fire as an active agent, there are few unifying trends. Fire histories can include a broad range of methods and draw upon diverse source materials.⁷⁹ Pyne once wrote there was “no truly political history of fire”,⁸⁰ though Ashley Schiff’s examination of the politics of fire research and Jake Kosek’s exploration of the politics of race and fire surely serve as counterexamples.⁸¹

⁷⁰ Stephen J. Pyne, “Problems, Paradoxes, Paradigms: Triangulating Fire Research,” *International Journal of Wildland Fire* 16, no. 3 (2007): 271–76.

⁷¹ Stephen Pyne, “Big Fire; or, Introducing the Pyrocene,” *Fire* 1, no. 1 (2017): 1.

⁷² Stephen J. Pyne, “Firestick History,” *The Journal of American History* 76, no. 4 (1990): 1132.

⁷³ Hansen and Griffiths, *Living with Fire: People, Nature and History in Steels Creek*.

⁷⁴ Greg Bankoff, Uwe Lübken, and Jordan Sand, eds., *Flammable Cities: Urban Conflagration and the Making of the Modern World* (University of Wisconsin Press, 2012).

⁷⁵ Hal K. Rothman, *Blazing Heritage: A History of Wildland Fire in the National Parks* (Oxford: Oxford University Press, 2007).

⁷⁶ R. L. (Roger Llewellyn) Wettenhall, *Bushfire Disaster: An Australian Community in Crisis*, Studies in Australian Society (Angus and Robertson) (Sydney: Angus & Robertson, 1975).

⁷⁷ Simon Pooley, “Fire, Smoke, and Expertise in South Africa’s Grasslands,” *Environmental History* 23, no. 1 (2018): 28–55.

⁷⁸ Mike Davis, *Ecology of Fear: Los Angeles and the Imagination of Disaster* (New York: Metropolitan, 1998).

⁷⁹ For instance, one approach has mixed oral histories, archival policy data, and surveyed forest structure in Michelle M. Steen-Adams, Susan Charnley, and Mark D. Adams, “Historical Perspective on the Influence of Wildfire Policy, Law, and Informal Institutions on Management and Forest Resilience in a Multiownership, Frequent-Fire, Coupled Human and Natural System in Oregon, USA,” *Ecology and Society* 22, no. 3 (2017).

⁸⁰ Pyne, “Problems, Paradoxes, Paradigms,” 273.

⁸¹ A.L. Schiff, *Fire and Water: Scientific Heresy in the Forest Service* (Cambridge: Harvard University Press, 1962), 196; Jake Kosek, “Smokey the Bear Is a White Racist Pig,” in *Understories: The Political Life of Forests in Northern New Mexico* (Durham: Duke University Press, 2006).

Pyne was probably being characteristically modest by excluding his own oeuvre, which has not only defined the field of fire history, but been the major force driving its expansion. In the political sense, his work has included examinations of the institutions which have emerged to govern ignition in settler societies and debates over their authority.⁸² It is difficult to overstate the influence of Pyne on fire history, and this thesis very much builds from his work, especially in Chapters One, Two, Three, and Five. Yet few have gazed into the flames for sustained engagements, and Pyne has few formal successor students.⁸³ The advantage of this – and the mercurial nature of fire history – is that it allows for a great deal of freedom and flexibility in approach.

Thus, this thesis is a fire history. As noted above, understandings of Indigenous burning are socially, culturally, and especially politically constructed. This thesis explores the politics of fire knowledge, asking: how has Indigenous burning been conceptualised, appropriated, understood, and reconceptualised? To what purposes have these understandings been put? How and why have the politics of control over ignition drawn upon Indigenous burning? It also briefly discusses some of the material consequences of these political debates and conceptualisations. As observed by biologist and member of the Citizen Potawatomi Nation Robin Kimmerer, and Karuk, Seneca, Cherokee and Mexican fire ecologist Frank Lake, “the worldview of a society is often written more truthfully on the land than in its documents”.⁸⁴ This analytical attention to material consequences is not just borne out of ecological concern. Indeed, given the extremely strong Indigenous cultural and spiritual attachment to country and distress at perceived inappropriate fire regimes,⁸⁵ fire histories should pay more attention to the ecological changes from colonisation – not just for the material effects upon human societies, but also for how they impacted upon the spiritual and cultural obligations of Indigenous cultures. As will be shown throughout this thesis, this recognition has largely been lacking even among those sympathetic to the material consequences of Indigenous burning. It will also be apparent that this thesis is in part an intellectual fire history.

This thesis reflects deeply on the language of fire. Attempts at fire history quickly reveal that the terms bequeathed by Australian English are manifestly inadequate to convey the Australian experience of

⁸² Stephen J. Pyne, *Fire in America: A Cultural History of Wildland and Rural Fire* (Princeton: Princeton University Press, 1982); Pyne, *Burning Bush*; Stephen J. Pyne, *Year of the Fires: The Story of the Great Fires of 1910* (New York: Viking, 2001); Stephen J. Pyne, *The Still-Burning Bush* (Melbourne: Scribe Short Books, 2006); Stephen J. Pyne, *Between Two Fires: A Fire History of Contemporary America* (Tucson: University of Arizona Press, 2015).

⁸³ Stephen J. Pyne, “Fire,” in *A Companion to American Environmental History*, ed. Douglas Cazaux Sackman, Blackwell Companions to American History (Malden, MA: Wiley-Blackwell, 2010).

⁸⁴ Robin Wall Kimmerer and Frank K. Lake, “The Role of Indigenous Burning in Land Management,” *Journal of Forestry* 99, no. 11 (2001): 36.

⁸⁵ For example see Kari Marie Norgaard, “The Politics of Fire and the Social Impacts of Fire Exclusion on the Klamath,” *Humboldt Journal of Social Relations* 36, no. 1 (2014): 73–97.

fire, and this weakness has hindered effective policy and cultural responses to fire management. Griffiths and Hansen have argued that ‘bushfire’ is frustratingly generic, and sought to extend the poetic term “firestorm” away from its technical definition;⁸⁶ Griffiths has similarly criticised the use of “unnatural” to describe Australian bushfires.⁸⁷ Fire language is dominated by metaphors of militaries and monsters,⁸⁸ and oral histories have shown that even firefighters who are committed to actively and ecologically using fire will casually use antagonistic and militaristic language which undermines their ideological commitments.⁸⁹ Destruction is so often the default, yet those like myself who have witnessed a ‘cool burn’ (a deliberately provocative oxymoron) know that fire can be peaceful and trickle through the landscape. Even the technical language of fire reveals political contests. For instance, American wildlife biologist Herbert Stoddard complained when forestry agencies in the American South finally conceded a sanctioned role for deliberate fire ignition, declaring that they “substituted the expression ‘prescribed burning’ for controlled burning”, implying that an expert was still needed to ‘prescribe’ the practice.⁹⁰ This meditation on fire language is important because this thesis is striving to open up new possibilities for fire history. As I have argued elsewhere, a deeper, richer language of fire will enable a more robust political and cultural rapprochement with fire.⁹¹

Quite clearly, fire history is a subset of environmental history, and the thesis particularly identifies with the engagement with Indigenous histories and interdisciplinarity found in Australian environmental history. Environmental history has been aptly defined as the “history of the mutual relations between humankind and the rest of nature”.⁹² American John McNeill identified three main strands of environmental history: material histories, cultural/intellectual histories, and political histories,⁹³ while Douglas Weiner has argued that ultimately “every environmental story is a story

⁸⁶ Hansen and Griffiths, *Living with Fire: People, Nature and History in Steels Creek*, 179.

⁸⁷ Griffiths, “‘An Unnatural Disaster?’”

⁸⁸ Griffiths; Teenie Matlock, Chelsea Coe, and A. Leroy Westerling, “Monster Wildfires and Metaphor in Risk Communication,” *Metaphor and Symbol* 32, no. 4 (2017): 250–61.

⁸⁹ Bethany E. Hannah, “The Smokey Generation: A Wildland Fire Oral History and Digital Storytelling Project” (MA diss., Prescott College, 2015), <http://gradworks.umi.com/15/89/1589895.html>.

⁹⁰ Quoted in A Sydney Johnson and Philip E Hale, “The Historical Foundations of Prescribed Burning for Wildlife: A Southeastern Perspective,” in *Proceedings: The Role of Fire for Nongame Wildlife Management and Community Restoration: Traditional Uses and New Directions*, ed. W. Ford, Kevin R. Russell, and Christopher E. Moorman, Gen. Tech. Rep. NE-288 (Newtown Square, PA: U.S. Dept. of Agriculture, Forest Service, Northeastern Research Station, 2002), 15.

⁹¹ Daniel May, “Shallow Fire Literacy Hinders Robust Fire Policy: Black Saturday and Prescribed Burning Debates,” in *Disasters in Australia and New Zealand: Historical Approaches to Understanding Catastrophe*, ed. Scott McKinnon and Margaret Cook (Palgrave MacMillan, 2020).

⁹² McNeill, “Observations on the Nature and Culture of Environmental History,” 6.

⁹³ McNeill, “Observations on the Nature and Culture of Environmental History”; Paul S Sutter recently argued that American environmental historians have retreated from intellectual history, see Paul S. Sutter, “Putting the Intellectual Back in Environmental History,” *Modern Intellectual History*, preprint, 17 February, 2020, 1–10.

about power”.⁹⁴ William Cronon has urged environmental historians to engage with the task of “telling not just stories about nature, but stories about stories about nature”.⁹⁵ While this thesis identifies with these traditions, it identifies more strongly with Australian environmental history’s much stronger relationship with Indigenous history.⁹⁶ This includes strong engagement with the work of Tom Griffiths on the influence of colonial perceptions of Australian environments.⁹⁷ As Andrea Gaynor and others have noted, Australian environmental history is also characteristically open to inter and cross-disciplinarity; many of Australia’s most influential environmental histories were not written by trained historians but by farmer-poets, ecologists, palaeontologists, and others.⁹⁸ This resonates strongly with my thesis which requires strong critical engagement with researchers from the many different disciplines who have contributed to shifting conceptualisations on fire, including foresters, anthropologists, ecologists, and others.⁹⁹

There is a field of history which studies disasters (including wildfires and bushfires), but while this thesis certainly examines the politics and policies of disasters, it is resolutely not a disaster history. Disaster histories have much to commend them, including illuminating how culture and disasters influence each other,¹⁰⁰ but this thesis is dedicated to a vision of fire that goes beyond destruction or disaster paradigms.

The thesis draws on and contributes to the study of Indigenous history, primarily by illustrating the role of fire in changing non-Indigenous perceptions of Indigenous Australians. Many of the analytical concerns of the field of Aboriginal history flow through this thesis, such as concerns about race, images

⁹⁴ Douglas R. Weiner, “A Death-Defying Attempt to Articulate a Coherent Definition of Environmental History,” *Environmental History* 10, no. 3 (2005): 409.

⁹⁵ William Cronon, “A Place for Stories: Nature, History, and Narrative,” *The Journal of American History* 78, no. 4 (1992): 1375.

⁹⁶ Tom Griffiths, “Environmental History, Australian Style,” *Australian Historical Studies* 46, no. 2 (2015): 157–73; James D. Rice has argued that environmental historians in the United States have neglected Native American history in recent decades, see James D. Rice, “Beyond ‘The Ecological Indian’ and ‘Virgin Soil Epidemics’: New Perspectives on Native Americans and the Environment,” *History Compass* 12, no. 9 (2014): 745–57.

⁹⁷ For example see Griffiths, “How Many Trees Make a Forest?”

⁹⁸ Andrea Gaynor in Sarah Brown et al., “Can Environmental History Save the World?,” *History Australia* 5, no. 1 (2011): 1–24; Eric Pawson and Stephen Dovers, “Environmental History and the Challenges of Interdisciplinarity: An Antipodean Perspective,” *Environment and History* 9 (2003).

⁹⁹ For a meditation on these issues, see Bowman, “Future Eating and Country Keeping”; many fire scientists are characteristically open to interdisciplinarity, see Christopher I. Roos et al., “Living on a Flammable Planet: Interdisciplinary, Cross-Scalar and Varied Cultural Lessons, Prospects and Challenges,” *Philosophical Transactions of the Royal Society B: Biological Sciences* 371, no. 1696 (2016).

¹⁰⁰ For instance, see Greg Bankoff, “Time Is of the Essence: Disasters, Vulnerability and History,” *International Journal of Mass Emergencies and Disasters* 22, no. 3 (2004): 23–42; Davis, *Ecology of Fear: Los Angeles and the Imagination of Disaster*.

of ‘noble savagery’, and the influence of property rights.¹⁰¹ As historian Bain Attwood reflects, it is “easy to forget” that as late as 1975 the very term “Aboriginal history” was novel.¹⁰² The chief contribution of this thesis to this particular field is the demonstration of how understandings of Indigenous burning both reflect and drive changes in how non-Indigenous Australians understand Aboriginal Australia, especially in Chapter Four.

I also engage with settler colonial theory to demonstrate how it helps explain suppression of Indigenous burning practices. Settler colonialism refers to attempts to theorise broad patterns and distinctive dynamics in colonies where settlers “came to stay”.¹⁰³ Working from scholars such as Patrick Wolfe, who theorised that invasion “is a structure not an event” and that settler colonialism has a “logic of elimination” of Indigenous peoples, settler colonial theory has proliferated in recent years, and many have used settler colonial theory to compare the experiences of Australian and American Indigenous peoples.¹⁰⁴ Clearly colonisation greatly affected fire; “fire on earth looks the way it does today because Europe expanded” through industrialisation, the influence of fire suppressing forestry, and agriculture.¹⁰⁵ However, Tim Rowse has criticised how settler colonialism as a framework can become teleological and presupposes a structure regardless of empirics.¹⁰⁶ Many Indigenous authors have also criticised it for failing to account for Indigenous agency and diversity of Indigenous experiences.¹⁰⁷ This thesis will support such cautions, promoting the need for historical complexity by demonstrating that in some case studies it may be possible to argue that the logic of elimination applied to Indigenous burning (as in Chapters Two and Three), but not in others (as in Chapter Four).

Settler colonial theory also helps explain several thematic concerns discernible throughout this thesis, including the enduring influence of ideological constructs such as ‘savagery’ and ‘wilderness’ in how non-Indigenous peoples understand Indigenous burning. As Rhys Jones sought to disprove in his provocative article which opens this thesis, many settlers in Australia viewed Indigenous Australians as savages who had not laboured on the land and thus had no property rights over this supposed terra

¹⁰¹ Bain Attwood recently proposed a definition of “Aboriginal history” to outline a specific methodological approach to the study of Indigenous peoples. See Bain Attwood, *The Good Country: The Djadja Wurrung, the Settlers, and the Protectors* (Clayton, Victoria, Australia: Monash University Publishing, 2017).

¹⁰² Quoted in Griffiths, *Deep Time Dreaming: Uncovering Ancient Australia*, 234.

¹⁰³ Jane Carey and Ben Silverstein, “Thinking with and beyond Settler Colonial Studies: New Histories after the Postcolonial,” *Postcolonial Studies* 23, no. 1 (2020), 5.

¹⁰⁴ Carey and Silverstein, 5; Walter L. Hixson, *American Settler Colonialism: A History* (Palgrave MacMillan, 2013), 8.

¹⁰⁵ Stephen J. Pyne, “Frontiers of Fire,” in *Ecology & Empire: Environmental History of Settler Societies*, ed. Tom Griffiths and Libby Robin (Edinburgh: Keele University Press, 1997), 20.

¹⁰⁶ Tim Rowse, “Indigenous Heterogeneity,” *Australian Historical Studies* 45, no. 3 (2014): 297–310.

¹⁰⁷ Shino Konishi, “First Nations Scholars, Settler Colonial Studies, and Indigenous History,” *Australian Historical Studies* 50, no. 3 (2020): 285–304.

nullius.¹⁰⁸ This drew upon earlier colonial experience in North America which tended to interpret Native Americans as Ignoble or Noble Savages, which Dakota historian Philip J Deloria noted became self-justifying campaigns of conquest and self-criticism.¹⁰⁹ The concept of ‘wilderness’ also related to terra nullius.¹¹⁰ Chapter Five will discuss how the logic of elimination applied to the settler creation of wilderness in America and explore how this concept has been rocked by a reconceptualisation of Native American burning practices. Chapters Four and Five will explore the influence of one relatively recent reconceptualisation of the savage discursive construct (the ‘Ecological Noble Savage’), and demonstrate how the concepts of savagery and wilderness have shaped interpretations of Indigenous burning practices in both North America and Australia.

The thesis engages in analysis of understandings of Indigenous burning in both Australia and the United States in order to demonstrate the mutual links and divergences and contributes to a number of other works engaged in similar endeavours. As will be demonstrated in Chapters One and Two, Australian fire politics and science might have been initially strongly influenced by European influences, but through the ‘light burning’ controversy, conceptions of climax ecology, and fire suppression paradigms, the United States has grown to exert a profound influence on how Australians have understood Indigenous burning. As these chapters discuss, this applies much more to the United States than influences from other nations due to the power of American institutions that govern fire, especially the US Forest Service. While this thesis is not an evenly weighted comparative analysis, it also engages in comparisons of the divergences in how non-Indigenous Australians and Americans have understood fire. Pyne’s work has helped blaze the way in establishing many of these links and divergences.¹¹¹ There have been analyses of contemporary Indigenous burning practices in both countries,¹¹² and as Chapter Seven discusses in detail, there have been many comparisons of pre-contact Indigenous burning practices, especially as they interact with megafauna extinction

¹⁰⁸ Attwood, *The Good Country: The Djadja Wurrung, the Settlers, and the Protectors*, 57.

¹⁰⁹ Philip Joseph Deloria, *Playing Indian* (Yale University Press, 1998).

¹¹⁰ Rhys Jones, “Ordering the Landscape,” in *Seeing the First Australians*, ed. Ian Donaldson and Tamsin Donaldson (Sydney: Allen & Unwin, 1985), 182.

¹¹¹ Pyne, *Burning Bush*. Pyne

¹¹² Christine Eriksen and Don L. Hankins, “The Retention, Revival, and Subjugation of Indigenous Fire Knowledge through Agency Fire Fighting in Eastern Australia and California,” *Society & Natural Resources* 27, no. 12 (2014): 1288–1303; T.C. Blackburn and M.K. Andersen, eds., *Before the Wilderness: Environmental Management by Native Californians* (Menlo Park, California: Ballena Press, 1993); Henry T. Lewis, “Fire Technology and Resource Management in Aboriginal North America and Australia,” in *Resource Managers: North American and Australian Hunter-Gatherers*, ed. Nancy M. Williams and Eugene S. Hunn (Boulder, Colorado: Westlaw Press Inc., 1982), 45–68.

theories.¹¹³ There is also a broader tradition of comparative and transnational environmental analyses of Australia and the United States.¹¹⁴

Methods

Fundamental to the methods employed in this thesis is an awareness of ethical responsibilities to Indigenous peoples. Clearly academic disputes over interpretation and reinterpretations of Indigenous history have had detrimental impacts on Indigenous peoples.¹¹⁵ There is an obvious risk that even self-aware non-Indigenous scholars will bring their own epistemic biases and frameworks to bear in interpreting Indigenous actions, experiences, and thought.¹¹⁶ Thus whenever possible, seeking to avoid Martin's warning that "ironically, in writing histories of colonisation we are proceeding by way of ideological colonisation",¹¹⁷ I have tried to use the words of Indigenous peoples themselves to describe their own burning practices, cosmologies, and epistemologies, and only from sources that exist in the public domain. Many Indigenous and non-Indigenous academics and authors have been critical of non-Indigenous academics who do not engage with Indigenous methodologies and ways of knowing, concerned that Western-style research can reproduce colonial power relations and knowledge production.¹¹⁸ Consequently, this thesis is built on the proposition that to write Indigenous history or to discuss Indigenous burning in a respectful manner requires ethical research paradigms, openness to new sources of data, and willingness to engage with Indigenous epistemologies.¹¹⁹ Chapter Five of this thesis will explore one notable example of controversial academic research on Native American environmental practices that some Indigenous scholars argued was harmful to Native

¹¹³ D. Merrilees, "Man the Destroyer: Late Quaternary Changes in the Australian Marsupial Fauna," *Journal of The Royal Society of Western Australia* 51, no. 1 (1968): 1–24; P.S. Martin, "40,000 Years of Extinctions on the 'Planet of Doom,'" *Palaeogeography, Palaeoclimatology, Palaeoecology* 82 (1990): 187–201.

¹¹⁴ Ian Tyrrell, *True Gardens of the Gods: Californian-Australian Environmental Reform, 1860-1930* (Berkeley: University of California Press, 1999); David Goodman, *Gold Seeking: Victoria and California in the 1850s* (Stanford University Press, 1994).

¹¹⁵ M. Langton, *Burning Questions: Emerging Environmental Issues for Indigenous Peoples in Northern Australia* (Darwin: Centre for Indigenous Natural and Cultural Resources Management, Northern Territory University, 1998); Gillian Cowlshaw, "On 'getting It Wrong': Collateral Damage in the History Wars," *Australian Historical Studies* 37, no. 127 (2006): 181–202.

¹¹⁶ For a meditation on Indigenous and Western epistemologies in the context of burning, see Helen Verran, "A Postcolonial Moment in Science Studies: Alternative Firing Regimes of Environmental Scientists and Aboriginal Landowners," *Social Studies of Science* 32, no. 5–6 (2002): 729–762.

¹¹⁷ Calvin Martin, "An Introduction Aboard the *Fidèle*," in *The American Indian and the Problem of History*, ed. Martin, Calvin (New York: Oxford University Press, 1987), 9.

¹¹⁸ Linda Tuhiwai Smith, *Decolonizing Methodologies: Research and Indigenous Peoples* (Otago: Otago University Press, 1999); Renee Pualani Louis, "Can You Hear Us Now? Voices from the Margin: Using Indigenous Methodologies in Geographic Research," *Geographical Research* 45, no. 2 (2007): 130–39.

¹¹⁹ Donald L. Fixico, "Ethics and Responsibilities in Writing American Indian History," *American Indian Quarterly* 20, no. 1 (1996): 29–39; Lake et al., "Returning Fire to the Land."

Americans – Shepard Krech’s *The Ecological Indian*.¹²⁰ Examples of ethical engagements with contemporary Indigenous burning research abound.¹²¹

This thesis is primarily a history of discursive constructs – understandings and conceptualisations of Indigenous burning – and their influence. As will be shown throughout this thesis, power over ignition in the time periods examined has overwhelmingly been held by non-Indigenous institutions and individuals. Therefore, the thesis is not primarily about Indigenous reactions to the non-Indigenous discourse (or discourses) of Indigenous burning. Nor is it a thesis that seeks to make original claims in recreating pre-contact Indigenous burning practices, or that aims to interpret contemporary Indigenous burning for a non-Indigenous audience. I am attentive to Fixico’s critique that “the problem for those who write about American Indians is that written sources have been produced almost exclusively by non-Indians”.¹²² Thus I strive to incorporate Indigenous voices as they appeared in historical debates over ignition; where there are absences in the forums where Indigenous burning was debated (as in Chapters One, Two, and Three) I seek to explain these absences; where Indigenous voices are present (as in Chapters Four and Eight) I highlight their presence.

In this thesis I have adopted the practice of using the generic term ‘Indigenous burning’ to describe the broad array of diverse burning practices described above. Some Indigenous languages themselves have many words to describe different fire and burning practices, shown by linguist Murray Garde for the Kunwinjku language group of Western Arnhem Land and archaeologist Sylvia Hallam for the Noongar peoples of South-Western Australia.¹²³ It is increasingly common to hear the term ‘cultural burning’ used by contemporary Indigenous groups, but as discussed in Chapter Eight, I reserve this term in a very specific sense for a particular movement of Indigenous burning practitioners and allies who operate in areas where colonisation largely disrupted the practice (if not the knowledge or culture) of Indigenous burning. Some have used the term ‘traditional’ to describe pre-contact burning practices,¹²⁴ but as cultural anthropologists Kim de Rijke *et al* have argued, the use of the term

¹²⁰ Shepard Krech III, *The Ecological Indian: Myth and History* (New York: Norton, 1999).

¹²¹ Michael Lewis, Amy Christianson, and Marsha Spinks, “Return to Flame: Reasons for Burning in Lytton First Nation, British Columbia,” *Journal of Forestry* 116, no. 2 (2018): 143–50; B. J. Austin et al., “An Indigenous-Led Approach for Regional Knowledge Partnerships in the Kimberley Region of Australia,” *Human Ecology* 47, no. 4 (2019): 577–88; Will Smith et al., “Intercultural Collaboration on Aboriginal Country” (Bushfire & Natural Hazards CRC, 2018); Lake et al., “Returning Fire to the Land”; Timothy Neale et al., “Walking Together: A Decolonising Experiment in Bushfire Management on Dja Dja Wurrung Country,” *Cultural Geographies* 26, no. 3 (2019): 341–59.

¹²² Fixico, “Ethics and Responsibilities in Writing American Indian History,” 35.

¹²³ Garde, “The Language of Fire: Seasonality, Resources and Landscape Burning on the Arnhem Land Plateau”; Sylvia J. Hallam, *Fire and Hearth* (Canberra: Australian Institute of Aboriginal Studies, 1975).

¹²⁴ For example, see State Government of Victoria, “Traditional Burning Practices of Aboriginal People and the Prescribed Burning Debate in Victoria,” in *Report of the Inquiry into the 2002-2003 Victorian Bushfires* (Melbourne: State Government of Victoria, 2003), 117–23.

'traditional' can be highly problematic in Indigenous contexts. Indeed, Chapter Four will demonstrate the pitfalls of 'tradition' as an interpretative framework for Indigenous burning. One scholar has used the term "myth" to highlight what she saw as a disconnect between non-Indigenous constructs of Indigenous burning and the evidence for pre-colonial burning practices in south-eastern Australia.¹²⁵ While I agree that non-Indigenous constructs of Indigenous burning and the practice of Indigenous burning can be radically different, this thesis will demonstrate various processes through which Indigenous burning practices actively reshape these constructs. Furthermore, the common understanding of myth implies a fundamentally fictional base. Indigenous peoples are engaged in political struggles where denial of their practices and connection to land affects their property rights, cultural obligations to country, and wellbeing. Implying their burning practices are a 'myth' would greatly complicate this.

Throughout this thesis, I refer to specific Indigenous groups by their preferred name rather than use collective terms wherever possible. I have tried to use the preferred group name as Indigenous peoples have expressed them, cognisant that Indigenous identity can be very complex and many ethnic or language group names recorded in early colonial sources may have been inaccurate.¹²⁶ As Noongar historians Len Collard and Sandra Harben write, "To describe the *Koori, Nyungar, Mulba, Murri, Nunga, Pallwah, Wongi* or *Wyba* as Aborigines or Indigenous Australians denies us our own diversity and identity within our own theoretical and applied epistemology".¹²⁷ This choice reflects a fundamental premise of my thesis: the diversity of Indigenous burning culture and practices. When referring more broadly to collective Indigenous Australians and Native Americans, I use the term 'Indigenous', though this should be understood as referring only to these ethnicities.¹²⁸ Instead of 'Aboriginal' or 'Indigenous Australians', historian Bill Gammage in *The Biggest Estate on Earth* chose to use the term "people" as a provocation to support his arguments,¹²⁹ but I have chosen not to do this as this would be too confusing for a thesis which includes non-Indigenous peoples and politics. Similarly, to consider non-Indigenous Australians or Americans as having identical fire practices or

¹²⁵ Samantha Strong, "How the Sense-Making of Myths Can Help Us Understand Bushfire" (Paper presented at *Bushfire Management: Balancing the Risks*, Canberra: NPA ACT, 2017).

¹²⁶ Michael Powell and Rex Hesline, "Making Tribes? Constructing Aboriginal Tribal Entities in Sydney and Coastal NSW from the Early Colonial Period to the Present," *Journal of the Royal Australian Historical Society* 96, no. 2 (2010): 115–48.

¹²⁷ Len Collard and Sandra Harben, "Nartj Katitj Bidi Ngulluckiny Koorl? (Which Knowledge Path Will We Travel?)," *Studies in Western Australian History* 26 (2010): 78.

¹²⁸ The very concept of 'Indigeneity' has been expanded by some in recent years to include peoples in the Philippines, parts of Africa, and even Scandinavian peoples, but here I refer only to Indigenous Australians and Native Americans; see Francesca Merlan, "Indigeneity: Global and Local," *Current Anthropology* 50, no. 3 (2009): 303–33.

¹²⁹ Gammage, *The Biggest Estate on Earth*, xix.

cultures will be demonstrated as greatly mistaken as many have had their own traditions of burning, thus where possible I have tried to specify more distinctive groupings.¹³⁰

A methodological consideration unique to fire history relates to practical experience. There are no guides and few theories of how to write fire history. The very nature of fire research means that many (if not most) who write in this space have practical experience of fire, perhaps as foresters, land managers, firefighters, or ecologists. A constant theme of this thesis will be arguments over the value of practical over abstracted academic knowledge about fire. Some have criticised academics who claim expertise over fire without possessing experiential knowledge of it (especially high-intensity fire).¹³¹ Undoubtedly part of Stephen Pyne's success in gaining a measure of respect globally and among groups with fiercely opposed views on fire is his personal history, including his employment as a smokechaser for fifteen years.¹³² I have no strong firefighting experience, and little prescribed burning experience. Does one need to have wielded the Pulaski as well as the pen?¹³³ Do the benefits of experiential knowledge outweigh the risk of suppression of criticism? I make no original claims based on my expertise of fire itself; instead, I rely upon peer-reviewed literature, which, for all its flaws, remains the most robust method for contestation of truth. I have also sought to immerse myself in contemporary fire cultures through engagement with management agencies, experts, and practitioners.¹³⁴

This thesis uses a form of discourse analysis as part of constructing this fire history. Some social scientists have previously used forms of discourse analysis to examine the "politics of blame" that occur after a destructive bushfire, or to examine highly contested bushfire politics.¹³⁵ Nevertheless these have generally been confined to analysis of a single event or its aftermath. Discourse has many definitions but essentially Hajer and Versteeg define it as "an ensemble of ideas, concepts and

¹³⁰ Griffiths, "How Many Trees Make a Forest?"; Stephen J. Pyne, "Pyne on Boyd, 'Indians, Fire and the Land in the Pacific Northwest,'" H-Net, February 2000, <https://networks.h-net.org/node/2718/reviews/3284/pyne-boyd-indians-fire-and-land-pacific-northwest>.

¹³¹ David Jefford Ward, "People, Fire, Forest and Water in Wungong: The Landscape Ecology of a West Australian Water Catchment" (PhD thesis, Curtin University of Technology, 2010), 18.

¹³² Stephen J. Pyne, "Making History from Fighting Fire" (Furniss lecture, Colorado State University, 25 March, 2009).

¹³³ A Pulaski is an American firefighting tool which combines an axe and an adze in a single head, allowing the wielder to both dig soil and chop wood in order to construct firebreaks.

¹³⁴ This includes maintaining an active affiliation with the Bushfire and Natural Hazards CRC, being hosted by fire experts Stephen Pyne and Don Hankins, and observing and assisting in prescribed burns.

¹³⁵ Whittaker and Mercer, "The Politics of Blame"; Buizer and Kurz, "Too Hot to Handle"; Travis Paveglio, Todd Norton, and Matthew S. Carroll, "Fanning the Flames? Media Coverage during Wildfire Events and Its Relation to Broader Societal Understandings of the Hazard," *Human Ecology Review* 18, no. 1 (2011): 41–52; Carol Marie Terracina-Hartman, "Fanning the Flames: How US Newspapers Have Framed Ten Historically Significant Wildfires 2003–2013" (PhD diss., Michigan State University, 2017); Karyn Bosomworth, "A Discursive-Institutional Perspective on Transformative Governance: A Case from a Fire Management Policy Sector," *Environmental Policy and Governance* 28, no. 6 (2018): 415–25.

categories” which are used to create meaning, and “which is produced and reproduced through an identifiable set of practices”.¹³⁶ The dominance of a particular discourse influences societies in their perceptions of possible solutions to particular problems, or the very terms and assumptions on which debate can be had.¹³⁷ Using Hajer and Versteeg’s definition of discourse quoted above, this thesis draws inspiration from those papers and from environmental discourse analysis more broadly, in order to meet William Cronon’s challenge for environmental historians to engage with the task of “telling not just stories about nature, but stories about stories about nature”.¹³⁸ Analysing the discourses of fire politics – and various conceptualisations of both Indigenous burning and prescribed burning – helps reveal how it was made possible that Indigenous burning could be socially constructed as legitimate and worthy of discussion and implementation, in a society where at least some of its members had previously sought to eradicate Indigenous cultures and dispossess them of land and resources. The analysis of discourse is common across the thesis, and reveals multiple typologies and analytical frameworks, rather than a single typology which applies to every chapter.

Unlike the discourse analyses from other scholars mentioned above, this thesis examines both historically important individual bushfires, and longer fire-related processes: Big Fires, Small Fires, and Fires in the Mind. Big Fires both reveal existing discourses and help reshape them. They can be ecologically and culturally transformative, a good reminder of the power of nature’s agency in history. Yet not every Big Fire is an historical turning point. The Big Fires I have selected for this thesis (discussed in Chapters One, Two, Three, Five, and Six) were all transformative beyond their own immediate contexts, influencing bushfire cultures and politics across continents.¹³⁹ However, unlike other fire histories,¹⁴⁰ this thesis also demonstrates the importance of long-term patterns of fire in shaping and shifting the discourses of Indigenous burning. This reinforces a key argumentative pillar

¹³⁶ Maarten Hajer and Wytse Versteeg, “A Decade of Discourse Analysis of Environmental Politics: Achievements, Challenges, Perspectives,” *Journal of Environmental Policy & Planning* 7, no. 3 (2005): 175; for an extended discussion on different discourse definitions, see Josh Whittaker and David Mercer, “The Victorian Bushfires of 2002–03 and the Politics of Blame: A Discourse Analysis,” *Australian Geographer* 35, no. 3 (2004): 259–87.

¹³⁷ For a demonstration of how the divergent framing of discourses following the 1988 Yellowstone Fires affected policy outcomes in the United States and Canada, see Nichole Fifer and Shannon K. Orr, “The Influence of Problem Definitions on Environmental Policy Change: A Comparative Study of the Yellowstone Wildfires: The Influence of Problem Definitions on Environmental Policy Change,” *Policy Studies Journal* 41, no. 4 (2013): 636–53; Seán Kerins, “Caring for Country to Working on Country,” in *People on Country: Vital Landscapes, Indigenous Futures*, ed. Jon Altman and Seán Kerins (Sydney: The Federation Press, 2012), 26–44; Hajer and Versteeg, “A Decade of Discourse Analysis of Environmental Politics,” 177; Marleen Buizer and Tim Kurz, “Too Hot to Handle: Depoliticisation and the Discourse of Ecological Modernisation in Fire Management Debates,” *Geoforum* 68 (2016): 50.

¹³⁸ Cronon, “A Place for Stories: Nature, History, and Narrative,” 1375.

¹³⁹ This is why I have not chosen to examine other devastating fires such as the 1983 Ash Wednesday or 1967 Tasmanian bushfires.

¹⁴⁰ Such as Paul Collins, *Burn: The Epic History of Bushfire in Australia*, 2nd ed. (Carlton: Scribe, 2009).

of this thesis, that fire should not be seen solely as destructive. Perhaps the linguistic monopoly of destructive metaphors has unconsciously influenced other historians to only consider Big Fires as transformative. Pyne has speculated on this but judged “We may wish that the meek fires will inherit the landscape but the wild ones make the news”.¹⁴¹ This thesis demonstrates that cool burns (in the form of Indigenous burning and some low-intensity prescribed burns) are indeed inheriting the landscape, especially through Chapters Four and Eight. Finally, this thesis also examines Fires in the Mind: imagined or abstracted fires, including those thought to have occurred hundreds and even tens of thousands of years ago. All three types of fires have shaped the discourses of Indigenous burning.

Consequently, this thesis uses a diverse array of source material. Each chapter will introduce the appropriate source material used, but this includes the sources of public debate (including newspapers and Royal Commission transcripts), policy evolution (including government documents), and academic discussions (including influential journal articles, conference papers, and monographs). Royal Commissions which followed the Big Fires I have selected were particularly significant. Royal Commissions shape public knowledge and discussion. They may direct policy development. Royal Commissions generate knowledge – whether directly, by providing a forum for contestation of knowledge, or indirectly, by shaping research agendas. Indeed, the lack of Royal Commissions in the United States helps explain divergent discourses of Indigenous burning between Australia and the United States. A final note: to aid readability throughout this thesis, historical data and measurements have been converted into SI or SI-derived units (such as converting acres to hectares).

Chapter Summary

The first chapter of this thesis examines the 1939 Black Friday bushfires in Victoria. This area is home to the ‘fire flume’ (possibly the most dangerous fire region in the world) and introduces the first floral protagonist of this thesis, the mountain ash (*Eucalyptus regnans*). As they were followed by the influential Stretton Royal Commission, the Black Friday fires set the paradigm for Australian bushfire politics, culture, and historiography. This chapter explores how graziers battled foresters for authority over ignition and responsibility for catastrophe. Most discourses of fire based their understandings on ‘natural states’ but there was rarely any incorporation of Indigenous burning, and practically no allowance for agency or direction. This chapter also demonstrates the influence exerted on Australian

¹⁴¹ Stephen J. Pyne, “2012 Words on Fire Symposium: Keynote,” OSU MediaSpace, accessed 2 May, 2017, https://media.oregonstate.edu/media/t/0_uo5e6hbq.

bushfire politics by American events – namely, the ‘light burning’ dispute and triumph of American fire suppression strategies, and the development of Clementsian climax ecology.

Chapter Two follows these threads back to the United States. Another Big Fire – the 1910 Big Burn – acted as a bellows upon the ‘light burning’ debate. Foresters viewed light burning (promoted by a diverse and loose coalition of graziers, timber companies, and others) as dangerous to their timber crops, moralistically, and as a political threat to their authority, and sought to aggressively suppress all fire. Light burners tried to appeal to the burning practices of Californian Native Americans (though such appeals were inevitably tinged by settler-colonial frameworks), but fire suppressionists gleefully ridiculed such appeals and sabotaged academic research which undermined their theories. Race was thus used in service of a political argument of authority over ignition and suppression. The drama and trauma of the Big Burn locked the US Forest Service and its allies into fire suppression as a strategy, with ecological consequences which reverberated around the globe.

Chapter Three explores the jarrah (*Eucalyptus marginata*) forests of South-Western Australia, where the documentary record of Noongar burning and colonialization allows for an extension of settler colonialism into fire history. This Chapter focusses upon the Rodger Royal Commission which followed the Big Fire which devastated Dwellingup in 1961. The Rodger Royal Commission helped shape the ‘Australian Strategy’ where foresters abandoned the lingering influence of the light burning debate and accepted a role for the deliberate and widespread use of fire in forest management. Yet despite links later made by the Australian Strategists to growing academic interest in pre-colonial Indigenous burning practices, the Commission saw only passing references to Noongar practices among both the foresters defending their stewardship, and farmers arguing for freedom to burn as they wished.

Chapter Four disrupts the pattern of Big Fires and Indigenous voices and fires mentioned only in abstract or past tenses, by examining the politics of fire management in Kakadu National Park in Australia’s fire-prone tropical Top End. As the world’s first national park to be owned by its Indigenous peoples, Kakadu has served as a site of encounter for many non-Indigenous Australians and others. Debate over fire management between Kakadu’s Indigenous owners, conservationists, academics, Park managers, and others, reveals competing discourses of Indigenous burning. Reconceptualisation of ‘wilderness’, concerns about cultural and environmental ‘continuity’, and tensions over the place of introduced species were all inspired by Indigenous Australians actively burning and asserting their rights to determine burning.

Chapter Five returns to the United States for a broad examination of post-War America. The dominance of the fire suppression paradigm gradually weakened due to the ‘Fire Revolution’ led by fire ecologists and other scholars, though this movement failed to comprehensively engage with

Native American burning. This is attributed, in part, to the influence of wilderness ideology in the US, which meant the Fire Revolution endorsed an ecological but not a cultural role for fire. The contradictions and failures of these Fires in the Mind were thrown into sharp relief by the 1988 Yellowstone Fires. These Big Fires inspired continued public debate and academic deconstruction, especially when the discourses of wilderness and the 'Ecological Indian' were appropriated or denied as part of broader land management debates. The chapter demonstrates how and why Native American burning is far less prominent in America than Aboriginal burning is in Australia, and reviews America's many contemporary fire challenges.

Chapter Six returns to the fire flume of Victoria to examine the 2009 Black Saturday Royal Commission. While Black Saturday was tragically reminiscent of Black Friday, the debates following this Big Fire revealed how Australian discourses of Indigenous burning had developed such that a distinct and diverse typology of responses can be constructed. This was hopelessly entangled with academic disagreement and broader culture wars over strategies of prescribed burning; the 'Australian Strategy' had faltered in Victoria. In 1939 notions of restoring Indigenous burning were laughed at by the Royal Commissioner; in 2009 conceptualisations of Indigenous burning became weaponised to support or dismiss policy positions on prescribed burning. This chapter also explores the life and death of a particular land management policy (a 5% rolling annual target for prescribed burning of Victorian public lands) to demonstrate how homogenising narratives of fire can lead to ecologically detrimental policies.

Chapter Seven examines and demonstrates the influence of Grand Unified Theories upon discourses of Indigenous burning. In a similar fashion to the Small Fires discussed in Chapter Four, these Fires in the Mind have driven conceptualisations of Indigenous burning outside of major bushfire events. Megafauna extinction theories proposed by Tim Flannery and Paul Martin have been conflated with and incorporate Indigenous burning; they were proposed as parables, come with political implications, and can be used to argue for apparently contradictory policy positions. Bill Gammage's *The Biggest Estate on Earth* has rapidly shaped discourses of Indigenous burning since Black Saturday. This chapter explores the strengths and flaws of Gammage's work, demonstrating how it reproduces some of the discourses established earlier in the thesis, and argues that the influence of his popular book makes it critical these flaws be uncovered.

The final substantive chapter explores Small Fires controlled by Indigenous peoples themselves which liberate Indigenous burning from the tyranny of the past tense. The West Arnhem Land Fire Abatement project has been a flagship programme for leveraging economic and environmental benefit from Indigenous burning and introduces the blue cypress pine (*Callitris intratropica*) as the

final floral protagonist of the thesis. Yet carbon abatement projects such as WALFA have been criticised on cultural and technological grounds, reproducing the discourses established in Chapter Four. In Australia's eastern and southern states, the 'cultural burning' movement is slowly but steadily redistributing power over fire. Cultural burning is confronted by the conflation with prescribed burning discussed in Chapter Six and by the discourses of cultural and environmental opportunity, yet it also represents a practical example of decolonisation, and is increasingly important to pan-Aboriginal identity.

The thesis concludes with reflections on the 2019-20 bushfire season in Australia and subsequent policy debates. The unprecedented extent of these fires and increased public interest in Indigenous burning underlines the urgency of historical analysis in this field.

I begin now with the 1939 Black Friday bushfires and subsequent Stretton Royal Commission, where non-Indigenous visions of how to live in antipodean Australia spectacularly clashed.

Chapter One:

Australia Chooses Fire Lighting: 1939 Black Friday and the Stretton Commission

“The whole of the Australian race have a weakness for burning”, declared sawmiller V. Christensen to the Stretton Royal Commission into the 1939 Black Friday bushfires.¹⁴² The Stretton Royal Commission exposed this in so many ways – that graziers and settlers had pyrophilic and mutually destructive tendencies, that foresters were blind to the necessity for some fire, that all were apathetic and suicidally interested only in themselves in the face of a bushfire. The Black Friday fires demonstrated that settlers were powerless in the face of firestorms. Most of all, the Stretton Commission demonstrated that practically all Victorians in 1939 were incapable of recognising the burning practices of Indigenous Australians in any way: as an historical practice, as a deliberate strategy, or as a contemporary hope.

In this chapter I explore the politics and conflicting discourses of fire surrounding the 1939 Black Friday bushfires in the ‘fire flume’ of Victoria. This region has probably the most dangerous fire weather in the world, generating immense firestorms that have created unique flora and overwhelm any human defences or suppression efforts. The Black Friday bushfires were the paradigmatic firestorm, building upon a pattern of destructive bushfires – but it was the subsequent Royal Commission under Leonard Stretton that ensured these fires had a greater long term impact on Australian fire culture than say, Black Sunday in 1926, or the 1944 fires. The Commission functioned as a debate between different visions of how to live in post-settlement Australia - fire exclusion vs broadcast burning - and Stretton’s eloquent report went beyond limited technocratic recommendations to demand changes throughout an entire culture. Black Friday has thus been interpreted as a day of reckoning for European Australia. Yet the competing visions of how to manage the environment took relatively little notice of Indigenous burning.

Before European settlement, Indigenous Australians burned across large parts of south-eastern Australia for diverse purposes, but this burning was unlikely to have been extensive in the forests of mountain ash and High Country (areas over 1200 metres above sea level) that would later burn on Black Friday. European settlement brought both violence and collaboration, but ultimately greatly altered the fire regimes, disrupting Indigenous burning and transplanting newer ignition patterns and

¹⁴² V. Christensen in “Transcript of evidence given before the Royal Commission to enquire into the causes and origins and other matters arising out of bush fires in Victoria during the month of January 1939”, (Melbourne: Government Printer, 1939), 721, University of Melbourne Digitised Collections.

transforming vegetation distribution. Graziers and settlers used the ‘red steer’ to clear areas for pasture and cropping and to generate ‘green pick’ for stock. Gradually, the imperial project of forestry arrived in Victoria, eager to stamp out fire to protect commercial timber, inspired by imperial training, European theorists, and especially American experience. Black Friday saw these two broad movements clash. History and ecology were equally key to their arguments over power of ignition; what was a ‘natural’ forest before European colonisation, what maintained or restored a ‘natural’ state, whether a ‘natural’ state was possible or pragmatic to achieve. Very few witnesses considered the burning practices of Victorian Indigenous peoples and even fewer recognised any sense of Indigenous agency through fire. Ultimately Stretton broadly sanctioned a role for deliberate ignition and held that settler fire culture was riven by self-interest, apathy, and impracticality, influencing Victorian and indeed Australian fire culture and policy for generations. Yet such approval and castigation had no role for the peoples who had lived and burned in the fire flume for tens of thousands of years.

The Stretton Commission is well-trodden ground for environmental historians, yet it is necessary to view the Commission through the lens of Indigenous burning to establish the terms of debate that will be explored in the rest of this thesis. Here, I examine the Commission hearings and report, along with public discourse surrounding the Commission expressed through contemporary newspapers (primarily *The Argus*).¹⁴³ This work is chiefly in dialogue with writing by Stephen Pyne, Tom Griffiths, Paul Collins, and Chris Soeterboek,¹⁴⁴ though the emphasis upon Indigenous burning and demonstration of the depth of influence from American fire culture represents my chief contribution.

Before European Contact

The Black Friday fires affected a large proportion of Victoria, demonstrating the diversity of fire regimes across this state. The plains around Melbourne and Port Phillip Bay rise into the foothills and mountains of the Dandenong and Yarra Ranges; to the east these ranges become more rugged and rise into the Great Dividing Range. The High Country (over 1200 metres above sea level) includes open

¹⁴³ In this chapter I am partially drawing upon, expanding, and reconceptualising previous work I conducted on the Black Friday fires in an Honours thesis. See Chapter One of Daniel May, “‘Fanning the Flames of Debate’: The Relationship between Concepts of Aboriginal Fire Regimes and Post-Bushfire Discussion in Australia” (Honours Thesis, Sydney, University of New South Wales, Australia, 2014).

¹⁴⁴ Pyne, *Burning Bush*; Tom Griffiths, *Forests of Ash* (New York: Cambridge University Press, 2001); Chris Soeterboek, “‘Folk-Ecology’ in the Australian Alps: Forest Cattlemen and the Royal Commissions of 1939 and 1946,” *Environment and History* 14, no. 2 (2008): 241–63; Collins, *Burn: The Epic History of Bushfire*, 2009.

vegetation such as grasslands and are interspersed with forested mountain ridges and river valleys.¹⁴⁵ Victoria lies within what Stephen Pyne calls the “fire flume”, a region where periodically, the interaction of high and low pressure cells allow hot drying winds from Australia’s arid interior to blast over and desiccate the flume areas.¹⁴⁶ The rugged terrain means these hot winds are channelled and funnelled; abrupt cooler southerly wind changes then cause further chaos to any existing fires – as Pyne notes, “the great fires of Australia are the product of great winds”.¹⁴⁷ There is a particular species that has evolved in this fire flume that is critical for understanding Black Friday: the first floral protagonist of this thesis is mountain ash (*Eucalyptus regnans*).

Mountain ash forests usually receive reliably high levels of rainfall, and due to the irregular terrain can often be sheltered from drier winds in normal seasons.¹⁴⁸ Their botanical name means “ruling” or “reigning”, reflecting their “popular image as a forest monarch” – towering over other trees as the tallest hardwood in the world.¹⁴⁹ Mountain ash lives between 300-1000 metres above sea level, while its cousin alpine ash (*eucalyptus delegatensis*) lives at slightly higher altitudes.¹⁵⁰ Mountain ash grows elsewhere in Australia (some Victorians are indignant to learn their monarch is called ‘swamp gum’ in Tasmania), but it is the central and north-eastern parts of Victoria that we concentrate on here.

It is “axiomatic” that mountain ash *needs* fire.¹⁵¹ It possesses features which “seem almost designed to promote fire”: heavy litter fall to create fuel, open crowns to allow updraught, flammable oils, and bark which functions perfectly as a firebrand.¹⁵² Yet, it is sensitive to fires of even low-intensity, lacking the features many other eucalypts have to resist damage. This apparent contradiction is resolved by considering that mountain doesn’t just need *fire*. Mountain ash needs *firestorms*. As Tom Griffiths puts it, mountain ash forests have “evolved to commit mass suicide once every few hundred years...Victoria is the most dangerous fire region on the planet, and the mountain ash is a genius at cultivating a very occasional firestorm”.¹⁵³ When the fire flume opens, a long drought and desiccating winds ensure that the wet sclerophyll mountain ash forests dry out. Add the chaos of an abrupt wind

¹⁴⁵ Select Committee Into The Recent Bushfires House of Representatives, “A Nation Charred: Report on the Inquiry into Bushfires” (Canberra: Australian Government Publishing Service, 2003); Griffiths, *Forests of Ash*, 12; note that Adams et al use a different definition for the High Country, see Mark A. Adams, Shaun C. Cunningham, and Maria T. Taranto, “A Critical Review of the Science Underpinning Fire Management in the High Altitude Ecosystems of South-Eastern Australia,” *Forest Ecology and Management* 294 (2013): 226.

¹⁴⁶ Pyne, *Burning Bush*, 279.

¹⁴⁷ Pyne, 37; Tom Griffiths, “We Have Still Not Lived Long Enough,” *Inside Story*, 16 February, 2009, <http://insidestory.org.au/we-have-still-not-lived-long-enough/>.

¹⁴⁸ David Ashton, “Fire in Tall Open Forests (Wet Sclerophyll Forests).,” in *Fire and the Australian Biota*, ed. A. Malcolm Gill, R. H. Groves, and I. R. Noble (Canberra: Australian Academy of Science, 1981), 345.

¹⁴⁹ Griffiths, *Forests of Ash*, 16.

¹⁵⁰ Griffiths, 14.

¹⁵¹ Ashton, “Fire in Tall Open Forests (Wet Sclerophyll Forests).,” 360.

¹⁵² Ashton, 360.

¹⁵³ Griffiths, ““An Unnatural Disaster?”,” 35.2.

change to already huge fires, and mountain ash forests (and anything else in the path) become the scene of some of the hottest fires on the planet. This flammability is “the secret of the success” for mountain ash as firestorms open their seeds; in the wake of the 1939 Black Friday firestorms some 2.5 million seedlings per hectare germinated.¹⁵⁴

The timing of these big fires is critical. There is genuine rainforest in these hills, remaining from when rainforests were once much more extensive in Australia. Australia’s separation from Gondwana and the cycles of glacial/interglacial periods caused what Pyne calls the “Great Upheaval”.¹⁵⁵ Antarctica became embraced by ice as the circumpolar current started, while Australia became “embraced by fire” as high pressure systems settled in the interior, inland seas dried up, and most soils did not receive glacial or volcanic rejuvenation.¹⁵⁶ Without any fire, the rainforest – remnants from before the Great Upheaval - will gradually take over.¹⁵⁷ Yet if fire comes too frequently, it will kill young mountain ash before it can reseed.¹⁵⁸ In this way our first floral protagonist serves as a stark demonstration that flora are adapted to *fire regimes* rather than just to fire.

Mountain ash is truly the monarch of Australian forests and thus has the divine right to be an exception from the usual generalisations that apply to Australian forests and woodlands. It is adapted to fire – but damaged by low-intensity fire. It does not develop lignotubers (a reserve of energy and buds in case of disturbance such as fire) and rarely coppices. Prescribed burning is impractical, for the forest is either too wet to support a flame or too dry to contain one. Mountain ash has evolved for a very particular type of fire, quite unlike other areas even within Victoria such as the Mallee or box-ironbark forests. Yet typically below and around mountain ash forests are found peppermint, and most ominously, messmate stringybark (*Eucalyptus obliqua*). Messmate has thicker bark, epicormic buds, and usually a lignotuber, in addition to its infamous bark streamers, features which favour and promote different fire regimes to those of mountain ash.¹⁵⁹ As Griffiths argues about these forests, “nation and state-wide arguments about fire founder hopelessly on the realities of intensely local

¹⁵⁴ Ashton, “Fire in Tall Open Forests (Wet Sclerophyll Forests).”, 362.

¹⁵⁵ Pyne, *Burning Bush*, 5.

¹⁵⁶ Griffiths, *Forests of Ash*, 5–6.

¹⁵⁷ Griffiths, *Forests of Ash*.

¹⁵⁸ This was observed to occur following a bushfire in 1982, see David Ashton and D.G. Martin, “Changes in a Spar-Stage Ecotonal Forest of *Eucalyptus Regnans*, *Eucalyptus Obliqua* and *Eucalyptus Cypellocarpa* Following Wildfire on the Hume Range in November 1982,” *Australian Forestry* 59, no. 1 (1996): 32–41; and after more recent fires, see David Bowman and Lynda Prior, “Fire-Driven Loss of Obligate Seeder Forests in the Alps (Synthesis),” *Hot Topics in Ecology, Ecological Society of Australia* (blog), 2016, <https://www.ecolosc.org.au/hot-topics/fire-driven-loss-obligate-seeder-forests-alps>.

¹⁵⁹ P. F. M. Ellis, “Firebrand Characteristics of the Stringy Bark of Messmate (*Eucalyptus Obliqua*) Investigated Using Non-Tethered Samples,” *International Journal of Wildland Fire* 22, no. 5 (2013): 642–51; Ashton and Martin, “Changes in a Spar-Stage Ecotonal Forest of *Eucalyptus Regnans*, *Eucalyptus Obliqua* and *Eucalyptus Cypellocarpa* Following Wildfire on the Hume Range in November 1982.”

history and ecology”.¹⁶⁰ A continental vision of fire can offer incorporation and acknowledgement of such locally-specific factors.

There is evidence of human arrival in what became Victoria since at least 22,000 years BP and probably much earlier.¹⁶¹ At time of European contact, there were over thirty distinct cultural groups in this region.¹⁶² The mountain ash forests around Melbourne fall within the Woi Wurrung and Daung Wurrung country, who are part of what is often referred to as the “Kulin nation”,¹⁶³ and within the broader Victorian area, the population in 1788 may have been as high as 60,000.¹⁶⁴ One thesis has proposed that Indigenous Australians and their environmental modifications intensified following environmental stabilisation in the Holocene, and the applicability of this to Indigenous burning patterns has been assessed for areas outside Victoria.¹⁶⁵ Within Victoria, Gell *et al* suggested a minor change in fire frequency in East Gippsland within the last millennium.¹⁶⁶

There is extensive evidence that prior to European contact Indigenous peoples used fire for a variety of purposes in Victoria. Victorian Indigenous Australians today assert that “burning is a cultural responsibility”, that Aboriginal fire is “caring for Country”, and that “fire is practicing my culture, more than just about burning”.¹⁶⁷ Most evidence for pre-colonial burning relates to food resources. Bill Gammage has argued burning was “precise and predictable”, and that it engineered vegetation distribution in order to maintain patterns of feed and shelter for desirable animals.¹⁶⁸ For instance, Gammage pointed to a painting by Eugene von Guerard of the River Wannon (in the Western District) in 1858 to argue that the depicted “central plain is not natural...it was burnt for grass”, and a template was enacted upon forest with fire to create “sawtooth” boundaries which allowed hunters to ambush

¹⁶⁰ Griffiths, *Forests of Ash*, 184.

¹⁶¹ Caroline Bird and David Frankel, *An Archaeology of Gariwerd. From Pleistocene to Holocene in Western Victoria.*, vol. 8, *Tempus: Archaeology and Material Culture Studies in Anthropology* (Anthropology Museum, University of Queensland, 2005), 11.

¹⁶² Richard Broome, “Changing Aboriginal Landscapes of Pastoral Victoria, 1830–1850,” *Studies in the History of Gardens & Designed Landscapes* 31, no. 2 (2011): 90.

¹⁶³ Griffiths, *Forests of Ash*, 24.

¹⁶⁴ Attwood, *The Good Country: The Djadja Wurrung, the Settlers, and the Protectors*, 6; estimates vary, see Hateley, *The Victorian Bush; Its “Original and Natural” Condition*, 87–88.

¹⁶⁵ For a historical account of the development of this theory, see Griffiths, *Deep Time Dreaming: Uncovering Ancient Australia*; J.R. Dodson and S.D. Mooney, “An Assessment of Historic Human Impact on South-Eastern Australian Environmental Systems, Using Late Holocene Rates of Environmental Change,” *Australian Journal of Botany* 50 (2002): 455–64; Black and Mooney, “The Response of Aboriginal Burning Practices to Population Levels and El Niño–Southern Oscillation Events during the Mid- to Late-Holocene.”

¹⁶⁶ Peter A. Gell, Iain-Malcolm Stuart, and J. David Smith, “The Response of Vegetation to Changing Fire Regimes and Human Activity in East Gippsland, Victoria, Australia,” *The Holocene* 3, no. 2 (1993): 150–60.

¹⁶⁷ A variety of Dreaming stories about Indigenous fire have been shared in Federation of Victorian Traditional Owner Corporations et al., “The Victorian Traditional Owner Cultural Fire Strategy,” 2019.

¹⁶⁸ Bill Gammage, “Victorian Landscapes in 1788,” *Studies in the History of Gardens & Designed Landscapes* 31, no. 2 (2011): 83.

prey on this grassland.¹⁶⁹ Many European colonist accounts didn't recognise the importance of small fauna to Indigenous management, but there is good evidence that burning was undertaken near Omeo for both larger and smaller game.¹⁷⁰

Burning was also undertaken for management of floral resources. Yam daisy (*Microseris lanceolata* or *murrnong*) is a nutritious root somewhat akin to a radish found throughout south-eastern Australia,¹⁷¹ and ethnographic research has revealed it as one of 940 species recorded as used for food in Victoria.¹⁷² George Augustus Robinson noted in 1840 that the Spring Plains were covered with "millions of murrnong" and described Indigenous women burning these and other plains for easier harvest of this tuber.¹⁷³ Growth of murrnong has often been argued to be promoted by careful use of fire.¹⁷⁴ Indeed, ethnobotanist Beth Gott argued that observations after the 1983 Ash Wednesday fires showed that murrnong tubers flourished for the first 3 years but then declined – indicating the need for regular burning (though Gott did not address whether such a cycle would need fires of Ash Wednesday's intensity).¹⁷⁵ Murrnong was just one of many similar plants managed for fire; another was the kangaroo apple (*Solanum vescum* or *gunyang*), called by Gott a "fire weed".¹⁷⁶

Fire was also used for purposes related less directly to food. It was used to create young and pliable stands of river reeds to be used for nets and baskets.¹⁷⁷ It was used for communication, to create pathways for travel in areas of thick vegetation, and upon European contact, as a weapon – both directly and to reduce the feed available for horses.¹⁷⁸ Many of these uses are analogous to the fire usage of Native Americans in California, as will be discussed in Chapter Two. Interestingly, there is some evidence from European accounts for Indigenous fires being ignited in summer – the most dangerous time for fires in the fire flume, though this evidence comes from western Victoria, and of course European colonist depictions rarely distinguished or recognised differences between fires that

¹⁶⁹ Gammage, *The Biggest Estate on Earth*, 59.

¹⁷⁰ Cahir et al., "Why Set the Bush [On] Fire?," 229–31.

¹⁷¹ Broome, "Changing Aboriginal Landscapes of Pastoral Victoria, 1830–1850," 93. Murrnong is sometimes referred to as *Microseris scapigera* in older literature.

¹⁷² Gott, "Aboriginal Fire Management in South-Eastern Australia," 1204.

¹⁷³ Robinson quoted in Gott, 1204; Cahir et al., "Why Set the Bush [On] Fire?," 233.

¹⁷⁴ Beth Gott, "Murnong—*Microseris Scapigera*: A Study of a Staple Food of Victorian Aborigines," *Australian Aboriginal Studies* 2 (1983): 2–18; P. H. Nicholson, "Fire and the Australian Aborigine—An Enigma," in *Fire and the Australian Biota*, ed. A. Malcolm Gill, R. H. Groves, and I. R. Noble (Canberra: Australian Academy of Science, 1981), 55–76.

¹⁷⁵ Gott, "Aboriginal Fire Management in South-Eastern Australia," 1205.

¹⁷⁶ Gott, 1206; Fred Cahir, Ian D. Clark, and Philip A. Clarke, eds., *Australian Biocultural Knowledge in South-Eastern Australia: Perspectives of Early Colonists* (Clayton: CSIRO Publishing, 2018), 61.

¹⁷⁷ Colloff, *Flooded Forest and Desert Creek: Ecology and History of the River Red Gum*, 115.

¹⁷⁸ Cahir, Clark, and Clarke, *Australian Biocultural Knowledge in South-Eastern Australia: Perspectives of Early Colonists*.

reflected pre-colonial practices and fires lit in response to European action.¹⁷⁹ However, despite such evidence from across the state, there is limited evidence for extensive pre-contact burning in mountain ash forests and some other areas affected by Black Friday.

The “eminent explorer, naturalist, and anthropologist” Alfred Howitt argued to the Royal Society of Victoria in 1890 that annual Aboriginal fires had “tended to keep the forests open”.¹⁸⁰ Areas such as the Tambo valley and Omeo district in Gippsland, previously open forest and park-like, were now “re-foresting” full of saplings that would have not have survived Indigenous burning; Howitt broke from most of his contemporaries when he recognised that European settlers had “dispossessed the [Indigenous] occupiers, to whom we owe more than is generally surmised for having unintentionally prepared it, by their annual burnings, for our occupation”.¹⁸¹ In contrast to this, forester Ron Hateley recently re-examined explorer accounts and argued that Indigenous burning in Victoria “did not have such a major effect on our forests compared with the plains and woodlands” and believes Gott’s work (and others) have been misinterpreted as depicting extensive rather than selective burning.¹⁸² Certainly, explorer accounts show that the hills north and east of Melbourne were heavily timbered, rather than open.¹⁸³ Furthermore, there is archaeological evidence for low density of Indigenous artefacts in wet sclerophyll areas, evidence the forests were only lightly used in pre-colonial times.¹⁸⁴

Ultimately, it seems likely that mountain ash forests were not subject to deliberate burning that was extensive or prevented large bushfires. Mountain ash forests must have experienced high intensity fires prior to Black Friday, as there are stands of evenly-aged trees throughout these forests predating 1939 and evidence of charcoal in soil from past conflagrations.¹⁸⁵ Furthermore, the seasonal calendar of the Kulin people includes seven annual seasons, with periodic but non-annual ‘fire’ and ‘flooding’ seasons, and mountain ash hills in one area are known as *Wyenondable* (the Fiery Hills), indicating cultural knowledge of and adaptation to high intensity fires.¹⁸⁶ This does not rule out a role for Indigenous fire completely – it is quite possible that lower intensity fires may not have registered in

¹⁷⁹ Cahir et al., “Why Set the Bush [On] Fire?,” 233; Cahir, Clark, and Clarke, *Australian Biocultural Knowledge in South-Eastern Australia: Perspectives of Early Colonists*, 116; Hateley, *The Victorian Bush; Its “Original and Natural” Condition*.

¹⁸⁰ Griffiths, *Forests of Ash*, 26; A.W. Howitt, “The Eucalypts of Gippsland,” *Transactions of the Royal Society of Victoria* 2 (1890): 109.

¹⁸¹ Howitt, “The Eucalypts of Gippsland,” 111.

¹⁸² Hateley, *The Victorian Bush; Its “Original and Natural” Condition*, 186.

¹⁸³ Cahir et al., “Why Set the Bush [On] Fire?,” 229.

¹⁸⁴ R. Hall, “Artefact Density Patterns in Areas of High Relief: A Case Study from Far East Gippsland,” in *Cultural Heritage of the Australian Alps. Proceedings of the Symposium Held at Jindabyne, New South Wales, 16-18 October 1991*, ed. B. Scougall (Canberra: Australian Alps Liaison Committee, 1992), 125–40.

¹⁸⁵ Some ecologists have speculated that prior to 1939 the proportion of multi-aged stands was slightly higher, indicating these historic conflagrations – while still severe – may have been less extensive than Black Friday or Black Saturday. See Griffiths, *Forests of Ash*, 23, 167.

¹⁸⁶ Hansen and Griffiths, *Living with Fire: People, Nature and History in Steels Creek*, 118–20; 29.

dendrochronological or sediment records of the past.¹⁸⁷ Nor does it totally rule out Indigenous presence and management of the forests (see Chapter Seven for a critique of Bill Gammage's insistence that the mountain ash forests were 'managed'). The conclusion of Griffiths is the most reasonable: the forests were "not permanently occupied" but "visited seasonally", and fire was used on the margins and to maintain clearings and pathways.¹⁸⁸ Indeed, burning along ecotones and to maintain paths and small glades is similar to burning by Native Americans in California as discussed in Chapter Two, and the Noongar burning of jarrah forests as discussed in Chapter Three.

For the High Country, robust dendrochronological evidence indicates that snowgums (which record low-intensity fires relatively faithfully) were burned at a rate of perhaps 1-10 fires per century, averaging at once every 25 years.¹⁸⁹ Ecologist Phil Zylstra has argued on the basis of this and other evidence (including ethnographic evidence from contemporary Ngarigo people) that uncontrolled bushfires in the Australian Alps did occur prior to European contact. Zylstra depicts the high country as having been burned selectively rather than extensively; montane forests were rarely if ever burned, lower altitude grasslands and woodlands were burned more frequently, and subalpine and alpine areas were largely not burned except to aid in the collection of Bogong moths (*Agrotis infusa*).¹⁹⁰ All these burning regimes were to drastically change upon European contact.

Contact and Colonisation

The earliest European sailors recorded fires in what became Victoria, such as Lieutenant John Murray sailing past Arthur's Seat in 1802.¹⁹¹ After some attempts at unofficial (and illegal) settlement in the Port Phillip District, permanent settlement solidified in the 1830s.¹⁹² Even before permanent settlement intensified, the effects of European contact elsewhere in Australia rippled through; historian Bain Attwood estimates that smallpox epidemics brought by Europeans in 1788 and 1829 probably reduced the Indigenous population in what became known as the Port Phillip District from

¹⁸⁷ Bowman, "The Impact of Aboriginal Landscape Burning"; Vic Jurskis et al., "Fire Management in Australia: The Lessons of 200 Years," in *Proceedings of the Joint Australia and New Zealand Institute of Forestry Conference, 27 April–1 May 2003* (Wellington, New Zealand: Ministry of Agriculture and Forestry, 2003), 353–368.

¹⁸⁸ Griffiths, *Forests of Ash*, 26.

¹⁸⁹ Banks, "The Use of Dendrochronology in the Interpretation of the Dynamics of the Snow Gum Forest."

¹⁹⁰ P. Zylstra, "Fire History of the Australian Alps: Prehistory to 2003" (Canberra: Australian Alps National Parks Liaison Committee, 2006). Zylstra argues that Howitt did not directly observe ignition and thus cannot be relied upon as a source of information for pre-colonial burning; this argument is open to the same criticism Stephen Pyne makes of Thomas Vale as discussed in Chapter Seven.

¹⁹¹ Cahir et al., "Why Set the Bush [On] Fire?," 231.

¹⁹² Broome, "Changing Aboriginal Landscapes of Pastoral Victoria, 1830–1850," 91.

60,000 to 15,000.¹⁹³ This must be taken into account when analysing settler depictions of fire, as they may not depict pre-contact practices but instead reflect diminished Indigenous populations scrambling to fulfil now-expanded responsibilities to country in a rapidly changing world.¹⁹⁴ Nevertheless, as Pyne notes for both Victoria and California (as discussed in Chapter Two), Indigenous burning had “prepared the landscape perfectly for European pastoralism”.¹⁹⁵

Consequently, pastoralists rapidly increased in number in the 1830s in what James Belich characterises as “explosive colonisation”; by 1838 there were some 300,000 sheep in what became the Port Phillip District, which then tripled by 1841.¹⁹⁶ The introduction and especially the overstocking of sheep was devastating to the District. Livestock such as sheep, cattle, and pigs massively increased erosion (especially near water sources), ate feed relied upon by indigenous faunal resources such as kangaroos, and ate Indigenous floral resources such as *murrnong*.¹⁹⁷ Furthermore, by outcompeting native fauna, these introduced livestock contributed to an increase in scrubby regrowth.¹⁹⁸ For instance, native fauna in the western districts of Victoria ate *acacia* and *callitris* seeds, but sheep had driven them out. As sheep didn’t eat those seeds, the seedlings rapidly grew.¹⁹⁹ This particular process is just one of many ways in which “sheep and cattle were the shock troops of empire” through the process that Alfred Crosby memorably labelled “ecological imperialism”.²⁰⁰ This elegant theory explains how settlers were often aided by the biota they brought with them (e.g. viruses, livestock, or weeds), and that the effect on Indigenous peoples could sometimes be deliberate or accidental.²⁰¹

There is no question that European settlement in the Port Phillip District involved a great deal of violence, especially during the pastoral period. The early pastoralist period has been characterised as “settler imperialism” advancing ahead of more permanent European settlement and ignoring settler

¹⁹³ Attwood, *The Good Country: The Djadja Wurrung, the Settlers, and the Protectors*, 6.

¹⁹⁴ Cahir et al., “Why Set the Bush [On] Fire?,” 228.

¹⁹⁵ Pyne, *Burning Bush*, 147.

¹⁹⁶ See Chapter Three of James Belich, *Replenishing the Earth: The Settler Revolution and the Rise of the Angloworld, 1783-1939* (Oxford University Press, 2009); Attwood, *The Good Country: The Djadja Wurrung, the Settlers, and the Protectors*, 12.

¹⁹⁷ Broome, “Changing Aboriginal Landscapes of Pastoral Victoria, 1830–1850,” 91–93; Norbert Finzsch, “‘The Intrusion Therefore of Cattle Is by Itself Sufficient to Produce the Extirpation of the Native Race’: Social Ecological Systems and Ecocide in Conflicts between Hunter–Gatherers and Commercial Stock Farmers in Australia,” *Settler Colonial Studies* 7, no. 2 (2017): 164–91; See also Geoffrey Bolton, *Spoils and Spoilers: A History of Australians Shaping Their Environment* (Allen & Unwin, 1981).

¹⁹⁸ Hateley, *The Victorian Bush; Its “Original and Natural” Condition*, 136.

¹⁹⁹ Pyne, *Burning Bush*, 216–17.

²⁰⁰ Griffiths, “How Many Trees Make a Forest?,” 380; Alfred W. Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900-1900*, 2nd ed. (Cambridge: Cambridge University Press, 1993).

²⁰¹ Tom Griffiths, “Ecology and Empire: Towards an Australian History of the World,” in *Ecology and Empire: Environmental History of Settler Societies*, ed. Tom Griffiths and Libby Robin (Seattle: University of Washington Press, 1997), 1–18; Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900-1900*.

laws put in place to protect Indigenous peoples;²⁰² even the attempt ostensibly made at peaceful agreement with the Kulin by John Batman in 1835 was more of a “confidence trick”.²⁰³ Pastoralists took productive Indigenous lands and especially waters. For instance, the Learmonth brothers in Central Victoria occupied 100,000 acres (approx. 40,000 ha) in 1838, and “actively and aggressively” excluded Indigenous people from their stations, to which local Indigenous peoples responded by using fire as a weapon.²⁰⁴ We may never know the full extent of this settler violence due to the destruction of historical evidence and the euphemisms used to conceal it.²⁰⁵ The historical questions of the extent of this violence, how to interpret such violence, and whether this was genocide is contentious and have spawned massive historical and cultural debates in Australia,²⁰⁶ but certainly settler policies and actions had a “genocidal effect”.²⁰⁷

There were also amiable and pragmatic relations, highlighting the complexity of interpreting colonisation in this region. Some Indigenous Australians were employed as pastoral workers on some stations.²⁰⁸ Especially as settlement intensified, many settlers were appalled at the violence or tried to improve the conditions for Indigenous Australians. These pressures led to the appointment of officials such as George Augustus Robinson to be Chief Protector of Aborigines or establishing Coranderrk Aboriginal Station.²⁰⁹ Coranderrk has a rich and complicated legacy, but the development of settler tourism and a fascination with what was seen as ‘primitive’ manifested in displays of traditional fire-making techniques by resident Indigenous peoples.²¹⁰ This example is a reminder of how fire has always been a primary way through which settler Australians have sought to understand and relate to Indigenous Australians.

²⁰² Finzsch, “The Intrusion Therefore of Cattle Is by Itself Sufficient to Produce the Extirpation of the Native Race.”

²⁰³ Griffiths, *Forests of Ash*, 51.

²⁰⁴ Cahir et al., “Why Set the Bush [On] Fire?,” 228, 238.

²⁰⁵ Tom Griffiths, “The Language of Conflict,” in *Frontier Conflict: The Australian Experience*, ed. Bain Attwood and S.G. Foster (Canberra: National Museum of Australia, 2003), 141; Attwood, *The Good Country: The Djadja Wurrung, the Settlers, and the Protectors*, 20.

²⁰⁶ For an entry into this debate, begin with Stuart Macintyre and Anna Clark, *The History Wars*, 2nd ed. (Carlton: Melbourne University Press, 2004).

²⁰⁷ Dirk Moses quoted in Bain Attwood and S.G. Foster, “Introduction,” in *Frontier Conflict: The Australian Experience*, ed. Bain Attwood and S.G. Foster (Canberra: National Museum of Australia, 2003), 10.

²⁰⁸ Broome, “Changing Aboriginal Landscapes of Pastoral Victoria, 1830–1850,” 92; Attwood and Foster, “Introduction.”

²⁰⁹ Attwood, *The Good Country: The Djadja Wurrung, the Settlers, and the Protectors*; see also Leigh Boucher and Lynette Russell, “Introduction: Colonial History, Postcolonial Theory and the ‘Aboriginal Problem’ in Colonial Victoria,” in *Settler Colonial Governance in Nineteenth-Century Victoria*, ed. Leigh Boucher and Lynette Russell (Canberra: Australian National University Press, 2015), 1–26.

²¹⁰ Ian D. Clark et al., “The Tourism Spectacle of Fire Making at Coranderrk Aboriginal Station, Victoria, Australia – a Case Study,” *Journal of Heritage Tourism* 15, no. 3 (2020), 249–266.

Key to this violence and the more amiable relations – and to the settler interpretations of Indigenous fire that laid the foundation for the discourse of Black Friday – was ideology. Historian Thomas Rogers has argued that a hierarchical ideology of progress and civilisation is key to understanding the violence in the colony of Victoria. Phrases and tropes were drawn on consistently, reinforcing that “words like ‘savage’, ‘settled’, and ‘civilised’ were not just simplifications of frontier conditions; they were used to justify murder”.²¹¹ Charles Hutton wrote in 1840 that “it was never intended that a few miserable savages were to have this fine country”, reflecting a view that Indigenous people had not laboured or worked the land and thus had no property rights over it in the Lockean philosophical tradition.²¹² Yet others such as Charles Griffiths reflected in 1845 that given the mix of mature trees and grassland around Melbourne “it is difficult...not to fancy that the hand of man had been engaged in combining and arranging these elements of natural beauty”.²¹³ The complexity and importance of ideology as it comes to assessing Indigenous burning can be seen through an examination of the views of grazier and amateur anthropologist Edwin Curr.

One of the first squatters on Yorta Yorta land from 1841 and a later member of the Board for the Protection of Aborigines, Curr’s memoirs have informed much prior historiography on Victorian Indigenous fire-use; his direct observations, inferences, and admiration for the sophistication of burning practices have been commonly cited.²¹⁴ Curr wrote that “it would be difficult to over-estimate” the use of the fire-stick, that with it Victorian Indigenous Australians “tilled [their] lands and cultivated [their] pastures with fire”,²¹⁵ and even wrote “it may perhaps be doubted whether any section of the human race has exercised a greater influence on the physical condition of any large portion of the globe than the wandering savages of Australia”.²¹⁶ However, Curr’s legacy is far more complicated than these quotes would suggest. He also believed “the native is a child” and was profoundly paternalistic, believing that if Indigenous peoples were “not coerced, they cannot be preserved from extinction”.²¹⁷ His biographer Sam Furphy judged that Curr “adhered to a Lockean view of private property” even when he recognised in some of his writings the influence of the

²¹¹ Thomas James Rogers, *The Civilisation of Port Phillip: Settler Ideology, Violence, and Rhetorical Possession* (Melbourne University Press, 2018), 224.

²¹² Hutton quoted in Attwood, *The Good Country: The Djadja Wurrung, the Settlers, and the Protectors*, 57. Angela Woollacott has recently argued that many settlers spent time throughout the British Empire and thus absorbed extant understandings of racial hierarchies and justifications to use force; see Angela Woollacott, *Settler Society in the Australian Colonies: Self-Government and Imperial Culture* (Oxford University Press, 2015).

²¹³ Griffiths quoted in Gammage, *The Biggest Estate on Earth*, 266.

²¹⁴ Gammage, 185; Pyne, *Burning Bush*, 103–4.

²¹⁵ Edward M. Curr, *Recollections of Squatting in Victoria, Then Called the Port Phillip District (from 1841 to 1851)* (Melbourne: George Robertson, 1883), 188–89.

²¹⁶ Curr, 189–90.

²¹⁷ Curr quoted in Sam Furphy, *Edward M. Curr and the Tide of History* (ANU E Press, 2015), 136.

firestick.²¹⁸ This complexity in Curr's views demonstrates the nuances required of historical interpretation of settler colonial attitudes and ideologies; as Tom Griffiths has written, "a narrow obsession with violence and white guilt" can result in historical work overlooking "more subtle and complex understandings of the frontier".²¹⁹ The complications of interpreting Curr's views demonstrates how some settlers were able to integrate an appreciation of Indigenous burning practices into ideological frameworks which supported settler colonialism.

Intensified settlement rapidly changed fire regimes. By 1850, settlers in the Port Phillip District area numbered perhaps 76,000, and Indigenous Australians perhaps just 2,000, drastically altering ignition patterns.²²⁰ These altered fire regimes were then further skewed during the Gold Rush following 1851 by rapid population growth and as prospectors fired to open up country for exploration.²²¹ As Victoria moved from squatting to settlement, the ideology of 'improvement' became more important, meaning native trees and ecological communities were increasingly considered the enemy by settlers.²²² Indeed, Collins has argued that the rural testimony in the 1939 Stretton Commission was dominated by a "settler-grazier mentality" which was influenced by a "hardly ever articulated presupposition that the bush is the enemy".²²³ Graziers and pastoralists extended their penetration to the High Country. Burning lower pastures in spring, they moved up the "snow leases" for summer, then burned these higher areas in autumn while moving stock down for winter, ensuring a cycle of fresh green pick for their stock.²²⁴ Concurrently, huge firestorms occurred such as Black Thursday in 1851, Red Tuesday in 1898 and Black Sunday in 1926,²²⁵ causing bushfire to become an important component of the construction of settler culture, particularly through the "mateship" ideal.²²⁶ Perhaps the most apt demonstration of the importance of changed fire regimes for Victoria is the link between bushfire and the great scourge of ecological imperialism in Australia: the rabbit. It was a bushfire that burned Thomas Austin's fences near Geelong and allowed his imported rabbits to escape, the first successful release of rabbits beyond domestication.²²⁷

²¹⁸ Furphy, 203.

²¹⁹ Griffiths, "The Language of Conflict," 148.

²²⁰ Broome, "Changing Aboriginal Landscapes of Pastoral Victoria, 1830–1850," 94

²²¹ Broome, "Changing Aboriginal Landscapes of Pastoral Victoria, 1830–1850," 94; Douglas Wilkie, "Earth, Wind, Fire, Water–Gold: Bushfires and the Origins of the Victorian Gold Rush," *History Australia* 10, no. 2 (2013): 95–113.

²²² Griffiths, "How Many Trees Make a Forest?"

²²³ Collins, *Burn: The Epic History of Bushfire*, 2009, 54, 57.

²²⁴ Pyne, *Burning Bush*, 213; Soeterboek, "'Folk-Ecology' in the Australian Alps," 246.

²²⁵ John Schauble, "'Where Are the Others?' Victoria's Forgotten 1926 Bushfires," *Victorian Historical Journal* 90, no. 2 (2019): 301–17.

²²⁶ Grace Moore, "'Raising High Its Thousand Forked Tongues': Campfires, Bushfires, and Portable Domesticity in Nineteenth-Century Australia," *Interdisciplinary Studies in the Long Nineteenth Century* 26 (2018).

²²⁷ Rabbits were also deliberately introduced elsewhere. See Pyne, *Burning Bush*, 219.

In the areas affected by Black Friday in 1939, there were significant transformations in fire regimes. Mountain ash forests were chopped down, allowed to dry in summer heat, then burned as hot as possible in efforts to clear and ‘improve’ the land, with these hot fires assuming “theatrical dimensions” in what became the region of South Gippsland.²²⁸ Ironically, this often *increased* the fire hazard as the wet sclerophyll was replaced with drier and more fire-prone flora.²²⁹ Furthermore, the removal of large mature trees by logging often caused mid-storey thickening, allowing for flames to more easily reach forest canopies.²³⁰ ‘Unimproved’ mountain ash forests themselves tended to be grazed less than alpine ash above or drier foothills, as they had little grass and lots of ferns.²³¹ In the high country, there is good evidence to show a massive increase in fire frequency above pre-colonial levels, especially from 1850 onwards.²³² Fire frequency was increasing in symbiosis with other ecological changes. Some settler Victorians noticed a spread of scrubby country in previously open areas throughout the state and attributed this to the cessation of Indigenous burning.²³³ Settlers were clearly aware of these changes, but had not yet reckoned with the magnitude of response required. That awaited Black Friday.

Fire regimes reeling from missing Indigenous ignition and the fire practices of settlers and graziers were further changed by the practices of foresters in Victoria. Forestry developed as an imperial project in two senses: it had an international outlook, and it was fundamentally about the exercise of power. The former is well acknowledged, the latter perhaps less so, yet in the words of forester David Hutchins, a forester is “a soldier of the State, and something more” who sought to capture lands, timber, and authority over ignition under the State.²³⁴ Modern forestry, associated with science and academic training, originated in Germany and France, and Great Britain recruited Germans (such as Dietrich Brandis, Wilhelm Schlich, and Berthold Ribbentrop) to found forestry in its imperial holdings

²²⁸ A. Malcolm Gill, “Post-Settlement Fire History in Victorian Landscapes,” in *Fire and the Australian Biota*, ed. A. M. Gill, R. H. Groves, and I. R. Noble (Canberra: Australian Academy of Science, 1981), 79; Griffiths, *Forests of Ash*, 33–43.

²²⁹ Pyne, *Burning Bush*, 213–15.

²³⁰ Nicholas Wilson, Geoffrey J. Cary, and Philip Gibbons, “Relationships between Mature Trees and Fire Fuel Hazard in Australian Forest,” *International Journal of Wildland Fire* 27, no. 5 (2018): 353–62.

²³¹ Griffiths, *Forests of Ash*, 43; Tom Griffiths, “Judge Stretton’s Fires of Conscience,” *Gippsland Heritage Journal* 26 (2002): 9–18.

²³² Banks, “The Use of Dendrochronology in the Interpretation of the Dynamics of the Snow Gum Forest”; Gell, Stuart, and Smith, “The Response of Vegetation to Changing Fire Regimes and Human Activity in East Gippsland, Victoria, Australia.”

²³³ For example George Augustus Robinson in 1844 quoted in Cahir et al., “Why Set the Bush [On] Fire?”; Howitt, “The Eucalypts of Gippsland”. It has also been argued that thickened regrowth was attributable to logging of mature trees, see Wilson, Cary, and Gibbons, “Relationships between Mature Trees and Fire Fuel Hazard in Australian Forest.”

²³⁴ Pyne, *The Still-Burning Bush*, 54.

– especially India.²³⁵ The key features of what became the imperial model of forestry, as it pertained to restrictions on rights and access for colonised peoples, organisational structure, and especially fire control, were all developed in India. Most foresters of the British Empire received formal education in Europe and a field apprenticeship in India.²³⁶

This also applied to American foresters. Figures including Gifford Pinchot and Henry Graves (discussed in Chapter Two) passed through this model;²³⁷ Brandis in particular has been described as the “father of Indian forestry” and therefore the “grandfather” of forestry in Australia and the United States.²³⁸ There were differing manifestations of this model, but forestry was largely based on utilitarian conservation of resources for future use against modern profligacy; in America it became particularly associated with the Progressive political movement, though this is disputed for Australia.²³⁹ For this reason, foresters in India, trained by Germans who saw no ecological role for fire, were mortified by the use of fire by Indian subjects. Fire was thought to be detrimental for the growth of timber for many reasons: it was thought to deteriorate soil, to undesirably open up forests, and to scar and damage the actual timber.²⁴⁰ Aiming to stamp out ignition in order to preserve their crop of timber from fire damage, they launched experiments in ‘fire conservancy’; despite methodological flaws, these experiments were declared successful in 1897 and the complete exclusion of fire became an important plank of the international forestry crusade.²⁴¹ Locality and ecology were ignored; as Hutchins declared: “What foreigners can do in Southern Europe, or Englishmen can do in India and South Africa, Englishmen can do in Australia, if only the matter is put squarely to them!”²⁴²

As discussed above, many European settlers in Australia had not valued native forests, and unrestricted sawmilling had begun in Victoria as early as 1850.²⁴³ Appalled by widespread environmental degradation, foresters slowly established themselves as a profession and grew their influence, by winning support for administrative bodies, establishing schools of forestry, and

²³⁵ John Dargavel, “Contested Forestries, Contested Educations: A Centenary Reflection,” *Australian Forestry* 75, no. 1 (2012): 16–21; Pyne, *The Still-Burning Bush*, 40.

²³⁶ Pyne, *Burning Bush*, 260.

²³⁷ Stephen J. Pyne, *Vestal Fire: An Environmental History, Told through Fire, of Europe and Europe’s Encounter with the World* (University of Washington Press, 1997), 491.

²³⁸ Roger Underwood, *Foresters of the Raj: Stories from Indian and Australian Forests* (Palmyra, Western Australia: York Gum Publishing, 2013), 294.

²³⁹ An introduction to this debate for Australia can be found in Drew Hutton and Libby Connors, *A History of the Australian Environmental Movement* (Melbourne: Cambridge University Press, 1999).

²⁴⁰ For example see D.E. Hutchins, *A Discussion of Australian Forestry, with Special References to Forestry in Western Australia* (Perth: Forests Department of Western Australia, 1916), 21.

²⁴¹ This is a major compression of a much longer story. Even by 1926 the Indian Forestry Manual conceded the need for some deliberate prescribed burning, or “early burning”, as they termed it. See Pyne, *Vestal Fire: An Environmental History, Told through Fire, of Europe and Europe’s Encounter with the World*, 495–99.

²⁴² Hutchins quoted in Pyne, 494.

²⁴³ Griffiths, *Forests of Ash*, 76.

conducting public campaigns.²⁴⁴ An early success in Victoria was the 1907 Forests Act which formally created reserves for forestry.²⁴⁵ Such victories were not easy as while there were some newspapers supportive of the forestry mission, many politicians consistently prioritised settlement or pastoral interests over forestry – setting the scene for the political conflict over Black Friday.²⁴⁶

Foresters in Victoria adopted the anti-fire attitudes of their imperial brethren. The first Conservator of Forests G.S. Perrin declared in 1890 that fire was “the greatest enemy the forests have to encounter”, while Hutchins declared “fire protection is the crux of Victorian forestry”.²⁴⁷ Such muscular rhetoric resonates with declarations by Pinchot, Graves and others in Chapter Two. Fire trails, lookout towers, and patrols became the infrastructure of this assertion of control over ignition. Even though Victorian foresters found total fire exclusion was impractical and practised some controlled burning of strips and patches, Pyne aptly characterised their admission of this to the 1928 Third British Empire forestry Conference as apologetic, hopeful this temporary concession could soon be banished.²⁴⁸

By 1939, some 16 million acres (approx. 6,500,000 ha) were under the nominal control of the Victorian Forests Commission, yet their authority over fire faced major challenges.²⁴⁹ However, reflective of the continual clash with powerful grazing interests, the power to grant grazing licenses in these lands was held by the rival Lands Department. Furthermore, the apparent success of establishing £200 fines for fire lighting in 1926 is belied when it is apparent that in the 13 years before Black Friday, there was not a single prosecution for illegal ignition.²⁵⁰ This is not because foresters were content with the fire practices of graziers. A.V. Galbraith, Chairman of the Victorian Forests Commission in 1926, declared graziers to be “the scourge of the forest”,²⁵¹ and in 1939 would testify there was “not the slightest doubt that any attempt at control of burning by landholders was extremely difficult and was stoutly resisted”.²⁵²

²⁴⁴ Dargavel, “Contested Forestries, Contested Educations.”

²⁴⁵ John Dargavel, *Fashioning Australia’s Forests* (Melbourne: Oxford University Press, 1995), 66.

²⁴⁶ Stephen Legg, “Political Agitation for Forest Conservation Victoria, 1860-1960,” *International Review of Environmental History* 2 (2016): 7–33.

²⁴⁷ Pyne, *Burning Bush*, 280–81.

²⁴⁸ Pyne, 282.

²⁴⁹ L. E. B. Stretton, *Report of the Royal Commission into the Causes of and Measures Taken to Prevent the Bushfires of Jan. 1939*, (Melbourne: Government Printer, 1939), 8, University of Melbourne Digitised Collections.

²⁵⁰ Collins, *Burn: The Epic History of Bushfire*, 2009, 55.

²⁵¹ Galbraith quoted in Griffiths, “Judge Stretton’s Fires of Conscience,” 11.

²⁵² A.V. Galbraith in “Transcript of evidence ... 1939”, 2149.

Black Friday

Black Friday itself was preceded by an extreme drought through 1938, and the fire flume opened as high and low pressure systems interacted to push hot air from the arid interior into Victoria.²⁵³ There were bad fire days ahead of Friday 13th January, with over a hundred people dying of heat stroke in the week of the devastating fires.²⁵⁴ On Black Friday itself, temperatures reached 44°C in Melbourne,²⁵⁵ combining with winds (some over 160 kmh⁻¹) to drive terrible firestorms throughout Victoria and parts of NSW and the ACT.²⁵⁶ In the words of Leonard Stretton, “on that day it appeared that the whole state was alight”.²⁵⁷ Seventy-one people were killed, 69 forest mills were wiped out, and millions of acres of forest burned.²⁵⁸

It took two weeks for the Victorian Government to formally establish a Royal Commission to inquire into the fires. Much of this was due to opposition from the Minister for Lands and Forests, A.E. Lind, who was an ally of grazing interests and feared the Commission would make adverse findings.²⁵⁹ Royal commissions are investigatory bodies in Commonwealth nations and states which usually have special powers to compel evidence or testimony. They are conventionally understood as politically independent and are usually called to investigate highly contentious matters, though a careful government can set the terms of the reference governing a commission in such a way as to limit or direct possible findings. They are often considered “quasi-judicial” as they can be led by judges and have the appearance of legal proceedings (including cross-examination and an adversarial manner) but their findings do not have to be accepted or enacted by governments.²⁶⁰ Royal commissions have brought down corrupt politicians and civil servants and precipitated cultural and economic transformations. Others have had relatively little lasting effect. Nevertheless, they attract a great deal of public attention. They both uncover existing discourse (including political arguments) and intensify it (by attracting and inspiring further comment); their necessarily extensive public documentation means they serve as valuable historical records.

²⁵³ Peter Evans, “Forest Fire and Funeral Pyre: Fire Tragedies of the Victorian Bush” (Country Fire Authority, 1993), 13.

²⁵⁴ W. S. Noble, *Ordeal by Fire: The Week a State Burned Up* (Melbourne: The Hawthorn Press, 1977); Collins, *Burn: The Epic History of Bushfire*, 2009, 44.

²⁵⁵ Collins, *Burn: The Epic History of Bushfire*, 2009, 11.

²⁵⁶ Noble, *Ordeal by Fire: The Week a State Burned Up*, 42.

²⁵⁷ Stretton, *Report of the Royal Commission into ... 1939*, 5.

²⁵⁸ Stretton, *Report of the Royal Commission into ... 1939*, 5.

²⁵⁹ Evans, “Forest Fire and Funeral Pyre: Fire Tragedies of the Victorian Bush,” 40.

²⁶⁰ Michael Eburn et al., “Learning Lessons from Disasters: Alternatives to Royal Commissions and Other Quasi-Judicial Inquiries,” *Australian Journal of Public Administration* 74, no. 4 (2015): 495–508.

The Commissioner chosen to investigate the Black Friday fires was Judge Leonard Stretton. Stretton was a “champion of the underdog and an advocate of bush values”, deeply compassionate, erudite, and witty (he was sometimes known as Victoria’s “judicial bard”).²⁶¹ The Commissioner worked hard to avoid an inquisitorial image. Stretton reassured witnesses and consistently stated throughout the hearings and in his Report he felt it was his role to look at the general rather than the particular in assessing the cause and response to Black Friday.²⁶² Stretton held sittings across the state until mid-April, deliberately seeking to visit many of the areas affected on Black Friday and to ensure evidence was collected from a broad cross-section of society. Tom Griffiths has judged that throughout Stretton’s career (he served as a royal commissioner five times) he was critical of both graziers and bureaucrats – two ostensibly competing tendencies that later historiography, caught up in interpreting Stretton for contemporary political battles, has sometimes failed to resolve.²⁶³ Paul Collins in particular was overly harsh in assessing Stretton, arguing that Stretton “seemed almost to enjoy putting down the mighty from their thrones” and was “quite tolerant of a procession of self-interested and opinionated rural witnesses”.²⁶⁴ As will be argued later, Stretton sought clear guidance from Charles Lane-Poole and the other fire exclusionists on when their fire exclusion strategies could work to prevent bushfires from spreading, and never really got a clear answer. Stretton understood that bushfire management is not just about ignition, but also about preparedness. Castigating individual farmers or graziers would achieve little, whereas calling for broader cultural change would achieve more. Collins’ criticisms relate more, one feels, to his judgement that Stretton “seemed bad-tempered and impatient with ‘environmental’ advocates” – advocates who were unable to present evidence that their plans would work in Victoria.²⁶⁵

Popular Debate

The Royal Commission transcripts and newspaper records from 1939 reveal a rich and highly contested politics of fire across broad cross-sections of Victorian society, especially concerning what today could be called prescribed burning but was then called ‘burning off’. Many graziers and rural

²⁶¹ Griffiths, “Judge Stretton’s Fires of Conscience,” 9–10.

²⁶² Tom Griffiths, “From the Ashes,” *Inside Story*, 12 October, 2011, <http://insidestory.org.au/from-the-ashes>.

²⁶³ Griffiths, “Judge Stretton’s Fires of Conscience”; Tom Griffiths, “Stretton, Leonard Edward (Len) (1893–1967),” in *Australian Dictionary of Biography*, vol. 16, 2002.

²⁶⁴ Collins, *Burn: The Epic History of Bushfire*, 2009, 111, 58.

²⁶⁵ Collins, 58; see also Tom Griffiths, “Pyromaniac Nation [Review of Paul Collins, *Burn: The Epic Story of Bushfire in Australia*],” *Australian Book Review* 287 (2006): 32–33.

residents (“settlers”) blamed the Black Friday disaster on a lack of burning due to Forest Commission fire exclusion policies.²⁶⁶

Much of this popular discourse in the letters columns of newspapers was unsophisticated and generic, with few details and at best a vague conception of two types of fire. Ostensibly, the main reason this burning was called for was as a protective measure. In the words of grazier Sidney Sparks, “there were never any big fires” before the Forests Commission implemented its policy of fire exclusion.²⁶⁷ According to “Bushman Born and Bred”, “fire is a good servant but a bad master”,²⁶⁸ while “Prickly Pear” asserted that fires would be prevented from spreading so disastrously if every bit of land was burned from winter into spring “as it became dry enough to burn”.²⁶⁹ The fire exclusion policy was thus judged as “definitely suicidal”.²⁷⁰ Such generic sentiments were as common as they were light on detail, such that the Editor of *The Argus* (a Melbourne-based broadsheet newspaper) pleaded “space cannot be found” for all the letters they received on the topic of burning.²⁷¹

A minority of graziers and rural residents were more sophisticated in their criticisms and advocacy for different fire management practices. John Henry Bancell stressed the importance of keeping fires at extremely low intensity so as not to damage “even ash trees”.²⁷² Grazier Harry Treasure warned against the dangers of a fire-scrub cycle, arguing that large fires would initially result in a flush of grass growth but subsequent scrubby growth would “ruin the country absolutely from a grazing point of view”.²⁷³ Farmers L.E.G. Gamble and Percy Weston both gave thoughtful and considered testimony of the ideal timing for burning, with Weston warning that spring burning promoted undesirable scrub whereas autumnal burning killed it.²⁷⁴ Dairy farmer Alfred Saxon argued for burning messmate stringybark to reduce the danger from burning bark embers, but felt doing this would mean there was no need to burn fire-sensitive ash forests.²⁷⁵ Considered proposals like these were in the minority of those advocating for more burning, but they demonstrate that not all graziers were pyromaniacs with

²⁶⁶ Noble points out that “settler” was the conventionally-understood term for farmers, even though some had been on their properties for nearly 100 years at this point. For Noble, this was indicative that Victoria was “still in the process of emerging from its colonial days”. A further interpretation is that Victorians still felt uneasy on the land; that they had not adapted to the country (or, more likely, they had not adapted the country to them and their practises). See Noble, *Ordeal by Fire: The Week a State Burned Up*, 11.

²⁶⁷ Sidney Sparks in “Transcript of evidence ... 1939”, 528.

²⁶⁸ [Letter to editor], ‘Bushman Born and Bred’, *The Argus*, 21 January 1939

²⁶⁹ [Letter to editor], ‘Prickly Pear’, *The Argus*, 21 January 1939

²⁷⁰ William Francis in “Transcript of evidence ... 1939”, 764.

²⁷¹ *The Argus*, 16 January 1939

²⁷² John Bancell in “Transcript of evidence ... 1939”, 232.

²⁷³ Harry Treasure in “Transcript of evidence ... 1939”, 1181.

²⁷⁴ L.E.G. Gamble “Transcript of evidence ... 1939”, 267; Percy Weston “Transcript of evidence ... 1939”, 1450.

²⁷⁵ Alfred Saxon in “Transcript of evidence ... 1939”, 1041.

a weakness for burning; sentiments like Saxon's statement "the eucalyptus is a fire weed" reveal a depth of environmental knowledge and observation.²⁷⁶

Graziers valorised each other's knowledge of fire and held it to be an essential part of bush culture. They emphasised the 'practical' nature of their knowledge over and over throughout the Commission, such as grazier John Cameron who supported earlier witnesses by simply saying "they are practical bushmen, and every bushmen knows that you must burn country to keep it safe".²⁷⁷ According to farmer Clarence Poole, "when the stockmen leased vast areas of Crown land for grazing...the fire was never destructive...because those Men [sic] knew when to burn".²⁷⁸ This practical knowledge was contrasted very strongly against that of representatives from the Forests Commission. William Francis argued that forest officers "who do not emanate from the bush-lands are definitely lacking in practical experience"; revealingly, "the forest should be controlled by experienced bushmen empowered to exercise their discretion as to when burning off is safe".²⁷⁹ Dairy farmer Alfred Webb supported this sentiment: "the only people who would know the conditions would be those who were bred and born in this country and know it all from A to Z" whereas "none of the Forest Officers here, or Mr Galbraith himself, is a bushman".²⁸⁰ Soeterboek noted this elevation of 'practical' over 'theoretical' knowledge in the later 1946 Royal Commission.²⁸¹ Another way of interpreting this emphasis is 'insider' vs 'outsider'; journalist W.S. Noble (who initially covered the fires in 1939 and then later wrote a book on them) reflected on a common sentiment resenting any imposition of authority over ignition: "a large number of country people looked on attempts to prevent them from lighting a fire in the open when they pleased as an intrusion on their natural liberty".²⁸²

Graziers and settlers primarily lit fires for two reasons beyond the loudly-stated protective purpose, the first being to obtain grass for their stock as fresh grass can grow in the nutrient-rich ash after a fire.²⁸³ Most graziers were reluctant to admit to this reason for burning (they were far more keen to emphasise burning as a hazard reduction measure), but some admitted it such as grazier and store holder George Purvis, who boldly declared "I never made any secret of the fact that we burn our leased land in order to get good feed for cattle".²⁸⁴ Foresters, defending their practices, had long resented graziers for such burning. Charles Lane-Poole, Inspector-General of Forests for the Commonwealth,

²⁷⁶ Alfred Saxon in "Transcript of evidence ... 1939", 1048.

²⁷⁷ John Cameron in "Transcript of evidence ... 1939", 701.

²⁷⁸ Clarence Poole in "Transcript of evidence ... 1939", 775.

²⁷⁹ William Francis in "Transcript of evidence ... 1939", 764.

²⁸⁰ Alfred Webb in "Transcript of evidence ... 1939", 1023.

²⁸¹ Soeterboek, "'Folk-Ecology' in the Australian Alps."

²⁸² Noble, *Ordeal by Fire: The Week a State Burned Up*, 12.

²⁸³ Soeterboek, "'Folk-Ecology' in the Australian Alps," 248.

²⁸⁴ George Purvis in "Transcript of evidence ... 1939", 989.

played graziers for regarding “a box of wax matches as the best grass seed” they might own,²⁸⁵ while forester Reginald Torbet gave evidence to the Commission that some 23% of fires were caused by grazing interests.²⁸⁶ The other partly-concealed reason to burn was that of settlers who burned to clear land for pasture or cropping. As Purvis put it, “if you take over a forest block, there is only [one] way to clear it, and that is with fire and the axe”.²⁸⁷ In general, however, graziers and settlers were less keen to emphasise these purposes for burning as opposed to burning for protective reasons, fearing they would be held responsible for Black Friday.

Despite such prevarications, the grazier’s inclination to light fires was hotly criticised by some. *The Age* speculated that the consequence of grazer fires meant they were “potential murderers”.²⁸⁸ Hardwood miller James Ezard tried to empathise with “those people [who] had have to burn the scrub to live” but added: “unfortunately there is always somebody who gets into one of these places who does not understand how to handle fires”.²⁸⁹ Most graziers were loath to admit to lighting fires that contributed to Black Friday, with an exception being William McCoy who when asked the source of Black Friday fires, said “cattlemen, naturally”.²⁹⁰ Dairy farmer Alfred Saxon said he knew “there are many scandalous men who light fires...they worry the life out of me”.²⁹¹ There were other causes blamed for ignition,²⁹² but fires from settlers and especially graziers were the main form of ignition blamed in popular discourse.

Academic Debate

Opposing settler-grazier views were many academics testifying to the Stretton Commission, who were influenced by the ‘climax’ model of ecology and therefore opposed to the use of fire. It’s important to note that ecology as a science in Australia had not achieved the pre-eminence and dominance it would achieve in the post-War period;²⁹³ popular natural history magazines still felt the need to explain the

²⁸⁵ C.E. Lane-Poole “Transcript of evidence ... 1939”, 2391.

²⁸⁶ Reginald Torbet in “Transcript of evidence ... 1939”, 2320.

²⁸⁷ George Purvis in “Transcript of evidence ... 1939”, 989.

²⁸⁸ Editorial 12 January 1939 quoted in Soeterboek, “‘Folk-Ecology’ in the Australian Alps,” 244.

²⁸⁹ James Ezard in “Transcript of evidence ... 1939”, 26-27. See also “Three Scars During Fire”, *Geelong Advertiser* 1939, found in K.L. Cecil, “The Red Steer: Bushfires Along the Great Ocean Road (Volume 1)” (Anglesea & District Historical Society, 1993), 157.

²⁹⁰ William McCoy in “Transcript of evidence ... 1939”, 1207.

²⁹¹ Alfred Saxon in “Transcript of evidence ... 1939”, 1045.

²⁹² Such as sparks from train engines as in ‘The Man on the Land’, [Letter to editor], *The Argus*, 21 January 1939, and fires lit by campers as in N.G. Johnson, [Letter to editor], *The Argus*, 16 January 1939.

²⁹³ Libby Robin, “Radical Ecology and Conservation Science: An Australian Perspective,” *Environment and History* 4 (1998): 191–208; Thomas R. Dunlap, “Ecology and Environmentalism in the Anglo Settler Colonies,” in

term to readers in the 1940s,²⁹⁴ and during the Commission Alfred Hardy of the Australian Forests League had to define it for Stretton.²⁹⁵ Nevertheless, the influence of climax ecology was paramount to many. The idea of the climax was based upon the work of American prairie ecologist Frederic Clements. Throughout the early decades of the twentieth century Clements wrote that “stabilisation is the universal tendency of all vegetation under the ruling climate”, and that “in the absence of civilised man” change could be incorporated “within the fabric of the climax” rather than being destructive to it.²⁹⁶ Plant communities would essentially stabilise over time and continue to become increasingly stable and resistant to disturbances – including fire.²⁹⁷ The environmental crises in Australia and America in the 1930s (especially Dust Bowls) saw government interest in how the ideas of Clements and other ecologists could guide management; the climax state represented a “scientifically calibrated yardstick” which provided both a measure of human interference, and something for management to aim for.²⁹⁸ Climax ecology with its sense of an inevitable tendency towards equilibrium and stability fell out of favour among ecologists in the decades following the Second World War, and contemporary ecology tends to emphasise disturbance and change as a natural process.²⁹⁹ Nevertheless the Stretton Commission revealed the influence of climax ecology upon forestry and land management in Victoria in 1939, especially in how it guided responses and conceptualisations of fire.

This was especially the case for A.E. Kelso, civil engineer representing the Melbourne and Metropolitan Board of Works, who sought to defend the Board’s policy of total fire exclusion and suppression on the lands it administered. Most of Melbourne’s water supply came from ash-type forest catchments which were closed forest and under the jurisdiction of the Board.³⁰⁰ The Board felt soil erosion would lead to declining water quality and were concerned that prescribed burning was “the greatest single factor aiding soil erosion”.³⁰¹ Kelso suggested there were “three conditions of forests” and that in a forest “in its natural condition” there would not be scrub.³⁰² Climax forest would be “admirably adapted to promoting stream flow conditions favourable to mankind” as it had wet

Ecology & Empire; Environmental History of Settler Societies, ed. Tom Griffiths and Libby Robin (Edinburgh: Keele University Press, 1997), 76–86.

²⁹⁴ Robin, *How A Continent Created A Nation*, 158.

²⁹⁵ Alfred Hardy in “Transcript of evidence ... 1939”, 1705.

²⁹⁶ Frederic E. Clements, “Nature and Structure of the Climax,” *Journal of Ecology* 24, no. 1 (1936): 256.

²⁹⁷ Griffiths, *Forests of Ash*, 141.

²⁹⁸ Donald Worster, “Grass to Dust: The Great Plains in the 1930s,” *Environmental History Review* 1, no. 3 (1976): 7.

²⁹⁹ Even while the ideas of Clements were at their most influential his theories were disputed by some ecologists such as Arthur Tansley. See Donald Worster, “The Ecology of Order and Chaos,” *Environmental History Review* 14, no. 1/2, 1989 Conference Papers, Part Two (1990).

³⁰⁰ Griffiths, *Forests of Ash*, 91. Kelso, 14/4, 2525

³⁰¹ Harold Strom in “Transcript of evidence ... 1939”, 1663; Kelso in “Transcript of evidence ... 1939”, 113.

³⁰² Kelso in “Transcript of evidence ... 1939”, 111.

soils, green scrub, and a closed canopy, further meaning it would be “very nearly immune” to fire, which Kelso considered a disturbance to natural conditions and “nature’s balance”.³⁰³ Consequently “the only satisfactory means of ensuring the permanency and sufficiency of water through these areas is to absolutely conserve the forests” – by which Kelso meant the total exclusion and suppression of any fire within the Board’s catchments.³⁰⁴

A different manifestation of climax ecology came from the Victorian Forests Commission and its allies, especially from Charles Edward Lane-Poole, Inspector-General of Forests for the Commonwealth. Lane-Poole’s biographer John Dargavel describes him as a perfect representative of the imperial nature of forestry at the time; he was “captured by the ideals of forestry”, was English, trained at Nancy in France, and worked throughout the British Empire before arriving in Australia.³⁰⁵ Dargavel paints a rich picture of a man “truly zealous” who worked to implement the forestry mission “irrespective of personal consequences or political reality” – his first regulations in Western Australia lasted just a month due to his fractious personality (discussed in Chapter Three),³⁰⁶ and his continual disparagement of foresters trained in the Victorian forestry school in Creswick caused great rifts in the nascent Australian forestry community.³⁰⁷ Lane-Poole’s zeal for forestry and disdain for those opposed to it have already been seen in his attacks on graziers. He served as a kind of expert witness to the Stretton Commission, seeking to defend the practices of the Victorian Forests Commission.

As discussed, the Forests Commission held some responsibility for lands, but this did not include power over grazing licenses. Nevertheless, it was the most visible government authority and theoretically held responsibility for bushfires in the lands it administered. The Forests Commission opposed broadcast burning and disliked even patch burning, though used it as a necessity. This stance was motivated by two things, the first being understandings of climax ecology. Forester Reginald Needham, for instance, believed broadcast burning was “misguided” and that a closed canopy would kill the scrub,³⁰⁸ Lane-Poole believed the “thickening up” of forests with scrub was “entirely due to fire” and that achieving the climax state would “get rid of an enormous amount of inflammable material”, ultimately leading to the “highest possible vegetation formation that the environment will

³⁰³ Kelso in “Transcript of evidence ... 1939”, 1782.

³⁰⁴ Kelso in “Transcript of evidence ... 1939”, 110. Under pressure during the Commission, Kelso did speculate that there might be some allowance for burning of messmate, but there was no evidence the Board had implemented this. See Kelso in “Transcript of evidence ... 1939”, 126.

³⁰⁵ John Dargavel, *The Zealous Conservator: A Life of Charles Lane Poole* (Crawley, W.A.: University of Western Australia, 2008), xi.

³⁰⁶ Dargavel, xi.

³⁰⁷ Dargavel, “Contested Forestries, Contested Educations.”

³⁰⁸ Reginald Needham in “Transcript of evidence ... 1939”, 1262.

stand”.³⁰⁹ Broadcast burning was also opposed because it was regarded as “definitely harmful” to timber.³¹⁰

In contrast with the Board of Works, however, the Forests Commission did accept a role for some prescribed burning, though reading the transcripts one can imagine this admission could only escape through gritted teeth. Inspector of Forests Thomas Hayden claimed “continual patch burning” was a “necessary evil” that would cease as soon as the climax state was achieved,³¹¹ while forester Alfred Hone forcefully asserted that even though burning of patches and strips was a “definite necessity” it was not, and should not, be carried out indiscriminately.³¹² After 34 days of Royal Commission hearings and months of newspaper coverage dominated by criticism of the Forests Commission’s practices, the counsel for the Forests Commission tried to remind Stretton of its practice of conducting some patch and strip burning, and positioned this as a “sensible middle-of-the-way attitude” that both protected economically valuable timber while helping to protect life and property of neighbours.³¹³ Despite such heavy criticism, a broader role for burning was resisted by the foresters, and broadcast burning was portrayed by Edward Barber (counsel for the Forests Commission) as “quite dead” having been given “burial with full military honours” by expert testimony from Lane-Poole.³¹⁴

Conservationists

Conservationists and conservationist sentiments played a small but important role in the Black Friday discussion, though they were nowhere near as large an issue as in the Black Saturday Royal Commission (discussed in Chapter Six). In contrast to populist narratives which depict settler Australians as inherently environmentally destructive, there is a deep history of environmental protection, contestation and appreciation.³¹⁵ In Victoria, many early naturalists were inspired by mountain ash forests, and groups such as the Field Naturalists Club of Victoria (formed in 1880) led activities and promoted conservation measures.³¹⁶ In the wake of Black Friday, a significant portion of the public discourse came from those appalled by the environmental devastation. Some called for

³⁰⁹ Lane-Poole in “Transcript of evidence ... 1939”, 2382-3.

³¹⁰ Alfred Hone in “Transcript of evidence ... 1939”, 2452-4.

³¹¹ Thomas Hayden in “Transcript of evidence ... 1939”, 1956.

³¹² Alfred Hone in “Transcript of evidence ... 1939”, 2452-4.

³¹³ Edward Barber in “Transcript of evidence ... 1939”, 2571.

³¹⁴ Edward Barber in “Transcript of evidence ... 1939”, 2574.

³¹⁵ Tim Bonyhady, *The Colonial Earth* (Carlton South: Melbourne University Press, 2000).

³¹⁶ Griffiths, *Forests of Ash*, 103–9; Hutton and Connors, *A History of the Australian Environmental Movement*, 36; Gary Presland, *Understanding Our Natural World: The Field Naturalists Club of Victoria, 1880–2015* (Blackburn: Field Naturalists Club of Victoria, 2016).

measures to prevent future bushfires and preserve the “unique Australian flora and fauna” with a special emphasis on charismatic fauna including koalas and wallabies,³¹⁷ while others expanded conservation beyond fauna to argue “we owe it to those who will follow to conserve forests and natural river flows”.³¹⁸ Often these measures involved greater powers to be given to the Forests Commission.³¹⁹ Some graziers and settlers expressed aesthetic appreciation for their lands and lamented the destruction caused by the fires beyond purely economic terms.³²⁰ However, such conservationist sentiments left no evidence of any appreciation or conceptualisation of Indigenous impact.

This analysis distinguishes conservationists and foresters, not because of any ideological difference between the two, but because the conservationists did not hold any jurisdiction over fires, whilst the foresters – through the Victorian Forests Commission – did. Paul Collins has argued that Lane-Poole should not be called a “proto-environmentalist” as he was primarily concerned with utilitarian use of forest resources in the long term, however this is not a clearly defined term and Hutton and Connors are more kind.³²¹ Unlike the more celebrated ‘preservationist’ vs ‘conservationist’ dispute in the United States discussed in Chapter Two, there was confusion in 1939 and hardly a sophisticated and well-defined spectrum of conservationist ideologies; the Stretton Commission found itself grappling with insufficiently nuanced language as it struggled to distinguish the meaning of ‘conservation’ versus ‘preservation’.³²²

Indigenous Burning at the Stretton Commission

We have seen how understandings of environments and climax ecology underlay the majority of calls for either more, targeted, or less burning in the forests after Black Friday; understandings of history were equally important, but these understandings almost universally conceived of a history without Indigenous burning. These understandings can be broadly characterised into two categories: those who thought that prior to implementation of fire suppression policies the forests had been in a natural

³¹⁷ See Archibald Campbell in “Transcript of evidence ... 1939”, 1496; “Anti-Char.” “Bush Fire Menace [Letter to the Editor].” *The Argus*, January 2, 1939.

³¹⁸ See Aubrey J Campbell, [Letter to editor], *The Argus*, 16 January 1939

³¹⁹ See Bushman, [Letter to editor], *The Argus*, 16 January 1939; Alfred Hardy in “Transcript of evidence ... 1939”, 1699-1802.

³²⁰ See Frederick Leorke in “Transcript of evidence ... 1939”, 963; William Lovick in “Transcript of evidence ... 1939”, 699.

³²¹ Collins, *Burn: The Epic History of Bushfire*, 2009, 120; Hutton and Connors, *A History of the Australian Environmental Movement*.

³²² See A.E. Kelso in “Transcript of evidence ... 1939”, 128.

state and prescribed burning was needed to keep them in that state, and those who thought that the natural state of the forests was without fire. Explicit incorporations of Indigenous burning into these understandings was very rare – and there were practically no advocates who portrayed any sense of agency or direction behind such burning.

Many graziers and farmers fell into the former category, believing that early grazier burning prior to fire exclusion had maintained a ‘natural’ state in the forests. According to farmer Clarence Poole, “when our forefathers came to Australia there was wonderful forest country, and fires were not known to such an extent as they are today” as fallen timber and other fuel was allowed to burn when “nature took its course”.³²³ Stockmen “knew burning off was essential for the safety of their stock and property”.³²⁴ Grazier Sidney Sparks agreed that “there were never any big fires” when the forests were in their ‘natural’ state.³²⁵ For farmer Edward Leeder, naturally-ignited fires had kept the forest floors “clean” (a common descriptive term), and agreed to the proposition that during grazier burning the bush had been maintained in the “natural condition it was before white men went into it”.³²⁶ Such beliefs were probably genuine in many cases, but they were also politically convenient for graziers and settlers who wished to defend and advocate for burning policies which reduced immediate fire hazard, cleared ground for farming, and provided green pick for stock. However, for the overwhelming majority of such advocates, the ‘natural’ state of the forest did not involve any sense of Indigenous burning. Ignition came from natural sources and fire suppression was to blame for thickening up of scrub; there was no sense of Indigenous burning having engineered landscapes or that settler burning might have differed from pre-colonial burning.

Others – chiefly academics – disagreed with this conception. Foresters were certainly aware of it prior to the Commission; forester Reginald Needham recounted that “original settlers would tell you that the forest east of Orbost was clean, open forest in the early days” and that one such “misguided” person told him that the way to keep that was to burn it regularly.³²⁷ There was general agreement that before European settlement the forests had been in a different, ‘natural’ state. Surveyor Charles Clarke noted that early surveyors and explorers were able to traverse lands “which today is practically impassable”.³²⁸ The difference was in the attribution for what created this natural state.

³²³ Clarence Poole in “Transcript of evidence ... 1939”, 774.

³²⁴ Clarence Poole in “Transcript of evidence ... 1939”, 774.

³²⁵ Sidney Sparks in “Transcript of evidence ... 1939”, 528.

³²⁶ Edward Leeder in “Transcript of evidence ... 1939”, 407.

³²⁷ Reginald Needham in “Transcript of evidence ... 1939”, 1262.

³²⁸ Charles Clarke in “Transcript of evidence ... 1939”, 1717.

Kelso, as discussed above, felt that the climax state was the 'natural' condition, and that it was the absence of fire that meant this "virgin condition...had clear floors".³²⁹ Note the use of 'virgin'; apart from the sexual imagery, such language is a very common settler trope that erases any sense of Indigenous management or alteration. As historian Thomas Rogers argued in a more general sense, the hierarchical language of civilisation and property inspired, justified, and propagated colonialism on land and in the mind. Lane-Poole, by contrast, made a small allowance for pre-colonial fire having a marginal presence in the forests. His researchers had "reached the conclusion that fires in the blackman's country were very small in comparison with those in our day".³³⁰ This research was based upon evidence from tree rings, pollen and charcoal analysis, and examination of *kingia* plants – in Western Australia.³³¹ Lane-Poole acknowledged Indigenous occupancy but banished it to the past, and had absolutely no conception of any regional or cultural diversity in pre-colonial burning practices.

Indeed, there was only a very small number of witnesses who gave evidence to Stretton of Indigenous burning. Dairy farmer Alfred Saxon testified that "I believe that aboriginals [sic] fired periodically to get feed to bring game, and that at intervals those fires went up into the messmate country".³³² Saxon advocated for some burning of messmate (in contrast to mountain ash), arguing that "if a tribe of aboriginals [sic] had been let loose in that forest, and carried on in their old ways, they would preserve that forest by doing just what the gentleman here and myself have suggested, that is, burning off and making it compulsory".³³³ Timber contractor Peter O'Mara argued that before the Victorian Forests Commission "you could ride a horse through anywhere" but that forests had become choked with inflammable material "that did not exist in the graziers' time, or the aboriginals' time".³³⁴ For O'Mara, "the aboriginals and the graziers are the men who *grew* this timber" [emphasis added]; Indigenous peoples burned to keep the forest floor clear for travel and to hunt kangaroo and wallaby, while early graziers burned for grass.³³⁵ O'Mara's recognition of Indigenous intent and agency was bolstered when he reflected they did not possess dugouts but apparently "did not burn to death" in conflagrations like Black Friday.³³⁶ Saxon and O'Mara were very much in the minority in giving considered portrayals of Indigenous burning.

Stretton himself gave little thought to Indigenous burning. When O'Mara praised the fire management of Indigenous Australians and graziers, Stretton asked "you would be in favour of taking the Forests

³²⁹ A.E. Kelso in "Transcript of evidence ... 1939", 1806.

³³⁰ C.E. Lane-Poole in "Transcript of evidence ... 1939", 2376.

³³¹ *Kingia* is quite similar to *Xanthorrhoea* discussed in Chapter Three.

³³² Alfred Saxon in "Transcript of evidence ... 1939", 1047.

³³³ Alfred Saxon in "Transcript of evidence ... 1939", 1047.

³³⁴ Peter O'Mara in "Transcript of evidence ... 1939", 1129.

³³⁵ Peter O'Mara in "Transcript of evidence ... 1939", 1130.

³³⁶ Peter O'Mara in "Transcript of evidence ... 1939", 1133.

Commission out of the forest and putting in a tribe of blackfellows to look after it?” but quickly clarified “I speak in jest”.³³⁷ Perhaps it had been a hot day and Stretton wished to liven up proceedings (indeed the 1939 transcripts are sprinkled with occasional jokes and witticisms from Stretton and his counsel), or he was merely reproducing attitudes common to his time, but quite obviously Stretton saw no role for Indigenous burning in these forests. As we shall see below, in his Report Stretton sided with the fire exclusionists in his view of what the forests had been before colonisation, but agreed with the fire advocates in how to manage the forests as they were in 1939.

Chris Soeterboek has argued that grazier-settler identification with Indigenous burning was genuine, but while there were definite similarities, Indigenous Australians appear to have burned in different areas and with far more diverse purposes in mind. To Soeterboek, “on the surface” grazier burning “appeared to be remarkably similar” as both “burned grasses to promote green pick for animals”.³³⁸ Soeterboek argued that “the difference lay in the use of the land that was burned” as Indigenous burning “conformed to the natural rhythms of Australia” and to “distinguish between native flora”, whereas graziers burned to promote introduced species and with less consideration of Australian conditions.³³⁹

This argument fails to grasp that graziers really only burned for a single resource – large grazing animals – whereas the available evidence indicates Indigenous burning in Victoria was conducted with far more diverse purposes in mind, including to promote edible tubers, engineer landscapes, and to attract small fauna.³⁴⁰ It also overlooks the reasons for burning that did not involve resources. Indigenous burning involved (and involves) cultural reasons that could be described as a sense of stewardship and obligations towards country, whereas while graziers undoubtedly felt attached to the lands they utilised, there was not the same depth of spiritual requirement to burn. The biggest difference, however, is simply that most graziers advocated for burning where Indigenous peoples probably didn’t burn. As discussed above, mountain ash and the high plains are exceptions to the general pattern of pre-colonial burning extending over most of Australia. As discussed in Chapter Six, graziers would later increasingly identify with Indigenous burning practices – even appropriate them – at the turn of the twenty-first century. However, there was very little evidence of such association

³³⁷ Stretton in “Transcript of evidence ... 1939”, 1134.

³³⁸ Soeterboek, “‘Folk-Ecology’ in the Australian Alps,” 251.

³³⁹ Soeterboek, 251.

³⁴⁰ Anthropologist Henry T. Lewis advanced a similar argument when he compared burning by cattle graziers in the Top End in the 1970s and 80s with Aboriginal burning (see Chapter Four); Henry T. Lewis, “Burning the ‘Top End’: Kangaroos and Cattle,” in *Fire Ecology and Management of Western Australian Ecosystems: Proceedings of a Symposium Held in Perth on 10-11 May 1985*, ed. Julian R. Ford, vol. WAIT Environmental Studies Group Report No. 14 (Perth: Western Australian Institute of Technology, 1985), 21–31.

in 1939, both because there was less awareness of Indigenous burning, and because there was no real political benefit in doing so.

There was no evidence that any witnesses who gave evidence to the Stretton Commission identified as Indigenous, nor was there any evidence of Indigenous voices in the public discourse.³⁴¹ Indigenous environmental modification or stewardship was inconceivable, thought as synonymous with ‘natural’ conditions, or spoken exclusively of in the past tense. This is hardly surprising given the era, but more recent Australian bushfire discourse as discussed in later chapters will prove quite different.

American Influences: The Climax and Light Burning

The Stretton Commission also provides us with a demonstration of one of the core messages of this thesis, that Australian fire conceptualisation has been profoundly affected by international influences, none more so (in the twentieth and twenty-first centuries) than America. There was already a precedent for American influence over the development of Australian forestry through the influence of figures such as forester E.H.F. Swain, who completed a study tour of American forests and regarded the United States as “the elder sister of Australia”; basic conditions were “practically parallel with those existing in Australia” and thus he saw “no reason why American methods should not be applied to Australian conditions”.³⁴² More generally, Victoria and California throughout the nineteenth and early twentieth centuries had exchanged techniques of irrigation and biological control, swapped experts, traded technologies, and exchanged plants.³⁴³ Influence over Victorian practices from India and the rest of the British Empire had been strong, as discussed, but the Stretton Commission reveals the growing dominance of American influence over Australian fire.

The most visible demonstration of this is that A.E. Kelso’s views on climax ecology were informed by American theory, and he directly read to the Stretton Commission American sources which had inspired and supported his views on fire exclusion. One of these, a volume from the US Forest Service, detailed experiments conducted by Walter Clay Lowdermilk in the San Dimas watershed of southern California.³⁴⁴ Lowdermilk’s findings supported Kelso’s belief that any sort of prescribed burning would increase erosion and surface runoff, as forest litter (i.e., surface and near-surface fuels) otherwise

³⁴¹ Furthermore, there was just a single female witness to the Royal Commission.

³⁴² E. H. F. Swain and Queensland Department of Public Lands, *An Australian Study of American Forestry* (Brisbane: Government Printer, 1918), 5, iv, 82; See also Pyne, *Burning Bush*, 261–84, 327.

³⁴³ Tyrrell, *True Gardens of the Gods: Californian-Australian Environmental Reform, 1860-1930*.

³⁴⁴ A.E. Kelso in “Transcript of evidence ... 1939”, 1781-1789.

filtered and slowed water's absorption into soil.³⁴⁵ Furthermore, and most tellingly, Kelso's language reveals he clearly identified the fire practices of Victorian settlers and graziers as synonymous with 'light burning', the same term for folk burning practices in California associated with the political debates discussed in Chapter Two. Kelso quoted from Yale Professor of Silviculture Ralph C. Hawley: "If only protection of the existing stand of timber is desired, then an annual light burning over of the forest may prove satisfactory" but "where continued production of forest crops is wanted, annual burning cannot be allowed".³⁴⁶ From Kelso's perspective of optimising soils and runoff, "there is not very much distinction between a hot fire and a light burn".³⁴⁷ Kelso was clearly influenced by the US Forest Service's triumph in the 'light burning' dispute in America and felt that this "outstandingly effective" demonstration of "forest control" meant there was no reason Victoria could not adopt the same practices.³⁴⁸ He did not dwell on Hawley's reflection that light burning was still practised in some parts of India and in areas of America with "the longleaf pine type",³⁴⁹ though if he had Kelso might have realised the triumph of the fire suppressionists in the light burning dispute had not been total (see Chapter Two). Kelso was hardly the only witness to the Commission who used the term "light burning" explicitly and others were clearly influenced by the fire exclusionist victory in the dispute (to be elaborated upon in Chapter Two).³⁵⁰

Others urged Victoria to adopt the muscular and aggressive American response to suppress any fires that did start. For instance, Allan Freeman writing to *The Argus* noted the United States used military forces "in the event of any similar calamity" (perhaps inspired by the 1910 'Big Burn' explored in Chapter Two),³⁵¹ while paper manufacturer Herbert Gepp argued "the whole basis of the attack upon the [fire] problem in North America" was to "hit the fires, and hit them quickly".³⁵² On the other hand, timber contractor Edmund Cornwall thought the fire exclusion strategy of the Forests Commission was "copied from a report of a conference on theoretical forestry in America, by impractical forest men", and that Victorians could never muster enough resources to successfully copy this American strategy.³⁵³ More generally, the environmental degradation caused by erosion and the Dust Bowl was

³⁴⁵ J. D. Helms, "Walter Lowdermilk's Journey: Forester to Land Conservationist," *Environmental History Review* 8, no. 2 (1984): 132–45.

³⁴⁶ A.E. Kelso in "Transcript of evidence ... 1939", 1806.

³⁴⁷ A.E. Kelso in "Transcript of evidence ... 1939", 1792.

³⁴⁸ A.E. Kelso in "Transcript of evidence ... 1939", 1850.

³⁴⁹ A.E. Kelso in "Transcript of evidence ... 1939", 1806. Hawley had no doubt read his Yale colleague Chapman's work on the fire ecology of the longleaf pine (see Chapter Two).

³⁵⁰ For instance, see William Lakeland in "Transcript of evidence ... 1939", 2439-2444.

³⁵¹ Allan Freeman, [Letter to editor], *The Argus*, 16 January 1939

³⁵² Herbert Gepp in "Transcript of evidence ... 1939", 1483-4.

³⁵³ Edmund Cornwall, 1/3, 1137

drawn upon repeatedly as a warning for Victorians of the need for effective conservation.³⁵⁴ In his Report, Stretton praised the education and propaganda campaigns of America for reducing the number of outbreaks of fire. While Stretton was sceptical of the “Brick Lane Ebenezer Tabernacle kind of testimony or statistics” – perhaps a reference to the zealous evangelism of the ‘Dixie Crusade’ (see Chapter Two) – he clearly felt it effective.³⁵⁵

Stretton’s Findings

Leonard Stretton submitted his findings on 16 May 1939, and they have been enormously influential in shaping Australian fire policy – and Australian fire culture – ever since. His opening paragraphs are deservedly celebrated in Australian environmental history:

Men who had lived their lives in the bush went their ways in the shadow of dread expectancy. But though they felt the imminence of danger they could not tell that it was to be far greater than they could imagine. They had not lived long enough. The experience of the past could not guide them to an understanding of what might, and did, happen.

These fires were lit by the hand of man.³⁵⁶

As Tom Griffiths rued when he viewed the 2009 Black Saturday bushfires as a catastrophic repetition of Black Friday, Stretton was “not commenting on the youthfulness of the dead; he was lamenting the environmental knowledge of both victims and survivors. He was pitying the innocence of European immigrants in a land whose natural rhythms they did not yet understand.”³⁵⁷ Such sentiments are not only appropriate for Black Friday, they are perhaps the dominant way in which European settlement of Australia has been environmentally interpreted. They had not lived long enough.

Stretton’s broader importance and recommendations are well-trodden ground and are not dwelled upon here. He was highly critical of how the politics of fire in Victoria had affected the Royal Commission itself. “The truth was hard to find...Much of the evidence was coloured by self-interest. Much of it was quite false”.³⁵⁸ He conceived that there were several different “classes of people” in

³⁵⁴ Such analogies and allusions were common in Australian environmental discourse as shown by Janette Susan-Bailey, though she downplays the causes and severity of environmental crisis in both nations. See Janette-Susan Bailey, *Dust Bowl: Depression America to World War Two Australia* (Palgrave MacMillan, 2016); Even Stretton referred to American soil degradation in his Report, and tackled it at length in his later Royal Commissions (especially in 1946); see Stretton, *Report of the Royal Commission into ... 1939*, 29.

³⁵⁵ Stretton, *Report of the Royal Commission into ... 1939*, 25.

³⁵⁶ Stretton, *Report of the Royal Commission into ... 1939*, 5.

³⁵⁷ Griffiths, “We Have Still Not Lived Long Enough.”

³⁵⁸ Stretton, *Report of the Royal Commission into ... 1939*, 7.

the witnesses, and all classes advocated for their own narrow interest.³⁵⁹ Generally, he did not limit himself to a conventional Royal Commission Report with targeted, specific, and limited recommendations. Instead, he condemned a whole society, calling for broad cultural changes in addition to large-scale reforms. For Stretton, “the major overriding cause” for the disaster was “the indifference with which forest fires, as a menace to the interests of us all, have been regarded” as they were treated as “matters of individual interest, for treatment by individuals” rather than a social problem.³⁶⁰ This apathy and indifference beyond a property line was “mass suicide”.³⁶¹ For Stretton, there could be only one fundamental principle from which all other fire policies must flow: “no person or department can be allowed to use the forest in such a way as to create a state of danger to others”.³⁶²

This especially applied to the competing strategies of total fire exclusion, strip burning, and broadcast burning to manage fuel. Stretton and his counsel assisting worked very hard to assay each strategy, for instance pursuing Kelso and Lane-Poole for even a rough timetable for forests to reach their supposed fire-resistant fire climax state.³⁶³ Stretton ultimately agreed that the forests had been “in their natural state” before “white men introduced fire to the forests”.³⁶⁴ As Griffiths notes, Stretton assumed that pre-European Australia was stable and largely free of human modification.³⁶⁵ When Europeans had brought fire to the forests, this had created a “cycle of destruction”; scrub grew back after fire, which required fire to clear it, which resulted in both thicker scrub regrowth and a compromised forest canopy which allowed more light to reach the scrub layer – in essence, a feedback loop.³⁶⁶ Where Stretton differed from the academics was that he believed “it was impossible in Australia to keep fire out of the bush long enough” to arrest the cycle of destruction, meaning that burning for protection was a necessary and pragmatic response.³⁶⁷

As a result, Stretton called for more protective burning, but advocates in later debates have often neglected his qualifications and nuance. Stretton noted that the amount of prescribed burning performed before Black Friday had been “ridiculously inadequate”, but defined it as “strip and patch

³⁵⁹ Stretton, *Report of the Royal Commission into ... 1939*, 7.

³⁶⁰ Stretton, *Report of the Royal Commission into ... 1939*, 10.

³⁶¹ Griffiths, “How Many Trees Make a Forest?,” 386.

³⁶² Stretton, *Report of the Royal Commission into ... 1939*, 7.

³⁶³ See A.E. Kelso in “Transcript of evidence ... 1939”, 111; or Lane-Poole “Transcript of evidence ... 1939”, 2383.

³⁶⁴ Stretton, *Report of the Royal Commission into ... 1939*, 11.

³⁶⁵ Griffiths, “Judge Stretton’s Fires of Conscience,” 17.

³⁶⁶ Stretton, *Report of the Royal Commission into ... 1939*, 11.

³⁶⁷ Pyne, *Burning Bush*, 314.

burning”.³⁶⁸ This was the first official sanctioning of prescribed burning for fuel reduction.³⁶⁹ However, for Stretton, this was “strip and patch burning”,³⁷⁰ rather than the broadcast burning advocated by graziers and settlers in 1939, or the grid burning later developed in Western Australia and elsewhere (see Chapter Three).³⁷¹ He further qualified “it is not suggested that the practice be followed in mountain ash country, except to a small extent, where necessity demands that it should be done”.³⁷² As will be argued in Chapter Six, later debates over prescribed burning in Victoria have been hindered by failing to reflect such qualifications and nuance for ecological diversity.

Stretton’s recommendations were not solely limited to prescribed burning; he also attacked the burning practices of graziers, though his ability to pursue them was limited by his remit which largely focussed on public lands. Stretton criticised graziers for irresponsible burning but was especially critical of the enforcement and jurisdiction of grazier fire. In a legal and bureaucratic muddle (Collins said the situation was “worthy of *Yes, Minister*”), the Lands Department and Forests Commission competed for authority: the Forests Commission managed the trees but the Lands Department was responsible for grass.³⁷³ Consequently, “nothing has been done to enforce the conditions or to refuse renewal of licenses” for graziers regardless of their burning practices, which combined with the inflexible nature of the laws meant graziers “have learned from their childhood to treat [them] with contempt”.³⁷⁴ Stretton would fully confront grazier fire in the later 1946 Royal Commission.³⁷⁵

The Legacy of 1939

After it was submitted, Stretton’s Report was immediately attacked by the Victorian Minister for Lands, probably because it reflected poorly on the Minister’s grazier-settler constituency.³⁷⁶ This is important because it is often claimed that Stretton’s Report resulted in the foundation of the volunteer firefighting group the Country Fire Authority and that his recommendations were adopted quickly; instead it would take another large bushfire (and the extraordinary measure of a vote of no

³⁶⁸ Stretton, *Report of the Royal Commission into ... 1939*, 16.

³⁶⁹ Pyne, *Burning Bush*, 313.

³⁷⁰ Stretton, *Report of the Royal Commission into ... 1939*, 16.

³⁷¹ Gill, “Post-Settlement Fire History in Victorian Landscapes,” 91.

³⁷² Stretton, *Report of the Royal Commission into ... 1939*, 31.

³⁷³ Collins, *Burn: The Epic History of Bushfire*, 2009, 126.

³⁷⁴ Stretton, *Report of the Royal Commission into ... 1939*, 16, 12.

³⁷⁵ Griffiths, “Judge Stretton’s Fires of Conscience”; Soeterboek, “‘Folk-Ecology’ in the Australian Alps.”

³⁷⁶ Collins, *Burn: The Epic History of Bushfire*, 2009, 30, 133–35.

confidence) before Stretton's recommendations were acted upon and the CFA founded.³⁷⁷ Fire is always political.

Nevertheless, environmental historians have found much to admire in Stretton's Report, and have described it as a landmark moment in Australia's environmental history where the limits of settler ability to manage this antipodean environment could no longer be ignored (Pyne compared it to the Fall of Singapore).³⁷⁸ There have been further major fires in Victoria since – 1944, 1962, 1983, 2002/3, 2006/7, 2009, 2020 – and a leader of a later inquiry reported feeling “Judge Stretton looking over his shoulder”.³⁷⁹ More recently, it is worth speculating over whether Stretton's influence has been entirely positive. The Stretton Commission may have helped establish what Neale and others identify as a contemporary “widespread expectation that wildfires are always preventable”,³⁸⁰ and consequently, the attitude that a destructive bushfire must represent a break in normal practice of such magnitude that it *demand*s a royal commission. Eburn and Dovers have suggested that the adversarial nature of royal commissions can hinder rather than help positive outcomes.³⁸¹

Stretton's vision of pre-colonial Australia was of an unmodified environment. As Griffiths notes, “partly this was the assumption of his generation” and it can also be explained in that the two ecological communities he most examined in his three Commissions – mountain ash and the high country – represent exceptions to general rules in that they “were probably never systematically and intensively burnt by Aboriginal people”.³⁸² It is worth asking what is the consequence of these assumptions, given Stretton's influence on Australian environmental culture, politics, and historiography. Would earlier broad recognition of Indigenous burning have been possible if Stretton had examined, for instance, jarrah forests, or open forests and woodlands? If mountain ash and snowgrass plains weren't in such proximity to training schools of ecologists in Melbourne and Sydney? Environmentalists today still quote from Stretton's environmental assumptions when contributing to fire inquiries, and historian Paul Collins relied upon Stretton's environmental findings about mountain ash forests to suggest in 2006 that fire policy across the Australian continent should be non-

³⁷⁷ Benjamin Thomas Reynolds, “A History of the Prepare, Stay and Defend or Leave Early Policy in Victoria” (PhD thesis, RMIT University, 2017), 82–84; James (Jim) McLennan, “70 Years before Black Saturday, the Birth of the Victorian CFA Was a Sad Tale of Politics as Usual,” *The Conversation*, 7 February, 2019, <http://theconversation.com/70-years-before-black-saturday-the-birth-of-the-victorian-cfa-was-a-sad-tale-of-politics-as-usual-111080>.

³⁷⁸ Pyne, *Burning Bush*, 314–21; Collins, *Burn: The Epic History of Bushfire*, 2009, 49; Griffiths, “Judge Stretton's Fires of Conscience.”

³⁷⁹ Griffiths, “An Unnatural Disaster?,” 35.2.

³⁸⁰ Timothy Neale, Jessica K. Weir, and Tara K. McGee, “Knowing Wildfire Risk: Scientific Interactions with Risk Mitigation Policy and Practice in Victoria, Australia,” *Geoforum* 72 (2016): 22.

³⁸¹ Eburn et al., “Learning Lessons from Disasters.”

³⁸² Griffiths, “Judge Stretton's Fires of Conscience,” 17.

interventionist despite having access to a vast body of subsequent research that has demonstrated vastly different fire ecologies across Australia, as we shall see in Chapters Three and Four.³⁸³

The politics of fire were transformed in the post-War period. Ultimately, the Stretton Commission played a small role in the broader development of Victorian conservationism, as did Stretton himself. The ‘Save the Forests’ campaign launched in 1944 to “prevent bushfires, arouse public interest, and ensure that the water, timber and soil resources of the State shall be fully conserved” was partly inspired by the fires.³⁸⁴ A typically eloquent phrase from Stretton’s 1946 Royal Commission (“An inseparable trinity – Forest, Soil, and Water”) became a conservation slogan and turbocharged the Save the Forests campaign.³⁸⁵ Nevertheless, the growth of environmentalism transformed the politics of fire. As will be discussed in Chapter Three, foresters and land managers moved to implement a greatly expanded strategy of prescribed burning from the 50s and 60s. Many members of the surging environmental movement in the 60s and 70s were uncomfortable with, and increasingly opposed prescribed burning,³⁸⁶ and as a consequence found themselves blamed as the cause of later bushfire disasters such as Ash Wednesday in 1983.³⁸⁷ Some foresters even began to see clearfelling as a substitute practice for regenerative bushfires in mountain ash forests, though activist discomfort with this practice was mirrored by later ecological research disputing the link.³⁸⁸

Stretton’s concerns (and those of many others) led to increased interest in the effects of burning and grazing in the high country, and, as will be discussed in Chapter Six, controversy has particularly raged since the snow leases were restricted.³⁸⁹ Perhaps the most significant change, though, was the slow lifting of the Great Australian Silence. Researchers such as Norman Tindale, Rhys Jones, Duncan Merrilees and Sylvia Hallam expanded understandings of Indigenous burning. Leonard Stretton may have been joking when he suggested restoring management of forests to Victorian Indigenous peoples. In 2020, this is no longer a joke, but is slowly happening across Australia.

³⁸³ Griffiths, “Pyromaniac Nation [Review of Paul Collins, *Burn: The Epic Story of Bushfire in Australia*]”; Kevin Tolhurst, “Fuel for the Tinderbox [Review of Paul Collins: *Burn*],” *The Australian*, 6 December, 2006.

³⁸⁴ Dargavel, *Fashioning Australia’s Forests*, 75.

³⁸⁵ Griffiths, “Judge Stretton’s Fires of Conscience,” 17.

³⁸⁶ Australian Conservation Foundation, *Bushfire Control and Conservation*, Viewpoint Series, No. 5 (Parkville, Victoria, 1970).

³⁸⁷ May, “‘Fanning the Flames of Debate’: The Relationship between Concepts of Aboriginal Fire Regimes and Post-Bushfire Discussion in Australia.”

³⁸⁸ Griffiths, *Forests of Ash*; David Lindenmayer et al., eds., *Mountain Ash: Fire, Logging and the Future of Victoria’s Giant Forests* (Acton: CSIRO Publishing, 2015); P.M. Attiwill et al., “Timber Harvesting Does Not Increase Fire Risk and Severity in Wet Eucalypt Forests of Southern Australia: Timber Harvesting Does Not Increase Fire Risk and Severity,” *Conservation Letters* 7, no. 4 (2014): 341–54.

³⁸⁹ W.K. Hancock, *Discovering Monaro: A Study of Man’s Impact on His Environment* (Cambridge: Cambridge University Press, 1972); Griffiths, “Judge Stretton’s Fires of Conscience”; Adams, Cunningham, and Taranto, “A Critical Review of the Science Underpinning Fire Management in the High Altitude Ecosystems of South-Eastern Australia.”

Chapter Two:

America Chooses Fire Fighting: The Light Burning Dispute and Dismissal of 'Piute Forestry'

It should be sufficient compliment to this natural method [light burning] that the Indians lived in, preserved, made permanent and transmitted to us on this continent the most extensive, valuable and useful forests in the world.

– *San Francisco Call*, 1902³⁹⁰

I hope nobody will take offense at my saying that 'Piute Forestry', Piute medical practice, Piute sanitation, or Piute living conditions are hardly to be assumed as being even as good as, to say nothing of being better than, up-to-date forestry, present-day medical practice, prevailing sanitation methods, or contemporary living conditions in this Year of Our Lord, 1929...

– George C. Pardee, 1929³⁹¹

In the first place I never argue with a light burner. Long and bitter experience has shown that it is foolish to do so...

– S.B. Show, 1920³⁹²

These quotes stem from the 'light burning' dispute in California in the early twentieth century, where newly-empowered foresters favouring fire suppression wrestled with a diverse array of landowners and graziers who advocated for 'light burning' to prevent wildfires. The dispute was hugely intensified by the Big Burn of 1910 (also known as the Big Blowup or the Great Fires), which devastated parts of the American West and shaped American fire discourse and practice in a way no other single fire season has achieved. As with the 1939 Black Friday bushfires, the 1961 Dwellingup bushfires, and the 2009 Black Saturday bushfires, the Big Burn represented a 'policy window' in which fire policy could be debated and potentially reformed. As the United States has exercised such extensive influence over the rest of the world, Pyne argues that "probably no other fire short of the holocausts that

³⁹⁰ "Indian Forestry [Editorial]," *San Francisco Call*, 23 September, 1902.

³⁹¹ George C. Pardee (Chairman of the State Board of Forestry), 'Light Burning', 1929, F3849: 186, Department of Forestry Records, California State Archives, Office of the Secretary of State, Sacramento, CA, USA.

³⁹² S.B. Show, "Letter in reply to Sparhawk's Memorandum of 28 September 1920", 9 November 1920, Box 232, Research Compilation File, 1897-1935, Forest Research Divisions, Records of the Forest Service, Record Group 95, National Archives, College Park, MD, USA.

accompanied Earth's putative collision with an asteroid along the Cretaceous/Tertiary boundary has had such global ecological reach" – and, I would add, *political* and *discursive* reach.³⁹³ The Big Burn hardened opposition to light burning and any role for prescribed burning in land management, and the victory of fire suppression in the light burning debate shaped fire management in America and, as Chapter One demonstrated, in Australia. In this chapter I demonstrate how the light burning dispute was shaped by understandings of the burning practices of Native Americans. The nature of settler colonialism in California relied upon ideological frameworks which minimised any sense of Native American fire management or environmental stewardship, amply demonstrated in the opening quotes of this chapter. The light burning debate was profoundly shaped by these same frameworks, even among ostensibly sympathetic light burners who sought to link their practices to pre-colonial management. The ultimate victory of the fire suppressionists in the American West was partly achieved by exploiting such racialised discourse.

Unlike Chapters One and Three, this chapter is not confined to a single, easily discernible bioregional area, or entirely within a discrete wildfire season and fallout. The fires I primarily examine largely occurred in Montana and Idaho in 1910, while the 'light burning' debate it amplified (but did not start) was centred in California. 'Light burning' was the collective term for a diverse array of fire practices across the North American continent. As will be demonstrated, it could be used to describe sophisticated regimes of burning for timber production or faunal management, or simple, irresponsible pyromania. It could include the fire practices of settlers (especially graziers and timber growers) and, as will be shown, was often identified with the pre-colonial burning practices of Native Americans (this included the derision of light burning as "Piute Forestry" and akin to "Piute sanitation" with which I opened this chapter). The resolution of the Californian debate in favour of fire suppression over light burning later affected the American South.

This broad spread is itself indicative of a weakness of early American fire management – the lack of bioregional administration or discourse. As I will demonstrate, the early United States Forest Service and its allies regarded prescribed burning in areas as different as Northern California and Florida in the same fashion: not through a fire-centric or pyroecological lens, but through a political one. To them, light burners were heretics, and Piute Forestry was laughable whether it was in the Great Basin east of the Sierra Nevada (where the Paiute language group actually lives), in the wetter climate of Mt Shasta, or in the longleaf pine forests of the Red Hills of Georgia and Florida. Yet of all these areas, the

³⁹³ Stephen J. Pyne, "The Source" (Joint Conference of the American Society for Environmental History and the Forest History Society, Durham, NC, 29 March, 2001), 4, <http://www.foresthistory.org/Events/lecture2001%20text.html>.

most influential in shaping American fire discourse was California. As Pyne writes, “no other state has so shaped the American way of fire”.³⁹⁴

I begin this chapter by exploring the environmental diversity of California. This drove a diversity of burning practices among California Indians; their fire-usage was sophisticated, extensive, and systematic. Unlike other Native Americans, however, they largely did not practise what Euro-Americans thought of as agriculture. The Spanish suppressed Native American burning as part of their settler colonial project, but the seizure of these lands by the United States saw intensified violence and genocide as settlers poured in to take advantage of considerable mineral and agricultural riches. Such rapid and violent colonisation required ideological frameworks that legitimated and justified it; settlers thus propagated tropes such as Manifest Destiny, racial hierarchies, and beliefs that California Indians lacked the ability for systematic thinking or long-term planning. Settler fire practices, introduced fauna, and the extermination of Native Americans radically altered fire regimes in California. New government bodies charged with environmental management sought to instil conservation ethics and preserve timber resources for the long term, seeing fire – both wildfire and the settler ‘light burning’ practices – as detrimental to that mission.

The 1910 Big Burn intensified the existing ‘light burning’ debate, which was about both power over public lands and whether they should be burned. The light burning debate was infused with class hierarchies and with the racial discourse of settler-colonialism. Some light burners identified their practices with Native American burning, whilst those arguing for fire suppression used racial pejoratives to ridicule and dismiss this challenge to their authority. In addition to the manipulation of research, this helped the fire suppressionists ultimately win the light burning debate in California, which would have grave ecological consequences for the American West. Fire suppression was then extended to the American South, chiefly as Southern fire practices were interpreted as identical to Californian light burning, despite enormous ecological and cultural differences. As already explored in Chapter One, some Australians such as A.E. Kelso attempted to import the fire suppression paradigm that resulted from the Big Burn.

Fire Before Colonisation

As an area for analysis of fire history, California defies easy categorisation. It has the snow-capped peaks of the Sierra Nevada, the dry Mojave desert, the steep canyons and beaches of Southern

³⁹⁴ Stephen J. Pyne, *California: A Fire Survey* (University of Arizona Press, 2016), 5.

California, the rich soils of the Central Valley, and the fog-shrouded coast of Humboldt County, to name just a few of the regions with diverse fire regimes. It's common to hear of 'Two Californias' (Pyne uses the San Andreas Fault to divide Northern from Southern California), but really there are many.³⁹⁵ As one of the world's five Mediterranean climates (another is South-Western Australia, discussed in Chapter Three), the Golden State is home to a remarkable degree of biotic diversity,³⁹⁶ accounting for a quarter of the biological diversity of the continental US.³⁹⁷ When analysed through a bioregional framework, over half of the vegetation covering California's 42 million hectares requires the repeated occurrence of fire to persist.³⁹⁸ This includes the charismatic flora which helped make the state famous, such as the towering giant sequoias (*Sequoiadendron giganteum*) which require fire to survive,³⁹⁹ but also the multiple scrubs and brushes which make up chaparral.⁴⁰⁰ Diversity is the key to understanding California and Californian fire, but this was not recognised by many of the actors in the discourse discussed in this chapter.

Dating the arrival of Native Americans in North America has implications for both fire and broader racial politics. For example, in recent years the "Solutrean" hypothesis of European antecedents to Native Americans has been adopted by white nationalists eager to undermine Native American claims to sovereignty.⁴⁰¹ Yet the timing of Native American arrival and dispersal through California is somewhat unclear. Many Native American societies today maintain that they have lived in their traditional lands since time immemorial.⁴⁰² Older textbooks described the well-studied Clovis peoples and their arrival from Siberia via the Beringia land bridge roughly 13,000 years ago, though recent

³⁹⁵ Pyne, 6.

³⁹⁶ Philip W. Rundel et al., "Fire and Plant Diversification in Mediterranean-Climate Regions," *Frontiers in Plant Science* 9, (2018).

³⁹⁷ Anderson, *Tending the Wild*, 13.

³⁹⁸ Neil G. Sugihara, Todd Keeler-Wolf, and Michael G. Barbour, "Introduction," in *Fire in California's Ecosystems*, ed. Jan W. Wagtendonk et al., 2nd ed. (University of California Press, 2018), 3.

³⁹⁹ Giant sequoias are serotinous (their seed cones require fire to open) and their adaptations to survive fire mean that fires actually help by reducing competition; see Albert J. Parker, "Fire in Sierra Nevada Forests: Evaluating the Ecological Impact of Burning by Native Americans," in *Fire, Native Peoples and the Natural Landscape*, ed. Thomas R. Vale (Washington: Island Press, 2002), 233–68. The picture is slightly less clear for their giant cousins - coastal redwoods (*Sequoia sempervirens*), but these are nevertheless extremely fire-resistant and their seedlings do not thrive in shade, meaning fires are necessary for their species to survive competition from tanoaks (*Notholithocarpus densiflorus*). See B. S. Ramage, K. L. O'Hara, and B. T. Caldwell, "The Role of Fire in the Competitive Dynamics of Coast Redwood Forests," *Ecosphere* 1, no. 6 (2010).

⁴⁰⁰ M. Kat Anderson and Jeffrey Rosenthal, "An Ethnobiological Approach to Reconstructing Indigenous Fire Regimes in the Foothill Chaparral of the Western Sierra Nevada," *Journal of Ethnobiology* 35, no. 1 (2015): 4–36.

⁴⁰¹ Jennifer Raff, "Rejecting the Solutrean Hypothesis: The First Peoples in the Americas Were Not from Europe," *The Guardian*, 21 February, 2018, <https://www.theguardian.com/science/2018/feb/21/rejecting-the-solutrean-hypothesis-the-first-peoples-in-the-americas-were-not-from-europe>.

⁴⁰² Eriksen and Hankins, "The Retention, Revival, and Subjugation of Indigenous Fire Knowledge through Agency Fire Fighting in Eastern Australia and California"; Kent G Lightfoot and Otis Parrish, *California Indians and Their Environment: An Introduction* (University of California Press, 2009), 39–40.

archaeological discoveries (particularly the Monte Verde site) prove a human presence in the Americas well before this period.⁴⁰³ Establishing a chronology of arrival is important especially as it pertains to debates over the extinction of Pleistocene megafauna, as discussed in Chapter Seven.

In California, Native Americans burnt for many reasons, including a variety of ways to promote food. Fire was used to drive large animals such as deer for hunting,⁴⁰⁴ to smoke out burrows and drive smaller game such as hares and rabbits into the open,⁴⁰⁵ and to shepherd insects such as grass hoppers.⁴⁰⁶ Fire was also used to stimulate growth of vegetation preferred by desired game. For instance, burning chaparral attracts deer and has been shown to cause an increase in their size, abundance and health.⁴⁰⁷ Burning was also conducted for non-animal food. Burning in black oak-ponderosa pine forests promoted black morel (*Morchella elata*) mushrooms;⁴⁰⁸ burning in chaparral could aid manzanita (*Arctostaphylos*), highly prized for its berries and cider;⁴⁰⁹ and fire could be used to aid the production of wild strawberries and wild potatoes.⁴¹⁰ The protection and promotion offered by fire enabled oak woodlands to predictably produce resources; the crop of a single tanoak (*Notholithocarpus densiflorus*) could yield 110,000 edible acorns.⁴¹¹

Burning was also used to promote resources other than food. For instance, one of the most important plants for many California Indians was and is hazelnut (*Corylus cornuta californica*). In addition to the consumption of hazelnuts, Native American fire promotes the sprouting of straight young hazelnut shoots, which were used to make arrows, rope, and fish traps.⁴¹² Perhaps the most striking material

⁴⁰³ Lightfoot and Parrish, *California Indians and Their Environment: An Introduction*, 41.

⁴⁰⁴ Henry T. Lewis, "Patterns of Indian Burning in California: Ecology and Ethnohistory," in *Before the Wilderness: Environmental Management by Native Californians*, ed. Thomas Blackburn and Kat Anderson (Menlo Park, California: Ballena Press, 1993), 91.

⁴⁰⁵ Fray Juan Crespi, Missionary Explorer on the Pacific Coast, 1769-1774 in Gerald W. Williams, "References on the American Indian Use of Fire in Ecosystems," 12 June, 2003, <http://www.geo.arizona.edu/palynology/geos462/wildlandfire.html>.

⁴⁰⁶ C. Raymond Clar, *California Government and Forestry: Volume 1: From Spanish Days until the Creation of the Department of Natural Resources in 1927* (Sacramento: Division of Forestry, Department of Natural Resources, State of California, 1959), 7.

⁴⁰⁷ Anderson, *Tending the Wild*, 136; Lewis, "Patterns of Indian Burning in California: Ecology and Ethnohistory," 72; Char Miller, "Essential Landscape: An Environmental History of Chaparral Ecosystems in California," in *Valuing Chaparral*, ed. E. Underwood, H. Safford, and J. Keeley (Springer, 2018), 125.

⁴⁰⁸ Anderson, *Tending the Wild*, 289.

⁴⁰⁹ Anderson and Rosenthal, "An Ethnobiological Approach to Reconstructing Indigenous Fire Regimes in the Foothill Chaparral of the Western Sierra Nevada," 11.

⁴¹⁰ Anderson, *Tending the Wild*, 279, 301.

⁴¹¹ Heather M. Busam, "Characteristics and Implications of Traditional Native American Fire Management on the Orleans Ranger District, Six Rivers National Forest" (MA diss., Sacramento, California State University, 2006), 66.

⁴¹² Anderson, *Tending the Wild*, 172; The benefits of fire management in promoting useful hazel shoots was empirically demonstrated in Tony Marks-Block, Frank K. Lake, and Lisa M. Curran, "Effects of Understory Fire Management Treatments on California Hazelnut, an Ecocultural Resource of the Karuk and Yurok Indians in the Pacific Northwest," *Forest Ecology and Management* 450 (2019): 117517.

consequence of Native American fire was the creation of basketry and cordage material. A single medium-sized cooking basket could require 3,750 deergrass stalks from 75 plants,⁴¹³ while a 12 m deer net would require 35,000 plant stalks.⁴¹⁴ As with hazel, patches of bear grass (*Xerophyllum tenax*) and deerbrush (*Ceanothus integerrimus*) thrive on small fires which create enough of an ecological disturbance to remove competitors but not enough to destroy the roots.⁴¹⁵ Native American fire increased the quality and quantity of fire-requiring medicinal plants such as manzanita, native tobacco (*nicotiana attenuate*) and sugar pine (*pinus tamberiana*).⁴¹⁶ Native American fire also kept undesirable brush down, controlled insects and pathogens deadly to desired plants,⁴¹⁷ reduced vegetative surface cover to make the harvest of materials easier, and recycled nutrients.⁴¹⁸ As with Indigenous burning, Native American burning was also used for ease of travel, for communication, and for visibility.⁴¹⁹ Most crucially, fire was used to prevent high-intensity wildfires. After all, a high intensity fire in tribal lands could destroy carefully-maintained resources and game habitat.⁴²⁰

Crucially, fire-promoted effects such as resprouting took some time to occur, and many basketry and cordage materials required a period of storage of several years to temper before they could be used. In other words, effective and efficient utilisation of these resources required planning years in advance – and the contemporary distribution of this vegetation beyond expected disturbance patterns supports the claims from contemporary California Indians that this planning process occurred. As Kat Anderson writes, “the success of indigenous economies depended on setting fires”,⁴²¹ but these had to be the right fires, of the desired intensity, at the right time of year, in the correct patterns.

Such an impressive list may lead a reader to accept anthropologist Omer Stewart’s confident declaration that “If there was anything to burn, Indians set fire to it”,⁴²² yet this was clearly not the case. California Indians did use fire a great deal, such that 6-16% of the state was burnt annually before

⁴¹³ Lightfoot and Parrish, *California Indians and Their Environment: An Introduction*, 20.

⁴¹⁴ M. Kat Anderson and Michael J. Moratto, “Native American Land-Use Practices and Ecological Impacts,” in *Sierra Nevada Ecosystem Project: Final Report to Congress*, vol. 2: Assessments and scientific basis for management options (University of California, Center for Water and Wildland Resources Davis, 1996), 187–206.

⁴¹⁵ Busam, “Characteristics and Implications of Traditional Native American Fire Management on the Orleans Ranger District, Six Rivers National Forest.”

⁴¹⁶ Anderson, *Tending the Wild*.

⁴¹⁷ Anderson, 144–51.

⁴¹⁸ Anderson and Rosenthal, “An Ethnobiological Approach to Reconstructing Indigenous Fire Regimes in the Foothill Chaparral of the Western Sierra Nevada,” 20.

⁴¹⁹ M. Kat Anderson, “An Ecological Critique,” in *Forgotten Fires: Native Americans and the Transient Wilderness*, ed. Henry T. Lewis and M. Kat Anderson (Norman: University of Oklahoma Press, 2002), 37–64.

⁴²⁰ Anderson and Moratto, “Native American Land-Use Practices and Ecological Impacts,” 196–97.

⁴²¹ M. Kat Anderson, “The Use of Fire by Native Americans in California,” in *Fire in California’s Ecosystems*, ed. Jan W. Wagtenonk et al., 2nd ed. (University of California Press, 2018), 381.

⁴²² Stewart, *Forgotten Fires*, 68.

European settlement,⁴²³ but this use of fire was not universal among the many different tribal groups, nor was Native American fire present to the same extent in all ecosystems. Occasionally the hyperbole of Stewart is used to argue against the ecological influence of Native American burning or even the sophistication of Native American practices more generally.⁴²⁴ However, this deployment misses a fairly obvious point. *A decision not to burn can be just as sophisticated as a decision to burn.* As with Indigenous burning, the recognition that certain desired ecosystems require protection from fire still implies detailed knowledge, long-term consequences, and planning and management. Of course, despite claims that California Indians did not practise agriculture,⁴²⁵ California Indian societies made a number of non-pyrotechnological modifications to their environments, including coppicing, pruning, the construction of granaries, the sowing of seeds and the construction of dams and fish weirs, all of which further complicate simplistic and racist definitions of Californian Indians as hunter-gatherers.⁴²⁶

Fire and Colonisation

In 1935 US Forest Service analyst L.A. Barrett dismissed calls for prescribed burning by arguing that in the record of Juan Bautista de Anza's explorations "I nowhere find a reference that the Indians were in the habit of burning the country."⁴²⁷ This assertion is odd, to say the least, given that even the most cursory examination of the records of the earliest Euro-American explorers (those without the naturalist tendencies of the eighteenth and nineteenth century explorers) reveal descriptions of Native American burning, such as those of Sir Francis Drake in 1579,⁴²⁸ and Fray Juan Crespi in 1769.⁴²⁹ Crespi's analysis is particularly interesting as he described dense stands of hazel in burned areas and speculated that meadows were maintained through burning "for a better yield of the grass seeds that

⁴²³ Lightfoot and Parrish, *California Indians and Their Environment: An Introduction*, 144; see also Scott L. Stephens, Robert E. Martin, and Nicholas E. Clinton, "Prehistoric Fire Area and Emissions from California's Forests, Woodlands, Shrublands, and Grasslands," *Forest Ecology and Management* 251, no. 3 (2007): 205–16.

⁴²⁴ See Thomas R. Vale, ed., *Fire, Native Peoples and the Natural Landscape* (Washington: Island Press, 2002); discussed in Chapter Seven.

⁴²⁵ Lightfoot and Parrish, *California Indians and Their Environment: An Introduction*, 4.

⁴²⁶ Blackburn and Andersen, *Before the Wilderness: Environmental Management by Native Californians*; Anderson, *Tending the Wild*, 54; Lightfoot and Parrish, *California Indians and Their Environment: An Introduction*.

⁴²⁷ L.A. Barrett, "A Record of Forest and Field Fires in California: From the Days of the Early Explorers to the Creation of the Forest Reserves" (San Francisco: US Forest Service, 1935), 12.

⁴²⁸ Drake interpreted Indian fires lit on his departure in 1579 as a farewell; see Williams, "References on the American Indian Use of Fire in Ecosystems," 72.

⁴²⁹ Crespi observed Indian burning in chaparral in 1769; see Omer C. Stewart, "Burning and Natural Vegetation in the United States," *Geographical Review* 41, no. 2 (1951): 318.

they eat".⁴³⁰ The first permanent European presence was not established until 1769 when the Spanish founded colonies and missions at San Diego and Monterey. The missions became crucial to European colonisation and between 1769 and 1823 twenty additional missions were built.⁴³¹

A critical yet under-appreciated aspect of colonisation was the suppression of Native American burning. In 1775 colonial authorities prohibited burning as tribes

...are wont to cause these fires because they have the bad habit, once harvesting their seeds, and not having any other animal to look after except their stomachs, [to] set fire to the brush so that new weeds may grow to produce more seeds, also to catch rabbits that get overcome and confused by the smoke...⁴³²

This was not the only attempt by the new colonial authorities to repress Native American burning through legal means; Governor José Joaquín de Arrillaga of the new province of Alta California issued the following proclamation in 1793:

With attention to the widespread damage which results to the public from the burning of the fields, customary up to now among both Christian and Gentile Indians in this country, whose *childishness* [emphasis added] has been unduly tolerated...I see myself required to have the foresight to prohibit for the future...all kinds of burning, not only in vicinity of the towns but even at the most remote distances, which might cause some detriment, whether it be by Christian Indians or by Gentiles...⁴³³

This proclamation explicitly reveals the racial hierarchy through which colonisers understood Native Americans: as children, incapable of long-term planning or forethought, and requiring coloniser administration. Another example was a treaty enforced upon the Wappo tribe by General Vallejo in 1836 following a 'chastisement' which prohibited the burning of fields "on any pretext whatever".⁴³⁴ As Pyne notes,⁴³⁵ this particular treaty was a deliberate attempt by the Spanish to free up pasturage for Spanish livestock to graze.

⁴³⁰ Rob Q. Cuthrell, "Archaeobotanical Evidence for Indigenous Burning Practices and Foodways at CA-SMA-113," *California Archaeology* 5, no. 2 (2013): 155.

⁴³¹ Anderson, *Tending the Wild*, 72–78.

⁴³² Captain Fernando Rivera y Moncada quoted in Pyne, *Fire in America: A Cultural History of Wildland and Rural Fire*, 416.

⁴³³ Letter from José Joaquín de Arrillaga to Father President of Missions Lasuén 31 May 1793; in Clar, *California Government and Forestry: Volume 1: From Spanish Days until the Creation of the Department of Natural Resources in 1927*, 8–9.

⁴³⁴ Clar, 10.

⁴³⁵ Pyne, *Fire in America: A Cultural History of Wildland and Rural Fire*, 417.

The destruction of Native American economies and food networks would drive them to either become directly dependent upon the missions for food, or to become reliant upon Western expertise and seeds in order to adopt Western agriculture. As Fray Fermin Francisco de Lasuén wrote in 1801, “the greatest problem for the missionary... [is] how to transform a savage race such as these into a society that is human, Christian, civil, and industrious. This can only be accomplished by denaturalising them...the uncultivated soil supports [the Chumash’s] manner of life”.⁴³⁶ The disruption of Native American economies and resources was critical to the colonisation project and would radically intensify when California was formally seized by the United States following the Treaty of Guadalupe Hidalgo in 1848. Tragically for California’s Native population, the beginning of the American period coincided with the Californian Gold Rush.

The depopulation of the early colonial period shaped fire regimes directly and ideologically. The Native American population in California at the start of the colonial period in 1769 has been estimated at roughly 300,000, but fell to perhaps 150,000 by 1846.⁴³⁷ The pace of decline during the Spanish and Mexican periods was greatly accelerated by the Californian Gold Rush as the Native population rapidly fell to barely 16,000 in 1880 through introduced diseases, disruption of food networks, and violence.⁴³⁸ Miners brought intensified diseases and destroyed and exploited Native resources, but depopulation was not just an indirect or unfortunate consequence of uncontrolled demographic chaos. There is a strong case to be made that California was the site of genocide.⁴³⁹ State Governor Peter Burnett in 1851 referred directly to a “war of extermination”, as many settlers regarded the area as *terra nullius* with no need for treaties with its Indigenous peoples.⁴⁴⁰ Governments also proved either incapable of preventing or had determined to promote violence.⁴⁴¹ The dynamics of disease and depopulation in Native California are relevant for two reasons. Population is to some extent a driver of ignition, so

⁴³⁶ Fray Lasuén quoted in Miller, “Essential Landscape: An Environmental History of Chaparral Ecosystems in California,” 126.

⁴³⁷ S.F. Cook, *The Population of the California Indians, 1769-1970* (Berkeley: University of California Press, 1976); Preston has also argued that it’s not inconceivable that this underestimates the pre-Columbian population as there is ethnographic evidence of plagues and epidemics arriving in advance of permanent European settlement. See W. L. Preston, “Portents of Plague from California’s Protohistoric Period,” *Ethnohistory* 49, no. 1 (2002): 69–121.

⁴³⁸ The concept of “explosive colonisation” is as apt for California as it is for Victoria; Belich, *Replenishing the Earth: The Settler Revolution and the Rise of the Angloworld, 1783-1939*.

⁴³⁹ Benjamin Madley, *An American Genocide: The United States and the California Indian Catastrophe, 1846-1873* (New Haven: Yale University Press, 2016); Brendan C. Lindsay, *Murder State: California’s Native American Genocide, 1846–1873* (Lincoln: University of Nebraska Press, 2012).

⁴⁴⁰ Governor Peter Burnett, “State of the State Address,” 6 January 1851, http://governors.library.ca.gov/addresses/s_01-Burnett2.html.

⁴⁴¹ Some Federal agents attempted to negotiate treaties but these were never ratified by Congress, see Hixson, *American Settler Colonialism: A History*, 123.

charting the dynamics of population is important for any study that analyses attempts to reconstruct indigenous burning patterns before and during periods of settler contact.

Furthermore, the especially violent and rapid nature of depopulation in California also explains the dismissive and derogatory attitudes towards Native American practices expressed during the light burning debate explored later in this chapter.⁴⁴² Consider how this deliberate depopulation (and its effect on Native American patterns of burning) was blissfully handwoven away by California Division of Forestry historian C. Raymond Clar barely a century after the slaughter began. Clar merely described the early history of American California as “sometimes more colourful than honourable”.⁴⁴³ This unconscious or deliberate whitewashing helps enrich our understanding of how Clar and others could only interpret Native American burning through a framework that discounted any Native American agency or systematic management of local environments. Anyone unaware of or unsympathetic towards the victims of systematic massacres would be unlikely to be sympathetic to resource management systems which reflected different epistemologies and attitudes towards fire.

Intensified settlement also brought an intensification of changes to fire regimes through the process of “ecological imperialism”, especially as it pertained to the effect of introduced fauna.⁴⁴⁴ The Spanish brought sheep, cattle, pigs and goats, which rapidly reproduced in fertile California. In 1800 the missions claimed to have 88,000 sheep,⁴⁴⁵ and by 1832 there were 420,000 head of cattle and over 300,000 sheep.⁴⁴⁶ As with the colony of Victoria as described in Chapter One, “explosive colonisation” occurred under American administration such that by 1880 there were over five and a half million sheep in the state.⁴⁴⁷ Sheep in particular changed the fire dynamics of California; they ate the herbaceous layer of vegetation and broke the fuel continuity which had previously allowed low-intensity fires to spread, in turn reducing the number of days on which an area *could* burn, which led to a reduction in the frequency of fire. This caused a greater accumulation of vegetation biomass, altering the species mix and distributions, and changing the structure of fuels – which ultimately

⁴⁴² Discourse centered on the inevitable passing of the “Noble Savage” had been internalised by the new United States of America, especially through much popular literature which tried to relegate racial violence to a pre-Revolutionary era. See Hixson, *American Settler Colonialism: A History*.

⁴⁴³ Clar, *California Government and Forestry: Volume 1: From Spanish Days until the Creation of the Department of Natural Resources in 1927*, 56.

⁴⁴⁴ This concept was brilliantly elaborated upon in Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900-1900*.

⁴⁴⁵ Barrett, “A Record of Forest and Field Fires in California: From the Days of the Early Explorers to the Creation of the Forest Reserves,” 9.

⁴⁴⁶ Anderson, *Tending the Wild*, 76.

⁴⁴⁷ Barrett, “A Record of Forest and Field Fires in California: From the Days of the Early Explorers to the Creation of the Forest Reserves,” 10.

changed the intensity of fires.⁴⁴⁸ Native American fire regimes were also disrupted by the habit of settlers lighting their own fires, which will be explored in further depth later.

When combined with the various laws prohibiting Native American burning, I argue this should be interpreted as a process of 'pyro-ecological imperialism'. Alfred Crosby's ecological imperialism thesis suggested that the overwhelming success of European imperialism in the 'neo-Europes' of North America, Australia and elsewhere had a strong ecological component. Introduced pathogens (such as smallpox), fauna (such as sheep or pigs), and flora (such as weeds) undermined Indigenous economies and resource networks and often conversely aided settler expansion.⁴⁴⁹ Extending Crosby's thesis to fire opens us to the insight that the success of European imperialism had a pyro-ecological component. Existing fire regimes in California were fundamental to Native American resources. Thus, the disruption of their ignition (through colonial laws) and fuels (through colonial fauna) vastly accelerated European imperialism. Furthermore, disruption of Indigenous burning regimes (and the lands created through these practices) wrecked obligations held by Native Americans to exercise stewardship over their lands, contributing to the demoralisation component speculated upon by many historians of European imperialism. Crosby himself noted that Indigenous peoples continued to fulfil their responsibilities to kin and share food and goods even at the height of epidemics, possibly contributing to the spread of the disease.⁴⁵⁰ Pyro-ecological imperialism allows for the extension of this insight into the cultural drivers of colonial impacts to include cultural obligations to non-human actors such as lands plants, and animals.

As with Crosby's original thesis, pyro-ecological imperialism did not necessarily need to be intentional or informed, merely effective and synergistic. As Pyne noted, the sad irony is that the landscapes partly created and maintained by Native American burning proved similarly suitable for the grazing stock of colonisers. Native American fires helped attract colonisation, leading to their extinguishment.⁴⁵¹ As in Chapter One, similar processes occurred in Australia. Nevertheless, Indigenous peoples should not be seen as purely passive victims of pyro-ecological imperialism. In a similar fashion to the process whereby *bininj* in the Top End of Australia adapted to introduced Asian water buffalo (see Chapter Four), some California Indian tribes adapted to incorporate exotics such as wild mustard (*Brassica*) and wild oat (*Avena fatua* and *Avena barbata*) into their diets, and Indigenous burning even helped

⁴⁴⁸ Sugihara, Keeler-Wolf, and Barbour, "Introduction"; Anderson, *Tending the Wild*, 184.

⁴⁴⁹ Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900-1900*; Alfred Crosby W. and Donald Worster, "Ecological Imperialism: The Overseas Migration of Western Europeans as a Biological Phenomenon," in *The Ends of the Earth: Perspectives on Modern Environmental History* (Melbourne: Cambridge University Press, 1988), 103–17.

⁴⁵⁰ Alfred Crosby W., "Virgin Soil Epidemics as a Factor in the Aboriginal Depopulation in America," *The William and Mary Quarterly* 33, no. 2 (1976): 289–99.

⁴⁵¹ Pyne, *Fire in America: A Cultural History of Wildland and Rural Fire*, 83.

the expansion and distribution of these species.⁴⁵² While the exact effect of Native American depopulation upon their burning practices is somewhat uncertain, it is obvious that the cessation of Native American burning had significant effects upon ecosystems in California. This was further intensified by colonial and Californian policies of fire suppression, ironically introduced to preserve California's natural wealth.

As colonisation further developed, settler ignition further altered Californian fire regimes from their pre-colonial state. Herders moved their sheep into the Sierra Nevada and Cascade ranges, shifting their stock seasonally. They lit fires to facilitate easier herding, open new range and increase forage in following years. The result was a similar, but not identical, pattern to fires lit by Native Americans.⁴⁵³ Documents from the late nineteenth and early twentieth centuries frequently refer to these herders, the fires they lit, and the ecological consequences of overgrazing. Many of the herders were Basques or non-Anglo settlers, and the criticism of these herders was also invariably racially tinged.⁴⁵⁴ For instance, the National Academy of Sciences referred to sheep as "hoofed locusts" and said "the nomadic sheep men are dreaded and despised".⁴⁵⁵ The engineer Marsden Manson wrote to the California Water and Forest Association that the employment of the sheep-herders' methods in Southern France and Spain meant that "devastating floods now alternate with dry channels, where a century ago perennial streams flowed",⁴⁵⁶ while US Forest Service agents would later declare these men were "ignorant and shiftless".⁴⁵⁷ The continued burning and overgrazing of the higher areas played an important role in radicalising the views of those who wanted to suppress fire. It became all

⁴⁵² Anderson and Moratto, "Native American Land-Use Practices and Ecological Impacts."

⁴⁵³ Documentary evidence would seem to indicate that most of the fires lit in the early twentieth century were in July and August (summer) rather than the usual time of Native burning (Fall); see Jay D. Miller and Hugh D. Safford, "Corroborating Evidence of a Pre-Euro-American Low- to Moderate-Severity Fire Regime in Yellow Pine-Mixed Conifer Forests of the Sierra Nevada, California, USA," *Fire Ecology* 13, no. 1 (2017): 58–90; Pyne, *Fire in America: A Cultural History of Wildland and Rural Fire*, 417.

⁴⁵⁴ An article in the *San Francisco Examiner* of 5 September 1889 quotes a C.M. Dabney of Fresno that "The burning of these forests by the herders is the greatest calamity of the state...[there is a group of men who] pay no taxes, have no homes, defy our laws, and who say they do not understand English"; in Barrett, "A Record of Forest and Field Fires in California: From the Days of the Early Explorers to the Creation of the Forest Reserves," 33.

⁴⁵⁵ National Academy of Sciences, "Report of the Committee Appointed by the National Academy of Sciences Upon the Inauguration of a Forest Policy for the Forested Lands of the United States to the Secretary of the Interior" (Washington: Government Printing Office, 1897), 18–19.

⁴⁵⁶ Marsden Manson, "Preserving the Forests by Fire," in *Should the Forests Be Preserved?* (California Water and Forest Association, 1903), 38.

⁴⁵⁷ Barrett, "A Record of Forest and Field Fires in California: From the Days of the Early Explorers to the Creation of the Forest Reserves," 30; US Forest Service Chief William B Greeley recalled that the herders' response to all questions was "No comprend Angleesh", and that they "observed the [legal restrictions on grazing on public lands] by slipping over the forest boundary whenever the ranger's back was turned"; see William B. Greeley, *Forests and Men* (New York: Country Life Press, 1951), 78.

too easy to conflate the burning of the herders as representative of all light burning, despite the fact that light burners often burned more carefully and for different purposes than grazers.

The rapidity of settlement and laissez faire exploitation of resources in the American West had environmental consequences which eventually resulted in the formation of public authorities charged with environmental management. The technique of hydraulic mining employed during the Gold Rush used massive volumes of water and caused significant erosion and sediment flows. In combination with damage caused by overgrazing and excessive logging, these changes caused the increasingly powerful Western irrigators to pressure Congress to protect watersheds. The Forest Reserve Act, passed in 1891, gave the President the power to create reserves, and in 1892 President Harrison proclaimed the San Gabriel Forest Reserve – the first of several Californian reserves. After some years the reserves were transferred to the Department of Agriculture by President Theodore Roosevelt, to be administered by what became the USDA Forest Service under a curiously energetic man named Gifford Pinchot.⁴⁵⁸ Pinchot's enthusiastic expansion of the Forest Service would transform the fire politics of America.

Pinchot is regarded today as one of the foremost figures of American conservationism. He helped give the Forest Service a set of moral values based on utilitarianism married with sustainability where supposedly unaligned scientists would make decisions rather than politicians.⁴⁵⁹ Pinchot was the first American to be formally trained in forestry, as he spent a year at the French National School at Nancy training under foresters such as Dietrich Brandis and Wilhelm Schlich and thus absorbed the attitudes and ideology of this transnational discipline (described in Chapter One).⁴⁶⁰ Pinchot vastly expanded the staff and budget of the Forest Service, and worked with his friend and Progressive ally President Roosevelt to greatly increase the size of the lands the Forest Service administered.⁴⁶¹ Charismatic and able, Pinchot inspired the loyalty of a number of young protégés throughout the Forest Service who became known as “little G.P.s” (one of these protégés later admiringly referred to Pinchot as the “Lion

⁴⁵⁸ The story of the creation of national forests in the US has been exceptionally well-travelled by historians, and I have chosen to give only a very brief outline here. Good sources to start include Anthony Godfrey, *The Ever-Changing View: A History of the National Forests in California, 1891-1987* (Vallejo, CA: USDA Forest Service, 2005); James G. Lewis, *The Forest Service and the Greatest Good: A Centennial History* (Durham, NC: Forest History Society, 2006).

⁴⁵⁹ Lewis, *The Forest Service and the Greatest Good: A Centennial History*, 55.

⁴⁶⁰ Lewis, *The Forest Service and the Greatest Good: A Centennial History*.

⁴⁶¹ Roosevelt expanded the size of American national forests from 46 million acres (19 million ha) to 150 million acres (60 million ha), particularly through the famous “Midnight Forests” where 16 million acres (6 million ha) were added overnight before Congress could strip Roosevelt of his powers to expand reserves; see Samuel P. Hays, *Conservation And The Gospel Of Efficiency: The Progressive Conservation Movement, 1890–1920* (Pittsburgh: University of Pittsburgh Press, 1959), 47; and Lewis, *The Forest Service and the Greatest Good: A Centennial History*, 62.

of Judah”).⁴⁶² Pinchot was also a superb public campaigner who sought to spread his conservation ethic through the American public and gain support for the Forest Service’s conservation mission. Pinchot inculcated in his protégés in the Forest Service and other forestry bodies the disdain for fire which permeated the imperial forestry movement.⁴⁶³ The strong self-belief of the fledgling Forest Service, its conviction to offer regulated and more maintainable land management methods, and its focus upon gaining public acceptance for its policies and mission, would have grave consequences for global fire politics after the particularly destructive wildfire season in 1910.

The 1910 Wildfires

The first fires of the 1910 fire season ignited on 29 April in Montana, heralding a series of wildfires throughout the West. By August drought had spread through much of the West, and as Clarence B. Swim of the Forest Service later recalled: “the late summer of 1910 approached with ominous, sinister, and threatening portents. Dire catastrophe seemed to permeate the very atmosphere...”⁴⁶⁴ The new USFS resolved to fight these fires and suppress them, marking a significant shift in which public agencies would fight wildfires. Yet with few rangers to patrol vast areas, the USFS was forced to hire seasonal firefighters. Over 10,000 men were hired from mines, ranches and even saloons. These “polygot mobs, mocked and maligned” had no firefighting training and little equipment, and were led by sparse foremen and loggers, backed by several companies of US Army soldiers.⁴⁶⁵ By 1 August more than 3,000 small fires had been contained by this ragtag force, with firefighters often needing to cut trails through mountainous terrains while carrying heavy packs to reach the fires.⁴⁶⁶ The tenth of August saw increasing winds and declining humidity, making firefighting in Idaho and Montana even more difficult. Then on the morning of 20 August a big wind locally known as a Palouser passed through, causing small fires to become large and creating the Big Burn.

⁴⁶² This description comes from William Greeley, one of Pinchot’s young men and later Chief of the Forest Service; see Greeley, *Forests and Men*, 59–66; Lewis, *The Forest Service and the Greatest Good: A Centennial History*, 78.

⁴⁶³ See also Pyne, *Vestal Fire: An Environmental History, Told through Fire, of Europe and Europe’s Encounter with the World*, 491–99.

⁴⁶⁴ The Forest History Society, “The 1910 Fires,” foresthistor.org, 18 December, 2014, <https://foresthistor.org/research-explore/us-forest-service-history/policy-and-law/fire-u-s-forest-service/famous-fires/the-1910-fires/>.

⁴⁶⁵ Stewart H. Holbrook, *Burning An Empire: The Story of American Forest Fires* (New York: MacMillan, 1943), 123; Pyne, *Year of the Fires: The Story of the Great Fires of 1910*, 84.

⁴⁶⁶ The Assistant District Forester for this region estimated that without trails these groups would do well to cover 5 miles a day; see Ferdinand Silcox, “How the Fires Were Fought,” *American Forestry* 16, no. 11 (1910): 631–39.

The Big Burn was devastating. In just thirty-six hours perhaps one and a half million acres of forest burned (approx. 600,000 ha).⁴⁶⁷ This was not just one single fire; there were at least 1,700 separate fires that burned in national forests throughout Idaho, Montana, and Washington.⁴⁶⁸ There were few recorded civilian deaths compared to Black Friday,⁴⁶⁹ but the toll on the inexperienced fire crews was catastrophic. At least 78 firefighters were killed in the space of two days.⁴⁷⁰ Of course, the United States had suffered bad wildland fires before 1910. For instance, the Peshtigo wildfires of 1871 killed perhaps 1000 people and were so intense they gave rise to the term “fire storm”, and the Hinckley Fires in 1894 killed over 400 people.⁴⁷¹ Other fires, both before and since, burned larger areas, or had greater immediate ecological impact. But the 1910 fires were different - *politically*.

These were the first wildfires in the United States to claim more firefighter than civilian deaths, and given the deaths were in part due to the Forest Service’s policy decision to fight the fires, the Big Burn might have spelled the end for the nascent Forest Service. Instead, the Service (and its allies) went on the offensive to shape public opinion. The 1910 fires supplied the Service with folk heroes and national publicity through dramatic stories such as Ed Pulaski’s leadership of a crew to survival.⁴⁷² Such actions helped inspire Federal legislation expanding the mission and jurisdictions of the Forest Service through the 1911 Weeks Act, and solidified the Service towards a strategy and doctrine of fire suppression. This response, however, was not inevitable. The West had been host to a slowly growing debate over fire management as the Forest Service expanded its jurisdiction over lands and ignition rights. Much like a Palouser, the Big Burn turned a low-level drama into a roaring conflict. This was the ‘light burning’ controversy, where a loose group of landowners and managers argued for fire lighting, loosely inspired by Native American practices, against the Forest Service and its allies, who argued for fire suppression. Nowhere was this debate as prominent as in California.

⁴⁶⁷ Pyne, “The Source”; Pyne has written of the difficulty of reconstructing the 1910 fires from textual evidence. The USFS bureaucracy which would later supply impressively detailed fire statistics did not exist, and newspaper reports in this sparsely-settled area of the US were highly inaccurate; see Pyne, *Year of the Fires: The Story of the Great Fires of 1910*, 132.

⁴⁶⁸ Holbrook, *Burning An Empire: The Story of American Forest Fires*, 131.

⁴⁶⁹ Barker estimates 7 civilian deaths, but the civilian death toll was almost certainly higher; see Rocky Barker, *Scorched Earth: How the Fires of Yellowstone Changed America* (Island Press, 2005), 111.

⁴⁷⁰ Pyne, *Year of the Fires: The Story of the Great Fires of 1910*, 215.

⁴⁷¹ Holbrook, *Burning An Empire: The Story of American Forest Fires*.

⁴⁷² Ed Pulaski was a foreman who led his crew to safety in a tiny tunnel while the fires raged. As the flames came closer and the air became worse, Pulaski was forced to threaten to shoot any who tried to flee in order to stop panic and certain death. Thanks to his leadership most of Pulaski’s crew survived, though he himself never received any compensation for the severe injuries he suffered during the ordeal. Pulaski only wrote once about his experiences; see E.C. Pulaski, “Surrounded by Forest Fires: My Most Exciting Experience as a Forest Ranger,” *American Forestry* 29, no. 356 (1923): 485–86; Pyne, “The Source.”

Light Burning: Fuel Reduction

The debate over ‘light burning’ as a land management strategy existed before the 1910 fires, and continued well after the fires. There is little doubt, however, that the Big Burn profoundly accelerated the debate. That debate took place in academic journals, in internal publications and conversations between land management agencies and owners, and – most crucially – in magazines and newspapers, bridging the technocratic and the popular spheres. Advocates for light burning were rarely organised or allied; rural burning was widespread but the term meant different things to different people (and many calling for prescribed burning did not even use the term). Of particular significance was the extent to which the debate reflected and influenced American attitudes towards Native American burning. Light burners claimed different purposes for, and benefits from, light burning, but many claimed that prescribed burning had been practised by Native Americans and that this system had some applicability for America. The light burning debate as a whole is relatively well-trod ground, so rather than exploring the Californian light burning debate chronologically as Stephen J. Pyne and Ashley Schiff have done,⁴⁷³ I will explore it by developing a typology of responses to highlight how light burning was understood, advocated for, and dismissed on racial grounds.

The most obvious and enduring point of contention between light burners and anti-light burners related to whether proposed methods of light burning would actually be of any use in preventing or reducing fire damage. Thomas Barlow Walker, owner of the Red River Lumber Company (which owned nearly half as much timberland as the USFS in California) was a practitioner of light burning on his lands near Mt Shasta in Northern California.⁴⁷⁴ A persistent thorn in the side of the fire suppressionists, Walker insisted that the light burning he conducted in 1902 had been highly successful.⁴⁷⁵ In the same month as the Big Burn, Lumberman George L. Hoxie wrote that it would take a “miracle” to keep ignition out of the forests, but that light burning would “deprive even the lightning fires of sufficient fuel”.⁴⁷⁶ Natural history writer and novelist Stewart Edward White argued in 1920 that “there are good fires and bad fires” and gave a reasonably detailed set of rules for light burning involving topography, timing, and frequency.⁴⁷⁷ White argued that the Forest Service’s use of fire scars on trees as evidence of the dangers of light burning overestimated the damage that fire did to trees; “It is as though a statistician should, in a factory investigation, count every barked knuckle as a mortal injury merely

⁴⁷³ See Chapters Two, Three, and Five especially of Pyne, *Fire in America: A Cultural History of Wildland and Rural Fire*; Schiff, *Fire and Water*.

⁴⁷⁴ Pyne, *Year of the Fires: The Story of the Great Fires of 1910*, 243.

⁴⁷⁵ T.B. Walker, “Forest Fires,” in *Report of the National Conservation Commission*, vol. 2 (Washington: Government Printing Office, 1909), 424.

⁴⁷⁶ George L. Hoxie, “How Fire Helps Forestry,” *Sunset* vol 25, no. 2, 1910, 148.

⁴⁷⁷ Stewart Edward White, “Woodsmen, Spare Those Trees!,” *Sunset* vol 44, no. 3, 1920

because some barked knuckles become infected”.⁴⁷⁸ *Sunset* magazine (then owned by the Southern Pacific Railroad – a major landowner thus with a vested interest in mitigating fire damage) even advertised White’s argument in an inflammatory manner, publicising it with posters in buses saying “Your forests are in danger. The Forest Service won’t save them but fire will”.⁴⁷⁹ Civil engineer Joseph A. Kitts believed that “crown fires do not occur when there is no appreciable litter”.⁴⁸⁰ Arguing that light burning “may be safely used to remove the forest litter”, Kitts pointed to his success in light burning since 1890.⁴⁸¹

The response of the Forest Service varied according to the qualifications and occupation of the light burner. Walker could be dismissed as lacking formal training, but the arguments from Kitts and White particularly worried the Service; an internal letter from the Chief of Forest Investigations privately conceded Kitts displayed “a very intelligent grasp of the situation” and that “as a theoretical proposition, I am inclined to agree with Mr Kitts’s thesis”.⁴⁸² However, the sticking point was that the Forest Service was interested in protecting the second growth of timber for future harvesting, and was concerned that light burning would damage and possibly kill these younger trees. In other words, sacrificing younger timber to protect mature timber from the ravages of wildfire ran counter to the long-term outlook and indeed ethos of conservationist forestry. Light burning without special preparations to protect young trees would kill the trees, and protections such as piling dirt or constructing firebreaks around young trees would be prohibitively expensive – between 20-60 times as expensive as total fire suppression. Light burning “from the standpoint of Forest Management [sic]...is financial suicide”.⁴⁸³ As F.E. Olmstead wrote to the Sierra Club, light burning would provide the illusion of a “safeguard” which would come with “irreparable damage to young trees...This is not forestry; not conservation; it is simple destruction”.⁴⁸⁴

Of course, the light burning debate was not helped by having a strongly moralistic bent to it. In 1890 Bernhard Eduard Fernow, Pinchot’s predecessor as chief of the USDA Division of Forestry, argued that “The whole fire question in the United States is one of bad habits and loose morals. There is no other

⁴⁷⁸ White, “Woodsmen, Spare Those Trees!”

⁴⁷⁹ David Carle, *Burning Questions: America’s Fight with Nature’s Fire* (Westport, Conn: Praeger, 2002), 28.

⁴⁸⁰ Joseph A. Kitts, “California Divided on Light Burning,” *The Timberman*, 1920, 36, 81

⁴⁸¹ Kitts, “California Divided on Light Burning,” 36, 81.

⁴⁸² Raphael Zon (Chief of Forest Investigations), “Letter to Mr Charles Hunt, Secretary, American Society of Civil Engineers”, 10 June 1919, Box 227 Folder: Protection – Fire (Light Burning), Research Compilation File, 1897-1935, Forest Research Divisions, Records of the Forest Service, Record Group 95, National Archives, College Park, MD, USA.

⁴⁸³ R.H. Boerker, “Light Burning vs Forest Management in Northern California,” *Forestry Quarterly* 10 (1912): 184–94.

⁴⁸⁴ F.E. Olmstead, “Fire and the Forest: The Theory of Light Burning,” *Sierra Club Bulletin*, January 1911; See also Nancy Langston, *Forest Dreams, Forest Nightmares: The Paradox of Old Growth in the Inland West* (Seattle: University of Washington Press, 1995).

reason or necessity for these frequent and recurring conflagrations”.⁴⁸⁵ The new class of foresters regarded firefighters as not just a nuisance but as unworthy, “habitually careless and improvident”, reflecting a class divide between academic elites and folk tradition.⁴⁸⁶ As we shall see, such sentiments of indolence echoed and were no doubt reinforced by hierarchical and pejorative stereotypes of Native Americans as lacking long-term planning.

As bad as indolence was the perception that light burners only cared about selfish short-term profit. Whether through internal communications or more public avenues, the idealist disciples of Pinchot expressed contempt for private interests: “most advocates of forest burning really want freedom to fire the woods without regard to the effect upon the future forest”,⁴⁸⁷ as “the private owner of timber, whose chief concern is the protection of trees which can be turned into money immediately...cares little or nothing about what happens to the younger stuff which is not yet marketable”.⁴⁸⁸ “Speculative” interests were anathema to a motivated and expansionist agency and profession associated with the early twentieth century Progressive political movement, and founded upon ideals of conservation and resolving resource conflicts in favour of “the greatest good of the greatest number in the long run”.⁴⁸⁹

The light burning debate also involved explicit hierarchies of knowledge and elements of class. Advocates for prescribed burning, whether using the term ‘light burning’ or not, usually emphasised their experiential as opposed to theoretical knowledge. H.J. Ostrander, for instance, writing to the *San Francisco Call* in 1902 claimed the knowledge of the “practical mountaineer” and emphasised that “there is but one practical way of preserving the forests of the Sierras from being destroyed by fire...it is by the use of fire”,⁴⁹⁰ while George L. Hoxie writing to *Sunset* in 1910 repeatedly claimed his methods were “practical”.⁴⁹¹ Advocates tended to position themselves in opposition to the new elite, academically-trained foresters. For example, Clinton Walker, son of Thomas Barlow Walker, referred with disdain to the “Yale foresters” who through enforcing fire protection had caused pests such as

⁴⁸⁵ Andrew Denny Rodgers III, *Bernhard Eduard Fernow: A Story of North American Forestry*, 2nd ed. (New York: Hafner Publishing Company, 1968), 167.

⁴⁸⁶ From F.B. Hough, “Report on Forestry, Submitted to Congress by the Commissioner of Agriculture”, 1882, Box 183 Folder: Forest Fire Research, Research Compilation File, 1897-1935, Forest Research Divisions, Records of the Forest Service, Record Group 95, National Archives, College Park, MD, USA.

⁴⁸⁷ Henry Graves, “The Torch in the Timber,” *Sunset* 44, no. 4 (1920): 37.

⁴⁸⁸ Olmstead, “Fire and the Forest: The Theory of Light Burning,” 45.

⁴⁸⁹ “Random Talk on Forest Fires (Editorial),” *American Forestry* 16, no. 11 (1910): 667–69; Pinchot’s maxim continues to inspire the USDA Forest Service today; see Tom Tidwell, “The Greatest Good | USDA,” 31 March, 2015, <https://www.usda.gov/media/blog/2015/03/31/greatest-good>.

⁴⁹⁰ H.J. Ostrander, “How to Save the Forests by Use of Fire [Letter to Editor],” *San Francisco Call*, 23 September, 1902.

⁴⁹¹ Hoxie, “How Fire Helps Forestry.”

insects to assume a “damaging and alarming proportion”.⁴⁹² White argued that “most scientists or experts have a sort of scientific contempt for laymen” but that “it would astonish you how conversant with the academic theories these ‘rough old lumbermen’ are”.⁴⁹³

In contrast, advocates for fire suppression lambasted the credentials and knowledge of light burners, claiming the authority of scientific forestry and belittling the class credentials of light burners. They positioned light burners as lacking “a definite knowledge of what forestry really is”,⁴⁹⁴ and asked “Is there a greater theorist in the world than the so-called practical man who generalizes for a whole State from what he sees in his own backyard?”⁴⁹⁵ In the sarcastic words of E.H. MacDaniels, “During the war we all belonged to amateur boards of strategy and could show General Pershing just what to do”.⁴⁹⁶ Such contestation over types of knowledge and attempts to use technical knowledge and qualifications as a political cudgel is reminiscent of the debates between Victorian foresters and graziers in the Stretton Royal Commission explored in Chapter One.

Light Burning: The Influence of Colonial Frameworks

A key and under-appreciated plank of the light burning debate was through references to American Indian burning practices. Light burning advocates frequently pointed to explorer or settler accounts of Native American burning practices to justify and bolster their claims, while fire suppressionists ridiculed the notion of Native American fire use as fire management. One of the Commissioners charged with managing Yosemite Valley, for instance, publicly testified that he “respected the ability of the Indians to manage that valley”, directly referencing the effect of Native American burning “making an open glade and pasture” and resisting the “encroachment of undergrowth” which would otherwise create large fires, in turn threatening Yosemite’s famous sequoia trees.⁴⁹⁷ The “practical mountaineer” H.J. Ostrander’s calls for the “practice of the Indians” to be restored was endorsed by

⁴⁹² Clinton Walker, letter to Red River Lumber Company 21 January 1938, quoted in Scott L. Stephens and Neil G. Sugihara, “Fire Management and Policy since European Settlement,” in *Fire in California’s Ecosystems*, ed. Jan W. Wagtendonk et al., 2nd ed. (University of California Press, 2018), 399–410.

⁴⁹³ White, “Woodsmen, Spare Those Trees!,” 116.

⁴⁹⁴ Marsden Manson, “The Effect of Partial Suppression of Annual Forest Fires in the Sierra Nevada Mountain,” *Sierra Club Bulletin*, 1906, 22.

⁴⁹⁵ Ernst A. Sterling in 1905 quoted in Clar, *California Government and Forestry: Volume 1: From Spanish Days until the Creation of the Department of Natural Resources in 1927*, 212.

⁴⁹⁶ E.H. MacDaniels, “National Forest Jungles: The Theory of ‘Light Burning’ in Yellow Pine Is Disproved,” *The Timberman* 25, no. 3 (1924): 51.

⁴⁹⁷ California, “Appendix to the Journals of the State and Assembly of the Twenty-Eighth Session of the Legislature of the State of California (Volume VIII),” § In the Matter of the Investigation of the Yosemite Valley Commissioners (1889), 41–45.

the editor of the *San Francisco Call*, which said the “proper use of fire is entirely consistent with the growth of young trees, which under the Indian system were preserved in such quantities as to continually renew the forest and protect its permanency”.⁴⁹⁸ Civil engineer Joseph A. Kitts quoted testimony of Native Americans to his grandfather that “Letum go too long – get too hot – killum all”, and promoted light burning by praising California Indians as the “most practical of foresters” who were able to distinguish between crown and surface fires.⁴⁹⁹

Nevertheless, such praise for Native American fire lighting from light burners was hardly an uncritical or enlightened action. Native American burning was still viewed through the general settler-colonial Californian framework for understanding California Indians at the time. The *Call*'s editors for instance acknowledged that fire lighting was “sneered at as ‘the Digger Indian plan’...[but that] it should be sufficient compliment to this natural method that the Indians lived in, preserved, made permanent and transmitted to us on this continent the most extensive, valuable and useful forests in the world.”⁵⁰⁰ ‘Digger Indian’ was a term originally used to describe Native peoples of the Great Basin, but by the 1870s had settled into a “taxonomic stigma” and pejorative for Native Americans of Central California, who were viewed as “treacherous, bloodthirsty, dirty, squalid, lazy, comic and/or pathetic”.⁵⁰¹ Such stereotyping reinforced Manifest Destiny and legitimised the genocide and theft of ‘wilderness’ (in reality, Native lands). The *Call*'s description, ostensibly so admiring of the result of Native burning techniques, still exhibited this framework through its description of Native Californians ‘transmitting’ their lands to settlers – a description that obscures the violent process of dispossession and conjures images of a vanishing race bequeathing their Social Darwinist superiors with a gift of land. This sentiment was common to light burners: despite his apparent sympathy for Native American customs, Kitts describes California Indians as being “anxious to hand this principle of forestry on to the white man” when the forests of California were “handed down intact”.⁵⁰²

Light burners may have felt that references to Native Americans or Native American practice may have bolstered their case in the court of public opinion, but fire suppressionists did not. Indeed, fire suppressionists almost seemed gleeful to draw upon racial prejudices common of the time, perceiving references to Native American culture as ridiculous and an easy angle of attack. USFS Chief William B. Greeley’s 1920 response to Kitts was titled ‘Piute Forestry’; a title that was not only sarcastic but also inaccurate given that the Paiute group lived in the arid Great Basin, on the other, drier side of the

⁴⁹⁸ Ostrander, “How to Save the Forests by Use of Fire [Letter to Editor]”; “Indian Forestry [Editorial].”

⁴⁹⁹ Kitts, “California Divided on Light Burning.”

⁵⁰⁰ “Indian Forestry [Editorial].”

⁵⁰¹ Allan Lonngberg, “The Digger Indian Stereotype in California,” *Journal of California and Great Basin Anthropology* 3, no. 2 (1981): 215–23; Hixson, *American Settler Colonialism: A History*, 124.

⁵⁰² Kitts, “California Divided on Light Burning,” 36, 82.

Sierra Nevada to where Kitts lived.⁵⁰³ This phrase was apparently politically resonant; responding to a 1928 letter to the California Governor, Dr Pardee of the California Board of Forestry ridiculed light burners by comparing “Piute Forestry”, to “Piute medical practice” and the old favourite of racialized discourse, “Piute sanitation”.⁵⁰⁴ California Indians were described as being at a “low stage of cultural development”,⁵⁰⁵ of being a “lethargic type”,⁵⁰⁶ who “lived always in the present...dwelt in skin teepees...whose interest were always individual and tribal and never collective”.⁵⁰⁷ The kind of long term planning and management necessary to establish and maintain basketry resources through fire was unlikely to be appreciated by men who readily quoted the journals of explorer John Fremont. Fremont (who was an active participant and leader in the genocidal violence against California Indians) informed their views of Native Americans as “nearly akin to that of the lower animals...In his wild state the Indian lives to get food”,⁵⁰⁸ systematic burning was literally “unbelievable...and contrary to all that we know of Indian life and character”,⁵⁰⁹ for Native Americans were “absolutely lacking in the ability or sense of cooperation, very lazy and had no sense of improving themselves or their conditions.”⁵¹⁰ Whether they were positioned as impotent and pitiful creatures living a “hand-to-mouth” existence,⁵¹¹ with an odd combination of admiration and patronisation as both “practical forester” and “simple savage”,⁵¹² or entirely sarcastically as a “noble redskin” (i.e., a Noble Savage),⁵¹³ the light burning debate was profoundly shaped by settler-colonial constructs of Native Americans. These stereotypes persisted in Californian fire management for a very long time. When the California Division of Forestry (formerly the Board of Forestry, today CalFire) commissioned C. Raymond Clar to write the official history of forestry in the Golden State, Clar devoted just four paragraphs to Native American burning

⁵⁰³ An analogy would be an Australian forester dismissing burning by the Gundjeihmi in tropical Kakadu National Park as ‘Martu burning’. William Greeley, “Piute Forestry or the Fallacy of Light Burning,” *The Timberman* 21, no. 5 (1920): 38–39; it is uncertain where this term came from, but Pyne suggests an origin from John Wesley Powell; Stephen J. Pyne, “(Personal Communication),” 14 April, 2020.

⁵⁰⁴ Pardee, ‘Light Burning’, CSA. Pardee had formerly been Governor of California himself, and lost his Governorship partly due to the efforts of the Southern Pacific Railroad – a large owner of timberland and key supporter of light burning. He was thus unlikely to look favourably upon any proposal pushed by Southern Pacific or its employees.

⁵⁰⁵ Graves, “The Torch in the Timber,” 39.

⁵⁰⁶ Emanuel Fritz, “The Role of Fire in the Redwood Region,” UC-AES Circular 323 (Berkeley, California: University of California College of Agriculture Agricultural Experiment Station, 1932), Carton 36, Emanuel Fritz Papers, BANC MSS C-B 728, The Bancroft Library, University of Berkeley, CA, USA.

⁵⁰⁷ Warren F. Coman, “Did the Indians Protect the Forest?,” *Pacific Monthly*, 3 September, 1911.

⁵⁰⁸ Barrett, “A Record of Forest and Field Fires in California: From the Days of the Early Explorers to the Creation of the Forest Reserves,” 8.

⁵⁰⁹ H.W. Fairbanks, “Shall We Use Fire as an Aid to Forestry?,” *The Overland Monthly* 57, no. 3 (1911): 306.

⁵¹⁰ Barrett, “A Record of Forest and Field Fires in California: From the Days of the Early Explorers to the Creation of the Forest Reserves,” 15.

⁵¹¹ Pardee, ‘Light Burning’, CSA.

⁵¹² Kitts, “California Divided on Light Burning,” 81.

⁵¹³ Greeley, “Piute Forestry or the Fallacy of Light Burning,” 38.

in his first volume, published in 1959. Clar was a forester who had served the Board for decades, and as discussed earlier, minimised the violence of Native American dispossession. According to Clar, “it would be difficult to find a reason why the Indians should care one way or another if the forest burned...Improve it for what purpose?”⁵¹⁴

There is little evidence of any consideration of Native American voices themselves. Most voices, whether pro or anti-light burning, referred to California Indians in the past tense. Even when direct oral testimony was referred to in support of light burning, it was confined to a distant past (Kitts, for instance, recounted his evidence as being told to his grandfather).⁵¹⁵ Such temporal placement reinforced the Vanishing Indian stereotype. The apparent lack of contemporary supporting evidence was used by opponents of light burning, who either recounted oral testimony of their own that seemed to show Native American irresponsibility with fire,⁵¹⁶ or simply dismissed oral testimony as based upon “very casual observations or, much worse, from handed down and hazy, but nevertheless revered observations of some pioneer”.⁵¹⁷ If one read only the public articles, it would be reasonable to assume that it never seemed to occur to anyone to even *ask* California Indians about their burning practices.

Yet there is evidence to show that Native American burning continued to occur in some areas throughout the first half of the twentieth century and that this was known to forestry officials and rangers.⁵¹⁸ Perhaps California Indians at the time were assumed to have been ‘contaminated’ by Western influences (similar to the cultural continuity discourse discussed in Chapter Four). Alternatively, foresters and rangers aware of contemporary Native American burning chose not to publicise their knowledge, either out of sympathy, or more likely, a sense of embarrassment at the failure of fire suppression. Ultimately, as with Australian Aboriginal history, the history of California Indian burning *since* contact began has yet to be substantially written. In a way, this is similar to the “maudlin sentimentalism” of so much American Indian historiography, where little space for Native

⁵¹⁴ Clar, *California Government and Forestry: Volume 1: From Spanish Days until the Creation of the Department of Natural Resources in 1927*, 3, 7.

⁵¹⁵ Kitts, “California Divided on Light Burning.”

⁵¹⁶ N.F. MacDuff, “Siwash Forestry,” *Six Twenty-Six*, 20 April, 1920, in Folder: Articles - Forest Fire, US Forest Service Headquarters History Collection, Library and Archives, Forest History Society, Durham, NC, USA.

⁵¹⁷ Clar, *California Government and Forestry: Volume 1: From Spanish Days until the Creation of the Department of Natural Resources in 1927*, 208.

⁵¹⁸ Busam, “Characteristics and Implications of Traditional Native American Fire Management on the Orleans Ranger District, Six Rivers National Forest,” 57; Anderson and Moratto, “Native American Land-Use Practices and Ecological Impacts,” 192; Anderson notes that Alfred Kroeber’s field notes from 1939 are rich with direct observation of Indian burning in Northern California; see Anderson, *Tending the Wild*, 126.

American agency is made.⁵¹⁹ I have found little evidence of any Indian voices themselves taking part in these debates and this is an area ripe for more systematic research.⁵²⁰

Not all references to Native American fire lighting in the context of debating future policy were made in good faith. Pinchot's great enemy in President Taft's administration, Secretary of the Interior Richard Ballinger, notoriously intervened in the light burning debate while the embers of the Big Burn were still warm on 25 August 1910. Seeing an opportunity to challenge the Forest Service's nascent strategy of fire suppression, and by extension get one up on the Forest Service's progenitor Pinchot, Ballinger called a press conference to say "We may find it necessary to revert to the old Indian method of burning over the forests".⁵²¹ Suffice to say, Pinchot's disciples in the Forest Service and broader forestry community did not appreciate such a mischievous public intervention. Indeed, the forestry profession saw many light burning advocates as disingenuous, whether they worked for timberland companies such as Southern Pacific Railroad or, especially, grazing interests. This was as clear-cut an appropriation of Indigenous burning for political purposes as can be found.

Light Burning: Grazing and Research

Unlike burning for fuel reduction, burning for the purposes of enriching or encouraging feed for grazers represented a much more troublesome challenge for foresters. National forests in the United States didn't just represent land kept for timber conservation or watershed protection; they also included lands previously used for animal grazing. The attempted extension of the state's authority over these lands, and with it, a regime of fire suppression, often led to political tensions that intertwined with the light burning debate. The focus of this chapter is upon the light burning debate as it pertains to prescribed burning for fuel reduction, burning for tree reproduction, and perceptions of American Indian burning, rather than burning for grazing. It is still worth a brief survey of this aspect to further demonstrate the ways in which the light burning dispute radicalised foresters against any use of fire.⁵²²

⁵¹⁹ Hixson, *American Settler Colonialism: A History*, x.

⁵²⁰ Godfrey has found evidence of the Mission Indian Federation of San Jacinto publicly contacting President Calvin Coolidge following the 1924 fire season to assert that native people could do a better job managing the local national forests in Godfrey, *The Ever-Changing View*, 194; Miller, "Essential Landscape: An Environmental History of Chaparral Ecosystems in California," 135.

⁵²¹ Ballinger quoted in *New York Times*, 26 August 1910, 4:1.2; see Pyne, *Year of the Fires: The Story of the Great Fires of 1910*, 111.

⁵²² The history of burning for grazing in the United States is probably best represented by Nathan F. Sayre, *The Politics of Scale: A History of Rangeland Science* (London: University Of Chicago Press, 2017); and Pyne, *Fire in America: A Cultural History of Wildland and Rural Fire*.

The forestry mission to suppress fire was not received well by grazing communities. Communities which had burned for grazing continued to do so: as Clar observed in 1943, “It was a well-known fact that in past years, most of the population would just about as soon travel about behind you and start fires, as be out to help you”,⁵²³ and graziers such as members of the National Wool Growers Association despaired they did not have the scientific knowledge with which to combat the “propaganda of Pinchotism” on its own terms.⁵²⁴ Attempts to prosecute ‘incendiarists’ failed; staff for the California State Forester despaired that they knew “of no case where a man has been brought before a court, let alone arrested for illegally setting a fire”, and those caught setting fires would be “aggressively proud of it, with ‘What are you going to do about it’ remarks and attitude”.⁵²⁵ As forestry researcher Emanuel Fritz admitted in 1937, “in some communities the incendiary...is regarded somewhat as a hero” and thus any jury of their peers was extremely unlikely to convict them.⁵²⁶ Any rangers attempting to enforce the laws too vigorously were at risk of being “burnt out”.⁵²⁷ Eventually the California Division of Forestry was forced to admit defeat in 1945, when it began issuing permits to burn on private land. In effect, this measure sanctioned the use of fire – a remarkable defeat for a profession which had regarded fire suppression so zealously.⁵²⁸ With such resistance to their high-minded mission, it is little wonder that foresters rarely distinguished between burning for grazing, burning for fuel reduction, and burning for tree reproduction – burners of any type were all labelled as ‘incendiarists’ and their burning as ‘light burning’.⁵²⁹ Foresters wary of what they perceived as the disingenuous claims of resentful grazers were disinclined to treat light burners such as Kitts or White

⁵²³ Field Conference on Organisation and Fire Control Policy, Mendocino County, 12 November 1943, F3849: 180, Department of Forestry Records, California State Archives, Office of the Secretary of State, Sacramento, CA, USA, 28.

⁵²⁴ Fred A. Ellenwood, Vice President of the National Wool Growers Association, 1932 quoted in C. Raymond Clar, *California Government and Forestry: Volume 2: During the Young and Rolph Administrations* (Sacramento: California Division of Forestry, 1969), 291.

⁵²⁵ L.L. Smith, ‘Memorandum for the State Forester’, 1945, F3849: 3537, Department of Forestry Records, California State Archives, Office of the Secretary of State, Sacramento, CA, USA.

⁵²⁶ Emanuel Fritz, “Letter from Fritz to George F Cornwall”, 13 March 1937, Carton 36 Folder 36:38 Fire Burning 1936-1945, Emanuel Fritz Papers, BANC MSS C-B 728, The Bancroft Library, University of California, Berkeley, CA, USA.

⁵²⁷ Clar, *California Government and Forestry: Volume 2: During the Young and Rolph Administrations*, 292. From the context, one assumes that Clar is not talking literally, but the early days of the extension of forestry did not go smoothly. Ed Pulaski was once involved in an armed standoff with a settler who took exception to the ranger’s control, and sincerely believed he would have died if he had not been quicker on the draw. This was America, after all. See Pyne, *Year of the Fires: The Story of the Great Fires of 1910*, 62.

⁵²⁸ Jan van Wagtenonk, “Dr Biswell’s Influence on the Development of Prescribed Burning in California,” in *The Biswell Symposium: Fire Issues and Solutions in Urban Interface and Wildland Ecosystems*, vol. General Technical Report, PSW-GTR-159 (USDA Forest Service, 1995), 11–12.

⁵²⁹ Emanuel Fritz, “Memorandum to Mr Bahr”, 26 October 1936, Carton 36 Folder 36:38 Fire Burning 1936-1945, Emanuel Fritz Papers, BANC MSS C-B 728; The Bancroft Library, University of California, Berkeley, CA, USA.

any differently; and this toxic attitude meant any serious consideration of Native American burning was impossible.

We have seen that the Forest Service and its allies sought to control and shape public discourse around fire, partly through employing racialised settler-colonial tropes, but they also sought to dismiss any academic criticism that arose. The illiteracy of many of light burning's advocates meant that their arguments could be dismissed as unscientific and mere folklore, but more technically informed arguments like those from Kitts and White could not be similarly disregarded. Even worse, some members of the forestry community internally questioned the zealous attitude against fire lighting.⁵³⁰ Consequently, some attempt at research was made to settle the matter. Numerous experiments were initiated, but the most important step was the formation of the California Forestry Committee in 1920 which included foresters, timberland owners, and academics.

Charged by the California State Board of Forestry with resolving the light burning controversy, the committee began by hearing the arguments of Forest Service scientist S.B. Show and light burning advocate Stewart Edward White.⁵³¹ It is highly questionable just how much this Committee engaged in the debate in good faith. In 1920 Show had said "In the first place I never argue with a light burner. Long and bitter experience has shown that it is foolish to do so",⁵³² and one of the Committee members would later admit that the purpose of the committee was to "keep the agitation out of the newspapers as much as possible".⁵³³ The Committee conducted experiments on only one study site near Yreka in Siskiyou County, conducting burns just twice and assessing the results primarily through the metric of effect upon tree reproduction.⁵³⁴ Fire ecologist Harold Biswell later remarked of this experiment "Probably at no other time in the history of forestry has such a major policy as that of fire exclusion been adopted with so little research to support it".⁵³⁵ The Committee also ran into the practical problem that while light burning had many advocates, they rarely agreed upon technique. The Committee chose to interpret disagreement over factors such as fire frequency or seasonality of ignition as evidence of ignorance or a lack of a coherent body of theory and practice. An alternative

⁵³⁰ White claimed that "to a great many" in the Forest Service, the merits of light burning had been proven. See White, "Woodsmen, Spare Those Trees!," 25.

⁵³¹ Donald Bruce, "Light Burning: Report of the California Forestry Committee," *Journal of Forestry* 21, no. 2 (1923): 129–33.

⁵³² Show, "Letter in reply to Sparhawk's Memorandum", NARA.

⁵³³ Ray Danaher quoted in Clar, *California Government and Forestry: Volume 1: From Spanish Days until the Creation of the Department of Natural Resources in 1927*, 490.

⁵³⁴ Bruce, "Light Burning: Report of the California Forestry Committee."

⁵³⁵ H.H. Biswell, *Prescribed Burning in California Wildlands Vegetation Management* (Berkeley: University of California Press, 1989), 97.

interpretation might have considered that light burners had learned to adapt to the diversity of fire regimes across the American West, or tested different types of light burning.

In this respect, fire suppression had a great argumentative advantage over light burning: it represented a single, easily understandable policy, versus a diversity of practice where sophisticated programmes of fire management were indistinguishable to the outsider from outright incendiarism. The science of fire ecology could be described as nascent at best in the 1920s – but ultimately, as Schiff has argued and Pyne elaborated,⁵³⁶ the Forest Service’s decision to stick with fire suppression was not guided by research. Research flowed from policy, rather than policy being informed by research. As Forest Service staff summarised in a reply to a letter from Chief William Greeley in 1928 canvassing thoughts on research priorities, “politics”, “finance”, “public education” and “execution” were “far more important than any lack of knowledge on fire occurrence and behaviour”.⁵³⁷ The Forest Service and its allies had some information which contradicted the fire suppression stance. In addition to the heretics discussed, the Forest Service was in possession of research from the famous ecologist Frederick Clements who in 1910 had shown that lodgepole pine forests (common throughout the Rocky Mountains) required fire.⁵³⁸ The Service chose to ignore this and other research, and use only the research which justified its own policies.⁵³⁹

After Light Burning: Fire Suppression

Legislative changes and the New Deal gave fire suppression hegemony in the West. The 1911 Weeks Act, whose passage was greatly aided by the 1910 experience, allowed the Forest Service to not only purchase more lands to add to the public estate, but also to encourage the development of state (in addition to federal) forestry departments and to engage in cooperative agreements with state forestry institutions and private landholders.⁵⁴⁰ Since fire suppression as a strategy relies upon early detection

⁵³⁶ Schiff’s treatment of the “light burning” dispute with regards to the various researchers remains definitive. See Schiff, *Fire and Water*; Pyne, *Fire in America: A Cultural History of Wildland and Rural Fire*, 117.

⁵³⁷ Ward Shepard, “Analysis of Replies to Colonel Greeley’s Fire Research Program Letter of 24 March, 1928”, 17 March 1930, Box 183 Folder: Forest Fire Research, Research Compilation File, 1897-1935, Forest Research Divisions, Records of the Forest Service, Record Group 95, National Archives, College Park, MD, USA.

⁵³⁸ The famous ecologist Frederick Clements, for instance, had published research commissioned by the Forest Service in 1910 that showed that lodgepole pine forests (common throughout the Rocky Mountains) required fire, but the Service ignored it. See Barker, *Scorched Earth: How the Fires of Yellowstone Changed America*, 118.

⁵³⁹ For an example of how the Committee’s “findings” were publicly represented, see S.B. Show and E.I. Kotok, *The Role of Fire in the California Pine Forests*, US Department of Agriculture Bulletin 1294 (Washington: Government Printing Office, 1924).

⁵⁴⁰ Lewis F. Southard, “The History of Cooperative Forest Fire Control and the Weeks Act,” *Forest History Today* Spring/Fall 2011 (2011): 17–20.

and suppression, coordinating strategy with neighbours is critical. This legislation not only allowed the Forest Service to do so, but also provided a means for the Service to gradually assume primacy across the United States as the agency most responsible for – and thus with the most authority to govern – fire. The later 1924 Clarke-McNary Act further built on this; thanks to Greeley “packing the stand” at public hearings with sympathetic witnesses, it extended and smoothed the processes set in train by the Weeks Act.⁵⁴¹ The 1928 McSweeney-McNary Act further extended the Forest Service’s authority, granting it a “virtual monopoly over federal research over fire”.⁵⁴² The explosion of public funds through President Roosevelt’s New Deal programmes allowed the Service and state forestry bodies to hugely expand their fire suppression apparatus; the Civilian Conservation Corps supplied the manpower. The standout example of this was the Ponderosa Way (a “fire equivalent to the Great Plains Shelterbelt”); over 1,100,000 miles of roads and fire trails, 9000 miles of telephone cable, and 300 lookout towers built within California alone, all to extend fire suppression.⁵⁴³

Fire suppression hegemony was again challenged at a crucial meeting of the Society of American Foresters in 1935. Researchers including Chapman and Stoddard felt confident enough to criticise the suppression of fire in the longleaf pine forests of the American South for the first time in public (discussed below).⁵⁴⁴ The anti-light burning consensus may have been slowly fracturing outside the West – but instead then-Forest Service Chief Gus Silcox issued the ‘10 am policy’, which demanded that every fire detected should be under control by 10 am the morning following detection. Silcox, of course, like Greeley, was a Forest Service Chief who was a veteran of the 1910 Big Burn. As Pyne says, through the 10 am policy Silcox would “refight the Great Fires, and this time he would win”.⁵⁴⁵

The Second World War and the threat of enemy action further strengthened the fight against fire. Japanese submarine shelling and their innovative incendiary balloons sought to start forest fires and damage the supply of timber to the American war machine. The American military, fearing “another Pearl Harbour”, militarised fire protection and worked with the Forest Service and state agencies to conceal public information about balloon ignitions.⁵⁴⁶ Furthermore, seeing the success of the 1942

⁵⁴¹ Greeley, *Forests and Men*, 107.

⁵⁴² Pyne, *Year of the Fires: The Story of the Great Fires of 1910*, 264.

⁵⁴³ Pyne, *California: A Fire Survey*, 11, 30.

⁵⁴⁴ Albert G. Way, *Conserving Southern Longleaf: Herbert Stoddard and the Rise of Ecological Land Management* (Athens: University of Georgia Press, 2011), 111; Remembering this meeting, Harold Biswell remarked that “fistfights were imminent”; see Biswell, *Prescribed Burning in California Wildlands Vegetation Management*, 88.

⁵⁴⁵ Pyne, “The Source.”

⁵⁴⁶ Los Angeles Forest Protective Association, “Letter to Paul V. McNutt, Federal Social Security Administrator”, 26 March 1942, F3849: 3682, Department of Forestry Records, California State Archives, Office of the Secretary of State, Sacramento, CA, USA. The concealment of balloon ignitions (code-named “paper drive”) was inspired by the British misinformation campaign which deceived Nazi assumptions about the accuracy of their V-1 bombs and V-2 rockets. I am somewhat sceptical that concealment of accuracy had a big impact,

film *Bambi* in conveying an anti-forest fire message to the American public, the military-industrial complex accelerated public propaganda which culminated in the now-iconic figure Smokey Bear.⁵⁴⁷ Smokey Bear's simple message of forest fire prevention ('Only You Can Prevent Forest Fires') made him one of the most recognised characters in the United States. The Forest Service directly credits him with "saving" millions of acres of forests being burned from accidental ignitions.⁵⁴⁸ However, the political success of fire suppression in the West would have grave ecological consequences, explored in Chapter Five.

Light Burning in the South

The 1910 Big Burn didn't start the light burning dispute, but it acted as a bellows upon both discourse and policy. As Pyne has argued, the Big Burn locked the USFS and its partners into a fire suppression paradigm.⁵⁴⁹ If light burning had succeeded in becoming more accepted, it is entirely possible that more research into Native American burning may have occurred. Yet the crack in the hegemony of fire suppression didn't come from the American West – it came from the South.

The full story of how the Forest Service and its allies in state forestry bodies unsuccessfully sought to suppress fire lighting traditions throughout the American South has been comprehensively covered by Ashley Schiff's *Fire and Water*,⁵⁵⁰ Pyne's *Fire in America*,⁵⁵¹ and more recently Albert G. Way's *Conserving Southern Longleaf*.⁵⁵² Suffice to say that cultural management of Southern forests relied upon the use of fire, forging strong Southern folklore traditions (mostly non-Indigenous). This particularly applied to longleaf pine (*Pinus palustris*) forests (in 1927, some 45% of the Florida pine area was burned annually).⁵⁵³ Technological change in the interwar years enabled the use of southern pine to create pulp, helping motivate the extension of forestry authority into the South now the West had been 'won'. Foresters like Greeley and Silcox – scarred institutionally and often personally by the 1910 fire season – made the strategic decision to work on suppressing all fires (and thus extending government control over fire and the forests) before addressing the annoyingly persistent questions

given the rather significant difference between aiming a self-propelled rocket across the English Channel and floating a balloon that utilises atmospheric currents to cross the Pacific Ocean. See Headquarters Western Defense Command, 'Japanese Balloon Information Bulletin No. 1', May 1945, F3849: 3736, Department of Forestry Records, California State Archives, Office of the Secretary of State, Sacramento, CA, USA.

⁵⁴⁷ Kosek, "Smokey the Bear Is a White Racist Pig."

⁵⁴⁸ Kosek, 186.

⁵⁴⁹ Pyne, *Fire in America: A Cultural History of Wildland and Rural Fire*, 103.

⁵⁵⁰ Schiff, *Fire and Water*.

⁵⁵¹ Pyne, *Fire in America: A Cultural History of Wildland and Rural Fire*.

⁵⁵² Way, *Conserving Southern Longleaf*.

⁵⁵³ Schiff, *Fire and Water*, 18.

raised about the importance of *some* burning to Southern forests. As a memorandum from the Forest Service stated in 1927, “We need not be greatly concerned over whether controlled burning is desirable or undesirable until after a good start, at least, has been made toward getting rid of the uncontrolled burning”.⁵⁵⁴ The “Dixie Crusaders” brought a high-evangelical message to the South that fire was destructive and intolerable, delivering 7300 public lectures, showing more than 4600 film screenings, and distributing nearly a million pamphlets in just three years.⁵⁵⁵ Needless to say this was not popular with local “woodburners”, who had burned for centuries for hunting, grazing, and pest control.⁵⁵⁶ Pyne quotes a Southern local pointing to fire lookout towers in the Clark National Forest and commenting “I think these towers are for war, so the government can conquer the people”.⁵⁵⁷ Southern cultural traditions of fire were interpreted by foresters through class, with folklore traditions of burning seemingly as easily dismissed as in the West.

Yet the biggest challenge to fire suppression in the South – and ultimately throughout America – came from researchers utilising academic methodologies and questioning Forest Service research with data the Forest Service could not so easily dismiss or ignore. As we have seen, the Forest Service and its allies had been successful in dismissing previous research that challenged the paradigm against light burning in the West and attempted to do the same in the South. For instance, an argument in *Literary Digest* to distinguish between “spectacular and awe-inspiring” blazes in the West and less intense fires in the South was dismissed by deriding the author as a “car-window botanist”.⁵⁵⁸ It would take researchers such as forester H.H. Chapman (eventual Head of the Yale School of Forestry), animal researcher S.W. Greene (affiliated with the Bureau of Animal Industry), and Herbert L. Stoddard (affiliated with the U.S. Bureau of Biological Survey), to slowly wear down the consensus against the use of fire through academic papers, conferences and monographs throughout the 1920s to 40s. Chapman argued persistently for fire’s role in Southern longleaf pine ecosystems, Greene demonstrated that cattle gained much more weight grazing on burned pasture than on unburned pasture, and Stoddard demonstrated that fire was essential for successful management of quail.⁵⁵⁹

⁵⁵⁴ Branch of Public Relations (Division of State Cooperation), “Fire in the Southern Pine Region (Memorandum for Field Use)”, March 1927, Box 230, Research Compilation File, 1897-1935, Forest Research Divisions, Records of the Forest Service, Record Group 95, National Archives College Park, MD, USA.

⁵⁵⁵ Way, *Conserving Southern Longleaf*, 102.

⁵⁵⁶ Pyne, *Fire in America: A Cultural History of Wildland and Rural Fire*, 144–46.

⁵⁵⁷ Pyne, 162–63.

⁵⁵⁸ Schiff, *Fire and Water*, 24–25.

⁵⁵⁹ H.H. Chapman, “Is the Longleaf Type a Climax?,” *Ecology* 13, no. 4 (1932): 328–34; S.W. Greene, “Relation between Winter Grass Fires and Cattle Grazing in the Longleaf Pine Belt,” *Journal of Forestry* 33, no. 3 (1935): 338–41; Herbert L. Stoddard, *Bobwhite Quail: Its Habits, Preservation, and Increase* (Scribner’s, 1931).

Eventually, the paradigm cracked in 1943 and the use of fire was sanctioned on national forest lands with longleaf pine and slash pine – an admission of differentiation in fire strategy and ecology.⁵⁶⁰

This was not an easy victory. The Forest Service fought such rebels in various ways. Internal attempts to replicate heretical research were deliberately sabotaged in order to demonstrate conflicting results.⁵⁶¹ Greene was forced out of his job.⁵⁶² Stoddard's work on the bobwhite quail was subject to "editorial censorship" by the Forest Service and sent back for revisions five times.⁵⁶³ Any who dared suggest a reconsideration of the use of fire were regarded as "being an advocate of promiscuous fire" and learned to hide their suspicions or couch them in so many qualifications as to be effectively useless.⁵⁶⁴ As in the West, the knowledge of those who had lived and burned in the woods was dismissed as being "cracker" folklore – revealing of a racial and class hierarchy.⁵⁶⁵ As in the West, advocates for burning drew upon knowledge of pre- and post-contact Native American burning practices; Chapman quoted observations that the longleaf pine was "increased by the Indian practice of burning",⁵⁶⁶ and Greene quoted direct observations from William Bartram of Native Americans from South Carolina to the Mississippi River setting fires "almost every day".⁵⁶⁷

Understanding the course of fire politics in the South is important not only because this was where the Forest Service was forced to modify its fire exclusion paradigm, but also because it underscores the nature of how the Forest Service interpreted fire. The Forest Service's view of fire in the South was shaped by its view of fire in the West, and the policies and strategic outlook the Service and its allies developed in the West were applied to the South. Southern woods burning in the longleaf pine was regarded with the same framework as burning in the Sierra Nevada or around Mt Shasta – as 'light burning'. Indeed, the Chief of the Forest Service in 1927, William B. Greeley, directed Southern policy in a document entitled "Light burning policy for the South". Greeley declared that "light burning is the most pressing forestry problem in the South today", and argued that it was the Forest Service's responsibility to resolve the "light burning problem [in the South]...as it was in California many years

⁵⁶⁰ van Wagtenonk, "Dr Biswell's Influence on the Development of Prescribed Burning in California," 14.

⁵⁶¹ For instance, two researchers in Mississippi had to be reassigned for taking false rather than random samples, while research plots elsewhere (that showed unburned trees actually grew more slowly than burned trees) were abandoned; see Schiff, *Fire and Water*, 32, 46.

⁵⁶² Sayre, *The Politics of Scale: A History of Rangeland Science*, 62.

⁵⁶³ E.V. Komarek, "History of Prescribed Fire and Controlled Burning in Wildlife Management in the South," in *Prescribed Fire and Wildlife in Southern Forests*, ed. Gene W. Wood (Georgetown, South Carolina: The Belle W. Baruch Forest Science Institute of Clemson University, 1981), 6, in in US Forest Service Headquarters History Collection, Library and Archives, Forest History Society, Durham, NC, USA.

⁵⁶⁴ Austin Cary (logging engineer), "Memorandum for District 7 on Florida Forest and Fire", 8 December 1927, Box 226: Folder: Protection – Miscellaneous, Research Compilation File, 1897-1935, Forest Research Divisions, Records of the Forest Service, Record Group 95, National Archives, College Park, MD, USA.

⁵⁶⁵ Pyne, *Fire in America: A Cultural History of Wildland and Rural Fire*, 154.

⁵⁶⁶ Chapman, "Is the Longleaf Type a Climax?," 331.

⁵⁶⁷ S.W. Greene, "The Forest That Fire Made," *American Forestry* 37, no. 10 (1931): 618.

ago”.⁵⁶⁸ Light burning was regarded as universal, irrespective of fire ecology or fire regime – because it was regarded on *political* terms, not on ecological, safety or even forestry terms. Greeley himself was a veteran of the 1910 fire season, and a veteran of the California light burning debate (it was Greeley that sarcastically wrote about the “Fallacy of Piute Forestry”).⁵⁶⁹ The Forest Service’s authority had been severely challenged by the 1910 wildfire season and the light burning debate in California. It could not tolerate any threat to its control or credibility. Perhaps, once burned, twice shy.

Conservationists

In coming chapters examining later historical periods, it will be shown that environmentalism fundamentally altered the politics of fire, but in the light burning dispute, conservationism worked in lockstep with the Forest Service. The dominant narrative of conservationism or environmentalism around the time of the 1910 Big Burn is the Hetch-Hetchy Valley dispute, which has been characterised as pitting “preservationists” such as John Muir against “conservationists” represented by Gifford Pinchot.⁵⁷⁰ Yet these philosophical arguments had little relevance to the politics of fire;⁵⁷¹ both men regarded fire with suspicion and believed in the necessity for a strong institution to fight forest fires.⁵⁷² Environmentalists also conceived of Native American burning in the same way as the Forest Service. Muir wrote with contempt and disgust of the Native Americans he encountered in the Sierra Nevada, describing them variously as “ugly”, “unclean” and writing of his “repulsion” at encountering them,⁵⁷³ readily fitting into the Digger Indian stereotype.⁵⁷⁴ He had great difficulty fitting them into his philosophy of wilderness, particularly troubled by their apparent uncleanliness yet wild nature.⁵⁷⁵

⁵⁶⁸ W.B. Greeley, “Light burning policy for the south”, 25 August 1927, Box 230, Research Compilation File, 1897-1935, Forest Research Divisions, Records of the Forest Service, Record Group 95, National Archives, College Park, MD, USA.

⁵⁶⁹ Greeley, “Piute Forestry or the Fallacy of Light Burning”.

⁵⁷⁰ Hays, *Conservation And The Gospel Of Efficiency: The Progressive Conservation Movement, 1890–1920*, 193–97.

⁵⁷¹ Barker, *Scorched Earth: How the Fires of Yellowstone Changed America*, 81.

⁵⁷² It’s fair to say that Pinchot held some understanding or at least curiosity towards fire’s role in some American ecosystems, speculating about how sequoia trees several thousand years old had survived historical forest fires; see Pyne, *Fire in America: A Cultural History of Wildland and Rural Fire*, 302; Pinchot also speculated about the adaptations various species (including longleaf pine) had towards fire; see Gifford Pinchot, “The Relation of Forests and Forest Fires,” *National Geographic* 10 (1899): 399–403; John Muir, “The American Forests,” *Atlantic Monthly*, 1897.

⁵⁷³ John Muir, *My First Summer in the Sierra* (Boston: Houghton Mifflin, 1916), 205, 218; Carolyn Merchant, “Shades of Darkness: Race and Environmental History,” *Environmental History* 8, no. 3 (2003): 380–94.

⁵⁷⁴ Richard F. Fleck, “John Muir’s Evolving Attitudes toward Native American Cultures,” *American Indian Quarterly* 4, no. 1 (1978): 19–31.

⁵⁷⁵ Merchant, “Shades of Darkness,” 383.

Muir's views of Native Americans were later modified by encounters with Alaskan tribes, possibly because he perceived a greater level of ecological understanding and more permanent signs of human presence and modification of the environment. However, he still lamented the influence of alcohol and gunpowder upon a potentially vanishing race, revealing that he too interpreted Native Americans through settler-colonial tropes such as the Noble Savage uncorrupted by civilisation.⁵⁷⁶ While Muir did observe some Sierra Indians lighting fires, he believed these were purely for hunting, and his philosophy of wilderness meant he was unable to see the then-open vista of Yosemite Valley or productive seed grounds of the Central Valley as artefacts of millennia of Native American tending, seeding, and burning.⁵⁷⁷ To Muir in 1868 Yosemite Valley was a "temple lighted from above...but no temple made with hands can compare with Yosemite...no mark of man is visible upon it".⁵⁷⁸ It is interesting to reflect that barely 40 years after Muir wrote these words, the former "Guardian" of Yosemite and long-time resident Galen Clark argued for a reinstatement of Native American burning. Yosemite had been "overrun with dense thickets of young forest trees" because it was no longer subject to the "care and management of the Indians".⁵⁷⁹ Nevertheless, Clark's views were very much in the minority among environmentalists. During the early stages of the light burning dispute, the *Sierra Club Bulletin* acknowledged some burning by Native Americans, but argued that the "Digger Indian system of forestry will not give timber as a crop" as "systematic and sustained protection" was required "to maintain the Sierra Nevada forever as a source of wealth both of timber and water".⁵⁸⁰

Quite unlike the much more democratic and broadly popular modern environmental movement, Samuel P. Hays's seminal work on the early conservationist movement argued that Pinchotism and conservation constituted a scientific movement. For Hays, conservationism was "a political system guided by the ideal of efficiency and dominated by the technicians who could best determine how to achieve it", with systematic fire protection an example of this supposed technical efficiency.⁵⁸¹ Perhaps it is no surprise that light burning – a political threat to the authority of the new conservationist institutions that sought to protect American public lands for rational use – was also rejected due to its associations with folk wisdom. In such circumstances 'Piute Forestry' had little chance of success.

⁵⁷⁶ Fleck, "John Muir's Evolving Attitudes toward Native American Cultures," 23.

⁵⁷⁷ Anderson, *Tending the Wild*, 3.

⁵⁷⁸ Muir quoted in Eric Michael Johnson, "How John Muir's Brand of Conservation Led to the Decline of Yosemite," Scientific American Blog Network, 13 August, 2014, <https://blogs.scientificamerican.com/primate-diaries/how-john-muir-s-brand-of-conservation-led-to-the-decline-of-yosemite/>.

⁵⁷⁹ Anderson, *Tending the Wild*, 157.

⁵⁸⁰ Manson, "The Effect of Partial Suppression of Annual Forest Fires in the Sierra Nevada Mountain," 22, 24.

⁵⁸¹ Hays, *Conservation And The Gospel Of Efficiency: The Progressive Conservation Movement, 1890–1920*, 3; Pyne, *Fire in America: A Cultural History of Wildland and Rural Fire*, 105; Coert DuBois, *Systematic Fire Protection in California Forests* (Washington: Government Printing Office, 1914).

Conclusion

In 2018 I was privileged to attend a meeting of the Northern California Prescribed Fire Council. Under the eye of the volcanic sentinel Mt Shasta, the room was full of landowners, scientists, government agency officers, and myself – an outsider. Dr Eric Knapp of the Forest Service read some papers from the ‘light burning’ debates. The room erupted in laughter at the hyperbolic description of prescribed burners as ‘incendiarists’. How things have changed.

The 1910 ‘Big Burn’ was not the beginning of the light burning debate in the American West. Nor was it the end of that debate. But it was, perhaps, the end of the beginning, as it hardened opposition towards light burning. It traumatised the foundational generation of the Forest Service and caused the foresters to view light burners as representing not just a policy threat, but a political one. The debate did not reflect pyro-regional or even cultural boundaries. A policy inspired in the Rocky Mountains and developed in California was applied in Florida; ‘Piute forestry’ was laughable regardless of whether the speaker was actually referring to Sierra Miwok, Yurok, or Chumash lands. The light burning debate cannot be explained only through race, but race was used in service of argument. The Forest Service and its allies deliberately drew upon existing racialized discourses such as the Digger Indian stereotype to fend off the light burning challenge; their own propagation of this discourse and reliance on prejudicial frameworks made it impossible for them to understand or even consider the possibility of systematic, knowledgeable Native American burning practices. The victory of fire suppression in the West, represented by the 10 am policy, ensured that fire fighting, not fire lighting, became the paradigm through which fire was viewed, and ultimately had grave ecological implications for the United States as explored in Chapter Five. The decision to fight rather than light fire stands in direct contrast to the consequences of the 1939 Black Friday Bushfires in Australia, discussed in Chapter One.

At its core, the debate was as much about power and control over fire and public land – the hand that grips the torch – as it was about whether to even light the torch in the first place. The debate about cultural burning in Australia today explored in Chapter Eight is still chiefly about power, as Victor Steffensen’s book *Fire Country* makes clear. The fact that light burners argued with reference to California Indian practices ensured that Native American practices would be dismissed. Pejoratives and bigoted frameworks were used to understand and describe Native American burning by people who didn’t actually know anything about it. The comic dismissal of ‘Piute forestry’ has echoes of another settler authority treating Indigenous burning as a joke – Judge Leonard Stretton in the wake of the 1939 Black Friday bushfires in Victoria. As shown in Chapter One, Stretton endorsed a role for fire lighting over the objections of technically minded experts. However, that endorsement still relied

upon an understanding of pre-colonial lands as existing in a 'natural', fire-free state. The light burning dispute and the Stretton Commission ultimately led to different outcomes: one resulted in fire being taken off the land, the other in an endorsement for the use of fire on the land.

Chapter Three:

Fire's Lucky Forest? The 1961 Dwellingup bushfires and the 'Australian Strategy'

The land the English settled was not as God made it. It was as the Aborigines made it.

– Sylvia Hallam, 1975⁵⁸²

It is true that we might ourselves burn the bush, but we could never do it with the same judgment and good effect of the Natives

– Henry Bunbury, 1836⁵⁸³

Instead of the Aboriginal firestick we now use aircraft dropping incendiary capsules which light up the country on a grid pattern and produce a mosaic pattern of burnt and unburnt land

– Alan McArthur, 1973⁵⁸⁴

Dwellingup is a small town nestled within the forests of South-Western Australia. Although economics and politics have made changes, it is still a forest town. Trucks carrying fresh-cut logs drive through, its largest tourist park is named Lane-Poole Reserve (after Charles Lane-Poole, the prominent forester), and its small Visitor and Information Centre is dominated by an exhibition detailing the 1961 bushfires. In Dwellingup I saw, open to the public, exhibitions on fire ecology and the proud record of the then-Department of Conservation and Land Management in managing fire for safety and ecology. I was shown a cleaned up 'balga' grasstree with dark marks that record its fire history – with gradations between the marks indicating the implications of the cessation of Indigenous burning. But just down the road, off the main highway, with the most miniscule of signs directing visitors, sits a memorial in Pinjarra. It is the blandest of monuments, talking of "men, women, and children, and a Colonial Officer who died here...as part of confrontations in the early days of the Swan River Colony". There is no information on why people died, how they died, and the passive language continues: "Remembering the spirit of the traditional owners of this land, we go forward together in peace, building a united

⁵⁸² Hallam, *Fire and Hearth*, 1.

⁵⁸³ Quoted in Len Collard and Dave Palmer, "Noongar and Non-Aboriginal People Going along Together (Ngulla Wangkiny, Ni, Katitjin Noongar Nyidyung Koorliny, Kura, Yeye, Boorda)," in *Indigenous Intermediaries: New Perspectives on Exploration Archives*, ed. Shino Konishi, Maria Nugent, and Tiffany Shellam (ANU Press, 2015).

⁵⁸⁴ Alan McArthur, "Plotting Ecological Change," in *Historians At Work: Investigating and Recreating the Past*, ed. Keith Swan, David Dufty, and G. S. Harman (Sydney: Hicks Smith & Sons, 1973), 44.

nation for future generations". Visitors without context would have no idea this was the site of the Pinjarra Massacre, where between 15 to 80 Indigenous Australians were slaughtered by newly arrived colonists. There's a tension there. A complete story of fire in the South West must acknowledge why patterns of fire changed, and what drove the 'cessation' of Indigenous burning.

In this chapter I explore the public and policy debate that followed the 1961 Dwellingup bushfires and subsequent Rodger Royal Commission. Western Australia is often ignored or under examined in histories of Australia,⁵⁸⁵ but the Rodger Royal Commission helped legitimate and shape the "Australian Strategy" of broad-based prescribed burning.⁵⁸⁶ This policy began in the South West and influenced fire management across Australia, even demonstrating an alternative to North American fire suppression policies and thus playing a small role in inspiring the American Fire Revolution discussed in Chapter Five.

I open this chapter by exploring how the jarrah forests of the South West can be considered fire's lucky forest,⁵⁸⁷ and briefly outline the depth and diversity of pre-contact Noongar burning in this region. Despite clear knowledge of the importance of fire to Noongar cultures and economies, European settlers forcefully suppressed fires and those who lit them. I argue this was an important component part of the violent nature of colonialism in the South West. After attempts to implement total fire suppression, Allan Harris experimented with broadscale prescribed burning in the 1950s. The 1961 Dwellingup bushfires and resulting Rodger Royal Commission saw prescribed burning as the key issue of contestation. Arguments between farmers and foresters were as much about forestry authority over ignition as they were about fire; farmers argued for the restoration of a pyric ideal that they believed existed before the forestry period. For the few who mentioned Noongar burning, it was only understood as hunting-based, with any resulting landscape an emergent property arising from superstition rather than a deliberate construction.⁵⁸⁸

⁵⁸⁵ Matthew Trinca and Andrea Gaynor, "Visions of Land and People in Western Australia," in *Country: Visions of Land and People in Western Australia*, ed. Andrea Gaynor, Matthew Trinca, and Anna Haebich (Perth: Western Australian Museum, 2002), 1–20.

⁵⁸⁶ In this chapter I use the phrase 'prescribed burning'. In 1961 it was far more common to use the phrase 'control burning' (or even 'backburning' or 'backfiring'), but I have chosen to risk a slight sense of historical anachronism in order to remain consistent with the rest of this thesis. The term 'Australian Strategy' was popularised by Pyne but may have an earlier origin. See Pyne, *Burning Bush*, 337.

⁵⁸⁷ A clear adaptation from Stephen Pyne's description of Australia as "Fire's lucky country". See Pyne, "Introduction - Fire's Lucky Country."

⁵⁸⁸ I use the term "emergent property" here in the sense it was used by scientist Richard Braithwaite to describe Indigenous burning in Kakadu; the assumption that any landscape that resulted from Indigenous burning was a by-product of the actions of a diverse group of individuals making individual ignitions for immediate purposes, rather than a deliberately engineered and managed landscape (or firescape) developed over time. It should be noted that Braithwaite's term has a distinct meaning in philosophy and biology that doesn't exactly match Braithwaite's use, but it is a useful term to describe a certain common assumption about Indigenous burning. See Richard W. Braithwaite, "Guest Editorial: Black and Green," *Journal of*

The Rodger Commission’s ultimate endorsement of prescribed burning and fire researcher Alan McArthur’s scientific data helped legitimate the policy; this policy coalesced into the Australian Strategy, a management response that contrasted heavily with the American strategy which emphasised fire exclusion and rapid suppression through water bombing. I briefly outline the basis and development of the Strategy, and demonstrate how this Strategy grew to dominate Australian fire discourse for decades – contributing to the highly charged debates over prescribed burning that are explored in Chapter Six. I argue the Australian Strategy was not heavily influenced by Indigenous burning. Any later links were grafted on to an already-evolving strategy. The chapter concludes by surveying the fire politics of the South West since the peak of the Australian Strategy in the 1970s, arguing that the contentious political disputes over this decline in prescribed burning, and whether it related to recent bushfire disasters, cannot be understood without grasping the entanglement with the disputes over sustainability in timber harvesting Judith Ajani labelled the “Forest Wars”.⁵⁸⁹ Indigenous burning was invoked in these later debates, but it was very rare for Noongar voices to be given prominence.

Before Dwellingup

“An island of wet habitat” bordered by semi-arid lands to the north and east, the South West has a Mediterranean climate with warm dry summers and cool moist winters.⁵⁹⁰ This highly seasonal rainfall (over 80% of which occurs between May and October) results in a high potential for fire in summer and autumn.⁵⁹¹ There is some evidence that the intensity of glacial and interglacial changes in the Pleistocene were experienced differently in the South West than in the South East. While more work needs to be done on this possibility, it is certain that replacement of shrubland with eucalypt forest coincided with and was probably caused by the end of the Last Glacial Maximum, implying that the South West’s vegetation was shaped by a combination of natural forces and Noongar burning, rather than exclusively one factor or the other.⁵⁹² Perhaps due to its isolated nature, the South West contains

Biogeography 19, no. 2 (1992): 114. See also Tim Rowse’s discussion of the historiography of intentionality, which, as he puts it, revolves around the question “did they know what they were doing?” in Tim Rowse, *After Mabo: Interpreting Indigenous Traditions* (Melbourne: Melbourne University Press, 1993), 123-4.

⁵⁸⁹ Judith Ajani, *The Forest Wars* (Carlton: Melbourne University Press, 2007).

⁵⁹⁰ John Dodson et al., “Vegetation and Environmental History of Southern Western Australia,” in *Country: Visions of Land and People in Western Australia*, ed. Andrea Gaynor, Matthew Trinca, and Anna Haebich (Perth: Western Australian Museum, 2002), 147.

⁵⁹¹ Neil Burrows and Lachlan McCaw, “Prescribed Burning in Southwestern Australian Forests,” *Frontiers in Ecology and the Environment* 11, no. s1 (2013): e25–34.

⁵⁹² J. M. K. Sniderman et al., “Vegetation and Climate Change in Southwestern Australia During the Last Glacial Maximum,” *Geophysical Research Letters* 46, no. 3 (2019): 1709–20.

extremely high endemic biodiversity and is considered one of the world’s biodiversity “hotspots” (similar to California as discussed in Chapter Two).⁵⁹³ Such uniquely concentrated biodiversity is a reminder of the need for a framework of Australia as a fire continent. In this chapter, I mostly focus upon the South-Western forests of jarrah (*Eucalyptus marginata*).

Whereas the characteristics of mountain ash framed Chapter One, jarrah helps frame this chapter as another floral protagonist. Today, jarrah forests form a strip running roughly north-south, limited in the east by rainfall and to the west by the Darling Scarp.⁵⁹⁴ These forests are found on poor soils, partly explaining why they persisted after European colonisation.⁵⁹⁵ While the South-Western Floristic Region has extremely high biodiversity, the jarrah forests have relatively lower degrees of biodiversity and due to the importance of the timber industry represent one of the better-known biomes in Western Australia.⁵⁹⁶ Due to their thick bark, jarrah trees can withstand surprisingly intense fires, and low intensity fires have negligible effects on growth rates.⁵⁹⁷ Fire has a strong presence in jarrah forests; at least 70% of floral species found within these forests regenerate from epicormic buds or basal sprouts after fire, and jarrah is a stringybark “notorious” for intense short-range spotting (fires started by embers flung ahead of the main fire front).⁵⁹⁸ Jarrah’s relative indifference to low intensity fire, highly seasonal fire weather, and high spotting potential, mean jarrah forests can be considered forests of fire – but a different kind of fire to those of mountain ash seen in Chapter One. A luckier one, for humans, as it can be directed and shaped.

Unlike the Top End of Northern Australia to be discussed in Chapter Four, the South West is often compared to the ‘fire flume’ of Victoria in order to compare the efficacy of management strategies.

⁵⁹³ Norman Myers et al., “Biodiversity Hotspots for Conservation Priorities,” *Nature* 403, no. 6772 (2000): 853–858.

⁵⁹⁴ W.R. Wallace, “Fire in the Jarrah Forest Environment,” *Journal of the Royal Society of Western Australia* 49, no. 2 (1965): 33–44.

⁵⁹⁵ Grant W. Wardell-Johnson et al., “Integrating Rehabilitation, Restoration and Conservation for a Sustainable Jarrah Forest Future during Climate Disruption,” *Pacific Conservation Biology* 21 (2015): 175–85; Bill Bunbury, *Invisible Country: South-West Australia: Understanding a Landscape* (Crawley, W.A.: University of Western Australia Press, 2015), 147.

⁵⁹⁶ Ian Abbott and Per Christensen, “Objective Knowledge, Ideology and the Forests of Western Australia,” *Australian Forestry* 59, no. 4 (1996): 206–212.

⁵⁹⁷ D.T. Bell, N.D. Burrows, and W.L. McCaw, “Influence of Fire on Jarrah Forest Vegetation,” in *The Jarrah Forest: A Complex Mediterranean Ecosystem*, ed. B. Dell, J.J. Havel, and N. Malajczuk (Dordrecht: Kluwer Academic Publishers, 1989), 203–18; F.J. Hingston, “Fire in the Northern Jarrah Forest,” in *Fire Ecology and Management of Western Australian Ecosystems: Proceedings of a Symposium Held in Perth on 10-11 May 1985*, ed. Julian R. Ford, vol. WAIT Environmental Studies Group Report No. 14 (Perth: Western Australian Institute of Technology, 1985), 61–65.

⁵⁹⁸ P. F. M. Ellis, “The Effect of the Aerodynamic Behaviour of Flakes of Jarrah and Karri Bark on Their Potential as Firebrands,” *Journal of the Royal Society of Western Australia* 93 (2010): 22; J. S. Gould et al., *Project Vesta: Fire in Dry Eucalypt Forest: Fuel Structure, Fuel Dynamics and Fire Behaviour* (Perth: CSIRO Publishing and Department of Environment and Conservation, 2007); Bell, Burrows, and McCaw, “Influence of Fire on Jarrah Forest Vegetation.”

The South West and Victoria do have ostensibly similar patterns of settlement and are often perceived to have analogous fire conditions (although in terms of climate the South West is closer to parts of California). The degree to which the South West can be environmentally compared to the fire flume is a major point of contention to be discussed in Chapter Six. Suffice to say it has been argued that the South West's prevailing winds and lower topographical variation mean it is less likely to suffer catastrophic fire conditions,⁵⁹⁹ but in my judgement such comparisons have not been satisfactorily quantified for a comprehensive determination.

The South West is the home of the Noongar people,⁶⁰⁰ and human occupation in the South West has been dated from at least 48,000 years ago.⁶⁰¹ There are 14 language groups within the broader Noongar grouping, and Noongar territory (*boodjar* or country) roughly overlaps the South West Botanic Province.⁶⁰² Noongar have described themselves as "literally related to country" and describe the South West as *karla* ("where their home fires burn");⁶⁰³ the Noongar words for home, usage, and fire were intimately related.⁶⁰⁴ Indeed, fire is so central to the Noongar that it is possible to think of significant parts of the South West (if not the entire region) as a Noongar firescape.

The definitive work on Noongar burning was published by archaeologist Sylvia Hallam in 1975. In *Fire and Hearth*, Hallam declared "The land the English settled was not as God made it. It was as the Aborigines made it".⁶⁰⁵ In this germinal work and in later papers, she depicted Noongar burning as systematically changing and maintaining vegetation and fauna.⁶⁰⁶ Burning encouraged grass, opened up the countryside, and kept litter on the forest floor to a minimum, allowing the forest to be "advantageously 'worked' by Aborigines".⁶⁰⁷ Hallam explored how seasonal movements and burning helped maintain ecological ties to landscapes, which she asserted "cannot be considered apart from social and symbolic ties".⁶⁰⁸ Using a variety of sources and paying close attention to ecological and environmental factors, Hallam argued "we must not expect to find homogeneity of firing schedules,

⁵⁹⁹ Neal J. Enright and Joseph B. Fontaine, "Climate Change and the Management of Fire-Prone Vegetation in Southwest and Southeast Australia: Fire Management in SW Australia," *Geographical Research* 52, no. 1 (2014): 34–44.

⁶⁰⁰ There are variations in how to spell Noongar in English. See Collard and Harben, "Being Black."

⁶⁰¹ Chris S. M. Turney et al., "Early Human Occupation at Devil's Lair, Southwestern Australia 50,000 Years Ago," *Quaternary Research* 55, no. 01 (2001): 3–13.

⁶⁰² Collard and Palmer, "Noongar and Non-Aboriginal People Going along Together (Ngulla Wangkiny, Ni, Katitjin Noongar Nyidyung Koorliny, Kura, Yeye, Boorda)"; Joe Dortch et al., "Settling the West: 50 000 Years in a Changing Land," *Journal of the Royal Society of Western Australia* 102 (2019): 30–44.

⁶⁰³ Collard and Palmer, "Noongar and Non-Aboriginal People Going along Together (Ngulla Wangkiny, Ni, Katitjin Noongar Nyidyung Koorliny, Kura, Yeye, Boorda)."

⁶⁰⁴ Hallam, *Fire and Hearth*, 43.

⁶⁰⁵ Hallam, vii.

⁶⁰⁶ Hallam, 14.

⁶⁰⁷ Hallam, 47–55.

⁶⁰⁸ Hallam, 31.

nor homogeneity of soil or climatic regime”, always stressing the localised nature of Noongar burning and not extending her thesis beyond the South West.⁶⁰⁹ Hallam stressed the diversity of Noongar burning by emphasising that fires could be lit for different purposes, of different sizes and intensities, at different times of year,⁶¹⁰ and that Noongar fire “aimed to keep parts of the landscape unburnt”.⁶¹¹ In a later response to David Horton’s polemics (discussed in the Introduction), Hallam argued

No student of Aboriginal firing has ever maintained that it was applied simultaneously and non-selectively over wide areas. Always certain nodes and zones would be kept regularly burned, while to other areas fire penetrated only infrequently. This is the distinction which the south-west Aborigines made between ‘Mundak – the bush; the wild country, the woods’ and ‘Nappal – burned ground; ground over which fire has passed...’ This could go through various stages from ‘Kundyl – young grass springing after the country has been burned...’ to ‘Narrik – unburned ground, but ready for burning...’⁶¹²

This explicit diversity of burning practice will be contrasted to the universalising tendency of Bill Gammage’s *The Biggest Estate on Earth* in Chapter Seven. Building on Henry T Lewis’s work in Kakadu and California (discussed in Chapters Two, Four and Five), Hallam noted that “fire could be most effective in marginal places” – in ecotones which transition between different biological communities.⁶¹³ Indeed, the intellectual exchange between Lewis and Hallam reinforces two of the core messages of this thesis: first, non-Indigenous understandings of Indigenous burnings have not developed in isolation in Australia, and – second – as a systematic manipulation of fire, Indigenous burning is not as unique as it is sometimes portrayed.

Trained as an archaeologist in Cambridge, Hallam built off the British field tradition of archaeology to bring an interdisciplinary approach to *Fire and Hearth* that radically expanded studies of Indigenous burning and set a standard that still looks lofty today.⁶¹⁴ If not for the academic isolation that often means Australia’s western third is unseen from the Hume Highway,⁶¹⁵ Hallam’s work would be further celebrated in Australia and North America. Like Rhys Jones in his seminal “fire-stick farming” paper, Hallam made the explicit link that the “regulated burning each year of different sections” of landscape

⁶⁰⁹ Hallam, 46.

⁶¹⁰ Hallam, “Peopled Landscapes in Southwestern Australia in the Early 1800s,” 184.

⁶¹¹ Hallam, 33.

⁶¹² Sylvia J. Hallam, “The History of Aboriginal Firing,” in *Fire Ecology and Management of Western Australian Ecosystems: Proceedings of a Symposium Held in Perth on 10-11 May 1985*, ed. Julian R. Ford, vol. WAIT Environmental Studies Group Report No. 14 (Perth: Western Australian Institute of Technology, 1985), 14.

⁶¹³ Hallam, 15.

⁶¹⁴ A festschrift was assembled to honour Hallam’s career; see Caroline Bird and R. Esmee Webb, eds., *Fire and Hearth Forty Years On: Essays in Honour of Sylvia J. Hallam* (Perth: Western Australian Museum, 2011).

⁶¹⁵ Trinca and Gaynor, “Visions of Land and People in Western Australia.”

had become forestry policy, and in concept was “just what the Aborigines had been doing”.⁶¹⁶ Nevertheless later in her career Hallam noted that Noongar burning generally “comprises rapid sequences of small, closely set fires, quite different from either natural or European fire regimes”.⁶¹⁷ This distinction between Indigenous and contemporary prescribed burning is often overlooked by fire scholars.

Further studies of Noongar burning have confirmed the rich landscape painted by Hallam of diverse and sophisticated fire-use, although the evidence for fire in jarrah forests conforms to broad rather than fine brush-strokes.⁶¹⁸ Accounts from Noongar today support a deep relationship with fire used to modify and manage large parts of the South West landscape.⁶¹⁹ However, this was not universal as the denser and wetter karri (*Eucalyptus diversicolor*) forests appear to have burned less frequently and were less occupied.⁶²⁰ The degree to which Noongar burning affected the jarrah forests in particular (as opposed to the frequently-burned Swan Coastal Plain) is slightly unclear. In stark contrast to other areas of Australia there is strong evidence that a significant amount of Noongar burning occurred during summer.⁶²¹ As this would have broadly coincided with seasons of high fire danger, it raises questions as to how the Noongar stopped fires getting out of control in the jarrah forests. An analysis of jarrah fire scars, stems, and growth suggested that prior to colonisation, these forests saw frequent low intensity, and only occasional (roughly every 80 years or so) high intensity fires; post-settlement saw the frequency of high intensity fires increase.⁶²² Other accounts imply that the jarrah forests were not used or occupied very often, perhaps only on a seasonal basis or along

⁶¹⁶ Hallam, *Fire and Hearth*, 33.

⁶¹⁷ Hallam, “Peopled Landscapes in Southwestern Australia in the Early 1800s,” 186.

⁶¹⁸ The general depiction of Noongar burning broadly promoting certain faunal and floral resources across some (but not all) of the South-West has been supported by Alison Lullfitz et al., “Human Niche Construction: Noongar Evidence in Pre-Colonial Southwestern Australia,” *Conservation and Society* 15, no. 2 (2017): 201–16.

⁶¹⁹ G. Kelly, “Karla Wongi: Fire Talk,” *Landscape* 14, no. 2 (1999): 48–53; Aiden Eades cited in Ward, “People, Fire, Forest and Water in Wungong,” 90; I Abbott, “Aboriginal Fire Regimes in South Western Australia: Evidence from Historical Documents,” in *Fire in Ecosystems of South West Western Australia: Impacts and Management*, ed. I Abbott and N. Burrows (Leiden: Backhuys, 2003), 119–46; Fiona Kost, “Burning the Bush: The Development of Australia’s South-West Botanical Province,” in *Humans and the Environment: New Archaeological Perspectives for the Twenty-First Century*, ed. Matthew I. J. Davies and Freda Nkirete M’Mbogori (Oxford: Oxford University Press, 2013), 117–31.

⁶²⁰ Kost, “Burning the Bush: The Development of Australia’s South-West Botanical Province”; Dortch, “Reconstructing Aboriginal Impacts on Australian Forests.”

⁶²¹ Lullfitz et al., “Human Niche Construction”; Burrows and McCaw, “Prescribed Burning in Southwestern Australian Forests”; Kost, “Burning the Bush: The Development of Australia’s South-West Botanical Province.” Note that Noongar generally recognise six seasons in their calendar.

⁶²² N.D. Burrows, B. Ward, and A.D. Robinson, “Jarrah Forest Fire History from Stem Analysis and Anthropological Evidence,” *Australian Forestry* 58 (1995): 7–16.

stream paths,⁶²³ implying that ignition was concentrated rather than spread throughout the forest. Of course, the influence of a fire is not limited to its ignition point.

In recent decades an exciting new technique for historical fire analysis has been developed which may shed light on pre-colonial jarrah forest fire regimes, though its reliability has been questioned. Unlike traditional dendrochronology, which relies upon annual horizontally extending growth rings often not present in Australian trees, this technique matches black marks on the vertical growth rings of balga grasstrees (*Xanthorrhoea preissii*) to fire events. As some grasstree growth rings predate European settlement of the South West, these have been used to bolster interpretations of high fire frequency in jarrah forests prior to intense European impact.⁶²⁴ Much like the cypress pines discussed in Chapters Four and Eight for the Top End of the Northern Territory, decline in balga growth (which can be stimulated by low-intensity fire) has been used to depict it as the “miner’s canary” indicating broad environmental changes caused by the cessation of Indigenous burning,⁶²⁵ with the solution being prescribed burning or a restoration of Indigenous burning practices.⁶²⁶ However, the balga studies have been disputed,⁶²⁷ particularly in accuracy or whether such marks represent fires that spread through a landscape or that were restricted to individual balga plants to promote useful resins or hunt nesting animals.⁶²⁸ It may be impossible for the balga disputes to be resolved,⁶²⁹ but given the traditional difficulty Australian biota poses to dendrochronology, it should be explored as much as possible in future. The balga disputes further underline the competing sources of evidence and knowledge which permeate academic fire discourse.

Europeans had sailed past Western Australia for centuries, but intensive contact between Noongar and Europeans began when King George’s Sound was garrisoned in 1826 and when the Swan River

⁶²³ See Abbott, “Aboriginal Fire Regimes in South Western Australia: Evidence from Historical Documents,” 138; Hallam, *Fire and Hearth*, 27.

⁶²⁴ See D. J. Ward, “Bushfire History from Grasstrees at Eneabba, Western Australia,” *Journal of the Royal Society of Western Australia* 92, no. 3 (2009): 261–268; Ward, “People, Fire, Forest and Water in Wungong.”

⁶²⁵ David Ward, “Balga Grasstrees,” Roleybushcare, accessed 4 September, 2017, <http://roleybushcare.com.au/bush-topics/18-balga-grasstrees>.

⁶²⁶ For instance, Federal MP Don Randall referenced the balga studies to call for more prescribed burning following the Waroona-Yarloop fire of 2016; see Don Randall in Commonwealth, Parliamentary Debates, House of Representatives, vol. 45, 26 February 2015, 1404–1407.

⁶²⁷ For instance, see B. P. Miller et al., “Grasstree Stem Analysis Reveals Insufficient Data for Inference of Fire History,” *Journal of the Royal Society of Western Australia* 95, no. 2 (2012): 95–102; Ben P. Miller et al., “Error in the Inference of Fire History from Grasstrees,” *Austral Ecology* 32, no. 8 (2007): 908–16.

⁶²⁸ Grant Wells, Stephen D. Hopper, and Kingsley W. Dixon, “Fire Regimes and Biodiversity Conservation: A Brief Review of Scientific Literature with Particular Emphasis on Southwest Australian Studies,” *Consultant Report Commissioned as Part of the EPA’s Review of CALM’s Fire Policies and Management Practices*. Environmental Protection Authority, Perth, Western Australia, 2004, 3.

⁶²⁹ Buizer and Kurz, “Too Hot to Handle.”

Colony was formally annexed for the British Crown in 1829.⁶³⁰ In a portent of the importance of timber for the South West, the founding of the Colony was commemorated not by the laying of a foundation stone but by Mrs Helen Dance chopping an axe into a jarrah tree.⁶³¹ As early as 1836 some 10,000 cubic feet of jarrah were sent to English shipyards, and logging expanded with the colony.⁶³² While agricultural settlement was intensive, especially later in the wheatbelt, a significant portion of jarrah forest survived clearing for agriculture as it lies on lateritic soil which farmers found undesirable.⁶³³ While milling had commenced in the area long beforehand, the town of Dwellingup was officially gazetted in 1910.⁶³⁴

As with settlers in Victoria and California (as explored in Chapters One and Two), most European settlers found Noongar burning incomprehensible or perceived it as dangerous to their settlements and crops, though a minority understood it as a sophisticated and deliberate system. Settler George Fletcher Moore, for instance, referred to Indigenous practices in 1833 as “landscape gardening” (i.e., deliberate modification, even if not up to the exacting standards of European ‘agriculture’).⁶³⁵ In 1836 Lieutenant Henry Bunbury noted:

By these fires ... the country is kept comparatively free from underwood and other obstruction, having the character of an open forest through most parts of which one can ride freely; otherwise in all probability, it would soon become impenetrably thick, and ... the labour cost of clearing would be so greatly increased as to take away all the profit, and it would change the very nature of the country, depriving it of the grazing and pastoral advantages it now possesses ... It is true that we might ourselves burn the bush, but we could never do it with the same judgment and good effect of the Natives⁶³⁶

Not all settlers were so accommodating or admiring. Indeed, in Western Australia the archival record is sufficiently strong to bolster the theory of ‘pyro-ecological imperialism’ introduced in Chapter Two.

⁶³⁰ Sylvia J. Hallam and Lois Tilbrook, eds., *Aborigines of the South West Region 1829-1840*, The Bicentennial Dictionary of Western Australians, Volume VIII (Nedlands, W.A.: University of Western Australia, 1990).

⁶³¹ Jenny Mills, “The Impact of Man on the Northern Jarrah Forest from Settlement in 1829 to the Forests Act 1918,” in *The Jarrah Forest: A Complex Mediterranean Ecosystem*, ed. B. Dell, J.J. Havel, and N. Malajczuk (Dordrecht: Kluwer Academic Publishers, 1989), 230.

⁶³² Wallace, “Fire in the Jarrah Forest Environment,” 34. McCaw and Burrows give the figure of 10,000 tonnes of jarrah. With a very crude estimate taken from 50 pounds/cubic foot for blue gum (*Eucalyptus globulus*) wood, or 227 tonnes total, Wallace’s figure seems more reasonable for a colony in its first decade. See W.L. McCaw et al., “Fire Management,” in *The Jarrah Forest: A Complex Mediterranean Ecosystem* (Dordrecht: Kluwer Academic Publishers, 1989), 317.

⁶³³ Bunbury, *Invisible Country: South-West Australia: Understanding a Landscape*, 146–47.

⁶³⁴ *Back To Dwellingup Fire Reunion 1961-2011*, Dwellingup History & Visitor Information Centre, 2011

⁶³⁵ Abbott, “Aboriginal Fire Regimes in South Western Australia: Evidence from Historical Documents,” 135.

⁶³⁶ Quoted in Collard and Palmer, “Noongar and Non-Aboriginal People Going along Together (Ngulla Wangkiny, Ni, Katitjin Noongar Nyidyung Koorliny, Kura, Yeye, Boorda).”

Conflict between Europeans and Noongars began as early as 1830 with the first forced displacement of Noongars from their traditional grounds and the destruction of Noongar fish traps by British soldiers.⁶³⁷ In 1833, faced with continuing violence and encroachment on their territory, Noongars of the lower Swan requested a meeting with the Governor to discuss the impact of colonisation upon their food resources. “Their efforts were met with amusement by the Lieutenant Governor and his entourage”.⁶³⁸ The year after, Noongars raided a British mill on the South Perth peninsula for flour. In response, Governor Stirling led a group to commit the infamous Pinjarra Massacre, killing between 15-80 people.⁶³⁹

The South West’s documentary record allows an extension of the academic theory of settler colonialism to include Indigenous fire practice. Settler colonialism seeks to explain forms of colonisation that rely upon a “logic of elimination” and permanent settlement rather than mere exploitation of Indigenous labour and extraction of resources.⁶⁴⁰ Certainly, later government programmes illustrate the theory’s applicability to the South West; Anna Haebich has made a powerful argument around later nineteenth and twentieth century government programmes to “breed out the Black”.⁶⁴¹ I argue this should be extended to the early years of the colony with regards to fire restrictions.

This intention is illustrated by a particular incident in 1846, when settlers at York had complained that Noongars were burning crops and grazing areas. In response to this allegation, various figures such as the Protector of Natives at York, the Reverend Henry Bland, pointed out that Noongar custom was to burn in summer and that it had no malicious intent.⁶⁴² The Resident Magistrate for the Murray District, Francis Singleton, noted summer was the “time of harvest” for both Noongars and Europeans, that fires were essential to Noongar resource harvesting, and that he saw it “as unjust to demand them to abstain from securing their game or their means of subsistence in a manner which they find to be the most effective”.⁶⁴³ Some suggested compromises whereby Noongar would be supplied with food

⁶³⁷ Hallam and Tilbrook, *Aborigines of the South West Region 1829-1840*, xiv.

⁶³⁸ Hallam and Tilbrook, xv.

⁶³⁹ Casualty estimates for the Pinjarra Massacre vary, and there was (unwarranted) controversy in the early 2000s over the characterisation of this incident as a massacre; see John Harris, “Hiding the Bodies: The Myth of the Humane Colonisation of Aboriginal Australia,” *Aboriginal History* 27 (2003): 79–104.

⁶⁴⁰ Hixson, *American Settler Colonialism: A History*; Carey and Silverstein, “Thinking with and beyond Settler Colonial Studies.”

⁶⁴¹ Anna Haebich, “Neoliberalism, Settler Colonialism and the History of Indigenous Child Removal in Australia,” *Australian Indigenous Law Review* 19, no. 1 (2016): 24; Anna Haebich, *For Their Own Good: Aborigines and Government in the South West of Western Australia, 1900-1940*, 2nd ed. (Nedlands, W.A.: University of Western Australia Press, 1992).

⁶⁴² Ward, “People, Fire, Forest and Water in Wungong,” 209.

⁶⁴³ Ward, 215–17.

resources in return for not igniting fires which might threaten colonial crops.⁶⁴⁴ These entreaties and suggestions for compromise were ignored. In 1847 “An Ordinance to Diminish the Dangers Resulting From Bush Fires” was proclaimed, the effect of which was that anyone setting fire in the prohibited period (summer, when fire danger was highest but also when Noongars burned the most) could be fined £50, except for youths and Noongars, who would face up to 50 lashes.⁶⁴⁵ Of course, non-Indigenous landowners lighting fires on their own private lands were exempt.⁶⁴⁶ Large numbers of Noongars were imprisoned at Rottnest Island for setting fires; some undoubtedly with arson intent, others undoubtedly simply filling their obligation to country.⁶⁴⁷ Indeed, imprisonment for ignition continued as late as 1888.⁶⁴⁸ An Island better known today for selfies with inquisitive quokkas was then an instrument of imperialism, including the deliberate disruption of ecological aspects of Noongar culture.

Part of the great elegance of Alfred Crosby’s theory of ecological imperialism is that it explains that the disastrous impact of colonisation could be initially unintentional. The spread of European grasses, pigs, diseases, and so on, were perhaps not initially intended as weapons of colonisation, though of course observant colonisers quickly realised the effect these intrusions had on Indigenous peoples, resources, and their capacity to resist settler colonialism.⁶⁴⁹ In the case of the South West, we can see this was not true for Indigenous burning. The British settlers were clearly aware of the importance of fire to Noongars. Colonial suppression of Noongar fire diminished their capacity to support themselves, and by extension, their capacity to resist the encroachment upon their resources. Alternative paths and compromises were suggested by some colonisers but were ignored. The logic of elimination applied to fire. In the South West, fire suppression was fire oppression.

Fire suppression, the impact of disease upon Noongar burning, the settlers’ own burning practices, and unregulated logging, vastly changed the jarrah forests of the South West.⁶⁵⁰ Some settlers used fire for their own purposes, though it is unclear to what extent these were inspired by or were a direct replication of pre-colonial Noongar burning in terms of seasonality, frequency, and intensity.⁶⁵¹

⁶⁴⁴ Eg “Protector of Natives” in the Swan Valley Charles Symmons quoted in Ward, 212–14.

⁶⁴⁵ “An Ordinance to Diminish the Dangers Resulting From Bush Fires”, 2nd September 1847, AU WA S4647 – cons2754 1, State Records Office of Western Australia, Perth, WA, Australia.

⁶⁴⁶ Simone Ruane, “Using a Worldview Lens to Examine Complex Policy Issues: A Historical Review of Bushfire Management in the South West of Australia,” *Local Environment* 23, no. 8 (2018): 784–85.

⁶⁴⁷ Neville Green, “Aboriginal Sentencing in Western Australia in the Late 19th Century with Reference to Rottnest Island Prison,” in *“Fire and Hearth” Forty Years On: Essays in Honour of Sylvia Hallam*, ed. Caroline Bird and R. Esmee Webb, Records of the Western Australian Museum, Supplement 79 (Western Australian Museum, 2011), 77–85; Ward, “People, Fire, Forest and Water in Wungong,” 102–4.

⁶⁴⁸ Haebich, “Neoliberalism, Settler Colonialism and the History of Indigenous Child Removal in Australia,” 20.

⁶⁴⁹ Crosby, *Ecological Imperialism: The Biological Expansion of Europe, 900-1900*.

⁶⁵⁰ Ward, “People, Fire, Forest and Water in Wungong.”

⁶⁵¹ Abbott, “Aboriginal Fire Regimes in South Western Australia: Evidence from Historical Documents,” 135.

Unregulated logging saw nearly a million acres (roughly 400,000 hectares) of jarrah forest cut-over before 1920.⁶⁵² Such rapid environmental changes did not go unnoticed, and consequently Charles Edward Lane-Poole, a familiar figure from Chapter One, was appointed Western Australia's first Conservator of Forests in 1916.⁶⁵³ Lane-Poole aimed to promote forest conservation for sustainable and efficient use but was unsuccessful in his goals due to his at-times abrasive personality. In 1921 he was replaced by the "less acerbic" Stephen Kessell who worked more successfully with local politicians and timber companies to implement effective timber regulation.⁶⁵⁴

Lane-Poole, Kessell, and their ilk saw fire as a threat (just like the Victorian foresters discussed in Chapter One). They believed it depleted nutrients, destroyed essential soil humus, and threatened harvestable timber.⁶⁵⁵ Even prescribed burning was anathema; in 1916 visiting forester David Hutchins pondered why there were "large numbers of otherwise intelligent persons" who believed fire exclusion was impractical, and compared control burning to "burning the carpets to save the house".⁶⁵⁶ Kessell pushed for a policy of almost total fire exclusion, with some strategically placed control burn strips, burned every three to four years.⁶⁵⁷ The attitude prevailing throughout this era is well summed up by forester Phil Sheldey's recollection of his "official indoctrination" letter upon appointment to the West Australian Forests Department in 1949, where he was warned an institutional acceptance of prescribed burning "would be tantamount to acknowledging that forestry is impossible".⁶⁵⁸ It's important to note, however, that while fire exclusion and suppression may have been policy, it may not have been implemented as practice. Oral histories indicate that prescribed burns ignited "on the quiet" may have been common among some foresters, showing total fire exclusion never enjoyed absolute support even among foresters.⁶⁵⁹

This early Western Australian policy of fire exclusion did not develop in isolation. Indeed, Hutchins, who had previously worked in India and South Africa, drew inspiration from Henry Graves (the successor to Gifford Pinchot as head of the United States Forest Service) in his description of the 1910

⁶⁵² Wallace, "Fire in the Jarrah Forest Environment," 35.

⁶⁵³ L.T. Carron, "Lane-Poole, Charles Edward (1885–1970)," in *Australian Dictionary of Biography*, vol. 9, 1983.

⁶⁵⁴ Bunbury, *Invisible Country: South-West Australia: Understanding a Landscape*, 148–49.

⁶⁵⁵ Burrows and McCaw, "Prescribed Burning in Southwestern Australian Forests," e27.

⁶⁵⁶ Hutchins, *A Discussion of Australian Forestry, with Special References to Forestry in Western Australia*, 20, 28.

⁶⁵⁷ N.D. Burrows, "Planning Fire Regimes for Nature Conservation Forests in South Western Australia," in *Fire Ecology and Management of Western Australian Ecosystems: Proceedings of a Symposium Held in Perth on 10-11 May 1985*, ed. Julian R. Ford, vol. WAIT Environmental Studies Group Report No. 14 (Perth: Western Australian Institute of Technology, 1985), 129.

⁶⁵⁸ Phil Sheldey, "Willow Springs," in *Firefighters: Stories from Australian Foresters*, ed. Oliver Raymond and Roger Underwood (Palmyra, Western Australia: York Gum Publishing, 2014), 36.

⁶⁵⁹ Bevan Campbell quoted in Roger Underwood, *Tempered by Fire: Stories from the Firefighters and Survivors of the 1961 Western Australian Bushfires*, ed. Roger John Underwood (Subiaco: The Bushfire Front, 2011), 84.

Big Burn in America and the perils of 'light burning' (familiar to us from Chapter Two).⁶⁶⁰ Once Kessell became Conservator, he ordered the reprinting of American papers relating to the light burning controversy on the grounds that the problems of the American West were "almost identical" to the Western Australian forester who "seeks to secure regeneration in the cut-over jarrah".⁶⁶¹ This reprint contained the verdict of the 1923 California Forestry Committee discussed in Chapter Two, which, as shown, was itself deeply flawed and resolved more on political rather than evidentiary grounds. In such ways the 1910 Big Burn, and the resolution of the light burning controversy it caused, shaped ecological consequences beyond North America.

Kessell's run as Conservator and the paradigm of fire exclusion did not last forever, and prescribed burning was introduced once Allan Harris became Conservator of Forests. Concerned with mounting damage to timber from bushfires, Harris had earlier experimented with broad area prescribed burning for fuel reduction purposes as a Forest Officer in 1939-40.⁶⁶² However, his work was increasingly opposed by the Forests Department administration until his position became untenable and he was forced to resign.⁶⁶³ This exile was reversed when Harris was appointed as Conservator in 1953. As Conservator, Harris planned further experimentation which led to an official policy change in 1954, resulting in a linear increase in the proportion of forest burned each year.⁶⁶⁴ Chapter Five explores American 'Fire Revolutionaries'; scientists and administrators who faced institutional opposition in introducing prescribed burning and fire ecology paradigms. Perhaps Harris could qualify as an Australian Fire Revolutionary. Ultimately, the amount of prescribed burning conducted, and its effectiveness, would become a key point of contention following the 1961 Dwellingup fires.

The 1961 Dwellingup Fires

⁶⁶⁰ Hutchins, *A Discussion of Australian Forestry, with Special References to Forestry in Western Australia*, 37; Hutchins referred to Henry S. Graves, "Protection of Forests From Fire," US Department of Agriculture Forest Service Bulletin 82 (Washington: Government Printing Office, 1910).

⁶⁶¹ Pyne, *Burning Bush*, 298; S. L. Kessell, "The Damage Caused by Creeping Fires in the Forest," Bulletin No. 33 (Perth: Western Australia Forests Department, 1924), 3.

⁶⁶² Allan Harris, in "Report of evidence taken by Mr G.J. Rodger appointed on the 27th April, 1961, as a Royal Commissioner to inquire into and report upon bush fires in Western Australia", (Western Australia Parliament, 1961), 1448, SROWA S2001.

⁶⁶³ Allan Harris in "Report of evidence ... 1961", 1448.

⁶⁶⁴ Gill, "A Review of Fire Regimes of the Forested Region of South-Western Australia with Selected Examples of Their Effects on Native Biota," 5.

The 1960/61 fire season saw heavy drought in the jarrah forests, compounded by a series of heatwaves. By 19 January 1961 the forests were in “explosive condition”.⁶⁶⁵ Lightning started 19 separate fires across 300 square miles of jarrah forest on 19 and 20 January, but these fires were not a major issue until Tuesday 24 January.⁶⁶⁶ A tropical cyclone affecting the North-West of Western Australia influenced winds and caused the existing fires to ‘blow up’ (meaning rapid spread and heavy spotting), especially after a powerful wind shift in the evening.⁶⁶⁷ There is an international rule of thumb today – in part developed through the experiences at Dwellingup in 1961 – that when fires reach a certain intensity (10,000 kWm⁻¹) suppression becomes impossible. During their “major run” the Dwellingup fires reached at least 15,000 kWm⁻¹,⁶⁶⁸ and it was noted in the following Royal Commission that surveying aluminium tags left 5 feet above the ground had melted – implying temperatures above 660°. ⁶⁶⁹ The fires quickly smashed through the town of Dwellingup that evening, leaving devastation in their wake. Rainfall the next day helped suppression, but it still took a month of mop up and patrol duties for the fire to be declared over.⁶⁷⁰

Remarkably, no lives were lost and there were no serious injuries from the Dwellingup fires,⁶⁷¹ a stark contrast to the other major fires investigated in this thesis, and a contrast to Black Friday that shaped fire policy for decades. While there were other fires in the 1960-61 season, the Dwellingup fires were the most devastating, burning 146,000 ha of mostly public land, destroying 132 houses and causing at least \$29,000,000 of property damage.⁶⁷² For the jarrah forests, the estimated timber loss was \$7,400,000, and of the 146,000 ha of jarrah burned, 18% were completely defoliated, 52% fully scorched, and 29% somewhat damaged – highlighting that the effect of damaging bushfires is not uniform.⁶⁷³

⁶⁶⁵ A.G. McArthur, “The Origin and Development of the Dwellingup Fires 19th-25th January, 1961”, AU WA S4643 – cons2756 1, State Records Office of Western Australia, Perth, WA, Australia.

⁶⁶⁶ McArthur, “Origin and Development”, SROWA 2.

⁶⁶⁷ Lachlan McCaw and Barry Hanstrum, “Fire Environment of Mediterranean South-West Western Australia,” in *Fire in Ecosystems of South West Western Australia: Impacts and Management*, ed. I Abbott and N. Burrows (Leiden: Backhuys, 2003), 87–106.; Origins and Development pp 23, 28

⁶⁶⁸ Paulo M. Fernandes and Hermínio S. Botelho, “A Review of Prescribed Burning Effectiveness in Fire Hazard Reduction,” *International Journal of Wildland Fire* 12, no. 2 (2003): 117–20.

⁶⁶⁹ William Roy Wallace in “Report of evidence ... 1961”, 170. Fire ecologist Kevin Tolhurst initially estimated the 2009 Black Saturday fires reached a Forest Fire Danger Index reading of 172, compared to the Dwellingup fires which reached 31; see Kevin G. Tolhurst, “Report on the Physical Nature of the Victorian Fire Occurring on 7th February 2009,” 15 May, 2009, 14.

⁶⁷⁰ McArthur, “Origin and Development”, SROWA, 3.

⁶⁷¹ McArthur, “Origins and Development”, SROWA, 2.

⁶⁷² G.J. Rodger, *Report of the Royal Commission Appointed to Enquire Into and Report upon the Bushfires of December, 1960, and January, February, and March, 1961 in Western Australia* (Western Australia Parliament, 1961), 22, SROWA S4643. The monetary figure has been adjusted for inflation and is in 2018 AU\$.

⁶⁷³ G.B. Peet and A.J. Williamson, “An Assessment of Forest Damage from the Dwellingup Fires in Western Australia” (I.F.A. 5th Conference, Perth: Institute of Foresters of Australia, 1968). This monetary figure has been adjusted for inflation and is in 2018 AU\$.

Public reaction to the fires was immediate. Newspapers reported the next day that “the once-thriving centre is practically wiped out”,⁶⁷⁴ and that the Post Office safe had been fused tight by the heat and needed to be cut open.⁶⁷⁵ Once the full fire season had finally ended, the Western Australian Government commissioned forester Geoffrey Rodger to lead a Royal Commission into the bushfire season. Well-regarded among Australian foresters,⁶⁷⁶ Rodger had previously been a Divisional Forest Officer in Western Australia and had led a prior Royal Commission into timber issues.⁶⁷⁷ Rodger visited many of the areas affected by the fires, took 23 days of sworn evidence, and heard 116 witnesses.⁶⁷⁸

Prescribed Burning in the Commission

The proceedings of the Commission and the surrounding public discussion were dominated by talk of fuel levels and ‘control burning’ (the dominant term for prescribed burning at this time). Unlike the post-Black Saturday discussion analysed in Chapter Six, the post-Dwellingup discussion exhibited only a limited number of arguments. Responses touching on land management can be characterised as largely advocating for more prescribed burning, and the response of foresters to these claims. Indeed, they can also largely be grouped by profession: farmers and settlers against foresters. It should also be noted that as the Commission chose to investigate the 1960-61 bushfire season more broadly (rather than simply concentrating on the Dwellingup bushfires), this analysis considers the entire public debate, rather than as it was confined to the Dwellingup bushfires.⁶⁷⁹

Many farmers advocated for greater prescribed burning as they wanted freedom to burn free of government control, both for protection against destructive bushfires, and for clearing/agricultural purposes. To many farmers and settlers, the period prior to Forests Department suppression was pyrically idyllic. During the early days of unregulated logging, scrub and slash was burned so “nothing

⁶⁷⁴ Ross Elliot and Jack Coulter, “Dwellingup explodes in night of terror”, *Daily News*, 25 January, 1961, AU WA S4648, State Records Office of Western Australia, Perth, WA, Australia.

⁶⁷⁵ Jack Coulter, “A Stricken Town Takes Stock”, *Daily News*, 26 January, 1961, AU WA S4648, State Records Office of Western Australia, Perth, WA, Australia.

⁶⁷⁶ His obituary in *Australian Forestry* notes “He will probably be remembered by the Australian forest services for his complete success in healing the rifts that had developed between the services before his appointment to the position of Director-General of Forests Brian Herbert Bednall, “Rodger, Geoffrey James (1894–1982),” *Australian Forestry* 46, no. 1 (1983): 4–5.

⁶⁷⁷ “Timber Talk”, *Daily News*, 3 May 1961, AU WA S4648, State Records Office of Western Australia, Perth, WA, Australia.

⁶⁷⁸ Rodger, *Report of the Royal Commission ... 1961*; “Commission Visits Fire Areas”, *West Australian*, 15 June 1961, AU WA S4648, State Records Office of Western Australia, Perth, WA, Australia.

⁶⁷⁹ Indeed, most witnesses did not discriminate between individual fire complexes.

would be there to carry a lively fire”,⁶⁸⁰ and prior to this the “real bushmen” (shepherds and kangaroo hunters) apparently lived by the adage “when it will burn – burn it” which ensured “the bush fire should never happen”.⁶⁸¹ They claimed the destruction of the 1960-61 bushfire season was “due to the lack of protective burning by the Forestry Department”.⁶⁸² The forests were “dirty”,⁶⁸³ whereas the previous burning banned by the Forests Department had succeeded in “keeping the bush clean”.⁶⁸⁴ To farmer Nancy Bateman the supposed lack of fire on Forests Department lands was inexplicable as “you cannot get good timber when you are not *controlling* the forest” [emphasis mine].⁶⁸⁵ Furthermore, newer settlers objected to the Forests Department holding power over fire, arguing that established farms had been developed by clearing fires lit in summer (now a prohibited period for fires), and the restrictions implemented as forestry assumed greater authority over ignition did not reflect “natural justice and fairness” to newer settlers.⁶⁸⁶ Talk of an idyllic past was not matched with broad sophistication in recommendations for how to burn. The more considered farmers recommended burning frequency ranging from every two years to every three to four years,⁶⁸⁷ but no less frequent than four years.⁶⁸⁸ More extreme voices advocated that the Forests Department “be compelled” to prescribe burn “whenever possible”,⁶⁸⁹ or that bush be burned “as often as it will burn”.⁶⁹⁰

In all these witness testimonies it was strikingly rare to find any real consideration of different fire regimes for different areas. Rare exceptions were Nancy Bateman who discussed the need for wetter forests to be burned only in summer as burning after rain would leave leaf litter unburnt but trees damaged,⁶⁹¹ while P. Hundley warned against spring burning.⁶⁹² Indeed, it is clear that much of the

⁶⁸⁰ “Proposed Evidence of Mr Mitchell of Cookennup”, 3 June 1961, AU WA S4645- cons2752 2, State Records Office of Western Australia, Perth, WA, Australia, 1.

⁶⁸¹ F.W. Smith, “Letter to Royal Commission”, 1 July 1961, AU WA S4649- cons2757 1, State Records Office of Western Australia, Perth, WA, Australia.

⁶⁸² Edward Charles Atkins in “Report of evidence ... 1961”, 405.

⁶⁸³ As seen in other chapters, this phrase was especially common to describe vegetation. See for instance “Statement tendered by D. F. O’Keeffe witness for the Displaced Miners Organisation of Collie”, 1961, AU WA S4645- cons2752 2, State Records Office of Western Australia, Perth, WA, Australia.

⁶⁸⁴ “Proposed Evidence of Mr Mitchell of Cookennup”, SROWA, 2

⁶⁸⁵ Nancy Bateman in “Report of evidence ... 1961”, 361.

⁶⁸⁶ M. J. C. Bateman *et al*, “Petition sent to Arthur Watts (Deputy Premier) of Western Australia Legislative Assembly”, 21 January 1959, AU WA S4644- cons2751 1, State Records Office of Western Australia, Perth, WA, Australia, 2.

⁶⁸⁷ For example, see Charles Ironmonger in “Report of evidence ... 1961”, 224; and Alfred Shedley in “Report of evidence ... 1961”, 372.

⁶⁸⁸ Richard Lewis in “Report of evidence ... 1961”, 652.

⁶⁸⁹ Frederick Brockman in “Report of evidence ... 1961”, 837.

⁶⁹⁰ P. Hundley, “Statement”, 29 May 1961, AU WA S4649- cons2757 1, State Records Office of Western Australia, Perth, WA, Australia.

⁶⁹¹ Nancy Bateman in “Report of evidence ... 1961”, 359.

⁶⁹² Hundley, “Statement”, SROWA.

evidence from farmers and settlers advocating increased prescribed burning was coloured by resentment against the “short-sighted” historical fire suppression policies, or even individual prosecutions for illegal ignitions.⁶⁹³ Commissioner Rodger was less sympathetic to farmers than Judge Stretton and often examined their claims that the Forestry Department had “prevented” prescribed burning.⁶⁹⁴ Typically his deeper analysis would reveal such allegations were “just a grouse”.⁶⁹⁵

Unlike the post-Black Friday discussions analysed in Chapter One or the post-Black Saturday discussions to be analysed in Chapter Six, it was extremely rare for witnesses to the Rodger Commission to argue for less prescribed burning. One of the few examples was farmer James Hargreaves, and the tone of Rodger’s questions was that of surprise.⁶⁹⁶ Perhaps this reaction reflected a cultural response to the different environments of the South West and South-East of Australia. Unlike concerns around Melbourne in 1939, there was little discussion of Perth’s water supply needing to be kept potable by complete fire suppression and thus no equivalent figure of A.E. Kelso.⁶⁹⁷ Unlike Black Saturday, the modern environmental movement had yet to emerge as a significant force in Western Australian fire politics – though, as we shall see in later parts of this chapter, this has not been the case since.

The other major discussants of prescribed burning were Western Australian foresters, who largely sought to defend their practices and point to the benefits of the prescribed burning they had conducted. Forests Conservator Allan Harris argued that fires ignited by settlers “held the dubious record of being the greatest origin” of all fires on public land.⁶⁹⁸ Harris referenced the extreme views noted above with the characterisation “there are some people who believe that you just ride through the bush on a horse and throw a match here and there and the fire will be a well-behaved individual”. Harris attempted to utilise history to support his views, as he argued that the Black Friday bushfires discussed in Chapter One had “stemmed from that type of thinking”.⁶⁹⁹ For Harris, the Department’s fire policy was “not a scorched earth policy” but rather a pragmatic balancing of the principle “fire control is a basis of all forestry” with a careful application of prescribed burning.⁷⁰⁰ Harris was careful to note that prescribed burning would not by itself stop fires, but described his personal evolution of

⁶⁹³ For example, see Herbert Saw in “Report of evidence ... 1961”, 114; and Stephen Mitchell in “Report of evidence ... 1961”, 1239.

⁶⁹⁴ See for instance George Ladhams and Norman Fletcher in in “Report of evidence ... 1961”, 588-9.

⁶⁹⁵ Harold Straker in “Report of evidence ... 1961”, 348.

⁶⁹⁶ James Hargreaves in “Report of evidence ... 1961”, 761-2.

⁶⁹⁷ For a history of debate over water supply in the South West, see Ruth A. Morgan, *Running Out? Water in Western Australia* (Perth: UWA Publishing, 2015).

⁶⁹⁸ “‘Fire Hazard Still Exists’, Says Harris”, *West Australian*, 24 June 1961, AU WA S4648, State Records Office of Western Australia, Perth, WA, Australia.

⁶⁹⁹ Allan Harris in “Report of evidence ... 1961”, 1478–79.

⁷⁰⁰ Harris in “Report of evidence ... 1961”, 1446, 1450.

thinking and the Department's "radical change of policy" under his Conservatorship from a total fire suppression policy to a prescribed burn policy since 1953.⁷⁰¹ Harris and other foresters pointed with pride to the Western Australian achievement which in just a few years represented 1,000 acres (405 ha) of forest prescribed burned per man per year, unmatched by any other forestry department in Australia;⁷⁰² forester George Nunn claimed prescribed burning meant State Forests represented "a protection rather than a danger to private property".⁷⁰³ Harris acknowledged that this agile and innovative policy had its detractors; "the protagonists of controlled burning policies are still regarded in many forestry circles as heretics".⁷⁰⁴

For Harris and the other foresters who testified to the Commission, complaints about prescribed burning did not represent informed policy or practice objections. Instead they reflected broader clashes of power and culture, and competing discourses over the role of the state. Fire control superintendent Angelo Milesi believed "with many people there is a natural antipathy to Government departments and civil servants...the farmer is an individualist" who views a forester as "a well-meaning theorist with his head in the clouds".⁷⁰⁵ Indeed, farmer William Pollard had explicitly complained about the "high-handed attitude" of foresters.⁷⁰⁶ Such perceptions echoed the complaints between foresters, farmers, and rural populations discussed in both Chapter One and Chapter Two, reinforcing that so often, fire politics is a cipher for other politics.

Indeed, the Rodger Commission was striking for how it reflected complaints and grievances based on perception, rather than policy. For instance, one farmer complained about a total lack of prescribed burning near Ellis Creek. Milesi nimbly dismissed this complaint by pointing to the fact the father of the complainant had actually lit a fire there in 1952 which escaped and cost the public a great deal of resources to suppress, and by implication rendered further fuel reduction unnecessary.⁷⁰⁷ Foresters frequently responded to criticism around controlled burning by pointing out they were not responsible for private land, and thus such criticism could be dismissed as "mistaken identity".⁷⁰⁸ Others pointed out the ignorance of farmers complaining about a non-existent policy of "non-burning";⁷⁰⁹ Bruce Beggs speculated "the settler who is insular in his approach" may not notice prescribed burning beyond

⁷⁰¹ Harris in "Report of evidence ... 1961", 1449, 1455.

⁷⁰² Harris in "Report of evidence ... 1961", 1451.

⁷⁰³ George Nunn in "Report of evidence ... 1961", 1262.

⁷⁰⁴ Allan Harris in "Report of evidence ... 1961", 1449.

⁷⁰⁵ Angelo Milesi in "Report of evidence ... 1961", 1314.

⁷⁰⁶ William Pollard in "Report of evidence ... 1961", 668.

⁷⁰⁷ Angelo Milesi in "Report of evidence ... 1961", 1313.

⁷⁰⁸ "Fires Started Deliberately – Witness", *West Australian*, 22 June 1961, AU WA S4648 State Records Office of Western Australia, Perth, WA, Australia. See also Gerald Cartmel in "Report of evidence ... 1961", 388–89.

⁷⁰⁹ Douglas McKay in "Report of evidence ... 1961", 767.

property boundaries.⁷¹⁰ Rodger's general sympathy towards foresters was particularly evident with these claims; as the Commission progressed he increasingly suggested to witnesses who made such complaints that they were not "up to date" with Forests Department policy.⁷¹¹

Noongar Burning in the Commission

Overall, there was relatively little discussion of Indigenous burning practices in the wake of the Dwellingup fires, though as with Chapter One what discussion did occur was limited solely to considerations of Indigenous burning as a material practice rather than in any cultural sense of obligations towards country. There was no evidence in any of the testimonies or submissions of any witness identifying as Noongar. As with Chapters One and Two, it was common for pre-contact Noongar burning to be conflated with the later practices of early settlers and cattlemen. The Commission was told that cattlemen had "carried on burning" having "learnt from the natives",⁷¹² and that "the settlers followed the natives' example for 60 years" until the initiation of Forests Department fire suppression had ruined this apparently blemish-free continuation.⁷¹³ The upshot of this claimed continuation was that prescribed burning meant "scrub had been kept down".⁷¹⁴ The typical result of this conflation of Noongar burning with settler burning was spelled out by farmer and grazier Stephen Mitchell who claimed that "if the old methods of keeping the bush clean had been continued, no such fires as at Dwellingup" could have occurred.⁷¹⁵

Noongar burning was largely understood on a superficial level. Most of those who mentioned it discussed it only as a practice intended to drive game rather than shape landscapes or generate a variety of resources. The bush was burned "primarily to run kangaroos" or drive grazers into the path of hunters.⁷¹⁶ Therefore, the overwhelming majority of testimony reflected understandings of any resulting 'clean' (i.e., fuel-reduced and thus less bushfire-prone) forest as an emergent property rather than a deliberate construction stemming from purposeful burning.⁷¹⁷ Any burning done in scrub near camps was "because of the fear of the debil-debil", rather than a rational technique to reduce danger to camps from bushfire, snakes, or insects, or reflected mere superstition rather than sophisticated

⁷¹⁰ Bruce Beggs in "Report of evidence ... 1961", 1083.

⁷¹¹ Geoffrey Rodger in "Report of evidence ... 1961", 1082.

⁷¹² Herbert Saw in "Report of evidence ... 1961", 1114.

⁷¹³ "Doctor Claims Mistakes by Fire Experts", *West Australian*, 19 May 1961, AU WA S4648 State Records Office of Western Australia, Perth, WA, Australia.

⁷¹⁴ "Burnt Scrub Prevents Bushfires", *West Australian*, 16 June 1961, AU WA S4648 State Records Office of Western Australia, Perth, WA, Australia.

⁷¹⁵ Stephen Mitchell, in "Report of evidence ... 1961", 1240.

⁷¹⁶ Francis Connor in "Report of evidence ... 1961", 1066; William Pollard in "Report of evidence ... 1961", 675.

⁷¹⁷ See Letter to the Editor, P.G. Riergert, *The West Australian*, 4 February 1961 in Ward, "People, Fire, Forest and Water in Wungong," 91.

cultural duties to manage country.⁷¹⁸ When combined with the vague connotations with post-settlement burning discussed above, it can be seen that most post-Dwellingup discussions of Noongar burning should fit into a paradigm of appropriation, where the concept is not engaged with in a sophisticated fashion, but instead used to advance political ends.

The most notable exception to this came from retired pastoralist Arthur Heppingstone. Heppingstone gave evidence revealing a more sophisticated understanding of Noongar burning that could fit within a consideration paradigm, where Indigenous burning is considered in a more nuanced fashion for educational or didactic purposes. Based on conversations with his grandfather and personal experience with Noongar burning as a child, Heppingstone described the frequency (“every second year”) and seasonality (“in the summer”) of Noongar burning.⁷¹⁹ Furthermore, his portrayal of Noongar burning as intended to create feed to “fatten” kangaroos and possums, in addition to mitigating against snakes and reducing bushfire fuel, reflected a deeper consideration of the ecological nature of Noongar fire.⁷²⁰ Indeed, Heppingstone observed how a thickening of scrub after the cessation of Noongar burning had caused springs to dry up due to greater water consumption.⁷²¹ Such burning was “conclusive proof” that Noongars “left the forest for the next generation” and reimplementation of regular burning would mean large fires such as at Dwellingup would not occur.⁷²² Nevertheless, Heppingstone’s views were very much an outlier, even in the few voices which did discuss Noongar burning. Unlike after Black Saturday (discussed in Chapter Six), the considerations which did occur were either vague or at most methodological, rather than philosophical.

No testimony touching on Noongar burning mentioned or considered the violence of colonisation in any sustained manner. In the same testimony, farmer Ernest Edwards was able to describe how the bush was “very clean” because “the aborigines [sic] in those days would burn bush as often as they [could]”, and then immediately elide Indigenous agency by describing how the greater quality of pre-colonial timber was “God given”.⁷²³ In an eerie echo of the quasi-Social Darwinist attitudes so prevalent in Chapters One and Two, farmer Herbert Saw related how “the result [of Noongar burning] was a wonderful gift of forests of tall, clean trunks waiting for us”.⁷²⁴ The impression gained from Royal Commission testimony is that Noongar burning just vanished along with the Noongar themselves –

⁷¹⁸ Stephen Mitchell in “Report of evidence ... 1961”, 1242.

⁷¹⁹ Arthur Heppingstone in “Report of evidence ... 1961”, 395, 398.

⁷²⁰ Heppingstone in “Report of evidence ... 1961”, 395.

⁷²¹ Heppingstone in “Report of evidence ... 1961”, 400.

⁷²² Heppingstone in “Report of evidence ... 1961”, 402.

⁷²³ Ernest Edwards, in “Report of evidence ... 1961”, 1080–81.

⁷²⁴ Herbert Saw in “Report of evidence ... 1961”, 1114.

sometimes with regret, but without much sense of violence. Clearly the Great Australian Silence was deafening in 1961.

Commissioner Rodger gave quite significant consideration to Noongar burning, which is not surprising given his professional experience as a forester. He was sceptical of oral evidence of Noongar burning, pressing witnesses on the accuracy of memories from childhood or hearsay recollections of elderly relatives.⁷²⁵ Rodger noted that he found it “difficult to imagine the natives deliberately went around burning off all the forest country...I would not expect them to be interested in the real forest country”, but from examining his questioning it seems clear he was far less sceptical of Noongar burning along ecotones and in grasslands and woodlands.⁷²⁶ In his Report he praised the “astonishingly dexterous” burning of Noongars in scrub and the edge of forests. However, he qualified that

It cannot be safely assumed, however, that the whole of the region or even any extensive area of the jarrah forest was regularly and systematically burnt over by the aboriginal [sic] before white settlement. In the wet karri region and the dry inland it is probable that extensive fires always were very infrequent⁷²⁷

Despite his praise of the technical proficiency of Noongar burning, Rodger was a man of his time. For him, Australian forests in 1961 – even the edges – were “only [now] emerging from the untended virgin state”.⁷²⁸ Quite apart from the awkwardly sexual imagery, this reveals a contradiction: how could forests (especially the edges) be ‘unspoiled’ if Noongar burning was so skilful and effective? For Rodger, as for every witness who gave evidence following the Dwellingup bushfires, the philosophical considerations of Indigenous burning were untouched. There was certainly no attempt to engage with Indigenous burning on a cultural level.

Rise of the Australian Strategy

The Rodger Royal Commission Report was published in August 1961 and made 27 distinct recommendations, 3 of which related to the deliberate use of fire via prescribed burning or backburning. Rodger noted at length that the critics of the Forests Department had “little real knowledge of the forests” or the Department’s performance in prescribed burning.⁷²⁹ He presented

⁷²⁵ See, for instance Geoffrey Rodger in “Report of evidence ... 1961”, 395, 400, 1082.

⁷²⁶ Rodger in “Report of evidence ... 1961”, 399.

⁷²⁷ Rodger, *Report of the Royal Commission ... 1961*, 5.

⁷²⁸ Rodger, *Report of the Royal Commission ... 1961*, 5.

⁷²⁹ Rodger, *Report of the Royal Commission ... 1961*, 50.

figures showing a “noteworthy” increase following the Harris shift in policy, finding that some 10-13% of forest land was now prescribed burned on an annual basis.⁷³⁰ This estimate should be taken advisedly; later fire managers have reflected that the nature of prescribed burning in long-unburnt jarrah areas probably meant that many of these early burns did not consume as much fuel as might be expected from burns in areas subject to a consistent rotation strategy.⁷³¹ In contrast with the Stretton Commission or post-2000 bushfire inquiries, Rodger’s recommendations around prescribed burning were generally couched around forestry priorities. Rodger’s forestry background no doubt left him naturally inclined to sympathise with the Department.

The most important result of the Rodger Commission for this thesis was his recommendation that the Forests Department “make every endeavour to improve and extend the practice of control burning to ensure that the forests receive the maximum protection practicable consistent with silvicultural requirements”.⁷³² While Rodger noted that “recently control-burnt country will not stop the spread of a fire on a day of extreme fire danger”, the main aim should be to “reduce the fire intensity and rate of spread and so allow fire suppression forces to attack the fire more easily and with greater safety”.⁷³³ This legitimisation contributed to the basis for the Australian Strategy of prescribed burning ever since, though it has been twisted into simplistic formulations such as ‘No fuel, no fire’. Pyne has noted how the Dwellingup fires could have been reasonably interpreted either way; the failure of the post-1953 prescribed programme to prevent the Dwellingup fires could have resulted in a “frank admission that holocausts were inevitable in Australia regardless of what measures might be taken”.⁷³⁴ Instead, the Commission’s findings and recommendations went the other way: “the Forests Department had simply not burned enough”; “the fires of 1939 had said to Stretton that something was fundamentally rotten; the 1961 fires told Rodger that something was fundamentally sound”.⁷³⁵ This framework underpinned bushfire strategy in Australia for decades, though as Chapter Six describes, it has been replaced, at least in Victoria, with a more reactive strategy closer to the ‘frank admission of inevitability’.

⁷³⁰ Rodger, *Report of the Royal Commission ... 1961*, 50–53. This proportion seems to contradict the later expansion of prescribed burning. A likely explanation is that Rodger and later reports were accounting for different areas.

⁷³¹ Lachlan McCaw, T. Hamilton, and C. Rumley, “Application of Fire History Records to Contemporary Management Issues in South-West Australian Forests,” in *A Forest Consciousness: Proceedings of the 6th National Conference of the Australian Forest History Society Inc, 12 - 17 September 2004, Augusta, Western Australia* (Rotterdam: Millpress, 2005), 562.

⁷³² Rodger, *Report of the Royal Commission ... 1961*, 58.

⁷³³ Rodger, *Report of the Royal Commission ... 1961*, 61.

⁷³⁴ Pyne, *Burning Bush*, 336.

⁷³⁵ Pyne, 337.

The Rodger Commission's philosophical endorsement of prescribed burning was bolstered by scientific data from forester and fire scientist Alan McArthur. McArthur accompanied the Commission as a technical adviser and was able to question witnesses and gather data on fire behaviour. His prior experiments in fires were largely focussed on low-to-moderate intensity bushfires, but Dwellingup gave him data on high intensity bushfires. To McArthur, among the most important findings were that the evening gust which hit the town was "largely fire-induced" and drove a huge amount of spotting; this weather "would have defied any economic fire suppression".⁷³⁶ The product of these findings and his earlier experiments was the 1962 pamphlet *Control Burning in Eucalypt Forests*, which gave fire managers across the continent empirically-derived guidelines for the now-coalescing Australian Strategy.⁷³⁷

The Dwellingup bushfires and McArthur's guidelines gave additional impetus to the South West's prescribed burning strategy. Up to the 1970s the annual extent of area prescribed burning continued to grow.⁷³⁸ Such an expanded strategy quickly faced the issue of how to deliver such increased ignitions. In 1965, a forest manager calculated that in order to reach the Department's goals, each assigned staff member must burn some 1125 hectares per year (almost tripling the prior estimated rate), when there were just 45 days per year suitable for prescribed burning.⁷³⁹ An answer came from the heavens: instead of North Americans, who were beginning to use aircraft to suppress fires with water, Australians would use aircraft to ignite fires. The world's first aerial prescribed burning was conducted that year in Shannon River (Western Australia) and was a success.⁷⁴⁰ Early trials revealed that aerial incendiaries could burn 1200 hectares per hour, versus 8-16 hectares per hour of ignition by ground crews, and for only a slight cost increase.⁷⁴¹ Aerial burning – an Australian invention – quickly became a key part of what Stephen Pyne has called the "Australian Strategy".⁷⁴² The Australian Strategy – especially as it was executed in the South West – attracted global attention. The Fire Revolutionaries running the Tall Timbers Fire Ecology conferences (discussed in Chapter Five) welcomed Australian expertise on prescribed burning – a reversal of the influence of the fire suppression paradigm that emerged from the light burning dispute.⁷⁴³

⁷³⁶ McArthur, "The Origin and Development", SROWA, 30, 56.

⁷³⁷ A.G. McArthur, "Control Burning in Eucalypt Forests" (Canberra: Forestry and Timber Bureau, 1962).

⁷³⁸ Burrows and McCaw, "Prescribed Burning in Southwestern Australian Forests."

⁷³⁹ Wallace, "Fire in the Jarrah Forest Environment."

⁷⁴⁰ Roger Underwood, *Fire from the Sky: A Personal Account of the Early Days of Aerial Burning in Western Australia* (Palmyra, Western Australia: York Gum Publishing, 2015), 14.

⁷⁴¹ Wallace, "Fire in the Jarrah Forest Environment," 42; In 1989 the averaged cost of aircraft burning was the equivalent of \$0.62/ha (2018 \$AU); see McCaw et al., "Fire Management," 323.

⁷⁴² As noted earlier, the term was popularised by Pyne but may have an earlier origin. Pyne, *Burning Bush*, 337.

⁷⁴³ Pyne, 396.

It would be tempting to conclude that the Rodger Royal Commission was the most important historical factor behind the Australian Strategy, but this is to oversimplify. Perhaps because the Stretton Royal Commission was so influential, it is only natural to assume that the Rodger Commission was equally important in shifting fire policy. I argue the Rodger Commission should instead be interpreted as helping to confirm and legitimate processes that were already occurring. Harris's decision to implement prescribed burning had occurred several years earlier. McArthur's empirical guides (derived in part from analysis of Dwellingup) played a more important role; most Australian fire managers today have at least heard of McArthur, though few recognise Rodger's name. Aerial prescribed burning helped by glamourising and technologizing a process already occurring.

It's interesting to note that much of the research that came to underpin the Australian strategy was actually conducted or verified during and after its development and implementation from 1953, rather than giving rise to it. In 1962 McArthur had described how to be successful "burning is probably necessary once every five years", as eucalypt forests would quickly recover from fire and grow more fuels.⁷⁴⁴ Much later research quantified the "inhibition period" for southern jarrah forests at 6 years, whereas other ecological communities such as Victorian mountain forests and Californian chaparral have much shorter inhibition periods (and thus would require more frequent repetition of burning).⁷⁴⁵ It was argued that the Dwellingup fires had proven a major strategic benefit to prescribed burning; that while during its most intense phase it had crossed an area prescribed burned 2 years prior, during less severe phases the results of Harris-instituted prior burning meant that the Dwellingup fires were of lower intensity than they otherwise would have been, aiding suppression and control activities.⁷⁴⁶ These two insights coalesced into an argument for broadscale, or strategic, programmes of prescribed burning over large areas of land. Jarrah forests were prone to spotting, but prescribed burning on a broad basis reduced the likelihood firebrands would land in an area of high fuel and quickly grow beyond suppression thresholds. It was acknowledged that prescribed burning was dangerous and there was always the risk of escaped burns; the limited inhibition period of jarrah meant that "the more prescribed burning that is done, the easier and safer it is" to do more.⁷⁴⁷

The Australian Strategy was formulated from a forestry and management background and this has distinctly influenced it throughout its life. As public concerns about the effect of broadscale prescribed

⁷⁴⁴ McArthur, "Control Burning in Eucalypt Forests," 3.

⁷⁴⁵ Matthias M. Boer et al., "Long-Term Impacts of Prescribed Burning on Regional Extent and Incidence of Wildfires—Evidence from 50 Years of Active Fire Management in SW Australian Forests," *Forest Ecology and Management* 259, no. 1 (2009): 135–40.

⁷⁴⁶ Fernandes and Botelho, "A Review of Prescribed Burning Effectiveness in Fire Hazard Reduction," 120; Peet and Williamson, "An Assessment of Forest Damage from the Dwellingup Fires in Western Australia"; McArthur, "Control Burning in Eucalypt Forests."

⁷⁴⁷ Neil Burrows, "The Great Escapes," *Fire Australia*, 2017, 37.

burning began to surface in the 1970s and intensified in the 1980s, the Department of Conservation and Land Management did move to incorporate a greater attention towards floral and faunal fire ecology,⁷⁴⁸ but ultimately the Strategy was predicated on a proactive management, rather than reactive research-led basis. Research into the ecological effects of prescribed burning was acknowledged, incorporated and even directed, but burning would continue as before, because “the manager simply cannot wait for scientists to complete studies on all species before initiating burning programmes”.⁷⁴⁹ The Australian Strategists rejected what they perceived as the “widely held philosophy [of] ‘let nature take its own course’” in favour of this proactive pragmatism,⁷⁵⁰ and equally rejected a “knee-jerk emulation” of North American fire strategies which were focussed on suppression and water bombing over fire bombing.⁷⁵¹ Pyne believed this decision was for some, elevated to a form of nationalism.⁷⁵²

This philosophical basis is critical to understanding the question of to what degree the Australian strategy was influenced by Indigenous burning. Pyne characterised the Australian Strategy as “firestick forestry”,⁷⁵³ but this poetic descriptor perhaps oversells the similarities. In concept, the architects of the Australian strategy were aware that Indigenous Australians used fire and that this might have implications for contemporary strategy. McArthur’s *Control Burning in Eucalypt Forests* speculated on whether the combination of lightning and Indigenous fires had resulted in a maximum fuel accumulation of 2-3 tonnes per acre.⁷⁵⁴ For McArthur, the Australian strategy was conceptually a continuation of Indigenous burning: “We can do much the same type of burning...instead of the Aboriginal firestick we now use aircraft dropping incendiary capsules which light up the country on a grid pattern and produce a mosaic pattern of burnt and unburnt land”.⁷⁵⁵ Others made this link; in 1975 one conference paper argued that “prescribed burning should be designed to result in a mosaic effect in order to ‘simulate the controlled fires of the period before colonisation by European man’”.⁷⁵⁶

⁷⁴⁸ See for example Burrows, “Planning Fire Regimes for Nature Conservation Forests in South Western Australia.”

⁷⁴⁹ P. Christensen and A. Annels, “Fire in Southern Tall Forests,” in *Fire Ecology and Management of Western Australian Ecosystems: Proceedings of a Symposium Held in Perth on 10-11 May 1985*, ed. Julian R. Ford, vol. WAIT Environmental Studies Group Report No. 14 (Perth: Western Australian Institute of Technology, 1985), 67.

⁷⁵⁰ Burrows, “Planning Fire Regimes for Nature Conservation Forests in South Western Australia,” 132.

⁷⁵¹ Pyne, *Burning Bush*, 339.

⁷⁵² There is an element of gentle ribbing in his observation. Pyne, *Burning Bush*.

⁷⁵³ Pyne, *The Still-Burning Bush*, 2.

⁷⁵⁴ McArthur, “Control Burning in Eucalypt Forests,” 3.

⁷⁵⁵ McArthur, “Plotting Ecological Change,” 44.

⁷⁵⁶ P.E. Christensen and P.C. Kimber, “Effect of Prescribed Burning on the Flora and Fauna of South West Australian Forests,” in *Proceedings of the Ecological Society of Australia*, vol. 9, 1975, 85–106.

Some sought to re-establish the methods and details of Indigenous burning, though detailed reconstructions were rare.⁷⁵⁷

Ultimately, I argue that the Australian strategy was not heavily influenced by Indigenous burning, and that links, entanglements, and confluences were later grafted on to an already-evolving land management strategy. McArthur was interested in Indigenous burning, acknowledging that it modified environments and thus “the term ‘natural state’ [to describe environments] must be open to considerable debate...perhaps we can say that there is no such thing as a ‘natural’ state”.⁷⁵⁸ However there is little public evidence from the initial stages in 1950s and 60s of serious engagement by McArthur or others with contemporary Indigenous communities – perhaps due to notions of cultural discontinuity (discussed in depth in Chapter Four). There was less interest than one might expect in efforts to determine the specifics of burning patterns: of timing, location, vegetation changes on local rather than landscape scales – all factors necessary for a *direct* emulation or re-establishment of Indigenous burning. It might be argued that the *expansion* of the Australian Strategy in the 1960s and 1970s was aided by the expansion in public awareness of Indigenous burning, except that the timing does not match. Aerial burning was well underway by the publication of the germinal papers of Rhys Jones and Duncan Merrilees (discussed in Chapter Seven) in the late 1960s. The extent of hectares burned in the South West had peaked by publication of Hallam’s *Fire and Hearth* in 1975. As we shall see later, the publication of Pyne, Flannery, and Langton’s works in the 1990s coincided with a continued decline in hectares burned, and the general faltering of the Australian strategy.

It’s fair to say the Australian Strategists were never really seeking to re-establish Indigenous burning. They were clearly aware of it in concept. Some were open to broader implications of it – what today we might understand as ‘Australia is a cultural landscape’. But sustained engagement in terms of determining methods and techniques of pre-contact burning only came once the Strategy was firmly embedded as policy. Furthermore, there is no evidence in the early or peak periods of the Strategy of any major contemplation or reflection on the implications of appropriating Indigenous burning practices, or upon the violence that underpinned the cessation of these practices. There was certainly no serious consideration of inviting contemporary Indigenous people to burn as per their traditional practices on a genuinely equal basis; of sharing or handing over the torch.

All this doesn’t answer the question of how the Australian Strategy should be judged on its own terms – did it mitigate against damaging bushfires? This assessment is necessary as the Strategy dominated Australian fire discourse for decades and its disciples argued strongly in favour of it following the 2009

⁷⁵⁷ An exception is Christensen and Annels, “Fire in Southern Tall Forests.”

⁷⁵⁸ McArthur, “Plotting Ecological Change,” 29.

Black Saturday bushfires. A major analysis conducted in 2009 on the Warren region (comprising jarrah forests south of Dwellingup) found that consistent prescribed burning significantly changed the distribution and composition of fuel age across the landscape, in turn reducing the incidence and extent of large unplanned fires. When prescribed burning declined in the 1980s and 90s there was a corresponding greater incidence in unplanned fires of medium size. Critically, the study found the area treated by prescribed fire had most effect against unplanned fire in following years rather than in the year of treatment, and that the distribution of older fuels was also important, pointing to the need for a programmatic approach to burning.⁷⁵⁹ Earlier studies by advocates of the Australian Strategy pointed with pride to the lack of loss of life since Dwellingup (sadly, no longer true), or gave case studies where the implementation of the Strategy was felt to have aided fire suppression.⁷⁶⁰

A related question was how exportable was the Australian Strategy? As shown in Chapter Six, it has been common for critics of fire management in other Australian states to point to Western Australia. Adams and Attiwill in 2011 lamented that “lessons” from Western Australia were “only slowly, even grudgingly” being accepted by some researchers and commentators.⁷⁶¹ It is not the focus of this thesis, but there are surprisingly few sophisticated comparative analyses that thoroughly verify these comparisons, and Australian fire discourse is poorer for it.⁷⁶² As discussed, the conditions to conduct burning would need to be considered (45 days available to burn each year, as discussed above, is far more generous than in some Victorian areas), as would the topography (Victoria is far less flat than the South West) and the vulnerability of adjoining farmland and settlements to escaped burns (which might influence concerns around liability and smoke). There is strong evidence that different forests react differently to applied programmes of fire, whether measured through the concept of ‘leverage’ (“the total area protected from high-intensity wildfire per unit area treated by fuel reduction”) or through an analysis of how forest structure influences fire behaviour.⁷⁶³ Additionally, there is the

⁷⁵⁹ Boer et al., “Long-Term Impacts of Prescribed Burning.”

⁷⁶⁰ See for instance R.J. Underwood, R.J. Sneeuwjagt, and H.G. Styles, “The Contribution of Prescribed Burning to Forest Fire Control in Western Australia: Case Studies,” in *Fire Ecology and Management of Western Australian Ecosystems: Proceedings of a Symposium Held in Perth on 10-11 May 1985*, ed. Julian R. Ford, vol. WAIT Environmental Studies Group Report No. 14 (Perth: Western Australian Institute of Technology, 1985), 153–70.

⁷⁶¹ Mark Adams and Peter Attiwill, *Burning Issues: Sustainability and Management of Australia’s Southern Forests* (Acton, ACT: CSIRO Publishing and Bushfire CRC, 2011), 77.

⁷⁶² This is not a new observation. The relative points of difference have been discussed among fire managers since at least 1985. See R.B. Good, “The Planned Use of Fire on Conservation Lands - Lessons from the Eastern States,” in *Fire Ecology and Management of Western Australian Ecosystems: Proceedings of a Symposium Held in Perth on 10-11 May 1985*, ed. Julian R. Ford, vol. WAIT Environmental Studies Group Report No. 14 (Perth: Western Australian Institute of Technology, 1985), 147–52; See also Adams and Attiwill, *Burning Issues: Sustainability and Management of Australia’s Southern Forests*.

⁷⁶³ Boer et al., “Long-Term Impacts of Prescribed Burning,” 133; Price et al., “Global Patterns in Fire Leverage”; Philip Zylstra et al., “Biophysical Mechanistic Modelling Quantifies the Effects of Plant Traits on Fire Severity:

question of prevailing conditions for destructive bushfires. Victoria – the ‘fire flume’ – has historically suffered from catastrophic conditions caused by combinations of drought, soaring temperatures, and chaotic winds. The South West’s closest equivalent to the conditions of Black Saturday would seem to be the 1978 Cyclone Alby crisis, where perhaps 100 simultaneous bushfires were driven forward by strong winds.⁷⁶⁴

The Australian Strategy Falters

As discussed, the Australian Strategy peaked and then declined. From an average of just below 300,000 ha/year at the beginning of the 1980s, it fell to below 100,000 ha/year at the end of the millennium, meaning the average interval between fires extended to more than 10 years.⁷⁶⁵ The proud post-Dwellingup record of no further fatalities from bushfires no longer applies; in recent years destructive and fatal bushfires in the South West have occurred.⁷⁶⁶ Many have claimed a causal relationship between these two factors, leading to a highly heated debate, but it is essential to understand the political context behind this. Despite rhetorical flourishes to Indigenous burning (chiefly through references to Hallam), there have been few detailed considerations of Indigenous burning, and very little space made for Indigenous voices.

The contentious nature of prescribed burning politics in the South West can only be understood as being heavily influenced by what economist Judith Ajani termed the “Forest Wars”, a long-running political dispute over logging of native timber.⁷⁶⁷ These debates “intensified markedly” in the South West after the formation of the Department of Conservation and Land Management (CALM) in 1985, which combined responsibilities for both conservation and timber production.⁷⁶⁸ Policy instruments called Regional Forest Agreements were designed to end the disputes and balance timber and conservation interests, created after long consultation and at great expense. As a sign of just how deeply entrenched these disputes were, the South-Western RFA lasted just eight weeks after it was

Species, Not Surface Fuel Loads, Determine Flame Dimensions in Eucalypt Forests,” *PLOS ONE* 11, no. 8 (2016): e0160715.

⁷⁶⁴ B. Hanstrum, “Fire Weather in Relation to Tropical Cyclones over South-West Western Australia,” in *Proceedings of the Third Australian Fire Weather Conference, 18-20 May 1989, Hobart* (Melbourne: Bureau of Meteorology, 1990), 79–84; Roger Underwood, *Cyclone Alby: Memories of the 1978 Western Australian Storm and Bushfire Crisis* (Palmyra, Western Australia: York Gum Publishing, 2018).

⁷⁶⁵ Chris Muller, “Review of Fire Operations in Forest Regions Managed by the Department of Conservation and Land Management: Report to the Executive Director of the Department of Conservation and Land Management” (Perth: Department of Conservation and Land Management WA, 2001), 56, 48.

⁷⁶⁶ Burrows, “The Great Escapes.”

⁷⁶⁷ John Dargavel, “Views and Perspectives: Why Does Australia Have ‘Forest Wars’?,” *International Review of Environmental History* 4, no. 1 (2018); Ajani, *The Forest Wars*.

⁷⁶⁸ Pierre Horwitz and Martin Brueckner, “The Use of Science in Environmental Policy: A Case Study of the Regional Forest Agreement Process in Western Australia,” *Sustainability: Science, Practice, & Policy* 1, no. 2 (2005): 16.

signed, withdrawn by the Court Coalition Government under heavy political pressure over a perceived lack of genuine consultation and scientific evidence.⁷⁶⁹ One prominent member of the West Australian Forest Alliance has described clearfelling of old growth trees as “the Auschwitz of the forest...unnecessary destruction of life”.⁷⁷⁰ CALM was regarded as “basically a forestry agency” with “little knowledge or interest in biodiversity and the environment”, and its data and publications regarded with great scepticism.⁷⁷¹ The response of CALM and its allies was fierce, pointing to the “embarrassing absence” of evidence of any claimed extinctions from clearfelling practices, and decrying the “infiltration of relativist and subjectivist values” into science critical of its policies.⁷⁷² This lack of faith in CALM from environmentalists informed their regard for CALM’s prescribed burning programmes.

As discussed in Chapter Six, there is a great deal of smoke and not much clear air around the link between activist groups and declines in prescribed burning as a practice. Suffice to say in the South West that the debate has been extremely fierce. In 1985 Dr Tingay of the Australian Conservation Foundation was able to claim that the conservation movement was “not opposed to fuel reduction per se” but was concerned about the potential for damage through the inappropriate use of fire.⁷⁷³ This measured tone was later overridden by more strident objections. Environmentalists were sceptical of prescribed burning because they were unable to escape that “the practice was developed by foresters to protect the timber resource”.⁷⁷⁴ They focussed on issues that “burn advocates will not admit”, including supposed harmful ecological impacts from over-frequent burning, the limited effectiveness of prescribed burning under severe conditions, crude risk assessment policies, and the danger of prescribed burning promoting fire-prone species.⁷⁷⁵ In response, prescribed burning

⁷⁶⁹ Martin Brueckner, “The Western Australian Regional Forest Agreement: Economic Rationalism and the Normalisation of Political Closure,” *Australian Journal of Public Administration* 66, no. 2 (2007): 148–58.

⁷⁷⁰ Beth Schultz quoted in Jean Hillier, “Can’t See the Trees for the Wood? Visions and Re-Visions of Old-Growth Forests in Western Australia,” in *Country: Visions of Land and People in Western Australia*, ed. Andrea Gaynor, Matthew Trinca, and Anna Haebich (Perth: Western Australian Museum, 2002), 73.

⁷⁷¹ Edwin O’Rourke, “Our Parks are still on fire”, *The Greener Times: WA’s Environmental News Magazine*, March 2003, Bib ID 2684009, National Library of Australia, Canberra, ACT, Australia, 23.

⁷⁷² Abbott and Christensen, “Objective Knowledge, Ideology and the Forests of Western Australia,” 209–10.

⁷⁷³ A. Tingay, R.J. Sneeuwjagt, and H.G. Styles, “Contemporary Views of the Voluntary Conservation Movement on the Use of Fuel Reduction Burns as a Land Management Technique,” in *Fire Ecology and Management of Western Australian Ecosystems: Proceedings of a Symposium Held in Perth on 10-11 May 1985*, ed. Julian R. Ford, vol. WAIT Environmental Studies Group Report No. 14 (Perth: Western Australian Institute of Technology, 1985), 215.

⁷⁷⁴ “Fire – Still the Hot Topic”, *The Greener Times: WA’s Environmental News Magazine*, February 2003, Bib ID 2684009, National Library of Australia, Canberra, ACT, Australia, 9.

⁷⁷⁵ WA Forest Alliance, “Briefing Paper: Fire, Prescribed Burning and the Conquest of Nature”, *The Greener Times: WA’s Environmental News Magazine*, February 2002, Bib ID 2684009, National Library of Australia, Canberra, ACT, Australia, 6-7. Another summary of environmentalist objections can be found in Neil Burrows and Ian Abbott, “Fire in South-West Western Australia: Synthesis of Current Knowledge, Management

advocates presented a choice: “either we manage fire...or wildfires will take control of the situation for you”.⁷⁷⁶ Particularly vocal advocates such as the Bush Fire Front have criticised a varied group including “wilderness fanatics...green journalists...[and] the fabled doctor’s wives from the affluent suburbs”,⁷⁷⁷ and argued groups such as the WA Conservation Council “have a lot to answer for” – namely, the destructive bushfires that have struck the South West in recent years.⁷⁷⁸

The bureaucratic and scientific consensus developed by McArthur that had underpinned the Australian strategy fractured. For instance, the Environmental Protection Authority of Western Australia published a review questioning “For what purpose” CALM implemented its programme,⁷⁷⁹ leading to a furious response from CALM which criticised the “selective and biased” use of evidence to erect “straw man” claims.⁷⁸⁰ In recent years the fire ecology base of the Australian strategy has been questioned, with attempts by the EPA and others to reframe the description of Australian flora and fauna as “fire-adapted” to “fire-tolerant”, and that plant traits which appear to originate from evolutionary adaptations to fire can instead be explained through ‘exaptation’.⁷⁸¹ This critique has in turn been criticised as irrelevant to contemporary concerns about fire management (i.e., it doesn’t matter how these traits developed, what matters is how they affect contemporary management).⁷⁸² These disputes led Buizer and Kurz to convincingly argue that the contemporary prescribed burning debate in the South West is actually about knowledge claims and different conceptions of vulnerability (environmental vs human).⁷⁸³

No doubt other factors influenced the decline in prescribed burning, though these make for more complex analysis beyond this thesis. One is political pressure (regardless of whether it is actually exercised or merely perceived in a precautionary sense) to reduce smoke pressures. Smoke from

Implications and New Research Directions,” in *Fire in Ecosystems of South West Western Australia: Impacts and Management*, ed. I Abbott and N. Burrows (Leiden: Backhuys, 2003), 448.

⁷⁷⁶ Neil Burrows quoted in ABC News (Australia), *WA Leads the Force in Tackling Bushfires*, 30 July 2010, <https://www.youtube.com/watch?v=XHi9CAPXwvs>.

⁷⁷⁷ Roger Underwood, “Bushfires and Global Warming,” *Quadrant Online* (blog), 26 November, 2015, <http://quadrant.org.au/opinion/doomed-planet/2015/11/bushfires-global-warming/>.

⁷⁷⁸ George Peet quoted in Tony Barrass, “Learning to Live with Nature,” *The Australian*, 10 December, 2011; Roger Underwood, “Ferguson Report a Beauty, but Now the Fight Begins,” *News Weekly*, no. 2976 (2016): 4–5.

⁷⁷⁹ Environmental Protection Authority (Western Australia), “Fire, for What Purpose? Review of the Fire Policies and Management Practices of the Department of Conservation and Land Management: A Discussion Paper” (Perth: Environmental Protection Authority, 2004).

⁷⁸⁰ Neil Burrows and Ian Abbott, “Critique of a Paper Submitted to the Environmental Protection Authority (EPA) of Western Australian Entitled ‘Fire Regimes and Biodiversity Conservation: A Brief Review of Scientific Literature with Particular Emphasis on Southwest Australian Studies’ by Grant Wells, Stephen D Hopper and Kingsley W Dixon” (Department of Conservation and Land Management WA, 21 June, 2004), 1, 3.

⁷⁸¹ Wells, Hopper, and Dixon, “Fire Regimes and Biodiversity Conservation”; Bradshaw et al., “Little Evidence for Fire-Adapted Plant Traits in Mediterranean Climate Regions.”

⁷⁸² Keeley et al., “Fire as an Evolutionary Pressure Shaping Plant Traits”; for a more in-depth description of this dispute, see Buizer and Kurz, “Too Hot to Handle.”

⁷⁸³ Buizer and Kurz, “Too Hot to Handle.”

prescribed burns has threatened closures of Perth airport and even shipping lanes,⁷⁸⁴ causing “constant pressure from ministers not to prescribe burn”.⁷⁸⁵ These concerns forced CALM to respond by changing its policies around when and how to burn to reduce the average number of days of reduced visibility.⁷⁸⁶ Another explanatory factor may be found in the changing demographics of the South West, as more people move into areas on the “wildland-urban interface” and are thus at risk from both bushfires and escaped prescribed burns.⁷⁸⁷ The South West as a whole has been affected by a sustained and substantial decrease in rainfall since the 1970s, potentially as a result of a combination of global and localised climatic changes.⁷⁸⁸ Combined with demographic and socio-economic changes, this is obviously shifting the drivers of both fire behaviour and impact.

Although this chapter has focussed on the debates following the Dwellingup fires, a brief survey reveals how these debates after 1961 have also involved connotations with Indigenous burning. Some environmentalists have disputed the relevance of Indigenous burning by arguing that the reasons and method for burning are very different to prescribed burning.⁷⁸⁹ Other environmentalists have questioned the popular representations of Noongar burning, accusing “burn advocates” of having “gone to great lengths to *construct* their version of how Aboriginal people used fire” [my emphasis], and were sceptical of any systematic burning in jarrah forests at all (echoing the ‘disagreement’ discourse explored in Chapter Six).⁷⁹⁰ Buizer and Kurz conducted a series of interviews with figures from all sides of the prescribed burning debates in the South West, and found both advocates and critics of prescribed burning drew on Indigenous burning to bolster their claims.⁷⁹¹

The voice of Noongar people has very rarely been heard in these debates, as Noongar environmental scientist Glen Kelly noted in 1999.⁷⁹² Kelly argued against the ‘cultural discontinuity’ “misconception”

⁷⁸⁴ Muller, “Review of Fire Operations in Forest Regions Managed by the Department of Conservation and Land Management: Report to the Executive Director of the Department of Conservation and Land Management,” 56.

⁷⁸⁵ Barrass, “Learning to Live with Nature.”

⁷⁸⁶ Rick Sneeuwjagt and Nigel Higgs, “Managing a Fiery Change (Reprint),” *Landscape*, 2009, 16.

⁷⁸⁷ Charis E. Anton and Carmen Lawrence, “Does Place Attachment Predict Wildfire Mitigation and Preparedness? A Comparison of Wildland–Urban Interface and Rural Communities,” *Environmental Management* 57 (2016): 148–62.

⁷⁸⁸ McCaw and Hanstrum, “Fire Environment of Mediterranean South-West Western Australia,” 89; Ruth Morgan, “Running out? An Environmental History of Climate and Water in the Southwest of Western Australia, 1829 to 2006” (PhD thesis, University of Western Australia, 2012).

⁷⁸⁹ “Fire – Still the Hot Topic”, *The Greener Times*, NLA, 10.

⁷⁹⁰ WA Forest Alliance, “Fire, Prescribed Burning and the Conquest of Nature”, *The Greener Times*, NLA, 6-7.

⁷⁹¹ Buizer and Kurz, “Too Hot to Handle.” It should also be noted that CALM (and its successor agencies) have sponsored research into Indigenous burning, including highly innovative work reconstructing burning in the Western Desert via historical aerial photographs. See Burrows et al., “Evidence of Altered Fire Regimes in the Western Desert Region of Australia”; Neil Burrows and Jane Chapman, “Traditional and Contemporary Fire Patterns in the Great Victoria Desert, Western Australia” (Perth: Department of Biodiversity, Conservation and Attractions, 2018).

⁷⁹² Kelly, “Karla Wongi: Fire Talk.”

that Noongar people have retained “little knowledge or memory of land and its processes”, and worried about how the cessation of Noongar burning practices had caused some parts of Noongar country to “move from productive and vital areas to what we consider sick (*mindytch*) or dead country (*noich boodja*).⁷⁹³ He was equally concerned about the consequences of a “no burn ideology” and “inappropriate prescribed burns”.⁷⁹⁴ As of December 2019, while there are great strides being made towards the implementation of cultural burning by Indigenous people for Indigenous purposes by the Ngadju people of the Great Western Woodlands, there is less evidence of a shift towards Noongar burning by Noongar people for Noongar purposes in the South West.⁷⁹⁵

Conclusion

Stephen Pyne has interpreted Australian fire history since Federation as being framed by two events: Black Friday and Dwellingup. Stretton skewered the fire exclusionists by pointing out Australian conditions rendered their ultimate aim unattainable; less well known is Pyne’s assessment of the shortcomings of the Australian Strategy as it applies to Victoria: “No, the Australian strategists might admit, they had never succeeded in doing hazard-reduction burning on the scale needed. A critic might retort that they never would”.⁷⁹⁶ Jarrah might be fire’s lucky forest, but not every fire manager is so lucky.

Jarrah forests have a close relationship with fire, as indeed do the Noongar people of the South West who systematically manipulated and maintained vegetation and faunal patterns. In the South West, fire suppression by European settlers was intimately tied up with violent settler colonialism, especially where these settlers understood that suppression of Noongar fires reduced their capacity to resist. Unrestrained exploitation of timber by settlers resulted in the establishment of forestry departments, which, inspired by the events discussed in Chapters One and Two, initially sought to exclude fire from the forests. Experimentation with prescribed burning in the 1950s was interpreted as highly successful by the Rodger Royal Commission at reducing the impact of the 1961 Dwellingup fires, and therefore received a full endorsement. The Commission heard from farmers and settlers who advocated for

⁷⁹³ Kelly, 10, 13.

⁷⁹⁴ Kelly, 13.

⁷⁹⁵ Suzanne M. Prober et al., “Ngadju Kala: Ngadju Fire Knowledge and Contemporary Fire Management in the Great Western Woodlands” (Floreat, Western Australia: Ngadju Nation and CSIRO, 2013); Prober et al., “Ngadju Kala”; Jessica K. Weir and Dean Freeman, “Fire in the South: A Cross-Continental Exchange” (Bushfire & Natural Hazards CRC, 2019), <https://www.bnhcrc.com.au/publications/biblio/bnh-5488>.

⁷⁹⁶ Pyne, *The Still-Burning Bush*, 102.

increased prescribed burning, but judged their complaints to be based on resentment at government authority over ignition rather than guided by evidence of successful practice.

The evidence of Noongar burning in jarrah forests (unlike Indigenous burning in mountain ash forests) might have opened up earlier possibilities for Indigenous burning discourses to further develop, but this did not occur. There was little discussion of pre-colonial Noongar burning, and, with one exception, the discussion which did occur was scant on details and devoid of any recognition of Noongar agency or intention. The Commission's recommendations helped shape the Australian Strategy of broad area prescribed burning, bolstering the support for the Australian Strategy provided by empirical guides to burning and the technological glamour of aerial ignition. The Strategy was reasonably successful in jarrah forests and strongly influenced fire management across Australia, but has faltered in recent decades as prescribed burning has become embroiled in broader Forest Wars. Despite implied and explicit links made between it and Indigenous burning practices, I argue the Australian Strategy was not heavily influenced by considerations of Indigenous burning in its early periods. Indeed, reappraisal of Australian fire management from the framework of Indigenous burning awaited new research, and a site where non-Indigenous Australians could encounter Indigenous burning as a lived reality.

Chapter Four:

Black, White, Red, Green: Kakadu as a Site of Encounters with Indigenous Burning

...and at one stage (in the late 1980s) Clarrie (pseudonym for a man well known to us both) was burning...and there was... a bit of resentment (within) the park service to Clarrie ...I mean, who are these buggers to tell him how to burn, and it came to a head one day when (one of the white rangers) who I have a lot of time for, came across Clarrie setting fires, and he said it's not park policy to burn at this time of the year. And Clarrie says, (laughing) 'well what's the park policy then, on Aboriginal burning? I'm an Aboriginal and I'm burning!' ... and the rangers ...would follow people like Clarrie...and he would play this game...of setting fires and trying to avoid getting caught, so...the fire thing was quite a complex thing on the ground.⁷⁹⁷

– interview with former Kakadu Park ranger conducted by Chris Haynes (former Kakadu Park ranger and manager)

Kakadu is bloody hot just before the Wet. The wetlands have shrunk. The grass is bone-dry. Huge clouds hang ominously, the curtain of humidity a promise of the monsoonal deluge to come, yet the country feels ready to explode. During a visit in November 2015, I remember a hot wind rising in the afternoon that carried ash from recent burns. I was with a busload of American and European tourists, and secretly glad their age allowed me to take it easy climbing up the rocks at Ubirr. The wind grew in strength, and what had been blue sky became grey. I began to feel slightly worried – this was the storm season, the danger period when Top End fires can burn most fiercely before rains quench parched soil. We heard thunder in the distance and smelt smoke in the air. That night was the first big storm of the Wet season. *Namarrgon*, the lightning man of Kunwinjku tradition, had arrived.

Kakadu is Australia's largest and best-known National Park. It is one of nineteen World Heritage sites in Australia,⁷⁹⁸ and each year over 200,000 people visit this area, one-third the size of Tasmania.⁷⁹⁹ The

⁷⁹⁷ C.D. Haynes, "Defined by Contradiction: The Social Construction of Joint Management in Kakadu National Park" (PhD thesis, Charles Darwin University, 2009), 271.

⁷⁹⁸ Kakadu National Park Board of Management and Australian Government: Director of National Parks, "Kakadu National Park Management Plan 2016-2026: A Living Cultural Landscape" (Director of National Parks Australia, 2016), 15.

⁷⁹⁹ C.D. Haynes, "Realities, Simulacra and the Appropriation of Aboriginality in Kakadu's Tourism," in *Indigenous Participation in Australian Economies: Historical and Anthropological Perspectives*, ed. I. Keen (Canberra: ANU E Press, 2010), 165.

Park is famous for its tropical wildlife and natural features, but it is just as renowned for its cultural heritage – Kakadu was the first national park in the world to be legally owned by its indigenous peoples, and for over three decades has functioned as a grand experiment in ‘joint management’ between Federal conservation bodies and Indigenous owners. Over those decades, Kakadu served as a site of encounter between Indigenous and non-Indigenous culture, particularly through fire, as the Park promoted its programs of restoring traditional burning practices. Kakadu and its neighbour Arnhem Land (explored in Chapter Eight) are especially resonant to Australian national identity as national spaces, due to perceived lesser impacts of colonisation, environmental significance, and importance in political debates over uranium mining and land rights. This is as true for non-Indigenous Australians as it is for Indigenous Australians; Russell McGregor argues the Indigenous activists of the 1960s and 70s saw Northern Australia as “the repository of authentic Aboriginality, a place from which a cultural renaissance could be initiated to reinvigorate the Aboriginal nation”.⁸⁰⁰ This national role can obscure the tensions of local politics and culture.⁸⁰¹

In this chapter I examine the politics of fire in Kakadu before its declaration as a Park in 1979 and in subsequent decades, particularly focussing upon the earlier years of the Park’s existence. I demonstrate the importance of Kakadu as a site where non-Indigenous Australians encountered active Indigenous burning and reveal some of the tensions and ambiguities exposed when Indigenous burning is no longer an abstract or historical concept. While I focus upon how Kakadu has shaped non-Indigenous perceptions of Indigenous burning, it is essential to note that Indigenous Australians from outside the Alligator Rivers region have also had their views on burning shaped by Kakadu: the Yorta Yorta group in Victoria, for instance, cited Indigenous burning in Kakadu to support their claims for the right to use fire to manage their own lands.⁸⁰² In Chapter Eight I will explore how the ‘cultural burning’ movement is re-establishing Indigenous fire management in Australia’s more intensively-colonised areas; an exploration of Kakadu’s fire politics foreshadows the ideological frameworks that will likely shape non-Indigenous responses to this restorative movement. The fire history of Kakadu thus exposes the ‘cultural continuity’ paradigm of how some non-Indigenous Australians have conceived of Indigenous burning and reveals how non-Indigenous Australians have grappled with conceptions of ‘wilderness’.

I open this chapter by exploring the factors behind fire’s ubiquity in Kakadu and the Top End of Australia more broadly, a reminder that Australia is a fire continent. I then briefly examine the history

⁸⁰⁰ Russell McGregor, “Another Nation: Aboriginal Activism in the Late 1960s and Early 1970s,” *Australian Historical Studies* 40, no. 3 (2009): 359.

⁸⁰¹ I am grateful to Maria Nugent for this insight. See Maria Nugent, *Botany Bay: Where Histories Meet* (Crows Nest: Allen & Unwin, 2005); Doreen Massey, *Space, Place, and Gender* (University of Minnesota Press, 1994).

⁸⁰² Colloff, *Flooded Forest and Desert Creek: Ecology and History of the River Red Gum*, 118.

of the Kakadu area before the 1970s, as Indigenous Australians moved into the area, shaped its vegetation, but were then heavily affected by colonisation. Protracted negotiations over wildlife conservation, land rights movements, and disputes over uranium mining led to the declaration of Kakadu National Park in 1979 under an experimental 'joint management' system. The rhetoric of Park policy has slowly warmed to an active role for Indigenous burning, but Indigenous residents have still reported a great deal of dissatisfaction with how this policy is enacted. Non-Indigenous Park staff were initially wary of Indigenous burning, exhibiting a range of responses including the 'cultural continuity', 'environmental continuity' and 'pyro-essential' frameworks. Evidence of how Indigenous burning was used by Park staff to defend Kakadu against external criticism reveals a complex relationship. Kakadu's role as a centre for academic research meant that academics both shaped the fire practices of Kakadu, and were shaped by the complex politics they found there – influencing conceptualisations of Indigenous burning across Australia and North America more broadly. The establishment of the Park was aided by activist conservationist groups, and Kakadu has subsequently been a microcosm for the broader Australian environmentalist movement's reconceptualisation of wilderness. The Top End's pastoral history ensured that graziers have played an important role in Kakadu's fire politics, pointing to the complexities of fire history and post-contact traditions. Tourists and miners have also helped shape fire discourse in Kakadu, although the course of debates over mining suggests environmentalist fears that Indigenous burning could be used to undermine conservation were unfounded.

The structure of governance in the Park has meant that Kakadu is governed by public Plans of Management. Interested parties can make submissions or comment on draft Plans. Combined with anthropological studies of the Park and archival records of the Park's early decades, there is a rich and unexamined record of the history of fire management within Kakadu. I particularly draw upon the anthropological work of Henry T. Lewis, a North American who through his work in the Top End developed comparative analyses of Indigenous burning across Australia and North America, and Chris Haynes, a former Park ranger and manager who subsequently completed an anthropology PhD on joint management in Kakadu. The access restrictions on submissions for later Plans of Management limits the bulk of this chapter's analysis to the earlier decades of the Park, as does the decision not to engage in detailed ethnographic work for this chapter.⁸⁰³ Consequently, in this chapter I focus upon the formation of the Park and its early decades. Rather than using a strictly chronological structure, I

⁸⁰³ Chris Haynes argues that analysis of joint management requires detailed ethnography, which is why I have chosen not to engage in an extended critique of the management structures of Kakadu. See Chris Haynes, "The Value of Work and 'Common Discourse' in the Joint Management of Kakadu National Park," *The Australian Journal of Anthropology* 28, no. 1 (2017): 72–87.

use a stakeholder structure as this best demonstrates how the competing goals of various distinctive groups have caused tensions in Kakadu's fire politics.

In this chapter I use the term *bininj* to refer to Indigenous Australians who were or are considered traditional owners of Kakadu National Park. It is a term in the local Kunwinjku and Gundjeihmi languages which means either "male" or "Aboriginal people", and is commonly used by Indigenous and non-Indigenous peoples alike throughout the Top End.⁸⁰⁴ There is an equivalent term – *balanda* – which is a generic term for non-Indigenous peoples (possibly originating from the Macassan word for Dutch traders), but as this chapter incorporates perspectives from North Americans and others, and because the term can overlook the long history of Malay and Chinese peoples living in Northern Australia, I have chosen to use the more generic 'non-Indigenous'. Similarly, the various Federal and Territory Government agencies involved have undergone administrative changes throughout my period of analysis; I have chosen to maintain historical fidelity at the cost of some confusion around successor agencies.⁸⁰⁵

History of the Kakadu Area Before and During Colonisation

The diverse environmental systems and ubiquity of fire within the Kakadu area, so different to the temperate and Mediterranean climates examined thus far, point to the diversity of Australia as a fire continent. Today, Kakadu National Park occupies 19,800 km² of the Alligator Rivers region of the Top End of the Northern Territory. Like much of the Australian continent, it lies within the tropics and is dominated by the monsoon climatic system, resulting in highly seasonal rainfall (over 90 percent of rainfall occurs during 'summer').⁸⁰⁶ Unlike the more temperate southern states, popular Western understandings of the climate system in Kakadu only distinguish between two 'seasons': Wet and Dry. *Bininj* conceptualise six 'seasons' based as much on flora flowering patterns and fauna migration as on weather patterns.⁸⁰⁷ The Park itself is unique in that in one drainage basin it contains examples of

⁸⁰⁴ In 2016, the Kakadu Board of Management agreed to use the combined term *bininj/munggay* to include the Jawoyn grouping. However, the bulk of my source material predates the addition of Jawoyn lands to Kakadu and thus I have chosen to maintain historical fidelity at the cost of inclusivity.

⁸⁰⁵ Such as Australian National Parks and Wildlife Service being renamed the Australian Nature Conservancy Agency in 1993, subsequently renamed Parks Australia in 1998.

⁸⁰⁶ Russell-Smith et al., "Aboriginal Resource Utilization and Fire Management Practice in Western Arnhem Land, Monsoonal Northern Australia: Notes for Prehistory, Lessons for the Future," 161.

⁸⁰⁷ An extensive description of the six seasons recognised by the Gundjeihmi is given in Russell-Smith et al., "Aboriginal Resource Utilization and Fire Management Practice in Western Arnhem Land, Monsoonal Northern Australia: Notes for Prehistory, Lessons for the Future"; however, the significance of the calendar has been disputed by Chris Haynes, who himself transcribed it from the knowledge of traditional owners Toby Gangali and Mick Alderson in an afternoon. Haynes questions whether the popularisation of the seasonal calendar

all the land forms and habitats of the Top End, and can be thought of as containing three major ecosystems: eucalypt savannah lowlands, the stone country plateau, and floodplains.⁸⁰⁸ A large variety of flora and fauna can be found within the Park, including many endangered, rare and endemic species.⁸⁰⁹

The monsoon climate system of Northern Australia helps ensure that fire is ubiquitous in Kakadu, and thus acts as another non-human protagonist of this thesis. Extremely seasonal rainfall provides fuel, and the lightning storms that precede the monsoon provide natural ignition sources.⁸¹⁰ Northern Australia is “the most fire-prone part of a very fire-prone continent”; each year, an astounding 250,000 to 450,000 km² is burnt, representing up to half of the total extent of savannahs across Northern Australia.⁸¹¹ Such ubiquity of fire exceeds that of even the jarrah forests of the South West, underlining the need for a vision of Australia as a diverse fire continent. It is also a reminder that fire history, which has traditionally focussed upon forests and woodlands, must include grasslands and savannahs. Later paragraphs will show how this pervasive presence of fire has greatly shaped the fire discourse of Kakadu, demonstrating the need for fire histories to conceptualise fire on a localised basis.

The arrival of Indigenous peoples and Indigenous firesticks in the area significantly shaped vegetation distribution. Archaeological evidence of human presence in the Top End indicates occupation for at least 40,000 to 60,000 years.⁸¹² Global climate change in the late Pleistocene and early Holocene led to the establishment of new freshwater wetlands in the Kakadu area within the last 2000 years, and there is evidence that burning of these particular regions (such as the Magela floodplain) began just 700-800 years ago.⁸¹³ This thesis has argued strongly that pre-contact Indigenous burning cannot be assumed to have been uniform across space; this example is a strong indication that pre-colonial

constitutes an appropriation of bininj culture and proposes it can even serve as a way of de-legitimising bininj who do not follow the calendar as it is (literally, at the Kakadu Visitor’s Centre at Bowali) carved in stone. See Haynes, “Realities, Simulacra and the Appropriation of Aboriginality in Kakadu’s Tourism.”

⁸⁰⁸ Richard W. Braithwaite, “The Biological Value of Kakadu National Park,” *Search* 18, no. 18 (1987): 296–301; A Malcolm Gill et al., “Fire Regimes of World Heritage Kakadu National Park., Australia,” *Austral Ecology* 25, no. 6 (2000): 616.

⁸⁰⁹ Braithwaite, “The Biological Value of Kakadu National Park.”

⁸¹⁰ Once fire is ignited (whether through natural or human ignition), it can be spread by non-human agents including Australian birds, see Mark Bonta et al., “Intentional Fire-Spreading by ‘Firehawk’ Raptors in Northern Australia,” *Journal of Ethnobiology* 37, no. 4 (2017): 700–718.

⁸¹¹ Jeremy Russell-Smith, “Fire Management Business in Australia’s Tropical Savannas: Lighting the Way for a New Ecosystem Services Model for the North?,” *Ecological Management & Restoration* 17, no. 1 (2016): 4; Alan Andersen, Garry D. Cook, and Richard J. Williams, eds., *Fire in Tropical Savannas: The Kapalga Experiment*, Ecological Studies Vol 169 (New York: Springer, 2003), vii. Jeremy Russell-Smith, “Fire Management Business in Australia’s Tropical Savannas: Lighting the Way for a New Ecosystem Services Model for the North?,” *Ecological Management & Restoration* 17, no. 1 (2016): 4; Alan Andersen, Garry D. Cook, and Richard J. Williams, eds., *Fire in Tropical Savannas: The Kapalga Experiment*, Ecological Studies Vol 169 (New York: Springer, 2003), vii.

⁸¹² Levitus, “Change and Catastrophe: Adaptation, Re-Adaptation and Fire in the Alligator Rivers Region,” 58.

⁸¹³ Levitus, 59–60.

Indigenous burning cannot be assumed to have been uniform across time. Burning by *bininj* profoundly shaped the vegetation distribution across this region. For example, as discussed in Chapter Eight, cypress blue pine (*Callitris intratropica*) is a species native to the Top End area that is relatively unscathed by the low-intensity fires that typifies most *bininj* burning but is heavily affected by high-intensity fires; the distribution of long-lived older specimens (100-200 years) compared with the growth of younger trees since colonial contact indicates the significant impact colonial contact had on Indigenous burning practices.⁸¹⁴

Sustained contact with Europeans brought significant and largely devastating changes to *bininj* living in the area. It seems reasonably likely that European contact with the people of the Alligator Rivers Region was preceded by Macassan traders.⁸¹⁵ A number of European explorers passed through or near to the region, including Phillip Parker King in the 1820s who gave the region its erroneous name.⁸¹⁶ At this time there were several language and ethnic groups living within the broader area, including the Jawoyn, Gundjeihmi and Gagudju (from whom the Park draws its name). The complex matrix of *bininj* identity will be discussed in depth below as it directly shapes the nature of fire discourse in the region. While the Alligator Rivers region saw comparatively less contact between Europeans and Indigenous Australians than the north-west Top End, the Indigenous population was still devastated through disease, disruption of economic and cultural systems, and direct violence.⁸¹⁷

The intensified impact of contact from the 1850s onwards directly shaped the politics of fire in Kakadu through the introduction of Asian water buffalo and demographic changes which drastically reduced the population of *bininj* present in the area. Sustained European impact on the region was driven by missions, cattle stations, and especially ventures based on the Asian water buffalo (*Bubalus bubalis*) that had been introduced to the Top End in 1825 and were observed in abundance in the Kakadu area in 1885.⁸¹⁸ Buffalo grew to such abundance that they altered the vegetation distribution of their park, thus altering fire regimes, as will be discussed below. Hunters shot buffalo for meat and hides for

⁸¹⁴ Clay Trauernicht et al., "Local and Global Pyrogeographic Evidence That Indigenous Fire Management Creates Pyrodiversity," *Ecology and Evolution* 5, no. 9 (2015): 1908–18; D. M. J. S. Bowman and W. J. Panton, "Decline of *Callitris intratropica* R. T. Baker & H. G. Smith in the Northern Territory: Implications for Pre- and Post-European Colonization Fire Regimes," *Journal of Biogeography* 20, no. 4 (1993): 373–81; D. M. J. S. Bowman et al., "The 'wilderness effect' and the decline of *Callitris intratropica* on the Arnhem Land Plateau, Northern Australia," *Australian Journal of Botany* 49, no. 5 (2001): 665–672.

⁸¹⁵ David Lawrence, *Kakadu: The Making of a National Park* (Melbourne: Melbourne University Press, 2000), 14.

⁸¹⁶ Lawrence, 14.

⁸¹⁷ Levitus, "Change and Catastrophe: Adaptation, Re-Adaptation and Fire in the Alligator Rivers Region," 65–67; Bill Neidjie, a prominent Gagudju elder, reputedly remembered being shot at by non-Indigenous hunters some time prior to the Park's creation, see Stanley Breeden and Belinda Wright, *Kakadu, Looking after the Country - the Gagudju Way* (Simon & Schuster, 1992).

⁸¹⁸ Aboriginal Project Committee, "Kakadu Region Social Impact Study: Report of the Aboriginal Project Committee" (Canberra: Supervising Scientist, 1997), 3.

export, and often employed *bininj* to assist them in their profession.⁸¹⁹ Further economic and social changes such as migration to urban centres resulted in the *bininj* population of the Alligator Rivers region falling to as low as a few dozen by the mid-1970s.⁸²⁰ This depopulation was rapidly reversed following the declaration of the Park in the late-1970s, so that the *bininj* population rose to over 300.⁸²¹ The period of depopulation has resulted in some commentators perceiving a lack of cultural continuity, which will be explored later as it has been cited by those questioning aspects of *bininj* burning practices.

Competing Goals: Kakadu National Park is Declared

The declaration of Kakadu National Park in 1979 addressed a number of competing goals, setting the stage for the Park's awkward balancing act between environmental, mining, and Indigenous interests. There were several attempts to establish protected areas for conservation in the area prior to the Park. The small Woolwonga Wildlife Sanctuary was founded in the area in 1969 amid persistent local campaigns for a national park to administer and protect the Alligator Rivers region.⁸²² In an indication of growing Australian academic acceptance of a place for fire in environmental management, a survey of the broader area in 1971 noted the profusion of "Aboriginal hunting fires", speculated on the ecological role of fire for the region's flora and fauna, and noted that the exclusion of fire would "almost certainly lead to catastrophe in the environment".⁸²³ Efforts to establish a protected area were greatly accelerated by mining interest in the area. Following the discovery of four major uranium deposits in the region between 1968 and 1973, the Whitlam Government established the Ranger Uranium Environmental Inquiry under Justice Russell Fox to investigate the possibility of uranium mining.⁸²⁴ In 1977 the Ranger Inquiry recommended that uranium mining should proceed, that a national park be established around the mining areas, and that the area's local Indigenous population should be granted land rights over what would become Stage 1 of Kakadu National Park.⁸²⁵

⁸¹⁹ David Ritchie, "Things Fall Apart: The End of an Era of Systematic Indigenous Fire Management," in *Culture, Ecology and Economy of Fire Management in North Australian Savannas: Rekindling the Wurrk Tradition*, ed. Jeremy Russell-Smith, Peter J. Whitehead, and Peter Cooke (Collingwood: CSIRO Publishing, 2009), 30.

⁸²⁰ Levitus, "Change and Catastrophe: Adaptation, Re-Adaptation and Fire in the Alligator Rivers Region," 58.

⁸²¹ Levitus, 77.

⁸²² Graham McMahon, "Park plan was to save Kakadu", *NT News*, 11 July 1996, Box PB 276, NTRS 2972, Northern Territory Archives Service, Darwin, NT, Australia.

⁸²³ Australia. Department of the Interior, *Proposal for a Northern National Park, Northern Territory: Plan of Management* (Canberra: Australian Government Publishing Service, 1971), 103–5.

⁸²⁴ Derrick Ovington, "Kakadu - Park Plus," *UNESCO Review*, 1979, 17.

⁸²⁵ Lawrence, *Kakadu*, 179–80.

Indeed, Kakadu's establishment was important in the burgeoning Indigenous land rights movement. For instance, among non-Indigenous allies, Prime Minister Bob Hawke insisted on vetoing the expansion of mining at Coronation Hill, prioritising land rights for Indigenous peoples rather than environmental considerations. Some scholars have speculated this stance may have contributed to his political downfall.⁸²⁶ More importantly, Kakadu played an essential role for Indigenous peoples themselves. The 1960s, 70s, and 80s saw a time of awakening political consciousness as Indigenous activists emerged and began to demand land rights through movements such as the 1966 Gurindji walk-off and 1963 Yirrkala bark petitions.⁸²⁷ Social scientist Charles Rowley characterised this period in 1978 with the declaration that "At last Aboriginal man [sic] has begun to defend himself by acting like modern political man".⁸²⁸ Established by the Federal Whitlam Government in response to land rights issues in the Northern Territory, the Woodward Commission in 1975 had recommended that 'protected areas' of the Northern Territory could be "jointly managed" for both Indigenous and conservation interests.⁸²⁹ The following year the Federal Government's *Aboriginal Land Rights (Northern Territory) Act* 1976 was signed, recognising Indigenous cultural beliefs and close affiliations with traditional lands. One requirement to prove traditional ownership under the *Land Rights Act* is the existence of recognised rights for hunting and foraging, but, foreshadowing the scepticism over contemporary Indigenous burning that was a hallmark of Kakadu's early years, the initial claim over what would become Stage I of Kakadu did not mention Indigenous burning as proof of these rights.⁸³⁰

The relationship between conceptualisations of Indigenous burning and the requirement to 'prove' ownership under the Act (and other land rights acts throughout Australia) is a complicated one that reveals changes in the way non-Indigenous Australians have understood Indigenous burning. Indeed, Northern Territory historian David Ritchie has even chronicled efforts by parties opposed to Indigenous land rights in other land claims to use Indigenous burning to argue *against* the land claim. For example, during the Finnis River Land Claim Hearings in 1981 several pastoralists and miners argued that granting Indigenous land rights would result in uncontrolled bushfires that would threaten their properties.⁸³¹ This interpretation of Indigenous burning as irresponsible and unsophisticated can be contrasted with later land claim hearings. The Jawoyn land claim in 1988 (which included southern

⁸²⁶ Gabrielle Chan, "Cabinet Papers 1990-91: Hawke's Fight to Keep Mining out of Kakadu Helped Unseat Him," *The Guardian*, 1 January, 2016.

⁸²⁷ Charlie Ward, *A Handful of Sand: The Gurindji Struggle, After the Walk-Off* (Melbourne: Monash University Publishing, 2016); Heidi Norman, *"What Do We Want?" A Political History of Aboriginal Land Rights in New South Wales* (Canberra: Aboriginal Studies Press, 2015).

⁸²⁸ Quoted in Norman, *"What Do We Want?" A Political History of Aboriginal Land Rights in New South Wales*, 4. Such a statement glosses over earlier Indigenous activism such as at Corranderrk.

⁸²⁹ Lawrence, *Kakadu*, 83.

⁸³⁰ Ritchie, "Things Fall Apart: The End of an Era of Systematic Indigenous Fire Management," 34–35.

⁸³¹ Ritchie, 34–35.

parts of Kakadu National Park) even utilised a paper produced by non-Indigenous Kakadu Park staff to support their argument about rights and obligations to traditional lands.⁸³² This contrast not only reflects changes in Australian society and appreciation of the complexity of Indigenous burning (including both claimants and their perceptions of the knowledge of the judiciary), but also points to the importance of Kakadu National Park as a site for changing non-Indigenous understandings of Indigenous burning.

The declaration of Kakadu as a National Park in 1979 resulted from these competing goals, and the competing tensions and requirements caused some to question whether *bininj* truly understood what it was they had agreed to. Kakadu was declared as a National Park based on a 99-year lease from the traditional owners to Derek Ovington (then-Director of Australian National Parks and Wildlife Service or ANPWS) following the recognition of Indigenous land rights in the region, though Justice Woodward's recommendations for "joint management" were not immediately formalised.⁸³³ Some *bininj* looked forward to the anticipated mining royalties which were a condition of the establishment of the Park which deliberately excluded the mining zone.⁸³⁴ On the other hand, former ANPWS officer Allan Fox conceded in 1983 that many of the traditional owners had little understanding of what a national park entailed, and speculated that these *bininj* supported it only as a way of retaining some control over uranium mining and tourism.⁸³⁵ Prominent Mirarr elder Toby Gangali reportedly despaired "I've given up...It's been six years now. I'm not fighting anymore".⁸³⁶ Kakadu National Park was born in controversy, even amongst the traditional owners, and this controversy and misunderstanding has affected the politics of fire management for decades.

Policy in Kakadu Slowly Warms to *Bininj* Burning

Following the creation of the Park, its managers have slowly warmed to Indigenous burning at a policy level, as shown through successive Plans of Management. The Director of ANPWS (and equivalent later agencies) has been required to prepare an official Plan of Management to last several years. The

⁸³² Ritchie, 35.

⁸³³ C.D. Haynes, "Seeking Control: Disentangling the Difficult Sociality of Kakadu National Park's Joint Management," *Journal of Sociology* 49, no. 2–3 (2013): 194–209.

⁸³⁴ Anthony J. Grey, *Jabiluka: The Battle to Mine Australia's Uranium* (Melbourne: Text Publishing, 1994), 192–94.

⁸³⁵ Allan Fox, "Kakadu Is Aboriginal Land," *Ambio* 12, no. 3/4 (1983): 163. This supported by observations from Sally Weaver. See Sally M. Weaver, "The Role of Aboriginals in the Management of Australia's Coburg (Gurig) and Kakadu National Parks," in *Resident Peoples and National Parks: Social Dilemmas and Strategies in International Conservation*, ed. Patrick C. West and Steven R. Brechin (Tucson: The University of Arizona Press, 1991), 311–33.

⁸³⁶ Lawrence, *Kakadu*, 103.

Plans are intended to set strategic priorities and lay a foundation for day-to-day management within the Park. Draft versions of the Plans are typically released to the public to provide comments prior to a final version being presented to Parliament for approval. To date there have been six Plans of Management, released in 1980, 1986, 1991, 1998, 2007, and 2016.⁸³⁷ It is fair to question the degree to which Plan priorities and goals are actually reflected in management actions on the ground, and indeed the lack of congruence has been a growing criticism expressed in many representations from the public. At no stage have representations been solely concerned with fire, but fire management within the Park, *bininj* burning, and the Indigenous relationship to country persistently appear as contested issues. Therefore these representations provide compelling insights into the tensions and ambiguities that have resulted from the complex interweaving of Indigenous, conservation, tourist, and other interests. Furthermore, the language used for the Plans reveals significant shifts in management philosophies and practices.

The first three Plans apparently describe a policy evolution from scepticism of the ‘traditional’ aspects of *bininj* fire use to a commitment to restore Indigenous burning practices. An important early influence upon the Park’s fire management was a 1980 report intended to provide prescribed burning guidelines appropriate to the fire-prone Top End. This recommended limiting fires in the late dry season, attempting to reduce the frequency and intensity of fires in tall open forests and woodlands, annually burn important areas, and biennially burn less essential areas.⁸³⁸ These guidelines for prescribed burning shaped the first two Plans of Management far more than any consideration of Indigenous burning. The initial 1980 Plan minimally noted that “it is difficult to observe traditional burning practices” due to “the effects of European occupancy” and migration of *bininj*,⁸³⁹ but that “a practical program of fire management for Kakadu National Park may be based on elements of traditional use of fire”.⁸⁴⁰ The second Plan of Management (released in 1986) largely built upon the 1980 Plan and incorporated the area included in the Stage 2 expansion. Little was specifically said about *bininj* burning patterns, other than an aspiration to “protect Park resources from the adverse consequences of fire”,⁸⁴¹ and to hold “formal and informal meetings” with traditional owners and the

⁸³⁷ As mentioned above, the representations for the 1998, 2007 and 2016 Plans have access restrictions.

⁸³⁸ J. Hoare et al., “A Report on the Effects of Fire in Tall Open Forest and Woodland with Particular Reference to Fire Management in Kakadu National Park in the Northern Territory” (Nightcliff: Australian National Parks and Wildlife Service, 1980).

⁸³⁹ Australian National Parks and Wildlife Service. “Kakadu National Park Plan of Management.” Canberra: Commonwealth of Australia, 1980, 193.

⁸⁴⁰ ANPWS, “Plan of Management” (1980), 177.

⁸⁴¹ Australian National Parks and Wildlife Service, “Kakadu National Park Plan of Management” (Canberra: Australian National Parks and Wildlife Service, 1986), 25.

new Gagudju Association to discuss matters such as fire management.⁸⁴² The third Plan of Management (released in 1991) went far further than previous plans, aiming to “re-establish, as far as possible, the traditional bininj [sic] patterns of burning”, although this was immediately justified by referring to biodiversity conservation concerns, reflecting the need for Kakadu to reconcile the concerns of multiple parties.⁸⁴³

This policy evolution could be attributed to the increasing emphasis on the role of joint management in Kakadu. Ever since the creation of Yellowstone National Park in 1872, all national parks around the globe had been exclusively administered by the state.⁸⁴⁴ The recommendations from the Woodward Royal Commission were that Kakadu should break from this model, and be managed on a joint basis by Indigenous and state authorities. After significant activism from local *bininj* and critiques from anthropologists, a formal Board of Management was created in 1989 to manage the Park in conjunction with the Director of ANPWS through a process labelled “joint management”.⁸⁴⁵ The Board itself was designed along the principles of Justice Woodward’s recommendations; of the original 14 members, 10 would be traditional owners. The Board itself was charged with preparing future Plans, making major decisions, monitoring the Park, and giving advice to the responsible Federal Minister.⁸⁴⁶ Kakadu and its Northern Territory partner Uluru-Kata Tjuta were the first national parks in the world to be jointly managed in this way: between a settler-colonial state and the Indigenous owners of the area. Joint management was thus an experiment, and conservation institutions and Indigenous groups alike across the world followed its course.⁸⁴⁷

Despite the implementation of the Board of Management, the structure and nature of joint management in Kakadu continues to cause dissatisfaction among insiders and attract criticism from outsiders. Anthropologist Sally Weaver observed that the dynamic and experimental nature of

⁸⁴² ANPWS, “Plan of Management” (1986), 18; in many ways, the 1986 Plan acknowledged the need for a change in management arrangements between ANPWS and *bininj*. Archival records indicate this priority was pushed by the Labour Minister for Arts, Heritage and Environment Barry Cohen – notwithstanding meeting delays caused by 6am summons from Prime Minister Hawke for 15 holes of golf. See “File Note 21 and 22 January 1986”, Item 1776618, Control Symbol 1986/167, E1509, National Archives of Australia, Darwin, NT, Australia.

⁸⁴³ Australian National Parks and Wildlife Service and Kakadu Board of Management and Parks Australia, “Kakadu National Park Plan of Management” (Canberra: Australian National Parks and Wildlife Service, 1991), 43-44.

⁸⁴⁴ Haynes, “The Value of Work and ‘Common Discourse’ in the Joint Management of Kakadu National Park,” 75.

⁸⁴⁵ For a more comprehensive view of the historical processes that led to the Board’s creation, see Haynes, “Seeking Control”; Lawrence, *Kakadu*.

⁸⁴⁶ ANPWS, “Plan of Management” (1991), 11.

⁸⁴⁷ Tim Rowse has previously discussed how national parks might function as “experiments in practical aesthetics”, whereby the convergence of Western biodiversity conservation and Indigenous stewardship over country can be tested. See Rowse, *After Mabo*, 125-7.

management in Kakadu meant *bininj* were constantly adapting to a “changing administrative milieu”.⁸⁴⁸ Haynes has critiqued the Board for relying upon Western governance structures, where non-Indigenous public servants use their superior cultural capital and knowledge of bureaucracy to dominate Board proceedings, serving to “alienate and frustrate” the *bininj* representatives.⁸⁴⁹ This criticism echoes the findings of Paul Nadasdy’s investigation into “co-management” in the Yukon in Canada.⁸⁵⁰ The unintentional reproduction of colonial power structures through joint management has, Haynes argued, contributed to the wide *bininj* dissatisfaction with fire management in Kakadu discussed below – and sends a stark warning to movements seeking to restore Indigenous burning elsewhere.

Later Plans of Management continued to expand policy goals towards Indigenous burning, although shifts in tone in the most recent Plan indicate increasing recognition of the complexities of implementing these lofty goals. The fourth Plan of Management, released in 1998, continued to elaborate on traditional fire use, describing two of the five main aims of Park fire management as to “promote traditional Aboriginal ways of burning within the park”, and to “involve *Bininj/Munggyu* in planning and implementing fire management”.⁸⁵¹ The fifth Plan of Management in 2007 heavily emphasised that “Kakadu National Park is an Aboriginal living cultural landscape”, noting a strong relationship between *bininj* and country, and recognising fire as a strong aspect of *bininj* cultural heritage.⁸⁵² This Plan described *bininj* burning as including “fire-assisted hunting and the creation of environmental mosaics” (indicating an understanding of Indigenous burning beyond unplanned fires).⁸⁵³ Critically, the fifth Plan proudly described that Indigenous burning was one of the reasons for Kakadu’s inscription on the World Heritage List. *Bininj* fire management had thus moved from being described cautiously to being promoted as an asset, though as will be demonstrated later in this chapter, it is questionable to what degree such promotion reflects *bininj* sentiment.

The most recent Plan of Management, released in 2016 and intended to last until 2026, acknowledges that the joint management relationship has changed and that the elders who “‘foot walked’ the

⁸⁴⁸ Weaver, “The Role of Aboriginals in the Management of Australia’s Coburg (Gurig) and Kakadu National Parks,” 321.

⁸⁴⁹ Haynes, “The Value of Work and ‘Common Discourse’ in the Joint Management of Kakadu National Park,” 77; Haynes, “Seeking Control”; see also Lisa Palmer, “Interpreting ‘nature’: The Politics of Engaging with Kakadu as an Aboriginal Place,” *Cultural Geographies* 14, no. 2 (2007): 255–73.

⁸⁵⁰ Paul Nadasdy, “The Anti-Politics of TEK: The Institutionalisation of Co-Management Discourse and Practice,” *Anthropologica* 47, no. 2 (2005): 215–32.

⁸⁵¹ Kakadu Board of Management and Parks Australia, “Kakadu National Park Plan of Management” (Jabiru: Commonwealth of Australia, 1998), 68.

⁸⁵² Kakadu National Park Board of Management and Parks Australia, “Kakadu National Park Management Plan 2007-2014” (Darwin: Director of National Parks Australia, 2007), 45.

⁸⁵³ Board of Management, “Park Management Plan 2007”, 64.

country and were intimately connected to land have now passed on”.⁸⁵⁴ The Plan particularly noted that post-colonial demographic changes in the stone country (the Arnhem Land Plateau) had resulted in the cessation of *bininj* burning practices, causing increased fuel loads, drastically different vegetation distribution and fire regimes, and the endangerment of many rare species.⁸⁵⁵ The Plan noted a range of current threats to biodiversity conservation through changes in fire regimes, and argued that reversing these changes would help “maintain” the Park’s “cultural values”, linking the natural and cultural values of the Park.⁸⁵⁶ Thus “traditional burning practices will continue to be recognised and incorporated in fire management programmes”.⁸⁵⁷ The tone and language of the 2016 Plan was much less positive than previous Plans; the Park staff and Board note a number of genuine crises and serious challenges.

Bininj Dissatisfaction with Fire Management in Kakadu

While the Plans of Management portray a Park administration that slowly grew less wary of Indigenous burning and more open to restoring the practice, there is strong evidence that Kakadu’s traditional owners were dissatisfied with fire management in the Park – both in terms of who grasps the firestick, and in how it is applied. In this thesis I have not sought to comprehensively survey the current views of *bininj* but have instead drawn upon previous studies and submissions to the Plans of Management. Therefore, it is important to note that these concerns may not be held by *bininj* today, and that the most recent Plan of Management, published in 2016, acknowledged and outlined plans to address many of these concerns.⁸⁵⁸

Exploring *bininj* discontent with burning requires a brief acknowledgement of the complexity of identity in the Park. There are generally two major ways of identifying *bininj* with particular areas in the Park: either through language (e.g. Gagudju and Gundjeihmi), or through descent groups known as *gunmogurrurr* or *mowurrwurr* (e.g. Mirarr, Wilirrgu).⁸⁵⁹ As has been argued by the Kakadu Region Social Impact Study, “traditional ownership is not a static construct and such issues can be, and are,

⁸⁵⁴ Board of Management, “Management Plan 2016”, 29.

⁸⁵⁵ Board of Management, “Management Plan 2016”, 88.

⁸⁵⁶ Board of Management, “Management Plan 2016”, 89.

⁸⁵⁷ Board of Management, “Management Plan 2016”, 90.

⁸⁵⁸ Parks Australia response in Appendix A, Director of National Parks, “Report of the Director of National Parks on the Preparation of the Sixth Kakadu National Park Management Plan” (Parks Australia, 2015), 36.

⁸⁵⁹ Aboriginal Project Committee, “Kakadu Region Social Impact Study: Report of the Aboriginal Project Committee,” 8.

fiercely contested in a region like Kakadu that has been depopulated and re-populated”.⁸⁶⁰ Furthermore, a number of institutional bodies such as the Northern Land Council, Gundjeihmi Corporation and Aboriginal Consultative Committee have existed throughout the Park’s history that claimed to speak for or enable *bininj* consultation on matters such as land management.⁸⁶¹ To add to this complexity, not all Indigenous people living or working within the Park throughout its history have held traditional ownership rights. Essentially, there has been no central Indigenous political authority for the Park, and what concentrations of political power have existed may have owed their position to non-Indigenous institutions or have only been legitimised through their relationship to non-Indigenous organisations.⁸⁶² The result has been a bewildering array of institutions, political bodies and individuals that the mechanisms of joint management require to be consulted by Parks Australia on matters of land management, all representing at best fewer than a thousand recognised Traditional Owners. This relates to the politics of fire management because a major point of discontent relates to who has authority to burn – acknowledging *bininj* concerns also requires a fair acknowledgement that the task for Park authorities is complex.

Bininj have consistently criticised the lack of control or amount of involvement they have with directing burning practices in Kakadu. The first Plan of Management (released in 1980) stated merely that “the co-operation, advice and participation of Aboriginals living in the Park will be sought in maintaining appropriate burning programs”,⁸⁶³ and it is clear that ANPWS began significant consultation about fire management with *bininj* even before the declaration of the Park.⁸⁶⁴ The Kakadu Region Social Impact Study quoted one traditional owner in 1997 saying that “fire should be done *bininj* [sic] way but *balanda* does it his way. Parks say *bininj* burning is humbug”.⁸⁶⁵ A 2008 Symposium reflected these criticisms, with *bininj* consistently stating that they “would like to be involved” in fire management, whether as rangers or “in all aspects from planning to doing the burning”, and that people doing the actual burning, whether *bininj* or *balanda*, need to be “properly trained in all aspects” before starting work – which includes “proper induction” into *bininj* burning

⁸⁶⁰ Study Advisory Group, “Kakadu Region Social Impact Study: Community Action Plan” (Canberra: Supervising Scientist, 1997), 9.

⁸⁶¹ For an extended discussion of how land councils can be forums for intense political disputes, see Norman, “*What Do We Want?*” *A Political History of Aboriginal Land Rights in New South Wales*.

⁸⁶² Study Advisory Group, “Kakadu Region Social Impact Study: Community Action Plan”; Weaver, “The Role of Aboriginals in the Management of Australia’s Coburg (Gurig) and Kakadu National Parks.”

⁸⁶³ ANPWS, “Plan of Management” (1980), 309.

⁸⁶⁴ M.A. Hill, “Letter to Director (Territory Parks and Wildlife Commission”, 20 April 1979, Item 7053234, Control Symbol KNP23, E1527.1, National Archives of Australia, Darwin, NT, Australia.

⁸⁶⁵ Quoted in Langton, *Burning Questions: Emerging Environmental Issues for Indigenous Peoples in Northern Australia*, 43.

practices.⁸⁶⁶ In theory the *bininj*-majority Board of Management created in 1989 should ameliorate these issues of control and power, but as Lawrence and Haynes have argued, the Board's structure, format and governance is not suited to *bininj* culture and thus the capacity of Board members to push for major change is limited.⁸⁶⁷ It should be noted that Parks Australia (the successor agency to ANPWS) have taken these criticisms on board and have promised major changes.⁸⁶⁸ Nevertheless the strong evidence of dissatisfaction points to the weaknesses of joint management as a system for restoring Indigenous burning.

It is important to note that *bininj* have had input into the Park's fire management at a ground level through employment as Indigenous rangers or advisors, but these measures have not necessarily implied success in shaping fire management more broadly. ANPWS has been committed to employing *bininj* since the declaration of the Park, beginning the first ranger training program under the direction of local naturalist Ian Morris in the year of the Park's foundation (1979).⁸⁶⁹ By 2014 nearly half (48%) of Park staff identified as Indigenous,⁸⁷⁰ and Kakadu's Aboriginal ranger training program was used as a guide for other national parks to implement their own Aboriginal ranger programs.⁸⁷¹ However, this employment has sometimes conflicted with their preferred use of fire within the Park. Anthropologist Henry T. Lewis interviewed one *bininj* ranger who complained that he had been chastised for lighting a fire after the approved burning period "that was not dangerous and went out where he anticipated it would".⁸⁷² Such sentiments reveal the tensions that can arise from balancing perspectives and goals under joint management mechanisms.

Furthermore, the employment of rangers or advisors doesn't necessarily imply success for *bininj* in shaping fire management. As the Northern Land Council has argued, Indigenous employment proportions do not reveal whether those who identify as Indigenous are in fact traditional owners of the Kakadu area, or more pertinently, reveal anything of the seniority or permanence of those

⁸⁶⁶ S. Winderlich, S. Atkins, and Steve Winderlich, "Kakadu Traditional Owner and Stakeholder Views on Fire Management," in *Kakadu National Park Landscape Symposia Series 2007– 2009. Symposium 3: Fire Management, 23–24 April 2008* (Aurora Kakadu (South Alligator): Supervising Scientist, Department of the Environment, Water, Heritage and the Arts, 2010), 6–10.

⁸⁶⁷ Lawrence, *Kakadu*; Haynes, "Defined by Contradiction."

⁸⁶⁸ Parks Australia response in National Parks, "Report...Sixth Kakadu National Park Management Plan" (2015), 36.

⁸⁶⁹ See Item 7053207, Control Symbol KNP5/1, E1527, National Archives of Australia, Darwin, NT, Australia.

⁸⁷⁰ Board of Management, "Management Plan 2016", 35.

⁸⁷¹ For instance, see N.C. Gare, "Letter to R. Anderson (National Parks Authority of Western Australia)", 28 June 1982, Item 7053207, Control Symbol KNP5/1, E1527, National Archives of Australia, Darwin, NT, Australia.

⁸⁷² Henry T. Lewis, "Ecological and Technical Knowledge of Fire: Aborigines Versus Park Rangers in Northern Australia," *American Anthropologist* 91, no. 4 (1989): 952.

employees.⁸⁷³ While senior *bininj* have been employed as “cultural advisors”,⁸⁷⁴ it does not immediately follow that they have been effective in influencing the policy and practice of fire management within the Park. Even with the employment of *bininj* rangers and advisors, some *bininj* have complained that ANPWS staff did not seek to learn from *bininj* or incorporate *bininj* burning practices in the culturally appropriate manner. Lewis interviewed one *bininj* ranger who in 1989 complained that “none of the European staff had ever asked him about setting fires. He didn’t feel that they thought he knew anything about using fires”.⁸⁷⁵ Similar findings were made by former Park manager and anthropologist Chris Haynes in his doctoral thesis, while independent technical auditors noted in 2012 that the incorporation of “traditional burning practices” had only ever been “partly implemented”.⁸⁷⁶

Bininj dissatisfaction also applies to the fire management practices employed by the non-Indigenous staff of the Park – incorporating ignition, suppression, and the overall distribution of vegetation that results from fire management. A common complaint in consultations with senior *bininj* in 1983 and 2010 was that the Park had too many “hot” fires, whether lit deliberately or resulting from inadequate prior fuel reduction.⁸⁷⁷ These particular comments referred to fire severity (a way of measuring the effect of fire on local species), with hot fires tied to concerns about the death of wallabies.⁸⁷⁸

Other concerns centre on the timing of fires. A common complaint is that ANPWS has been burning too late in the dry season,⁸⁷⁹ or that there is not enough burning during the wet season.⁸⁸⁰ *Bininj* have occasionally described Park staff as being too “frightened” to burn at the correct time to achieve their stated goals.⁸⁸¹ A related complaint is that Parks staff have suppressed fires that occurred outside the preferred ANPWS burning period; fires that were seen as necessary by *bininj* and may have been lit by

⁸⁷³ Northern Land Council in National Parks, “Report...Sixth Kakadu National Park Management Plan” (2015), 173.

⁸⁷⁴ ANPWS, “Plan of Management” (1986), 18.

⁸⁷⁵ Lewis, “Ecological and Technical Knowledge of Fire: Aborigines Versus Park Rangers in Northern Australia,” 952.

⁸⁷⁶ Bruce Leaver et al., “Kakadu National Park Management Plan 2007-2014 Technical Audit: Summary Report” (Director of National Parks Australia, 2012), 19; Haynes, “Defined by Contradiction”.

⁸⁷⁷ C.D. Haynes, “Discussion with Aboriginal staff about fire use/protection”, 14 February 1983, Item 7053234, Control Symbol KNP23, E1527, National Archives of Australia, Darwin, NT, Australia; and S. Winderlich, S. Atkins, and Steve Winderlich, “Kakadu Traditional Owner and Stakeholder Views on Fire Management,” in *Kakadu National Park Landscape Symposia Series 2007– 2009. Symposium 3: Fire Management, 23–24 April 2008* (Aurora Kakadu (South Alligator): Supervising Scientist, Department of the Environment, Water, Heritage and the Arts, 2010), 8.

⁸⁷⁸ Haynes, “Discussion with Aboriginal staff about fire use/protection”, NAA.

⁸⁷⁹ “Consultative Committee Meeting, Day 1”, 22 August 1990, Control Symbol 1990/281, E1509, National Archives of Australia, Darwin, NT, Australia, 8, 3.

⁸⁸⁰ Winderlich, Atkins, and Winderlich, “Kakadu Traditional Owner and Stakeholder Views on Fire Management,” 8.

⁸⁸¹ C.D. Haynes, “Minute: Kakadu Burning Off Programs – Information Paper”, 9 February 1983, Item 7053234, Control Symbol KNP23, E1527, National Archives of Australia, Darwin, NT, Australia, 8, 3.

them. Haynes's interviewees described a particularly memorable incident, quoted here and at the start of this chapter:

...and at one stage (in the late 1980s) Clarrie (pseudonym for a man well known to us both) was burning...and there was... a bit of resentment (within) the park service to Clarrie ...I mean, who are these buggers to tell him how to burn, and it came to a head one day when (one of the white rangers) who I have a lot of time for, came across Clarrie setting fires, and he said it's not park policy to burn at this time of the year. And Clarrie says, (laughing) '*well what's the park policy then, on Aboriginal burning? I'm an Aboriginal and I'm burning!*' ... and the rangers ...would follow people like Clarrie...and he would play this game...of setting fires and trying to avoid getting caught, so...the fire thing was quite a complex thing on the ground.⁸⁸² [Italics my emphasis]

Some *bininj* have expressed concern about the use of modern technology, including aerial ignition, questioning whether it is 'traditional'. Aerial ignition had been conducted in the Alligator Rivers area even before the official declaration of the Park,⁸⁸³ and after the Park was founded, ANPWS undertook field trips to South-Western Australia to visit the birthplace of aerial ignition in Australia (described in Chapter Three).⁸⁸⁴ It is clear that there was an effort by some in ANPWS to integrate aerial burning by Parks staff with ground burning by traditional owners,⁸⁸⁵ but the role of aerial burning has been controversial. For instance, at a 2008 fire management symposium a "strong feeling" was conveyed that "a major part of traditional burning was to get back on country and do it on foot".⁸⁸⁶ Not all *bininj* have opposed helicopter burning; others have called for more funding for expanded aerial ignition.⁸⁸⁷ Aerial ignition can represent a pragmatic accommodation for Indigenous Australians who no longer live on country but who still wish to uphold their obligations or connections to country, but for others it may not reap the same spiritual or cultural significance of more traditional walking and burning. As we shall see, controversy and ambivalence around aerial ignition has also been expressed by non-Indigenous peoples concerned with the Park, including Park staff, tourists, and academics, as indeed it has for Indigenous fire management in neighbouring Arnhem Land, discussed in Chapter Eight. Aerial

⁸⁸² Haynes, "Defined by Contradiction," 271.

⁸⁸³ R.E. Fox, "Aerial Control burning – Kakadu 1978", 14 August 1978, Box 1 Item 78/74, NTRS 3615, Northern Territory Archives Service, Darwin, NT, Australia; Jon Day, "Minute: Draft Guidelines for Fire Management Kakadu National Park, Appendix 2 – Aerial Ignition Programme", 28 April 1981, Item 7053234, Control Symbol KNP23, E1527, National Archives of Australia, Darwin, NT, Australia.

⁸⁸⁴ Jon Day, "Minute to Alex Carter and Malcolm Forbes", 4 November 1982, Item 7053234, Control Symbol KNP23, E1527, National Archives of Australia, Darwin, NT, Australia.

⁸⁸⁵ M.A. Hill, "Letter to Director", 20 April 1979, Item 7053234, Control Symbol KNP23, E1527, National Archives of Australia, Darwin, NT, Australia.

⁸⁸⁶ Winderlich, Atkins, and Winderlich, "Kakadu Traditional Owner and Stakeholder Views on Fire Management," 8.

⁸⁸⁷ Winderlich, Atkins, and Winderlich, 7–9.

ignition can thus represent a microcosm of broader issues around the adoption of modern technology or changed ignition patterns into Indigenous burning practices, whether in Kakadu or more broadly.

The effect of introduced Asian water buffalo upon vegetation patterns further highlights the tensions and ambiguities that were revealed at Kakadu. As described above, buffalo were introduced by Europeans in the nineteenth century and rapidly spread throughout the Top End. Many *bininj* came to welcome buffalo; believing they had a right to exist in Kakadu, feeling they prompted oral histories from the buffalo hunting period, and welcoming a source of protein and hides for use and export.⁸⁸⁸ In the 1980s ANPWS participated in the Brucellosis and Tuberculosis Eradication Campaign (BTEC) launched to satisfy biosecurity concerns for cattle export, and thus sought to cull the buffalo present in the Park.⁸⁸⁹ Many ANPWS staff regarded buffalo as a pest and introduced feral animal that compromised their biodiversity conservation goals for Kakadu, and thus welcomed the BTEC program.⁸⁹⁰ Yet for *bininj*, BTEC caused a great deal of resentment, and the Plans of Management reveal lengthy and unresolved discussion about whether buffalo should have a place in the Park.⁸⁹¹

Quite apart from what this issue reveals about differences in Indigenous and Western perspectives on 'introduced' or 'feral' species, the rapid population growth of buffalo and subsequent near-total eradication during BTEC dramatically transformed fire regimes in Kakadu. Buffalo consumed vegetation and thus altered distribution and fuel patterns, particularly affecting the monsoon rainforests and floodplains of Kakadu.⁸⁹² Similarly, the swift eradication caused a second ecological cascade which affected the fire regimes variably; floodplains ecologically recovered very quickly, while the buffalo consumption of juvenile trees in the woodlands has meant these woodlands have not returned to their previous state.⁸⁹³ Thus at a physical and at a conceptual level, buffalo challenged ideas of Western conservation in Kakadu. Should 'traditional' burning discount any incorporation of the effect of introduced species? Debates over buffalo remind us that Australian fire history cannot be neatly divided into 'pre' and 'post' colonisation phases; that fire history must include analysis of fauna as well as the traditional focus on flora; and that notions of 'tradition' and what deserves to be conserved can radically differ between Indigenous and non-Indigenous Australians.

⁸⁸⁸ Catherine J. Robinson, Dermot Smyth, and Peter J. Whitehead, "Bush Tucker, Bush Pets, and Bush Threats: Cooperative Management of Feral Animals in Australia's Kakadu National Park," *Conservation Biology* 19, no. 5 (2005): 1385–91.

⁸⁸⁹ Darrell Lewis, *Slower than the Eye Can See: Environmental Change in North Australia's Cattlelands - a Case Study from the Victoria Rivers District, Northern Territory* (Darwin: Tropical Savannas CRC, 2002), 42.

⁸⁹⁰ Haynes, "Seeking Control," 203.

⁸⁹¹ Aaron M. Petty et al., "Savanna Responses to Feral Buffalo in Kakadu National Park, Australia," *Ecological Monographs* 77, no. 3 (2007): 441–463.

⁸⁹² Petty et al.

⁸⁹³ Petty et al.

Evolving Attitudes of Park Staff Towards Indigenous Burning

In the early years of the Park, Park staff were initially wary of *bininj* burning, as reflected in the public-facing Plans of Management discussed above and internal documents. Draft documents from Park rangers attempting to develop a coherent fire management strategy in 1981 sum up this early attitude: “The role of fire in this environment is therefore highly complex, and until we understand fully the implications of any particular management proposal, we should err on the conservative side.”⁸⁹⁴ Archival documents reveal that as familiarity with *bininj* burning developed and the question of integrating or adopting Indigenous burning was raised through the 1980s, Park staff actively debated questions of integration in internal seminars.⁸⁹⁵ Such efforts, and cross-cultural communications, were slow. During his fieldwork in the 1980s, Lewis noted that “All Aborigines (and even some Europeans) maintained that ANPWS personnel made no serious attempts to learn about either contemporary or so-called traditional practices”; one *balanda* ranger admitted to Lewis “I still don’t know how they do anything about fire. We’ve never had them take us out and show us what they do”.⁸⁹⁶ Such statements echo the sentiments recorded from *bininj* above about the level of interest they perceived from Parks staff.

This wariness of Indigenous burning from *balanda* Park staff could have reflected their conservationist attitudes, training, and preconceptions about the ecological role of fire, or disbelief in Indigenous competence with fire. In the late 1970s and 1980s, fire ecology was still establishing itself as a field and many non-Indigenous rangers and staff were recent arrivals to the fire-prone tropics of Australia.⁸⁹⁷ This unfamiliarity with fire was explicitly used as an explanation in a meeting with Indigenous staff in 1983,⁸⁹⁸ and the prevalence of these fire-wary conservationist attitudes was confirmed by Lewis and Levitus.⁸⁹⁹ Other rangers may have felt that *bininj* lacked sophisticated

⁸⁹⁴ Jon Day, “Minute ‘Draft Guidelines for Fire Management Kakadu National Park’”, 28 April 1981, Item 7053234, Control Symbol KNP23, E1527, National Archives of Australia, Darwin, NT, Australia, 2.

⁸⁹⁵ For example, see Jon Day, “‘Fire Management in Kakadu National Park’ text of Kakadu Seminar”, August 1982, Item 7053234, Control Symbol KNP23, E1527, National Archives of Australia, Darwin, NT, Australia.

⁸⁹⁶ Lewis, “Ecological and Technical Knowledge of Fire: Aborigines Versus Park Rangers in Northern Australia,” 951–52.

⁸⁹⁷ Greg Miles, “Is Early Dry Season Burning an ‘Ecological Trojan Horse?’” (Unpublished manuscript, September 2016).

⁸⁹⁸ Haynes, “Discussion with Aboriginal Staff about fire use/protection”, NAA.

⁸⁹⁹ Lewis, “Ecological and Technical Knowledge of Fire: Aborigines Versus Park Rangers in Northern Australia,” 942; R. Levitus, “Management and the Model: Burning Kakadu,” in *Sustainable Environments, Sustainable Communities: Potential Dialogues between Anthropologists, Scientists and Managers: Proceedings of a Symposium Hosted by the School of Anthropology, Geography and Environmental Studies, the University of Melbourne, 2 October 2004*, ed. Monica Minnegal, Research Paper (University of Melbourne. School of

knowledge of fire. One non-Indigenous ranger described their Kakadu experience as “like living in a house full of pyromaniacs”.⁹⁰⁰ This particular perception could be explained by experiences that led the ranger to believe *bininj* were irresponsible with fire, or through problems in ‘translating’ *bininj* fire knowledge (these are not mutually exclusive explanations).

The initial experience of the Aboriginal ranger program in Kakadu supports the interpretation that attempts by non-Indigenous Park staff to engage with *bininj* burning were hampered by cross-cultural mistranslations. The first program was run by Aboriginal Training Officer Ian Morris, a local naturalist who had extensive experience working with Indigenous Australians in Arnhem Land. The initial training program ran for a full year with five *bininj* graduating, all selected in consultation with local *bininj* groups.⁹⁰¹ Archival documents reveal ANPWS staff prioritised selecting traditional owners who possessed knowledge “seen as being a basis of many land management programs”, such as knowledge of fire and the Gundjeihmi seasonal calendar (discussed below).⁹⁰² Yet as a means for sharing knowledge and culture, the program was only partially successful. In the words of Haynes “very quickly it became apparent that thinking about fire involved aspects of religious life that could not be discussed.”⁹⁰³ When asked “why do you light fires” the trainee rangers gave 16 distinct answers, including reasons such as to drive game, protect fire-sensitive areas, and to encourage the growth of certain plants.⁹⁰⁴ Yet every answer given had a material basis, rather than explaining cultural importance or sense of obligations towards country. It may be that in this program, and in encounters between *bininj* and Park staff more broadly, *bininj* did not give deeper explanations for their use of fire due to sensitivities and issues of trust.⁹⁰⁵

There is good evidence to show that, as with the public-facing policy documents, some Park staff became more open to *bininj* burning in the late 1980s and 1990s. An ANPWS Planning Issues Paper from 1985 strengthens ANPWS’s commitment to “traditional burning”, stating that “The overall policy for fire management in the Park is that traditional burning practices will be restored as much as

Anthropology, Geography and Environmental Studies); No. 21. (Melbourne: School of Anthropology, Geography and Environmental Studies, The University of Melbourne, 2005), 30..

⁹⁰⁰ Lewis, “Ecological and Technical Knowledge of Fire: Aborigines Versus Park Rangers in Northern Australia,” 945.

⁹⁰¹ J.D. Ovington and Australian National Parks and Wildlife Service, “Comments on the Representations on the Plan of Management for Kakadu National Park” (Canberra: Australian National Parks and Wildlife Service, 1980), 7.

⁹⁰² “Training for Park Management Kakadu N.P.”, approx. 1980, Item 7053210, Control Symbol KNP5.2, E1527, National Archives of Australia, Darwin, NT, Australia, 2- 3.

⁹⁰³ C.D. Haynes, “Report on Kakadu Training Program – Fire Syllabus”, June 1979, Item 7053207, Control Symbol KNP5.1, E1527 National Archives of Australia, Darwin, NT, Australia.

⁹⁰⁴ Haynes, “Report on Kakadu Training Program – Fire Syllabus”, NAA.

⁹⁰⁵ This is enormously generalising but would be consistent with observations of Indigenous attitudes towards knowledge, in that in Indigenous societies it has often been the case that deeper cultural knowledge has not been readily shared with outsiders and is seen as privileged information.

possible”.⁹⁰⁶ By 1987 ANPWS ecologist A.J. Press was able to confidently declare “ANPWS is re-establishing the form of traditional burning practices of the Aboriginal people”.⁹⁰⁷ Yet it remains unclear the extent to which this public rhetoric was backed by evidence of changes in practice, and the *bininj* dissatisfaction in the 2000s discussed above indicates that changes in practice were only partly successful. Anthropologist Robert Levitus argued that this decline in caution among Park staff towards traditional burning should be partly attributed to changing environmental conditions; the rapid fuel changes resulting from BTEC drove an urgent reconsideration of burning.⁹⁰⁸

Throughout this period of slowly warming attitudes, some Park staff exhibited three common non-Indigenous responses to Indigenous burning that will become ever more prevalent in the later chapters of this thesis: the cultural discontinuity attitude, pyro-essentialism, and the environmental discontinuity attitude. The cultural discontinuity attitude can be characterised as the belief that whatever the practices of Indigenous peoples were before colonial contact and significant social and environmental disruption, this disruption had such an effect upon Indigenous burning practices that contemporary practices cannot be considered ‘traditional’. As Weaver noted, this represents a double standard: European Australians could “reinterpret their own past”, but Indigenous peoples could not do so legitimately.⁹⁰⁹ An elaboration upon this as it applies to burning regards contemporary Indigenous burning as non-traditional as it uses modern technology such as four-wheel drives, cigarette lighters or helicopters – defining the ‘Indigenous’ nature of Indigenous burning by the technology used for ignition, rather than by the cultural framework for burning. This is clearly an essentialist attitude as it regards Indigenous burning as something that possesses definable attributes that are essential to its form, and an example of the negative consequences that can arise from essentialism.⁹¹⁰ For the purposes of this thesis, this attitude can be thought of as pyro-essentialism. The third attitude is that changes in environments such as changed vegetation distribution, introduced species, or even climate change mean ‘traditional’ burning is no longer relevant – i.e., ‘environmental discontinuity’.

Variations of these views were held by some Park staff throughout the life of the Park. As Haynes wrote in a Technical Memorandum in 1985 describing *bininj* burning and claims of cultural continuity:

⁹⁰⁶ “Planning Issues Paper”, 1985, Item 1770783, Control Symbol 1985.20, E1509, National Archives of Australia, Darwin, NT, Australia.

⁹⁰⁷ A.J. Press, “Fire Management in Kakadu National Park: The Ecological Basis for the Active Use of Fire,” *Search* 18 (1987): 247.

⁹⁰⁸ Levitus, “Management and the Model: Burning Kakadu,” 30.

⁹⁰⁹ Weaver, “The Role of Aboriginals in the Management of Australia’s Coburg (Gurig) and Kakadu National Parks,” 330; see also Marshall Sahlins, “Goodbye to Tristes Tropes: Ethnography in the Context of Modern World History,” *The Journal of Modern History* 65, no. 1 (1993): 1–25.

⁹¹⁰ Philosopher Anne Phillips provides an extensive discussion on essentialism in Anne Phillips, “What’s Wrong with Essentialism?,” *Distinktion: Scandinavian Journal of Social Theory* 11, no. 1 (2010): 47–60.

“They say ‘we are doing this as we always have done’. In some ways this is true; in others it would appear to be a departure from traditional practice.”⁹¹¹ Similarly, a non-Indigenous ranger wrote in 1981 that “while it is true that the aborigines [sic] did frequently burn the land long before the arrival of Europeans, the pattern [sic] of burning has undoubtedly changed, and today fire management [note the distinction between Indigenous burning and ‘fire management’] is of immediate concern to Kakadu.”⁹¹² Sally Weaver also observed this attitude among ANPWS personnel who questioned “whether the Aboriginal owners of the parks are ‘traditional’ Aboriginals or, phrased otherwise, whether there is a traditional culture remaining in the minds and daily behaviour of the Aboriginal owners”.⁹¹³ Robert Levitus confirms this; “discussions with Park staff in 1996 revealed some of the same scepticism that Lewis had found regarding the life history backgrounds of local people and the quality of the indigenous knowledge base available for management to draw on.”⁹¹⁴ Such evidence clearly reflects cultural continuity and pyro-essential attitudes.

This is a complex topic and requires extreme sensitivity, especially from non-Indigenous academics. Colonisation undoubtedly caused much disruption to Indigenous cultures and it is not unreasonable to question if knowledge may have been lost (or even directly suppressed, as in Chapter Three) when it pertains to management of a Park with heritage significance to Australia and humanity as a whole. However, it is also possible that knowledge was handed down even if practices were not carried out, and that Indigenous peoples may not feel comfortable sharing the depth of their knowledge with descendants of colonists or those who do not possess authority to have that knowledge, as discussed above.

Whatever misgivings some Park staff may have had about *bininj* burning in Kakadu, others have felt comfortable drawing rhetorically upon Indigenous burning to promote ANPWS practices. When the first five Indigenous rangers were presented with their certificates in Canberra in 1980, the media release proudly declared that the training program had been a “two-way exercise” and that ANPWS staff “had learned much from the Aboriginals about the Park’s wildlife, plant and animal communities, and the use of fire in park management”.⁹¹⁵ Articles written by Park staff and published in popular scientific magazines such as *Ambio* highlighted the “carefully evolved fire management practices” of

⁹¹¹ C.D. Haynes, “Problems in Fire Management at Kakadu,” in *Towards an Expert System for Fire Management at Kakadu National Park*, Technical Memorandum 85/2 (Canberra: CSIRO Institute of Biological Resources, Division of Water and Land Resources, 1985), 8.

⁹¹² Day, “Minute: Draft Guidelines for Fire Management Kakadu National Park”, NAA.

⁹¹³ Sally M. Weaver, “Progress Report: The Role of Aboriginals in the Management of Cobourg and Kakadu National Parks, Northern Territory, Australia” (North Australian Research Unit, Darwin, 30 July, 1984), 18.

⁹¹⁴ Levitus, “Change and Catastrophe: Adaptation, Re-Adaptation and Fire in the Alligator Rivers Region,” 78.

⁹¹⁵ Minister for Science and the Environment, “Media Release: ‘Aboriginal Park Rangers Graduate’”, 27 March 1980, Item 7053207, Control Symbol KNP5.1, E1527, National Archives of Australia, Darwin, NT, Australia.

bininj and that ANPWS staff sought “the advice of local Aboriginals in helping to determine appropriate fire management programs”.⁹¹⁶

Bininj burning practices were also used to defend Park practices against criticism, though initially this had to be conducted on non-Indigenous terms. For instance, the second Plan of Management (released in 1986) was criticised by members of the public for making a commitment to Indigenous burning. ANPWS Director Ovington defended this policy, but felt the need to justify it through Western scientific terms: “Because the traditional use of fire has had a major bearing on the ecological diversity in the Park, its use is appropriate to the maintenance and/or rehabilitation of the historical diversity of ecosystems.”⁹¹⁷ In 1986 this public defence made little reference to the cultural or religious context of *bininj* burning, but another example points to growing faith among Park staff that critics would appreciate both the natural and cultural aspects of Kakadu’s heritage. When in 1999 the UNESCO World Heritage Committee considered placing Kakadu on the List of World Heritage in Danger, Environment Australia (successor to ANPWS) explicitly pointed to “traditional fire practices” being introduced into park management as a program “concerning protection [sic.] of cultural heritage protection in the Park”.⁹¹⁸ The Park’s landscape was described as reflecting “50,000 years of ongoing human occupation and land management” and “represents an outstanding example of man’s interaction with the natural environment”.⁹¹⁹ In both these instances, the defence of policy towards Indigenous burning was couched for a specific audience, but considering the attitudes of Judge Stretton in Chapter One or the complete discounting of Indigenous burning as a non-historical practice in Chapter Three, it is remarkable to see such attitudinal change.

This evidence of how Park staff have understood and represented *bininj* burning demonstrates the overall importance of *bininj* burning in Kakadu for shaping how non-Indigenous Australians have understood Indigenous Australia more broadly. The use of fire is the most obvious physical manifestation of connection to country. In Kakadu, this relationship was justified and legitimised by referring to ecological benefits of *bininj* fire practices, while the less tangible cultural aspects were de-emphasised. Even the most urban tourists could be shown an area subject to fire management or could learn about *bininj* burning’s aid for hunting, promoting plant growth, or reducing fuel. Furthermore, once the benefits of *bininj* fire management were established, Park staff could

⁹¹⁶ Michael Hill, “Kakadu National Park and the Aboriginals: Partners in Protection,” *Ambio* 12, no. 3/4 (1983): 158–67.

⁹¹⁷ Ovington, “Representations” (1986), 51

⁹¹⁸ Environment Australia, “Australia’s Kakadu: Protecting World Heritage. Response by the Government of Australia to the UNESCO World Heritage Committee Regarding Kakadu National Park” (Commonwealth of Australia, 1999), 133.

⁹¹⁹ Environment Australia, 7.

legitimate their own fire management efforts through this construct of Indigenous fire-use – even if their own management efforts bore only partial resemblance to *bininj* direction, or if the public portrayal of *bininj* burning was inaccurate.

Academic Encounters With Fire in Kakadu

A further source of tension in the fire politics of Kakadu has been academic knowledge. Fire in Kakadu has been especially attractive to academics for two reasons. The northern Australian region in a general sense was subjected to comparatively later and less intense colonisation, meaning that more Indigenous burning has been extant than in southern Australia. This is shown by the attendance and engagement of Indigenous land managers in seminars and symposiums that have been held to discuss fire management across Northern Australia.⁹²⁰ Therefore, Northern Australian researchers and managers were discussing the practicalities and complexities of adopting Indigenous fire management as early as 1971, long before their Southern counterparts.⁹²¹ The second reason lies in the role of Kakadu in particular as a centre of new academic understandings of Indigenous Australia across a range of research interests. Explanations for this prominence include the prestige and high visibility of Kakadu National Park (aided by high profile conservation disputes and tourism), interest in the governance of the joint management arrangements, research into Kakadu's plentiful Indigenous artwork, and academic inquiry into savannah ecology. These factors combined to ensure Kakadu attracted great academic interest, which has significantly shaped Australian fire cultures, and the fire politics of the Park.

For many years the Alligator Rivers region has hosted a large number of academic researchers, and this has considerably shaped the fields of fire ecology, archaeology, and anthropology more broadly. For many years CSIRO maintained a research station at Kapalga which was host to a significant multi-year study measuring a number of different tropical fire ecology variables.⁹²² Kapalga and other

⁹²⁰ P. Jacklyn and Jeremy Russell-Smith, eds., *Proceedings from the North Australia Fire Management Workshop, Darwin, 24-25 March 1998* (Darwin: Tropical Savannas CRC, 1998), 3.

⁹²¹ See M.J. Fisher, "The Role of Fire in the Management of National Parks in the Northern Territory," in *Proceedings of the Tropical and Arid Fire Symposium* (Darwin: Bush Fires Council of the Northern Territory, 1971); R.E. Fox, "Summary of Published Work," in *Report on the Use of Fire in National Parks and Reserves* (Darwin: Department of the Northern Territory, Forestry, Fisheries, Wildlife, Environment and National Parks Branch, 1974), 1–11.

⁹²² The results of the Kapalga experiments are described in Andersen, Cook, and Williams, *Fire in Tropical Savannas: The Kapalga Experiment*; other long-term fire experiments in Northern Australia are described in Jeremy Russell-Smith et al., "Fire and Biodiversity Monitoring for Conservation Managers: A 10-Year Assessment of the 'Three Parks' (Kakadu, Litchfield and Nitmiluk) Program," in *Culture, Ecology and Economy*

research stations have ensured many of Australia's fire scientists have at some point either visited, researched, or responded to research from the Alligator Rivers region.⁹²³ The anthropological work of Jones, Haynes and Lewis in describing Indigenous burning in this area was crucial to spreading knowledge and legitimising Indigenous burning to the academy.⁹²⁴ The Park itself has sponsored and directed some of this research; Park staff such as Chris Haynes, Jon Day and Tony Press have themselves played an important role in conducting and disseminating academic research focussed on fire management and Indigenous fire use.⁹²⁵ Academia has shaped the fire politics of Kakadu; both by contributing to debate over fire management policies for the Park, and by shaping the terms by which debate is conducted.

Indeed, Indigenous management in Kakadu – especially burning – has served as a rich prompt for researchers to debate apparent differences between Western academic and Indigenous epistemologies. Experiences in this region led many academics to believe that the attitudes towards the nature, values and approaches towards knowledge are vastly different between these two knowledge systems, although some philosophers of science have questioned such clear distinctions between two supposedly separate systems of knowledge.⁹²⁶ However, the main academic discourse is of clear distinctions, and such strong perceptions of difference in knowledge systems have had very real consequences when it comes to Indigenous environmental knowledge.

Spurred by observations of differences in knowledge systems, Western scientists have often tried to justify their research to critical *bininj* as being a form of translation, but the process of translation in

of Fire Management in North Australian Savannas: Rekindling the Wurrk Tradition, ed. Jeremy Russell-Smith, Peter J. Whitehead, and Peter M. Cooke (Collingwood: CSIRO Publishing, 2009), 294–324.

⁹²³ Prominent Australian fire scientists such as David Bowman and Jeremy Russell-Smith earned their stripes in the Alligator Rivers region and neighbouring Arnhem Land.

⁹²⁴ Eg Jones, "Hunters in the Australian Coastal Savanna"; C.D. Haynes, "Land, Trees and Man (Gunret, Gundulk, Dja Bining)," *Commonwealth Forestry Review* 57 (1978): 99–106; Haynes, "The Pattern and Ecology of Munwag: Traditional Aboriginal Fire Regimes in North-Central Arnhemland"; Lewis, "Ecological and Technical Knowledge of Fire: Aborigines Versus Park Rangers in Northern Australia."

⁹²⁵ C.D. Haynes, "Letter to the Director", 13 July 1979, Item 7053234, Control Symbol KNP23, E1527, National Archives of Australia, Darwin, NT, Australia ; Jon Day, "Proposed Abstract for Poster – ANZAAS", 30 April 1982, Item 7053234, Control Symbol KNP23, E1527, National Archives of Australia, Darwin, NT, Australia; Tony Press, "Fire, People, Landscapes and Wilderness: Some Thoughts of North Australia," in *Country in Flames: Proceedings of the 1994 Symposium on Biodiversity and Fire in North Australia*, ed. Deborah Bird Rose, vol. Biodiversity Series Paper No. 3 (Darwin: Jointly published by the Biodiversity Unit (Department of the Environment, Sport and Territories) and the North Australia Research Unit (The Australian National University), 1994), 19–24.

⁹²⁶ See, for instance D. Pearce, A. Jackson, and Richard W. Braithwaite, "Aboriginal People of the Tropical Savannas: Resource Utilization and Conflict Resolution," in *The Future of Tropical Savannas: An Australian Perspective*, ed. A. Ash (Melbourne: CSIRO Publishing, 1996), 88–103; A.N. Andersen and B.J. McKaige, "Burning Issues: Communicating Fire Research in Northern Australia," in *Ecology for Everyone: Communicating Ecology to Scientists, the Public and the Politicians*, ed. R.J. Hobbs and R.T. Wills (Chipping Norton, NSW: Surrey Beatty and Sons, 1998), 88–96; Verran, "A Postcolonial Moment in Science Studies: Alternative Firing Regimes of Environmental Scientists and Aboriginal Landowners."

Kakadu has had unintended side-effects. The premise of the translation justification for non-Indigenous research into Indigenous knowledge is that it represents a way of pragmatically legitimating *bininj* knowledge to non-Indigenous audiences, which may generate greater public and political support for *bininj* aspirations. For instance, Dick Braithwaite of CSIRO explained to the Aboriginal Consultative Committee in 1990 that “a lot of what CSIRO do is record things that Aboriginal people already know but they put it in a way that other people can understand.”⁹²⁷ Haynes describes the dangers of this approach to *bininj* culture extensively in his historical account of how the Gundjeihmi seasonal calendar came to be codified for Park staff. Today, the calendar is sold on t-shirts and publicised for tourists visiting Kakadu. Yet Haynes recounted how it was in fact the work of a single afternoon’s work with senior *bininj* Toby Gangali and Mick Alderson in 1978.⁹²⁸ Since then, Haynes believes the calendar, a “mimetic transformation of an abstracted knowledge on to paper”, has actually rearticulated “traditional forms of authority” and can be used to challenge *bininj* authority and authenticity if they do not appear to be sticking to what after all is meant to be *their* traditional calendar.⁹²⁹ The innocent product of an idle afternoon is now literally set in stone at the Kakadu Visitor Centre.

Through this particular experience, reflection, and *bininj* criticism, other researchers slowly realised the issues with translation arguments, and with research into *bininj* burning more generally. In 1996, Northern Australian scientists Pearce, Jackson and Braithwaite confessed that “there is often poor recognition of intellectual property rights by scientists. They tend not to acknowledge Aborigines in the knowledge-gaining process”.⁹³⁰ In 2000, Park historian David Lawrence further noted “one problem with codifying aspects of traditional ecological knowledge is that, once it is documented and made generally available for use by non-Aboriginals, the information ceases to exist within its social and cultural parameters and its use can no longer be controlled by Aboriginal custodians.”⁹³¹ This helps explain some of the factors behind *bininj* criticism of academic research into Kakadu.

Certainly, there has been significant *bininj* dissatisfaction with academic researchers. *Bininj* have felt that researchers travelling to Kakadu have been driven by their own personal priorities, rather than responding to what the *bininj* community desired. For instance, it is telling that the first official researcher presented to the Gagudju Association as part of the newly-established Park’s research

⁹²⁷ “Minutes to Consultative Committee Meeting Held 4 and 5 October, 1990”, October 1990, Control 1990/281, E1509, National Archives of Australia, Darwin, NT, Australia.

⁹²⁸ Haynes, “Defined by Contradiction,” 261.

⁹²⁹ Haynes, 261–64.

⁹³⁰ Pearce, Jackson, and Braithwaite, “Aboriginal People of the Tropical Savannas: Resource Utilization and Conflict Resolution,” 102.

⁹³¹ Lawrence, *Kakadu*, 253.

program in 1980 was an archaeologist, rather than, for example, a linguist hired to help train *balanda* staff in *bininj* language.⁹³² Some *bininj* have specifically criticised academic research in Kakadu for having an extractive manner, regardless of justifications provided by the translation argument. As Mick Alderson said in 1990,

What value have we got after 15 years? People seem to come here just to use the facilities and the country and we don't get much value, we only get things we already know. Surely after 15 years we should have more, what about solutions for *Mimosa* and *Salvinia* [invasive species]?⁹³³

CSIRO scientists admitted that *bininj* felt “that they were unwelcome at Kapalga”, and that they had been “less than successful” at “engaging traditional Aboriginal landowners”.⁹³⁴ Such statements point to the kind of tensions that can occur when academic research is actively being undertaken while contemporary Indigenous burning is occurring. Far from a benign force, the manner in which academic research into Indigenous burning has been conducted can be harmful to Indigenous aspirations.

The strong presence of academics in Kakadu means it is no surprise they have been highly vocal in shaping the discussion of fire management in the Park before and since its creation, especially through criticism of the ambiguous way through which competing fire management priorities were reconciled throughout the Park's early decades.⁹³⁵ This ambiguity particularly troubled those scientists especially concerned with effective conservation. In 1991, CSIRO scientist Alan Andersen questioned whether the avowed goal to “re-establish” traditional burning practices would “potentially conflict” with protecting biodiversity conservation; “one of the major reasons for aboriginal [sic] burning was for ease of travel – is one of the objectives of ANPWS fire management to make it easier to walk through the bush? The objectives are listed as if they are all complementary, when they are potentially competing”.⁹³⁶

Academics – especially those concerned with conservation – have expressed concerns echoing the cultural continuity discourse as it applies to fire knowledge. For example, in 1986 archaeologist John Mulvaney cast doubt on the aspirations of the draft second Plan of Management statement that

⁹³² Dehne McLaughlin, “Field Report; Subject – Kakadu National Park Plan of Management”, 18 July 1980, Item 1770783, Control Symbol 1985.250, E1509, National Archives of Australia, Darwin, NT, Australia.

⁹³³ “Minutes to Consultative Committee Meeting Held 4 and 5 October, 1990”, NAA.

⁹³⁴ Andersen and McKaige, “Burning Issues: Communicating Fire Research in Northern Australia,” 94.

⁹³⁵ See Penny Wurm (NT University) in in “Representations on the Fourth Plan of Management in Respect of Kakadu National Park” (National Parks And Wildlife, 1997), 2; and Ralph Slatyer (ANU) in J.D. Ovington, “Comments on the Representations Concerning Kakadu National Park Plan of Management as Released for Public Comment” (Canberra: Australian National Parks and Wildlife Service, 1986), 4.

⁹³⁶ Alan Andersen (CSIRO Division of Wildlife and Ecology) in in Australian National Parks and Wildlife Service, “Comments on the Representations Concerning the Kakadu National Park Plan of Management” (Canberra: Australian National Parks and Wildlife Service, 1991), 1-5.

“Because the traditional (Aboriginal) use of fire maintains ecological diversity it is appropriate in a national park”. Mulvaney argued that this link between *bininj* burning and ecological diversity “[remained] to be verified”, and “the knowledge of traditional Aboriginal fire management is still very incomplete”.⁹³⁷ Anderson went further in 1991, questioning the extent of acute knowledge of “traditional fire management” available.⁹³⁸ Peter Carroll alluded to a supposed sense of wide recognition that *bininj* had experienced a loss of cultural knowledge over the last century.⁹³⁹ Other academics have been less sceptical of how *bininj* burning might contribute to biodiversity conservation. Jeremy Russell-Smith lamented that the considerable scientific and anthropological research on this knowledge appeared to not have been incorporated and was ignored in the 1998 Plan of Management.⁹⁴⁰

The link between *bininj* burning and contemporary fire management has also been understood by some academics through the environmental continuity paradigm. David Bowman, for instance, has expressed concern that ecological changes in Northern Australia generally mean efforts to return to traditional management are impossible.⁹⁴¹ Richard Braithwaite argued this principle applied to Kakadu as “the particulars of Aboriginal burning are now largely irrelevant as the world has changed so much” (referring to ecological changes), though “the generality is, however, still valid”.⁹⁴² Braithwaite was referring to the concept of the goal of conservation management being a mosaic of burnt areas, though his understanding was based on the framework that the pre-colonial patch mosaic was an “emergent property” of Indigenous burning, rather than the deliberate creation of long-term goals.⁹⁴³ Perhaps it is only natural that such concerns would come from those most concerned with studying the natural world, but it reveals that these academics understood Indigenous burning only on a material basis.

In a similar sense, some academics who worked in Kakadu displayed pyro-essential attitudes towards Indigenous burning in Kakadu. CSIRO wildlife scientist Ken Myers questioned the use of modern technology for Indigenous burning in Kakadu, but only on the grounds of potentially greater ecological

⁹³⁷ DJ Mulvaney in Ovington, “Representations” (1986), 2.

⁹³⁸ Alan Andersen (CSIRO Division of Wildlife and Ecology) in ANPWS, “Representations” (1991).

⁹³⁹ Peter Carroll in “Representations” (1997), 4.

⁹⁴⁰ Jeremy Russell-Smith in “Representations” (1997), 1-2.

⁹⁴¹ David Bowman, “Why the Skillful Use of Fire Is Critical for the Management of Biodiversity in Northern Australia,” in *Country in Flames: Proceedings of the 1994 Symposium on Biodiversity and Fire in North Australia*, ed. Deborah Bird Rose, vol. Biodiversity Series Paper No. 3 (Darwin: Jointly published by the Biodiversity Unit (Department of the Environment, Sport and Territories) and the North Australia Research Unit (The Australian National University), 1994), 107.

⁹⁴² Braithwaite, “Guest Editorial: Black and Green, 114.

⁹⁴³ Braithwaite, 114.

impact.⁹⁴⁴ Pyrogeographer David Bowman speculated that “technological approaches to land management may not be able to mimic traditional Aboriginal burning practices”; not due to the nature of the technology being ‘modern’ rather than ‘traditional’, but rather simply as “flying around in machines throwing fire out of helicopters and aeroplanes does not simulate to any degree the *fineness of detail* which is required for firestick farming” [my emphasis].⁹⁴⁵ As with the environmental continuity arguments explored above, these researchers interpreted Indigenous burning primarily through a framework of material factors rather than incorporating cultural importance. It should be noted that the views of some of these academics have changed over time, especially in the way they understand Indigenous burning, and the attitudes quoted above reflect only their attitudes at a particular time (this especially applies to David Bowman, one of Australia’s most prominent, prolific, and provocative fire academics). Perhaps it was their experiences in Kakadu that challenged these preconceptions and ideological frameworks.

Furthermore, despite the *bininj* criticism described above, not all academic research has been viewed negatively by *bininj*. Projects investigating *bininj* burning in wetlands in Kakadu have been developed in conjunction with *bininj*, and are often described as signs of successful research with Indigenous co-design and a practical outcome.⁹⁴⁶ These have demonstrated that frequent *bininj* burning of wetlands for resources results in far more abundant and species-diverse birdlife.⁹⁴⁷ Most intriguingly, local *bininj* Peter Christophersen recently proposed the implementation of a savannah burning carbon abatement project in Kakadu, drawing inspiration from the neighbouring West Arnhem Land Fire Abatement project.⁹⁴⁸ The politics of carbon abatement savannah burning projects will be explored in more depth in Chapter Eight, but this project is indicative of the agile and innovative fire scene in Kakadu, with a traditional owner trying to meld *bininj* knowledge with Western science and accounting to generate an economic opportunity.

⁹⁴⁴ Ken Myers in Ovington, “Representations” (1986), 2.

⁹⁴⁵ Bowman, “Why the Skillful Use of Fire Is Critical for the Management of Biodiversity in Northern Australia,” 120–21.

⁹⁴⁶ Lawrence, *Kakadu*, 281; Sandra McGregor et al., “Indigenous Wetland Burning: Conserving Natural and Cultural Resources in Australia’s World Heritage-Listed Kakadu National Park,” *Human Ecology* 38, no. 6 (2010): 721–29; Steve Davidson, “Cultural Burning Revives a Kakadu Wetland,” *Ecos* 2005, no. 125 (2005): 14–16.

⁹⁴⁷ McGregor et al., “Indigenous Wetland Burning: Conserving Natural and Cultural Resources in Australia’s World Heritage-Listed Kakadu National Park.”

⁹⁴⁸ Peter Christophersen, Gundjehmi Aboriginal Corporation, and Aboriginal Carbon Fund, “Northern Kakadu Emissions Abatement Project” (3rd Emissions Reduction Summit, Melbourne, 2016), <http://summit2016.carbonmarketinstitute.org/wp-content/uploads/2016/05/Peter-Christophersen.pdf>. Gundjehmi Aboriginal Corporation in Appendix A of Director of National Parks, “Report of the Director of National Parks on the Preparation of the Sixth Kakadu National Park Management Plan,” 37.

‘Seeing’ Red: Environmentalists and Fire in Kakadu

The environmentalist movement in Australia has been significantly challenged by *bininj* burning in Kakadu, much of which can only be explained through the broader context of the highly contested politics within the Park. Part of the disagreement between activists on whether they should support *bininj* burning in a national park is due to tactical political concerns: if Indigenous Australians can use four wheel drives to burn ‘protected’ areas as this is ‘traditional’, this theoretically opens the door for other groups such as farmers or foresters to make similar claims.⁹⁴⁹ As Chapter Six will demonstrate, activists have long been wary that fire will be used as a wedge for resource extraction. Yet the evidence for whether this concern actually reflected what occurred in the early decades of the Park is ambiguous at best.

This is particularly shown through debates over whether to expand Kakadu or inscribe it on the World Heritage List. The proposed Stage II and III expansions contained the Coronation Hill mining zone and debate over whether to approve the expansion was highly intense. Federal Minister for Resources and Energy Senator Gareth Evans approved of mining at Coronation Hill and famously described Stage III as “clapped out buffalo land”, implying it was of little conservation value.⁹⁵⁰ Similarly, the Northern Territory Government lobbied intensely against the inscription of Kakadu onto the World Heritage list on the basis much of the Park had little conservation worth. Famous conservationist Harry Butler was hired and argued intensely against the World Heritage nomination, stating “UNESCO World Heritage demanded areas of Rolls Royce standard, and all Canberra was offering was a clapped-out Holden”.⁹⁵¹ Notably, however, neither of these efforts to imply questionable conservation ‘value’ incorporated arguments about Indigenous fire practices in any significant manner.⁹⁵² This omission is particularly noteworthy given that later attempts to oppose conservationist measures would draw upon Indigenous burning as evidence for environmental degradation, such as the 1994 NSW Farmer’s Federation pamphlet as discussed in Chapter Six,⁹⁵³ or conservative columnist David Barnett’s attempt to criticise Indigenous land rights movements by misinterpreting Tim Flannery’s megafauna extinction

⁹⁴⁹ A.J. Brown and Noel Pearson, “Keeping the Land Alive: Aboriginal People and Wilderness Protection in Australia” (Sydney: The Wilderness Society, 1992), 43.

⁹⁵⁰ Lawrence, *Kakadu*, 160.

⁹⁵¹ K. Mellanby, “Politics and Wildlife in Australia,” *Nature* 325 (1987): 112.

⁹⁵² Even a significant report from Keen and Merlan reporting on the cultural and spiritual significance of the area to the Jawoyn traditional owners did not contain any significant mention of Indigenous burning; see I. Keen and Francesca Merlan, “The Significance of the Conservation Zone to Aboriginal People,” Resource Assessment Commission Kakadu Conservation Zone Inquiry Consultancy Series (Canberra: Australian Government Publishing Service, 1990).

⁹⁵³ Benson and Redpath, “The Nature of Pre-European Native Vegetation in South-Eastern Australia.”

thesis discussed in Chapter Seven.⁹⁵⁴ In the early decades of the Park, environmentalists had feared that *bininj* burning would be used as a wedge to splinter conservation efforts, but these fears were not borne out by events.

Beyond tactical concerns, environmentalists were challenged by *bininj* burning in Kakadu at a conceptual level. A recurrent concern was that *bininj* burning was not traditional (the cultural continuity argument). Some environmental groups expressed doubt at whether contemporary *bininj* burning was consistent with 'traditional' practices, casting it as burning for "play".⁹⁵⁵ Others understood *bininj* burning as being motivated only by hunting and argued that hunting should not be allowed at all in the Park,⁹⁵⁶ or that hunting should only be conducted in a traditional manner (i.e. with spears and on foot), reflecting forms of pyro-essentialism.⁹⁵⁷ Much of this was no doubt motivated by discomfort with the active use of fire in ecological management; a common claim was that *bininj* burning may actually damage the environment and compromise biodiversity conservation.⁹⁵⁸ Yet a deeper analysis reveals discomfort over the foundations upon which conservation in Kakadu was built.

Indeed, some environmentalist responses to *bininj* burning reveal discomfort with power over fire. Some argued that *bininj* burning should only be permitted if it aligns with the goals of nature conservation.⁹⁵⁹ Others argued that "scientific evidence should be collected to determine whether traditional Aboriginal burning regimes increase wildlife diversity".⁹⁶⁰ Essentially, the latter environmentalists are saying that *bininj* burning in Kakadu is only permissible on their terms; that it must satisfy their criteria and achieve their objectives. Motives for *bininj* burning such as the expression of connection to country or to keep country clean in a spiritual or religious sense must be subordinated to largely Western concerns of biodiversity and conservation. Furthermore, they are stating that *bininj* burning may only be permitted once validated through their preferred system of knowledge (ecological sciences). This conceptual conflict could be interpreted as an inevitable consequence of the competing conservation goals in Kakadu – unless a reconceptualisation of conservation is attempted, one that incorporates Indigenous goals, aspirations, and activities.

This reconceptualisation has partly occurred through the environmentalist redefinition of wilderness inspired by Kakadu. Founded in the second half of the twentieth century under a cloud of negotiation

⁹⁵⁴ D. Barnett, "Fire-Stick Farmers Are Killing Kakadu," *The Australian Financial Review*, 22 January, 1998; Tim Flannery, "Gross Ignorance in Kakadu Claim [Letter]," *The Australian Financial Review*, 10 February, 1998.

⁹⁵⁵ The Wild Life Preservation Society of Australia in Ovington, "Representations" (1986), 2.

⁹⁵⁶ The Wild Life Preservation Society of Australia in Ovington, "Representations" (1986), 1.

⁹⁵⁷ Colong Foundation for Wilderness in "Representations" (1997), 5.

⁹⁵⁸ Colong Foundation for Wilderness in "Representations" (1997), 5.

⁹⁵⁹ Total Environment Centre in Ovington, "Representations" (1986), 6.

⁹⁶⁰ Colong Foundation for Wilderness in ANPWS, "Representations" (1991), 7.

balancing environmental, mining, tourist, and Indigenous interest, Kakadu can hardly be considered as an extension of the settler-colonial model of the first national parks developed in the nineteenth century. As discussed in Chapter Five, the first national parks in America were partly conceptualised as spaces of wilderness, which necessarily required the removal of Indigenous occupancy (including Indigenous peoples and any sign of their habitation) from the landscape. Tracy Banivanua Mar has extended this argument to many early Australian national parks, arguing they functioned as soldiers of *terra nullius*.⁹⁶¹ Kakadu, on the other hand, was declared much later, and as discussed, at a time of increasing Indigenous activism and with at least partial Indigenous consultation. Institutionally, it cannot be regarded as working in the same violent settler-colonial model as Yellowstone or Yosemite. However, the early decades of Kakadu make clear that the legacy of wilderness ideology remained extremely strong. Indeed, Rhys Jones noted that even the Director of ANPWS at the time of the first Plan of Management, a man usually sympathetic to Aboriginal culture, celebrated the Plans as they would “ensure the retention of the wilderness character” and noted Kakadu had been “described as an untamed wilderness”.⁹⁶² Wilderness continued to exercise its influence – even unconsciously – among the institutions and administrators of Kakadu, but its influence was especially strong among environmental groups.

Given Kakadu’s status as the first national park in Australia to be jointly managed by conservation authorities and Indigenous peoples, it is only natural that this issue would arise, especially in the context of the obvious deliberate and systematic use of fire. Environmentalist groups that venerated wilderness had already been challenged by the complex and uneasy matrix of debate that underlay the temporary alliance of environmentalists, archaeologists, and Indigenous Australians during the battles to save the Franklin River in Tasmania’s south-west in 1982-3.⁹⁶³ As Griffiths writes, “Some environmentalists called the archaeologists ‘mind merchants’ and accused them of ‘disturbing the forest’ with invasive technology and science”.⁹⁶⁴ In the early 1990s in an “anguished self-examination”, the Wilderness Society and the Australian Conservation Foundation both opened internal debate on Aboriginal land rights and whether they should support them.⁹⁶⁵

Kakadu itself would prompt and reflect the influence of these environmentalist reappraisals and internal debates over wilderness. Cultural geographer Lisa Palmer has argued that romantic imagery

⁹⁶¹ Tracey Banivanua Mar, “Carving Wilderness: Queensland’s National Parks and the Unsettling of Emptied Lands, 1890-1910,” in *Making Settler Colonial Space*, ed. Tracey Banivanua Mar and Penny Edmonds (Palgrave Macmillan, 2010), 73–94.

⁹⁶² Jones, “Ordering the Landscape,” 184.

⁹⁶³ See Tom Griffiths, *Hunters and Collectors: The Antiquarian Imagination in Australia* (Melbourne: Cambridge University Press, 1996); Billy Griffiths, *Deep Time Dreaming: Uncovering Ancient Australia*.

⁹⁶⁴ Griffiths, *Hunters and Collectors: The Antiquarian Imagination in Australia*, 266.

⁹⁶⁵ Griffiths, 268.

from Kakadu has appeared prominently in merchandise and propaganda from groups such as the Wilderness Society and the Australian Conservation Foundation.⁹⁶⁶ The influence of wilderness has not been limited to external promotional material. In 1986 the Wilderness Society argued that fire frequency in Kakadu should be reduced and that all burning, even “traditional Aboriginal burning practices” “should only be undertaken to promote wildlife diversity”,⁹⁶⁷ but by 1992 a Wilderness Society monograph soberly explored the problem inherent to recognising Indigenous burning practices in Kakadu while maintaining the concept of “wilderness”.⁹⁶⁸ The Wilderness Society was not alone in facing this definitional dilemma; other environmentalist groups such as The Environment Centre NT Inc.,⁹⁶⁹ and the Colong Foundation for Wilderness were also forced to grapple with the concept of wilderness when attempting to influence management in Kakadu.⁹⁷⁰ Former Director of the Australian Conservation Foundation, Dr Geoff Mosley, has long defended the need for wilderness in Kakadu. He argued against proposed revisions to wilderness in the 1998 Plan of Management because non-Indigenous Australians have been “wrenched” from the land and need wilderness spaces to re-establish links to environments.⁹⁷¹ Such definitional debates over wilderness were not limited to activists; academics also drew upon *bininj* burning to challenge wilderness such as the archaeologist Clive Gamble.⁹⁷² Fire management in Kakadu both attracted and shaped these debates.

It should be noted that some environmentalist groups were much more supportive of *bininj* burning in Kakadu.⁹⁷³ Some, for instance, argued that hunting should be allowed within the Park, reasoning that to restrict it would be to ignore the pre-colonial impact of *bininj* in shaping the Park’s biodiversity.⁹⁷⁴ These differences reflect not only the diverse tactical approaches of different activists, but also a discomfort at the heart of relations between Indigenous people and the environmental ‘movement’. Eve Vincent and Timothy Neale recently characterised this relationship in general as

⁹⁶⁶ Lisa Palmer, “Bushwalking in Kakadu: A Study of Cultural Borderlands,” *Social & Cultural Geography* 5, no. 1 (2004): 109–27.

⁹⁶⁷ The Wilderness Society in Ovington, “Representations” (1986), 4.

⁹⁶⁸ It is likely that the extended Indigenous protests and cultural debate around the Australian Bicentenary may have sparked this redefinition. Brown and Pearson, “Keeping the Land Alive: Aboriginal People and Wilderness Protection in Australia.”

⁹⁶⁹ The Environment Centre NT Inc. in “Representations” (1997), 6.

⁹⁷⁰ Colong Foundation for Wilderness in “Representations” (1997).

⁹⁷¹ Palmer, “Bushwalking in Kakadu,” 119.

⁹⁷² Clive Gamble, “The Artificial Wilderness,” *New Scientist* 1503 (10 April, 1986): 50–53; see also Rose, *Nourishing Terrains*.

⁹⁷³ National Botanic Gardens in A.N.P.W.S., “Representations Received in Connexion with the Plan of Management for Kakadu National Park.” (Australian National Parks and Wildlife Service, 1980), 1; Australian Conservation Foundation in ANPWS, “Representations” (1980), 3.

⁹⁷⁴ Phillip Toyne (former Executive Director of the Australian Conservation Foundation) in S. Woenne-Green et al., *Competing Interests: Aboriginal Participation in National Parks and Conservation Reserves in Australia: A Review* (Fitzroy: The Australian Conservation Foundation, 1994), 3.

“unstable relations”,⁹⁷⁵ and this unease has been particularly pronounced at Kakadu. Indeed, the protracted politics surrounding uranium mining in the Alligator Rivers region and consequent fractures between and within *bininj* and environmentalist groups during the Ranger Inquiry and Coronation Hill dispute would not have helped matters.⁹⁷⁶ The ultimate question following the establishment of Kakadu as a jointly managed national park has always been the prioritisation of nature conservation or Indigenous aspirations. Fire is a particularly obvious flashpoint.

Miners, Pastoralists, Tourists

As discussed above, some activist groups have worried about how disputes over conservation in the Alligator Rivers region may be affected by recognition of *bininj* burning’s effect in shaping the landscape, yet in the early decades of the Park, the mining industry and its allies did not substantially argue this link. If the landscape had already been altered by human use, what difference would be made by mining it? Activists feared this argument in discussions surrounding the extension of mining or World Heritage provisions (which would restrict future mining), but these fears were misplaced. Mining consultant W.J. Fisher questioned Kakadu’s World Heritage Status and whether the Park was “pristine” by pointing to “many forms of land use” which had degraded the Park such as pastoralism; this included Indigenous burning but it was not explored beyond this single sentence.⁹⁷⁷ Similarly, the Conservation Commission of the development-friendly Northern Territory Government argued against the 1991 Federal Government nomination of Kakadu to the World Heritage List but only referred to Indigenous alteration of the landscape in passing.⁹⁷⁸ The Commission argued Kakadu’s “eucalypt forests cannot be regarded as virgin”, but this was due to both “50 000 years of Aboriginal burning” and 100 years of substantial European impact – and this single sentence represents the only substantial argument about degradation through Indigenous burning in a document of nearly a hundred pages.⁹⁷⁹ It appears this line of argument was simply not used in the sources available; even

⁹⁷⁵ Eve Vincent and Timothy Neale, eds., *Unstable Relations: Indigenous People and Environmentalism in Contemporary Australia* (Perth: UWA Publishing, 2016).

⁹⁷⁶ David Lawrence extensively described these politics in Lawrence, *Kakadu*, 179..

⁹⁷⁷ W.J. Fisher, “Kakadu National Park World Heritage Status-Fact or Fiction?,” in *Environmental Planning in Multiple Land Use Areas* (11th North Australian Mine Rehabilitation Workshop, Darwin: Department of Mines and Energy, 1989), 75.

⁹⁷⁸ For most of Kakadu’s history, the Northern Territory Government favoured development in Kakadu and resented the Federal Government’s administration over the area. See Lawrence, *Kakadu*, 190–96..

⁹⁷⁹ Conservation Commission of the Northern Territory, “A Submission Concerning a Nomination of Kakadu National Park by the Australian Government for Inscription in the World Heritage List” (Darwin: Conservation Commission of the Northern Territory, 1991), 14.

the famous description of Stage III as “clapped out buffalo country” refers to *European* environmental impacts, not *Indigenous* impacts.⁹⁸⁰

There are several possible explanations for this feared logic not appearing in these particular disputes. One interpretation is that the conceptual link for this line of argument may not have reached broader public awareness until after the publication of Tim Flannery’s megafauna extinction thesis in *The Future Eaters* in 1994.⁹⁸¹ The corporate-affiliated Institute for Public Affairs tried to make this link in 1991, but instead of dwelling upon deconstructions of wilderness through Indigenous burning, focussed upon dubious conflation of pre-colonial Indigenous ochre mining with the strip mining used in Kakadu’s Ranger mine.⁹⁸² Alternatively, mining interests may have judged that implying your neighbours and employees’ ancestors were environmentally irresponsible pyromaniacs might make for awkward future encounters. Ultimately, perhaps arguments appealing to employment, royalties, and profit may have been judged as more politically resonant in the early 1990s than esoteric debates over wilderness.

Pastoralists and graziers represent another group who have shaped the politics of fire in Kakadu, through both shaping policies, and by bringing their own fire practices into the region before the declaration of the Park. Sections of what would progressively become Kakadu were former cattle or buffalo stations (such as the Gimbat and Goodparla cattle leases), and Kakadu has bordered multiple cattle leases. Pastoralism and grazing has had a large economic and cultural presence in Northern Australia (accounting for roughly 70% of land use in Northern Australia),⁹⁸³ and was one of the prime ways through which *bininj* and non-Indigenous Australians interacted for many years.⁹⁸⁴ This was particularly the case through the employment of Indigenous Australians on cattle stations, through buffalo hunting, and throughout the pastoral and grazing industries.

Graziers brought their own fire practices to Northern Australia and altered existing patterns of burning. Similarly to graziers on the High Country as described in Chapter One, or the herders in

⁹⁸⁰ Lawrence, *Kakadu*, 160.

⁹⁸¹ Flannery, *The Future Eaters*.

⁹⁸² Matthew Spriggs, “Future Eaters in Australia, Future Eaters in the Pacific? Early Human Environmental Impacts,” *Australian Archaeology* 52, no. 1 (2001): 58.

⁹⁸³ John C. Z. Woinarski et al., “The Disappearing Mammal Fauna of Northern Australia: Context, Cause, and Response,” *Conservation Letters* 4, no. 3 (2011): 192–201; W.H. Winter and J. Williams, “Managing Resources and Resolving Conflicts: The Role of Science,” in *The Future of Tropical Savannas: An Australian Perspective*, ed. A. Ash (Melbourne: CSIRO, 1996), 20–27. Even Australian bush poet Banjo Paterson wrote about buffalo hunting in the Alligator Rivers region. See Andrew Barton Paterson, “Buffalo Country,” in *The Animals Noah Forgot* (Sydney: The Endeavour Press, 1933).

⁹⁸⁴ Ann McGrath, *Born in the Cattle: Aborigines in Cattle Country* (Allen & Unwin, 1987).

California described in Chapter Two, graziers in Northern Australia burned for “green pick”.⁹⁸⁵ Furthermore, as Samantha Wells and others have demonstrated, some North Australian pastoralists employed Indigenous employees to use fire as a land management tool from the early twentieth century.⁹⁸⁶ This long period of influence has led some to question the mutual influences, differences and similarities between the two groups and their fire use. As with the graziers discussed in Chapter One, some in Northern Australia claim that the burning conducted by Indigenous employees on behalf of graziers and buffalo hunters was effectively indistinguishable from pre-contact burning.⁹⁸⁷ On the other hand, Henry T. Lewis observed in the 1970s and 80s that graziers and Indigenous Australians both used fire, but burned for different reasons – Indigenous Australian fire economies were structured around a vast web of resources and other reasons to burn, whilst cattlemen burned to optimise a single resource: cattle.⁹⁸⁸

The way in which Northern Australians have debated the extent of grazer influence upon Indigenous burning further demonstrates the ideological frameworks discussed throughout this chapter and thesis. One commentator has extended the differentiation identified by Lewis to argue that Indigenous Australians in pastoral regions adapted their knowledge of burning “to the demands of ‘cattle culture’” and consequently lost their knowledge of pre-contact burning.⁹⁸⁹ He further argued that due to the history of pastoralism in the broader Alligator Rivers region anthropological interpretations of ‘traditional’ *bininj* burning knowledge are in fact based on “misinformation” from “acculturated” Indigenous Australians.⁹⁹⁰ This commentator concludes this means the fire policies of Kakadu National Park are misguided and based on false information.⁹⁹¹ This is an obvious and perhaps extreme manifestation of the cultural continuity argument that views Indigenous burning through a framework of material practices; furthermore, it is reminiscent of the entanglement between Indigenous and grazer fire practices explored for the High Country in Chapters One and Six. Another grazier, interviewed by Lewis, exclaimed

⁹⁸⁵ Bushfires Council N.T., “Discussion Paper to Formalise a Strategy for Management of Wildfires in the NT” (Darwin: Bushfires Council N.T., 1992); Tim McGuffog and Tom Starr, “Fire Management in Northern Australia: The Top End Trifecta,” in *Bushfire '97 Proceedings* (Plaza Hotel, Darwin: CSIRO Tropical Ecosystems Research Centre, 1997), 234–38.

⁹⁸⁶ Samantha Jane Wells, “Negotiating Place in Colonial Darwin: Interactions between Aborigines and Whites, 1869-1911” (PhD thesis, University of Technology, Sydney, 2003), 119. Wells, “Negotiating Place in Colonial Darwin,” 119.

⁹⁸⁷ Len Rosendale in Dennis Schulz, ed., *Fire on the Savannas: Voices from the Landscape* (Darwin: Tropical Savannas CRC, 1998), 7.

⁹⁸⁸ Lewis, “Burning the ‘Top End’: Kangaroos and Cattle.”

⁹⁸⁹ Tony Hayward-Ryan, *Kakadu Burning: The Incineration of North Australia* (Winnellie: Tony Hayward-Ryan, 1996), 15.

⁹⁹⁰ Hayward-Ryan, *Kakadu Burning: The Incineration of North Australia*.

⁹⁹¹ Hayward-Ryan.

You're not one of those anthropologists who's going to try and tell me that the Black Fellas knew what they were about...that they were some kind of conservationist? What a lot of bloody nonsense!⁹⁹²

This dismissal is a response to the Noble Savage stereotype of Indigenous impacts upon the environment. Chapter Five discusses the influence of the Noble Savage stereotype in the United States, but as discussed throughout this thesis it has also informed the frameworks by which Australians understand Indigenous burning.

Clearly, the fire practices of graziers shaped the fire regimes of Northern Australia for decades (and continue to do so today), but graziers have also pressured the fire policies of Kakadu itself, albeit in diverse ways. Some pastoralists referred to Kakadu's fire management as "pyromania",⁹⁹³ while others complained of trying to stop "these bloody wildfires from moving in from Kakadu way".⁹⁹⁴ Such pressures meant that Kakadu staff were forced to "sacrifice a strip of land each year to keep in place a good neighbour policy against the pastoral boundary" through prescribed burning.⁹⁹⁵ Not all graziers have viewed *bininj* fire management in Kakadu negatively. Some have been very receptive to contemporary schemes to adapt Indigenous burning as a form of carbon abatement (discussed in Chapter Eight), though this could also be explained through economic prospects for otherwise largely unproductive Northern land.

The final group who have shaped and been shaped by the politics of fire in Kakadu are tourists; indeed, tourism in Kakadu has played an important role in shaping how many non-Indigenous Australians and others understand Indigenous burning in general. At least 200,000 people visit Kakadu each year, and it is Australia's most famous national park.⁹⁹⁶ Visitors are enticed to the Park by its natural and cultural heritage as brochures depict both lush waterfalls and ancient rock art. The tourist market also includes visitors from overseas, many enticed by images from one of Australia's most enduring cultural exports: *Crocodile Dundee* was partly filmed and set in the Kakadu region. It is telling that the climax of the second film in the series involves a bushfire.⁹⁹⁷ Such experiences have inspired beliefs such as that expressed by the Darwin Bushwalker's Club in 1991 that "to anybody familiar with the area it is clear that most of the landscape is a human artefact...Historically Kakadu is the product of long term

⁹⁹² Lewis, "Burning the 'Top End': Kangaroos and Cattle," 28.

⁹⁹³ Peter M. Cooke, "Buffalo and Tin, Baki and Jesus: The Creation of a Modern Wilderness," in *Culture, Ecology and Economy of Fire Management in North Australian Savannas: Rekindling the Wurrk Tradition*, ed. Jeremy Russell-Smith, Peter J. Whitehead, and Peter M. Cooke (Collingwood: CSIRO Publishing, 2009), 98.

⁹⁹⁴ Tom Starr in Schulz, *Fire on the Savannas*, 21.

⁹⁹⁵ Jacklyn and Russell-Smith, *Proceedings from the North Australia Fire Management Workshop, Darwin, 24-25 March 1998*, 19.

⁹⁹⁶ Board of Management, "Management Plan 2016", 13.

⁹⁹⁷ Pyne, *Burning Bush*, 376.

fire management by aboriginals”.⁹⁹⁸ Following the Ash Wednesday bushfires in 1983, Federal MP Peter Milton, the Chair of a House of Representatives inquiry into the 1983 Ash Wednesday bushfires, related to scientific evidence of pre-colonial burning through experiences with contemporary Indigenous burning in Kakadu.⁹⁹⁹ Furthermore, the experiences of tourists within Kakadu have helped shape the discourse of Indigenous burning more broadly. For instance, Northern Land Council member Peter Cooke believed conservative columnist David Barnett’s tourist experience of Kakadu had led to his extraordinary attack on Indigenous “over-burning” as a proxy disqualifier against Aboriginal land rights.¹⁰⁰⁰

Such experiences are encouraged by the Park which directly promotes *bininj* burning as part of the tourist experience, though its conflation with contemporary prescribed burning has been critiqued by former Park manager Chris Haynes. As Haynes has explored, Kakadu is promoted to tourists for its “its so-called ‘Aboriginal culture’”; Lisa Palmer interviewed one tourist who reflected “bushwalking in Kakadu gives you a glimmer of understanding of what it is liked to be possessed by the country.”¹⁰⁰¹ *Bininj* culture has been commodified and appropriated by the tourism industry, Park authorities and even *bininj* themselves. For example, Haynes analysed an Environment Australia (successor to ANPWS) brochure that conflated pre-contact *bininj* burning with contemporary planned burning. Haynes argued this brochure concealed that contemporary burning by Park authorities is a “metonym of imagined tradition” that is not the same as *bininj* “*anwurrk*, in which burning off the vegetation is part of being, caring for one’s land and thereby expressing ownership of it”.¹⁰⁰² An earlier section of this chapter demonstrated how historical official publications and Plans of Management often conflated *bininj* burning with contemporary burning; the 2016 Plan persists in this conflation by arguing that “Bininj/Mungguy traditional burning practices will continue to be recognised and incorporated in fire management programmes”,¹⁰⁰³ while material produced for tourists extends this conflation. As of March 2017 the Parks Australia website says “Like our ancestors, we light small fires early in the year” and “Our rangers use traditional patch burning to clear the fuel load”.¹⁰⁰⁴ Yet despite

⁹⁹⁸ Darwin Bushwalking Club in ANPWS, “Representations” (1991), 1.

⁹⁹⁹ “Bushfires and the Australian Environment, 1983-1984: Transcript of Evidence. Reference: Environmental Impact of Bushfires: Official Hansard Report” (Canberra: Government Printer, 1984), 135.

¹⁰⁰⁰ Peter Cooke, “Forward to Which Past?,” *Tropical Savannas CRC Savanna Links*, March 1998, http://savanna.cdu.edu.au/publications/savanna_links_issue5.html?tid=27693.

¹⁰⁰¹ Haynes, “Realities, Simulacra and the Appropriation of Aboriginality in Kakadu’s Tourism,” 170; Palmer, “Bushwalking in Kakadu,” 118.

¹⁰⁰² Haynes, “Realities, Simulacra and the Appropriation of Aboriginality in Kakadu’s Tourism,” 176.

¹⁰⁰³ Board of Management, “Management Plan 2016”, 90.

¹⁰⁰⁴ Parks Australia, “Our Stories,” *Kakadu National Park*, 2013, <https://parksaustralia.gov.au/kakadu/people/stories.html>.

such conflation and commodification, and clear evidence that many tourists have reported positive experiences of *bininj* burning in Kakadu, many tourists have complained the Park is over burned.

Tourist complaints that Kakadu has been burned too often have persisted throughout the Park's history. Feedback to ANPWS on fire management reflects that many tourists are uncomfortable with the ubiquity of fire and fire scars in the Kakadu landscape; the label "Australian National Sparks and Wildfires" was used (similar to the epithets used to describe Victorian agencies discussed in Chapter Six),¹⁰⁰⁵ the Park has been described as "Kakadon't",¹⁰⁰⁶ and one tourism operator wrote he had heard "all we see is miles and miles of burntout boring bushland" so often it was "becoming embarrassing".¹⁰⁰⁷ This is supported by anecdotes from many researchers familiar with the Park,¹⁰⁰⁸ and the Aboriginal Consultative Committee who were concerned that criticism of Park fire management was conflated with criticism of *bininj* fire use.¹⁰⁰⁹ Understandably the tourist industry is highly critical of this result, and the Kakadu Visitor Organisation even suggested that "areas of the Park which are available to the public should not entirely be burnt out each year during the main tourist months".¹⁰¹⁰ While quantitative measures of visitor attitudes towards *bininj* burning are not available, it is telling that Lewis records a ranger in 1980 prioritising exclusion of fire from roadside areas as "a burnt out forest is not what park visitors come to see",¹⁰¹¹ and in an internal technical memorandum from 1985 Haynes refers to "the visual impact of burnt vegetation on park visitors" as a significant issue affecting fire planning, to be considered with the same weight as concerns about *bininj* burning.¹⁰¹² Leaving aside whether criticisms of Kakadu as over-burned are valid on ecological or fuel management grounds, the persistence of such perceptions reminds us that preconceptions of fire as damaging remain a powerful framework through which non-Indigenous peoples relate to fire.

¹⁰⁰⁵ Kakadu Visitor Organisation in ANPWS, "Representations" (1991), 1.

¹⁰⁰⁶ Bushwalking Australia in National Parks, "Report...Sixth Kakadu National Park Management Plan" (2015), 88.

¹⁰⁰⁷ M.E. Stopp in ANPWS, "Representations" (1991),2.

¹⁰⁰⁸ See for example Aaron M. Petty, Vanessa deKoninck, and Ben Orlove, "Cleaning, Protecting, or Abating? Making Indigenous Fire Management 'Work' in Northern Australia," *Journal of Ethnobiology* 35, no. 1 (2015): 140–62; Andersen and McKaige, "Burning Issues: Communicating Fire Research in Northern Australia"; Langton, *Burning Questions: Emerging Environmental Issues for Indigenous Peoples in Northern Australia*; Press, "Fire, People, Landscapes and Wilderness: Some Thoughts of North Australia."

¹⁰⁰⁹ "Consultative Committee Meeting, Day 1", NAA.

¹⁰¹⁰ Kakadu Visitor Organisation in ANPWS, "Representations" (1991), 1

¹⁰¹¹ Lewis, "Ecological and Technical Knowledge of Fire: Aborigines Versus Park Rangers in Northern Australia," 943.

¹⁰¹² C.D. Haynes, "Problems in Fire Management at Kakadu," in *Towards an Expert System for Fire Management at Kakadu National Park*, Technical Memorandum 85/2 (Canberra: CSIRO Institute of Biological Resources, Division of Water and Land Resources, 1985), 7.

Conclusion: Ever-Burning Issues

On my final day in Kakadu, the bus began to pass through an area that had recently been burnt by a high intensity fire. Black trunks, bare earth and red leaves were seen through the window. Our guide tried to explain this was the result of a fire gone wrong from the uranium mines, and to reiterate that fire was generally 'healthy' for the landscape, but even he fell silent as we continued through the vast scorched area. The tourists were unconvinced.

Kakadu faces immense future environmental challenges; invasive grasses such as gamba grass (*Andropogon gayanus*) threaten to permanently alter fuel patterns through promoting a positive feedback loop known as the "grass-fire cycle" which threatens the trees and woodlands of Kakadu,¹⁰¹³ while the Park is experiencing a catastrophic decline in small mammals, possibly due to changed fire regimes.¹⁰¹⁴ Former Kakadu ranger Greg Miles has argued many of the increasing environmental issues in Kakadu including the grass-fire cycle have been exacerbated by the Park's preference for burning during the early dry season as opposed to more flexible seasonality of fire.¹⁰¹⁵ The Park's challenge to manage the competing demands explored throughout this thesis is further limited by declining funding.¹⁰¹⁶ As an experiment in cross-cultural land management, it is clear that the results in fire management have been decidedly mixed, perhaps because the Park has had to satisfy multiple competing demands.¹⁰¹⁷ Nevertheless, Haynes argues that the environmental and cultural success of the *mimosa pigra* (an invasive shrub) control team is an example of how "common discourse" and shared experiences can make joint management succeed.¹⁰¹⁸ From an ecological point of view, fire management in neighbouring Arnhem Land has been much more successful, as will be discussed in Chapter Eight.

In this chapter I have aimed to explore the politics of Indigenous burning in an area with a strong recent history of such active and overt burning and demonstrate that fire politics can still be fiercely

¹⁰¹³ Richard J. Williams et al., "Landscape-Scale Fire Research in Northern Australia: Delivering Multiple Benefits in a Changing World," in *Culture, Ecology and Economy of Fire Management in North Australian Savannas*, ed. Jeremy Russell-Smith, P. J. Whitehead, and Peter M. Cooke (Collingwood: CSIRO Publishing, 2009), 222; Natalie A. Rossiter et al., "Testing the Grass-Fire Cycle: Alien Grass Invasion in the Tropical Savannas of Northern Australia," *Diversity and Distributions* 9 (2003): 169–76.

¹⁰¹⁴ Woinarski et al., "The Disappearing Mammal Fauna of Northern Australia."

¹⁰¹⁵ Miles, "Is Early Dry Season Burning an 'Ecological Trojan Horse?'; Jeremy Russell-Smith et al., "Assessing Ecological Performance Thresholds in Fire-Prone Kakadu National Park, Northern Australia," *Ecosphere* 8, no. 7 (2017): e01856.

¹⁰¹⁶ See also Bruce Leaver et al., "Kakadu National Park Management Plan 2007-2014 Technical Audit: Summary Report" (Director of National Parks Australia, 2012).

¹⁰¹⁷ This would no doubt disappoint Rowse in his speculation that "we might get better country" from the convergence between Western biodiversity conservation and Indigenous care for country in hybrid national parks; see Rowse, *After Mabo*, 126-7.

¹⁰¹⁸ Haynes, "The Value of Work and 'Common Discourse' in the Joint Management of Kakadu National Park."

contested when Indigenous burning is present. Nevertheless, unlike in the South-East of Australia as discussed in Chapter Six, the use of Indigenous burning as a proxy for other environmental disputes has been noticeably less pronounced. Environmentalist fears that Indigenous burning could be appropriated to undermine the legitimacy of conservation efforts are not supported by political debate in Kakadu's early decades. It was in Kakadu that the ideological discourses of cultural continuity, environmental continuity, and pyro-essentialism fully manifested as non-Indigenous ways of understanding Indigenous burning. At times, these attitudes have been expressed by various Park staff, academics, environmentalists, and others. These frameworks appear differently to how they emerged in earlier chapters exploring Victoria and the South West of Australia, demonstrating the importance of localised, rather than national narratives of Indigenous burning. Furthermore, they demonstrate how ideological frameworks might shape non-Indigenous reactions to expansions of Indigenous burning – a critical issue, as will be demonstrated in Chapter Eight.

When Kakadu rangers express disquiet about the technological means of *bininj* ignition, they are not referring to abstract possibilities, but to personal experiences and conflicting goals to navigate through their professional responsibilities. It is this contemporary reality – that Indigenous burning in Kakadu is not a historical or abstract concept – that explains how Kakadu has shaped fire discourse though Australia more broadly. Indeed, the evidence of how *bininj* burning has been used by Park staff to argue against criticism of the Park's practices indicates remarkable changes in Australian attitudes towards Indigenous burning. Regardless, *bininj* dissatisfaction with the management of Kakadu points to the complexities of efforts to restore Indigenous burning and the importance of culturally appropriate management structures.

The pre-colonial changes in burning on Magela Creek, the effect of buffalo on physical fire regimes, and perceptions that employment by graziers altered Indigenous burning practices, all demonstrate why the overall fire history of Australia cannot be regarded simply as 'pre' and 'post' colonisation. The environmental impacts of European arrival occurred at different paces in different areas; colonisation was dynamic. Rather than conceptualising Australia's fire history in pre- and post-contact stages, a more effective framework for conceptualisation would be based on local histories and fire regimes.

Chapter Five:

Stuck in the Wilderness: The Fire Revolution, 1988 Yellowstone Fires, and Struggles with Native American Burning in Post-War America

Still as statues, we leaned on our tools and watched the flames spread. Most images of fires in California are dramatic; waterbombers swooping down to battle with roaring blazes near Southern Californian mansions. This fire was slow. It trickled rather than roared. We burnt downhill, against the wind, occasionally raking ahead or behind, or shaping the flames to control the burn. These were our tools: rake and leaf blower, match and driptorch, and most of all – patience. I learned many things in the United States, but the peace of watching this fire has stayed with me. Some weeks after Professor Don Hankins (a Miwko? fire practitioner) and I had finished burning along this ridge near Chico, I revisited the burnt ground and saw a movement from the corner of my eye. A turkey had been attracted by our fire and was searching through the ash for new growth. It might have made for less dramatic TV than helicopters and waterbombers circling above Malibu, but I can't help thinking images like this are what Californians could associate with fire.

Months later, the town of Paradise, close to this ridge, would be obliterated by the 2018 Camp Fire. In the wake of the fires, arguments raged about whether a “fuel surplus” and lack of prescribed burning had contributed to the fires.¹⁰¹⁹ Aspects of this debate were familiar to Australians (such as the arguments over prescribed burning in the wake of the 2009 Black Saturday chapters as described in Chapter Six). Other terms of debate were less familiar to Australians (such as a greater emphasis on thinning and the jargon of the Wildland Urban Interface). Conspicuous in its comparative absence in this Californian example was any deep engagement with Indigenous burning in public debate.

In this chapter I explore the contrasts between Australian and American fire discourse in the post-war period, and demonstrate how and why concepts of Native American burning have been far less influential or prominent in the United States than concepts of Aboriginal Australian burning in Australia. In a similar fashion to Chapter Two, this chapter's analysis includes a significant fire (the 1988 Yellowstone Fires) which focused and shifted discourse and policy, but also looks more broadly to shifts in American policy, management and thought throughout the post-Second World War period.

¹⁰¹⁹ Jeff Goodell, “Ryan Zinke Blames Radical Enviro for California Fires,” *Rolling Stone*, 21 November, 2018; Joshua Emerson Smith, “California, Trump Eye Logging to Fight Wildfire as Scientists Point to Climate Change and Housing Sprawl,” *The San Diego Union-Tribune*, 25 November, 2018, <https://www.sandiegouniontribune.com/news/environment/sd-me-wildfire-logging-climate-change-20181125-story.html>; for a visualisation of the Camp Fire, see Lizzie Johnson, “150 Minutes of Hell: Death and Survival in California's Fire Tornado,” *The San Francisco Chronicle*, 5 December, 2018, <https://projects.sfchronicle.com/2018/carr-fire-tornado>.

The chapter re-examines secondary material and existing historiography, presents analysis of policy documents and internal memoranda from land management agencies, and includes analysis of archival material related to influential researchers from this period (especially Harold Weaver and Harold Biswell).

Building on Chapter Two, I first discuss the ecological and social consequences of the victory of the fire suppressionists in the American West. The Fire Revolution led by fire ecologists challenged and ultimately overthrew the fire suppression paradigm at a policy level, but failed to comprehensively engage, conceptually or practically, with any sense of Native American burning. Furthermore, the conventional narrative of the Fire Revolution – a heroic group of individuals who triumphed over institutional opposition to implement prescribed fire – is much more ambiguous in explaining changes at the level of prescribed burning practice. Assessing the Revolution thus demonstrates the complexity of ideas and policies in shaping fire practices and ecologies. The Revolution's failure to engage with a cultural interpretation of Native American burning is partly explained by the influence of wilderness as a discourse and ideal in the United States, especially since the 1964 Wilderness Act, which consolidated the concept's erasure of Native America. The 1988 Yellowstone Fires were broadcast on primetime television and inspired significant public and political discussion. This controversy caused the Fire Revolution's policy impact to falter and threw the ideological and practical failures of the wilderness ethic into public debate.

The Yellowstone Fires also contributed to a general academic deconstruction of the most important frameworks through which non-Indigenous Americans in the twentieth century understood Indigenous burning: wilderness and the Ecological Indian. The wide reach of the controversy surrounding the Yellowstone Fires raised the temperature of environmental politics as activists and the Wise Use movement engaged in continual skirmishes. The contentious tone of this conflict and the enduring influence of wilderness as a paradigm which conceptually erased Native American burning meant American environmentalists have been suspicious of an active role for cultural fire as opposed to natural fire (whether prescribed burns or Native American burns). I close this chapter by outlining other structural factors that help explain why Native American burning is less prominent in the United States than Indigenous burning is in Australia, and draw out some aspects of the significance of this contrast for highlighting broader changes in Australian culture.

Consequences of Fire Suppression in the American West

The victory of the fire suppressionists discussed in Chapter Two had grave ecological consequences for the American West, and the growing recognition of this outcome among practitioners, academics, and even the general public coalesced into a dominant fire deficit/fuel surplus narrative that has overwhelmed more localised nuances. Nevertheless, it is certain on a broad scale that widespread public education campaigns, aggressive suppression responses, and an increasing use of aerial fire suppression techniques (including waterbombing and deployment of smokejumpers) has caused a significant reduction of the amount of fire on American lands. For instance, the United States Forest Service credited the Smokey Bear public education campaign alone for reducing the number of forest fires by 40% between 1940 and 1998.¹⁰²⁰ This reduction in wildland fire was almost certainly the dominant cause behind a swathe of ecological changes, including a 39% reduction in forest openings in the Klamath Mountains,¹⁰²¹ a decline in the density of Yosemite National Park's large-diameter trees in favour of smaller diameter trees,¹⁰²² and general shifts in forest composition from fire resistant/shade intolerant species to fire intolerant/shade tolerant species.¹⁰²³ The timing, and the observed effects from some later successful reintroduction of pre-suppression fire regimes in reversing these changes,¹⁰²⁴ serves to strengthen this link between fire suppression and such ecological change.

Scholars have traced how this imposition of state power over fire throughout the fire suppression era through policies such as the '10 am policy' also had negative social consequences for a variety of social groups. As explored in Chapter Two, fire suppression was resisted in Northern California by white settlers and graziers. Jake Kosek has demonstrated how the imposition of Forest Service fire suppression policy on forest lands in New Mexico interfered with long-held resource and cultural practices of local Mexican-Americans, leading to Smokey Bear being interpreted there as "a white racist pig".¹⁰²⁵ Kari Norgaard has shown how the loss of access to traditional food sources (particularly

¹⁰²⁰ Jesse Minor and Geoffrey A. Boyce, "Smokey Bear and the Pyropolitics of United States Forest Governance," *Political Geography* 62 (2018): 90.

¹⁰²¹ Busam, "Characteristics and Implications of Traditional Native American Fire Management on the Orleans Ranger District, Six Rivers National Forest," 65.

¹⁰²² J.A. Lutz, Jan W. Wagtendonk, and J.F. Franklin, "Twentieth-Century Decline of Large-Diameter Trees in Yosemite National Park, California, USA," *Forest Ecology and Management* 257, no. 11 (2009): 2296–2307.

¹⁰²³ Andrew E. Scholl and Alan H. Taylor, "Fire Regimes, Forest Change, and Self-Organization in an Old-Growth Mixed-Conifer Forest, Yosemite National Park, USA," *Ecological Applications* 20, no. 2 (2010): 375; see also Ryan D. Haugo et al., "The Missing Fire: Quantifying Human Exclusion of Wildfire in Pacific Northwest Forests, USA," *Ecosphere* 10, no. 4 (2019): e02702.

¹⁰²⁴ Gabrielle F.S. Boisramé et al., "Vegetation Change during 40 Years of Repeated Managed Wildfires in the Sierra Nevada, California," *Forest Ecology and Management* 402 (2017): 241–52.

¹⁰²⁵ Kosek, "Smokey the Bear Is a White Racist Pig."

salmon and tan oak acorns) contributed to profound declines in health for the Karuk tribe in Northern California, driving increasing rates of diabetes, obesity, and mental illness.¹⁰²⁶ Norgaard noted that a driver behind mental health issues for the Karuk was their inability to fulfil their cultural obligations (including fire management) while observing accelerating ecological changes caused by fire suppression policies.¹⁰²⁷ This particular example highlights how fire suppression particularly affected the physical, mental, and spiritual health of Native Americans in California, who were already reeling from the explosive colonisation described in Chapter Two.

These ecological and social effects of fire suppression, combined with the zeal with which fire suppression was enacted, have shaped and restricted fire management policy. The conventional narrative of the fire deficit/fuel surplus concludes by observing how fire suppression in the American West has actually made the problem of wildfires worse. An example of this interpretation is Timothy Ingalsbee's "wildfire paradox" which flows from the "firefighting trap", where fire management is "ultimately failing owing to its own apparent success" as fuels have accumulated to the point that new fires not immediately suppressed can quickly grow to a size and intensity beyond the capacity of agencies to contain them.¹⁰²⁸ Yet the effects of the fire suppression era run deeper, on a political level.

During the light burning debate in the early decades of the twentieth century, Forest Service staff fretted that admitting their fire suppression paradigm was mistaken might lead to a loss of authority and legitimacy. Chapter Two demonstrated how research which undermined this paradigm was either ignored or deliberately suppressed. Some staff foresaw political consequences to this zeal for fire suppression. Logging engineer Austin Cary, for instance, argued in a 1927 Forest Service internal memorandum that "a too straight-out attitude" towards the use of prescribed fire "would later prove more or less embarrassing".¹⁰²⁹ Other staff in the American South shared concerns about the zeal against prescribed burning, yet their concerns about longleaf pine's problematic need for fire were dismissed. Instead, management directed that "we need not be greatly concerned over whether controlled burning is desirable or undesirable until after a good start, at least, has been made toward getting rid of the uncontrolled burning".¹⁰³⁰ I argue the stubborn long-term insistence of the fire establishment (largely represented by the Forest Service, which by virtue of size and legislative changes attained a virtual monopoly on fire research and policy) on fire suppression in the West

¹⁰²⁶ Norgaard, "The Politics of Fire and the Social Impacts of Fire Exclusion on the Klamath."

¹⁰²⁷ Norgaard argued that this particular aspect of American power over Indigenous societies could be viewed as "cultural genocide". See Norgaard, 91.

¹⁰²⁸ Timothy Ingalsbee, "Whither the Paradigm Shift? Large Wildland Fires and the Wildfire Paradox Offer Opportunities for a New Paradigm of Ecological Fire Management," *International Journal of Wildland Fire* 26, no. 7 (2017): 557.

¹⁰²⁹ Cary, "Memorandum for District 7 on Florida Forest and Fire", NARA.

¹⁰³⁰ Branch of Public Relations, "Fire in the Southern Pine Region", NARA.

ultimately led to a long-lasting loss of its political capital. The result was the embarrassment Cary foresaw. This political capital was especially lost when ecologists and conservation biologists presented a growing amount of evidence of the undesirable ecological effects of fire suppression. Eventually recognising this evidence, the Forest Service and other bodies changed their strategies and philosophies towards a greater acceptance of fire on the land in what has been termed the 'Fire Revolution'. Yet, as will be shown, the manner in which this occurred precluded any significant role for Native American burning – whether as inspiration, or in contemporary practice.

A Fire Revolution?

The Fire Revolution was a shift in policy and philosophy towards the use of fire in land management in the United States in the middle and later decades of the twentieth century, led by individual researchers working against institutional opposition. Several prominent ecological and biological scientists were leading figures of the Revolution, but rather than examining each I direct my analysis to particular researchers in order to demonstrate how the Revolutionaries tended to overlook Native American burning. This omission can be explained by two factors; they didn't attribute a significant role to Native American burning or conceive of it in a cultural sense, and even for those who allowed for cultural fire, the contours of the light burning debate had convinced them it was not politically credible to argue with reference to Native American burning. Social scientists argued for a more cultural interpretation of Native American burning, but their arguments were either ignored or downplayed by the Fire Revolutionaries.

While it did not have a clear single chronological or geographical beginning, the insurgency against fire suppression inevitably had a strong Southern component. The Southern United States (as discussed in Chapter Two) had already disrupted the efforts to enforce fire suppression across the nation, through objections on cultural grounds from Southerners and especially through the academic challenges presented by H.H. Chapman, S.W. Greene and Herbert L. Stoddard.¹⁰³¹ Their legacy of innovation in the use of fire for land management was consolidated by the creation of the Tall Timbers Research Station in Florida in 1958. Tall Timbers was privately funded and owned its own land which helped to guarantee independence from government oversight (especially from the USFS), enabling it to organise the Tall Timbers Fire Ecology Conferences and publish conference proceedings advocating a positive message around fire's role in the environment without any interference from the fire

¹⁰³¹ See also Johnson and Hale, "The Historical Foundations of Prescribed Burning for Wildlife: A Southeastern Perspective."

suppressionists. Under the leadership of ecologist Ed Komarek, Tall Timbers hosted its first Fire Ecology Conference in 1962 – representing possibly the first deliberate use of the term “fire ecology” in the world.¹⁰³² Tall Timbers was thus an important geographic and academic centre of the Fire Revolution. Its organisation of the 1967 Fire Ecology Conference in California recognised the importance of this state for fire policy in the United States.

The Fire Revolution in California came from multiple directions, but when the Revolution triumphed and changed the fire policies of agencies, the focus on ecological and biological scientists meant that important precursor contributions from social scientists were overlooked. For instance, the geographer Carl Sauer had published papers in the first half of the twentieth century showing an interest in the use of fire by Indigenous peoples, and speculated that Native American use of fire had created grasslands within the American West that would otherwise be wooded. Sauer argued that “the fundamental importance to [Indigenous societies] of fire as a hunting device has been little noticed”.¹⁰³³ Sauer’s theory – that Indigenous burning engineered landscapes – bears close resemblance to those proposed by (among others) Rhys Jones and Bill Gammage. Sauer even argued that the pre-Columbian extinction of Pleistocene megafauna of North America was partially through human use of fire; the link between Indigenous burning practices and megafauna extinction will be explored in Chapter Seven.¹⁰³⁴ Sauer developed his research interest through a large conference of geographers, the proceedings of which were published as the seminal 1955 *Man’s Role in Changing the Face of the Earth*. Sauer argued “deliberate management of their range by burning to increase food supply is apparent among hunting and collecting peoples”,¹⁰³⁵ but unfortunately his interest in Indigenous use of fire played no role in shifting American agency policy towards the use and suppression of fire. Sauer’s influence on the Fire Revolution was thus limited to inspiring generations of doctoral students to take an interest in Indigenous modification of the environment – including William Denevan (explored below in ‘Troubles with Wilderness’) and anthropologist Omer C. Stewart. Omer C. Stewart also developed a detailed and extensive body of work using ethnographic and ecological methods, though sadly his work did not receive the recognition it warranted from the Tall Timbers group or even colleagues in his own discipline. Stewart found that “Indians from about fifty tribes report intentional broadcast burning in order to increase the yield of seeds of wild grasses”,¹⁰³⁶

¹⁰³² Komarek, “History of Prescribed Fire and Controlled Burning in Wildlife Management in the South”.

¹⁰³³ Carl O. Sauer, “A Geographic Sketch of Early Man in America,” *Geographical Review* 34, no. 4 (1944): 554.

¹⁰³⁴ Sauer, “A Geographic Sketch of Early Man in America.” Sauer

¹⁰³⁵ C.O. Sauer, “The Agency of Man on the Earth,” in *Man’s Role in Changing the Face of the Earth*, ed. W.L.J. Thomas et al. (Chicago: University of Chicago Press, 1955), 54; A reasonable summary of the conference’s influence is Michael Williams, “Sauer and ‘Man’s Role in Changing the Face of the Earth,’” *Geographical Review* 77, no. 2 (1987): 218–31.

¹⁰³⁶ Stewart, “Fire as the First Great Force Employed by Man,” 120.

and urged that “controlled light burning would help to reduce very harmful wildfires”.¹⁰³⁷ Despite contributing to *Man’s Role in Changing the Face of the Earth*, Stewart’s work was largely ignored by his disciplinary colleagues.¹⁰³⁸ Another of his doctoral advisers – influential anthropologist Alfred Kroeber – politely listened to a paper in which Stewart argued that Indigenous burning had influenced forest environments, and airily dismissed it by saying “We should all be grateful [for the paper] and leave it there”.¹⁰³⁹ Both due to its heretical ideas and to Stewart being “blackballed” for embarrassing one of his former professors in court cases pitting the Paiute tribe against Federal government agencies, Stewart’s 800 page magnum opus was rejected by academic reviewers.¹⁰⁴⁰ It was not until 2002 that Stewart’s work was finally published thanks to the efforts of Kat Anderson and Henry T. Lewis – the most important social scientist Fire Revolutionary, and a familiar figure from Chapter Four.

At roughly the same time Stewart was being marginalised in his efforts to promote a positive view of Native American burning to an academic (let alone a wider) audience using the social sciences, Harold Biswell (another researcher from UC Berkeley) was slowly succeeding in breaking the fire suppression hegemony in California by developing insights in fire ecology. Inspired by formative training in the South-Eastern longleaf pine forests,¹⁰⁴¹ “Harry the Torch” conducted experiments on chamise, ponderosa pine, and especially the giant sequoia in the 1950s and 60s.¹⁰⁴² His results showed strong ecological benefits to prescribed burning and were a powerful argument against the fire suppression paradigm. Crucially, Biswell also held demonstration field days, inviting students, interested members of the public, and even opponents to observe and participate in prescribed burning.¹⁰⁴³

Biswell’s work ultimately succeeded in helping to shift agency policy away from zealous fire suppression, but he faced immense opposition throughout his life as a consequence of the light burning dispute. This included a public denouncement and open letter from his own Dean circulated among foresters throughout California.¹⁰⁴⁴ It was not just the Forest Service and its allies who had

¹⁰³⁷ Stewart, *Forgotten Fires*, 312.

¹⁰³⁸ Stewart, “Fire as the First Great Force Employed by Man”; yet some Australians were at least aware of Stewart’s work, see Hancock, *Discovering Monaro: A Study of Man’s Impact on His Environment*, 23, and the discussion of Rhys Jones at the beginning of the Introduction.

¹⁰³⁹ Edward Struzik, *Firestorm: How Wildfire Will Shape Our Future* (Washington: Island Press, 2017), 88.

¹⁰⁴⁰ Henry T. Lewis, “An Anthropological Critique,” in *Forgotten Fires: Native Americans and the Transient Wilderness*, ed. Henry T. Lewis and M. Kat Anderson (Norman: University of Oklahoma Press, 2002), 20. To add insult to professional injury, Tall Timbers regarded Stewart’s work positively and expressed initial interest in publishing it – but lost the manuscript and didn’t respond for 25 years! See Lewis and Anderson, “Introduction.”

¹⁰⁴¹ Biswell even described seeing the experimental plot mentioned in Chapter Two which the United States Forest Service had quietly abandoned after it disproved that fire suppression would result in improved timber growth; See Biswell, *Prescribed Burning in California Wildlands Vegetation Management*, 86.

¹⁰⁴² Carle, *Burning Questions*, 111.

¹⁰⁴³ van Wagtenonk, “Dr Biswell’s Influence on the Development of Prescribed Burning in California.”

¹⁰⁴⁴ Carle, *Burning Questions*, 69.

difficulty with Biswell's burning. For instance, the environmentalist activist and author Ian McMillan accused Biswell of being an "incendiarist" and agent of the "range management complex" (a reference to the burning practices of graziers), and argued that the adoption of Biswell's proposed prescribed burning program in Yosemite should be resisted as he was "unable to see how the fact that the Indians used fire for various economic purposes would prove that the practice produces 'naturalness' and is good for wilderness".¹⁰⁴⁵ This sentiment foreshadows a major argument of this chapter, that the ideal of wilderness has been conceptually blinding because it denies Native American burning and culture.

Curiously, while Biswell studied the musings of John Muir and Galen Clarke from the nineteenth century on the nature of Native American burning (discussed in Chapter Two), he did not give a great deal of serious analysis to it or its deeper implications. Biswell praised Henry T. Lewis and even drew upon observations of Noongar Indigenous Australian burning (discussed in Chapter Three) to demonstrate by analogy the force of Indigenous burning upon the Californian landscape. However, his major published work, *Prescribed Burning in California Wildlands Vegetation Management* (published in 1989), considered "fires set by lightning and by Indians" in the same chapter.¹⁰⁴⁶ For Biswell, as for so many American biophysical scientists, Indigenous burning was in the past tense and understood only in a material sense.

Biswell was not the only Fire Revolutionary in the American West. Forester Harold Weaver had conducted experiments on prescribed burning and also faced significant institutional opposition. A forester, unlike the ecologist Biswell or the wildlife biologist Komarek, Weaver was more successful at publishing in forestry journals and thus challenging the forestry hegemony in their own forums. Critically, he worked for the Bureau of Indian Affairs, not the United States Forest Service, and was thus outside the reach of those who sought to suppress both fire and its advocates.¹⁰⁴⁷ This is not to say his work did not face challenges.¹⁰⁴⁸ His most important paper faced multiple stringent and unfair rounds of revisions before eventually being published in 1943.¹⁰⁴⁹ Weaver privately ensured the paper was as "'back-fire' proof as it could possibly be written",¹⁰⁵⁰ and reflected that as it approached

¹⁰⁴⁵ Ian McMillan, "Letter to Harold Biswell", 28 March 1973, Carton 54, Sierra Club Records, BANC MSS 71/103c, The Bancroft Library, University of California, Berkeley, CA, USA.

¹⁰⁴⁶ Biswell, *Prescribed Burning in California Wildlands Vegetation Management*, 51.

¹⁰⁴⁷ Stephen J. Pyne, "An Ecological and Silvicultural Tool: Harold Weaver," *To The Last Smoke: An Anthology* (University of Arizona Press, 2020), 359-365.

¹⁰⁴⁸ For instance, forester Emanuel Fritz once warned Weaver "Harold – for your own protection and to prevent the general public from getting wrong ideas, I personally hope you will keep the results of your experiments within professional journals and out of the general press for the present"; see Carle, *Burning Questions*, 76.

¹⁰⁴⁹ Harold Weaver, "Fire as an Ecological and Silvicultural Factor in the Ponderosa-Pine Region of the Pacific Slope," *Journal of Forestry* 41, no. 1 (1943): 7–15.

¹⁰⁵⁰ Harold Weaver, "Letter to 'Frank', Colville Indian Agency", 29 April 1941, Box 1 Folder 1, Harold Weaver Collection, Library and Archives, Forest History Society, Durham, NC, USA.

publication he should “begin looking for a good bomb shelter”.¹⁰⁵¹ Weaver and Biswell corresponded with each other, sharing research and strategies to overcome the fire suppression hegemony. For instance, Weaver once recommended Biswell for a grant by writing that ‘Harry the Torch’ was “not afraid to discuss facts as he understands them. This has, at times, made him unpopular with foresters who believe that it should be universally understood that fire is an unmitigated evil in the forest”.¹⁰⁵² When the Tall Timbers Fire Ecology Conferences in the South had become sufficiently popular for Komarek to organise a conference in California in 1967, both Biswell and Weaver presented, helping to build a small network of prescribed burning advocates across the United States.¹⁰⁵³

Like Biswell, and despite his experience working on Native American land, Weaver did not dwell on pre-colonial Native American burning practices. For instance, when commenting on a slide show to be presented by the Arizona Watershed Management Division, Weaver recommended “leave the Indians clear out of the picture...prescribed burning by Indians will fall with a dull thud...you should explain that foresters are supervising this burning – not Indians”. Most critically, Weaver warned “for an example of what can happen to people who advocate ‘Pauite Forestry’ you should review Steward Edward White’s attempts to preach ‘Indian or Light Burning’”.¹⁰⁵⁴ The scars of the light burning dispute discussed in Chapter Two remained in the landscape and in the minds of fire researchers. In talks, Weaver described the pine forests of the Sierra Nevada being open and park-like “under redman ecology”, but also stated that “this forest was truly a product of nature – natural man and natural environment”.¹⁰⁵⁵ Like Biswell, Weaver saw Native Americans through the prism of nature, not recognising a role for culture – seeing Native American burning as natural and not cultural, and fitting Native Americans into an intellectual framework akin to the Ecological Noble Savage trope discussed below.

Weaver and Biswell’s work played a role in the growth and output of the modern American environmental movement in the 1960s as the United States reconsidered its relationship with the natural world. Aided by factors such as the publication of Rachel Carson’s *Silent Spring* in 1962, the modern environmentalist movement began to shape land management policy in the United States

¹⁰⁵¹ Harold Weaver, “Letter to F.P. Keen”, 22 February 1943, Box 1 Folder 2, Harold Weaver Collection, Library and Archives, Forest History Society, Durham, NC, USA.

¹⁰⁵² Harold Weaver, Letter, 1959, Box 2 Folder 14, Harold Weaver Collection, Library and Archives, Forest History Society, Durham, NC, USA.

¹⁰⁵³ Pyne, *California: A Fire Survey*, 168.

¹⁰⁵⁴ Carle, *Burning Questions*, 64.

¹⁰⁵⁵ Harold Weaver, “Man and Fire in Ponderosa Pine in the Sierra Nevada of California [draft talk]”, circa late 1950s/1960s, Box 2 Folder 14, Harold Weaver Collection, Library and Archives, Forest History Society, Durham, NC, USA.

throughout the 1960s.¹⁰⁵⁶ A key part of this was the 1963 Leopold Report, written by A. Starker Leopold (son of famous conservationist Aldo Leopold). Originally commissioned to resolve the issue of a proposed cull of elk in Yellowstone, the Leopold Report quickly morphed into a vision of how humanity should regard protected areas, which should become “vignettes of primitive America”, that is, recreated such that they resembled “the condition that prevailed when the area was first visited by the white man”.¹⁰⁵⁷ The implications of this philosophy will be discussed further below, but it is certain that Starker Leopold was inspired by the Fire Revolutionaries.

There is a conventional historical narrative of the Fire Revolution that emphasises the total victory of the heroic individual researchers over fire suppression policies which resulted in more good fire on the ground, but the power of this narrative in explaining the actual course of fire history in the United States in the last half-century is highly questionable. This standard narrative of the Fire Revolution depicts the various agencies and institutions holding power over fire (including the Forest Service and National Park Service) slowly being convinced by the heroic researchers, until the agencies finally embrace the use of fire. The turning point is usually illustrated by the admission of defeat by a United States Forest Service representative promoting prescribed burning to a Tall Timbers conference in 1974.¹⁰⁵⁸ As Pyne notes, by 2003 the idea that fire suppression had resulted in detrimental ecological consequences “had so saturated the popular mind that [popular author] Michael Crichton could use misplaced fire suppression as an example of ironic environmental protection, as part of his introduction to [the novel] *Prey*, and expected to be understood by readers of glossy-paper pulp fiction”.¹⁰⁵⁹ This narrative that the Fire Revolution had overcome institutional barriers and resolved the fire deficit/fuel surplus is somewhat supported at a policy level, but less cogent in explaining changes on the ground.

Certainly, policies have become far more accommodating to prescribed burning than the days of the light burning controversy. The National Park Service incorporated fire management (including restorative burns) into Sequoia and Kings Canyon National Parks in 1968.¹⁰⁶⁰ By 1978, even the Forest

¹⁰⁵⁶ Rachel Carson, *Silent Spring* (Houghton Mifflin, 1962); see also Linda Lear, *Rachel Carson: Witness for Nature* (New York: Henry Holt, 1997); Paul Warde, Libby Robin, and Sverker Sörlin, *The Environment: A History of the Idea* (Baltimore: Johns, 2018); Carolyn Merchant, *The Columbia Guide to American Environmental History* (Columbia University Press, 2002), 174–90.

¹⁰⁵⁷ A. Starker Leopold, “Wildlife Management in the National Parks (or, The Leopold Report),” in *The Great New Wilderness Debate*, ed. J. Baird Callicott and Michael P. Nelson (Athens, Georgia: University of Georgia Press, 1998), 106. There is little space to explore it here, but it is striking to reflect the parallels between this emphasis on primitivism and Myles Dunphy’s advocacy for ‘Primitive Areas’ in Australia.

¹⁰⁵⁸ Pyne, *Between Two Fires: A Fire History of Contemporary America*, 165.

¹⁰⁵⁹ Stephen J. Pyne, *Tending Fire: Coping with America’s Wildland Fires* (Washington, D.C.: Island Press, 2004), 9.

¹⁰⁶⁰ van Wagtenonk, “Dr Biswell’s Influence on the Development of Prescribed Burning in California,” 13.

Service revised its policy, encouraging managers to “make more use of prescription fire to protect, maintain, and enhance the natural resource values and aesthetics within approved areas on the National Forest”.¹⁰⁶¹ As Arthur Jeseau of the California Division of Forestry said on one of Harry the Torch’s field trips in 1980; “in the fifties we were all making fun of Harold and fighting him. Now, 30 years later, we are all working for him”.¹⁰⁶² At a conceptual level, the idea that fire could be ecologically beneficial had been transformed from heresy to being expressed in policy. There is no doubt this was a revolution in policy – but I argue that the change in actual practice was more evolutionary than revolutionary (where it changed at all). The Fire Revolution was won, theoretically, in the 1970s and 80s. All else should have been mopping up. Yet in 2018, with the ash still warm in the ruins of what had been the Northern Californian town of Paradise, the Fire Revolution narrative was still trotted out – and Americans *still* debated that more fire was needed on the ground.

There are two issues that undermine any practical sense of a total victory for the Fire Revolutionaries. The first is the simple fact that the amount of prescribed burning conducted on public lands under the new policies has been very low and thus not enough to catch up and address the theorised fuel surplus. During the 1970s, for instance, the National Park Service lit 126 prescribed burns which burned 1,656 acres – in a decade in which it experienced 4,159 wildfires that burned 833,017 acres.¹⁰⁶³ In other words, the prescribed burns lit in that decade burned less than one per cent of the area burned by wildfire. Even today, most prescribed burning still occurs in the Southern states rather than in the American West.¹⁰⁶⁴ Thus, the practical consequences of the Revolution have been more gradual than radical. A slow shift towards prescribed burning cannot be simplistically interpreted as an ecologically beneficial shift; fire suppression hastened the spread of some invasive species but

¹⁰⁶¹ US Forest Service, "Revised Fire Management Policy, Fact Sheet, Forest Service, USDA", 1978, Folder: Fire: Forest Service Fire Management Policy, US Forest Service Headquarters History Collection, Library and Archives, Forest History Society, Durham, NC, USA.

¹⁰⁶² Biswell, *Prescribed Burning in California Wildlands Vegetation Management*, 107.

¹⁰⁶³ Pyne, *Between Two Fires: A Fire History of Contemporary America*, 175. This converts to 670 ha and 337,110 ha. In other words, the prescribed burns lit in this decade represented less than 1% of the area burned by wildfire.

¹⁰⁶⁴ Bill Gabbert, “National Survey – the Use of Prescribed Fire,” *Wildfire Today*, 11 January, 2016, <http://wildfiretoday.com/2016/01/11/national-survey-the-use-of-prescribed-fire/>.

hindered the spread of others.¹⁰⁶⁵ Similarly, the efficacy of prescribed burning continues to be disputed for many areas in the United States (as we shall see for Victoria in Chapter Six).¹⁰⁶⁶

The second issue is that the new policy comfort with fire did not necessarily translate to prescribed burning. Instead, influenced by the Leopold Report and the increasingly hegemonic ethic of natural wilderness (discussed below), federal agencies tended to grow more comfortable with allowing naturally ignited fires to burn within managed boundaries (bounded by backburns and fuel breaks), rather than igniting their own prescribed burns. Thus, it is difficult to assess the ecological consequences of the Fire Revolution, undermining the heroic narrative.

More importantly for this thesis, the ecologist Fire Revolutionaries paid only a minor amount of attention to Native American burning – and the agencies paid practically none. This is not to say that they ignored evidence of Indigenous burning, but in a similar fashion to Alan MacArthur and the advocates for an Australian Strategy as mentioned in Chapter Three, they consciously or unconsciously overlooked its cultural relevance in favour of a biophysical focus. Weaver acknowledged Native American burning had some effect on vegetation distribution, though he cautioned against over-attribution of its influence on Yosemite.¹⁰⁶⁷ Biswell chose to group Native American burning with fires ignited by lightning in his textbook, stating that “prior to European settlement...fires were a *natural* [my emphasis] feature of the environment”.¹⁰⁶⁸ As so often with American fire scientists and fire managers, Native American fire was portrayed in the same breath as lightning fire – as a natural rather than a cultural phenomenon with differing patterns and material consequences of ignition, and with no recognition of the cultural context for burning.

What is remarkable about this very biophysical view of Indigenous fire is that an alternative view was available, but that Fire Revolutionaries in the humanities and social scientists were less successful in shaping policy and philosophy. While Sauer and Stewart’s work in the early and middle decades of the century had not left a significant impression on the Fire Revolutionaries, Biswell wrote approvingly of the work of his contemporary, anthropologist Henry T. Lewis. Lewis conducted research on Indigenous burning and his research has been regarded particularly well among other scholars (one of his papers

¹⁰⁶⁵ For instance, fire suppression in ponderosa pine forests actually delayed the spread of invasive species by contributing to a closed forest canopy which blocked out the light for invasives, while prescribed burning in Kings Canyon National Park had to be halted as it was aiding the spread of invasive grasses; see Jon E. Keeley, “Fire Management Impacts on Invasive Plants in the Western United States,” *Conservation Biology* 20, no. 2 (2006): 375–84.

¹⁰⁶⁶ For an entry into these debates, see Owen F. Price et al., “The Impact of Antecedent Fire Area on Burned Area in Southern California Coastal Ecosystems,” *Journal of Environmental Management* 113 (2012): 301–7; Fernandes and Botelho, “A Review of Prescribed Burning Effectiveness in Fire Hazard Reduction.”

¹⁰⁶⁷ Harold Weaver, “Letter to Phil Ernst (Park Forester Yosemite National Park)”, 21 February 1951, Box 1 Folder 8, Harold Weaver Collection, Library and Archives, Forest History Society, Durham, NC, USA.

¹⁰⁶⁸ Biswell, *Prescribed Burning in California Wildlands Vegetation Management*, 6–7.

was described in 1999 as “the seminal paper in the anthropological literature on fire”).¹⁰⁶⁹ Importantly, Lewis’s work on American Indigenous fire was strongly influenced by his work on Australian Indigenous fire. In 1980, he was invited to visit the Australian National University (then home to John Mulvaney and Rhys Jones) and eventually produced his work on Indigenous Australian burning in North Australia discussed in Chapter Four.¹⁰⁷⁰ Lewis’s work has been influential on a generation of Californian social scientists and researchers from the humanities. The comparative dimension of his work has been especially influential – many academic papers published today on California Native American burning from the social sciences and humanities make direct or indirect comparisons with Indigenous Australian burning.¹⁰⁷¹ In other words, the intellectual models Lewis used to understand Aboriginal Australian burning have helped non-Indigenous Californians to understand Native American burning.

The Fire Revolution narrative has been propagated by researchers, the popular media, and the agencies themselves. It appeals to many comforting themes: the triumph of heroic individuals over collective and institutional intransigence; growing awareness of humanity’s ecological impact; a sense that evidence-based policy will eventually overcome obstacles.¹⁰⁷² The American fire community continues to propagate the mildly hagiographic historiography of the Fire Revolution discourse today; Pyne dryly notes such retellings can become the “modern equivalent of favoured campfire yarns”.¹⁰⁷³ Yet Lewis’s work represents a path of the Fire Revolution not taken by the agencies and institutions with power over fire. Perhaps if they had, these campfire yarns would have a fundamentally different character.

Indeed, the very term ‘Fire Revolution’ can seem arrogant and hard-headed when viewed from a historical perspective that includes Indigenous burning. From a long-term perspective, ‘Fire Rediscovery’ seems more apt. Even then, as discussed earlier in this chapter and extensively by Pyne,¹⁰⁷⁴ this narrative fails to explain why the actual amount of burning has not risen as much as a full adoption of Komarek, Biswell and Weaver’s ideas might imply. A significant factor limiting the adoption of prescribed burning has been the influence of the wilderness ideal, which grew especially

¹⁰⁶⁹ R. Boyd, “Introduction,” in *Indians, Fire, and the Land in the Pacific Northwest*, ed. R. Boyd (Corvallis, Oregon: Oregon University Press, 1999), 17.

¹⁰⁷⁰ Henry T. Lewis, “In Retrospect,” in *Before the Wilderness: Environmental Management by Native Californians*, ed. Thomas Blackburn and Kat Anderson (Menlo Park, California: Ballena Press, 1993), 394.

¹⁰⁷¹ See for instance Anderson, *Tending the Wild*. It should be noted that Lewis also conducted comparative work in Canada, but the boreal climate of Canada means that Californian researchers have tended to seek parallels with the Mediterranean-climate parts of Australia.

¹⁰⁷² I am grateful to Stephen Pyne for this insight. Pyne, Stephen J., “[Personal Communication],” 8 July, 2018.

¹⁰⁷³ Pyne, *California: A Fire Survey*, 167.

¹⁰⁷⁴ Pyne’s deconstruction of the Fire Revolution narrative is probably best conveyed in Pyne, *Tending Fire: Coping with America’s Wildland Fires*; and Pyne, *Between Two Fires: A Fire History of Contemporary America*.

prominent in the 1960s. The failures of the Fire Revolution (ideological, ecological, political), especially those that concerned the wilderness ideal, were thrown into stark relief when Yellowstone erupted in flame in 1988.

The Erasure of Native America through Wilderness

A consistent ideology influencing how Americans relate to their environment is that of wilderness, and it grew especially prominent at a policy level in the 1960s. Inspired by nineteenth century figures such as Henry Thoreau and John Muir (discussed in Chapter Two), and by movements appreciative of natural beauty and the sublime such as romanticism, wilderness as a concept is especially resonant to Americans.¹⁰⁷⁵ Or, more correctly, to settler Americans. After all, Albert Bierstadt's depictions of the Sierra Nevada which inspired such appreciation for the American West never included any paintings of burned over areas.¹⁰⁷⁶ The cultural adoption of giant sequoias as iconic images of the United States, granting a sense of antiquity that rivalled the ruins of Rome,¹⁰⁷⁷ ignored any physical signs of Indigenous occupancy of North America such as the mounds of Cahokia, the canals of the Hohokam, or the rock-carved dwellings of the Pueblos. This was no accident.

Wilderness as an ideology relies on a conception of nature in opposition to human culture, and its creation and appreciation required the removal of Native Americans from the landscape. Wilderness had to be created, not discovered, and an image of America as pristine virgin wilderness largely empty of people was the result. The movement had important religious origins, even if later movements manifested with a secular tinge.¹⁰⁷⁸ As many academics have argued, the very concept of wilderness was at least in part invented to justify and conceal the dispossession of Native lands and the genocide

¹⁰⁷⁵ This is a necessarily brief introduction to the origins of wilderness and a formidable array of works examining the concept. Good entry points would include Mark David Spence, *Dispossessing the Wilderness: Indian Removal and the Making of the National Parks* (New York: Oxford University Press, 1999); Roderick Nash, *Wilderness and the American Mind* (Yale University Press, 1967); J. Baird Callicott, "That Good Old-Time Wilderness Religion," in *The Great New Wilderness Debate*, ed. J. Baird Callicott and Michael P. Nelson (Athens, Georgia: University of Georgia Press, 1998), 387–94; Michael P. Nelson and J. Baird Callicott, "Introduction: The Growth of Wilderness Seeds," in *The Wilderness Debate Rages on: Continuing the Great New Wilderness Debate*, ed. Michael P. Nelson and J. Baird Callicott (Athens, Georgia: University of Georgia Press, 2008), 1–20; Banivanua Mar, "Carving Wilderness: Queensland's National Parks and the Unsettling of Emptied Lands, 1890–1910."

¹⁰⁷⁶ Roderick Nash, "Sorry, Bambi, But Man Must Enter The Forest: Perspectives on the Old Wilderness and the New," in *Fire's Effects on Wildlife Habitat: Symposium Proceedings, Missoula, MT, March 21, 1984*, ed. James E. Lotan, General Technical Report INT-182 (Ogden, Utah: US Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station, 1985), 266.

¹⁰⁷⁷ Spence, *Dispossessing the Wilderness: Indian Removal and the Making of the National Parks*, 29.

¹⁰⁷⁸ Callicott, "That Good Old-Time Wilderness Religion."

that settlers perpetrated upon many Native American groups.¹⁰⁷⁹ National parks – America’s “best idea” – were a direct consequence and manifestation of wilderness ideology.¹⁰⁸⁰ As Cronon and others have noted, “it is no accident” that the national park and wilderness movement emerged at the same time as nostalgia for the closing of the American frontier peaked.¹⁰⁸¹ National parks in the United States, many of which were inspired by or publicly justified by reference to wilderness, were based on the violent dispossession of Native Americans. Yosemite Valley was ‘discovered’ by a military unit pursuing Ahwahneechee Native Americans.¹⁰⁸² The first Park Headquarters in Yellowstone was a “heavily fortified blockhouse” reflecting concerns about Native American attacks.¹⁰⁸³

While the concept of wilderness was used to justify the creation of the earlier parks such as Yosemite in the nineteenth and early twentieth centuries, it was most importantly codified into American law with the Wilderness Act of 1964, itself inspired by the Leopold Report of 1963.¹⁰⁸⁴ The Leopold Report, originally commissioned to provide some guidance on the issue of elk over-population in Yellowstone, grew to make more sweeping claims and established an ethic and ideology that inspired the Act.¹⁰⁸⁵

As a primary goal, we would recommend that the biotic associations within each park be maintained, or where necessary recreated, as nearly as possible in the condition that prevailed when the area was first visited by the white man. A national park should represent a vignette of primitive America.¹⁰⁸⁶

While the Report itself carefully noted that active management by humans had demonstrably positive impacts and recommended this as a strategy,¹⁰⁸⁷ the Act largely ignored this in favour of a more hard-line wilderness goal:

¹⁰⁷⁹ M.L. Pratt, *Imperial Eyes: Travel Writing and Transculturation* (New York: Routledge, 1992); M.J. Bowden, “The Invention of American Tradition,” *Journal of Historical Geography* 18 (1992): 3–26; C.E. Kay and R.T. Simmons, “Preface,” in *Wilderness and Political Ecology: Aboriginal Influences and the Original State of Nature*, ed. C.E. Kay and R.T. Simmons (Salt Lake City: University of Utah Press, 2002), xi–xix.

¹⁰⁸⁰ The etymology of this phrase – made famous by documentary maker Ken Burns – is a little unclear. See Alan MacEachern, “Who Had ‘America’s Best Idea’?,” *NiCHE* (blog), 23 October, 2011, <http://niche-canada.org/2011/10/23/who-had-americas-best-idea/>.

¹⁰⁸¹ William Cronon, “The Trouble with Wilderness; Or, Getting Back to the Wrong Nature,” *Environmental History* 1, no. 1 (1996): 14; Banivanua Mar, “Carving Wilderness: Queensland’s National Parks and the Unsettling of Emptied Lands, 1890-1910.”

¹⁰⁸² Spence, *Dispossessing the Wilderness: Indian Removal and the Making of the National Parks*, 102.

¹⁰⁸³ Spence, 57.

¹⁰⁸⁴ Technically Yosemite was first held as a state park rather than under Federal protection.

¹⁰⁸⁵ J. Baird Callicott and Michael P. Nelson, “Introduction,” in *The Great New Wilderness Debate*, ed. J. Baird Callicott and Michael P. Nelson (Athens, Georgia: University of Georgia Press, 1998), 1–22; Stephen J. Pyne, “Vignettes of Primitive America: The Leopold Report and Fire History,” *Forest History Today*, no. Spring (2017): 12–18.

¹⁰⁸⁶ Leopold, “Wildlife Management in the National Parks (or, The Leopold Report),” 106.

¹⁰⁸⁷ Pyne, *Between Two Fires: A Fire History of Contemporary America*, 42.

A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognised as an area where the earth and its community of life are untrammelled by man, *where man himself is a visitor who does not remain*. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, *without permanent improvements or human habitation*, which is protected and managed so as to preserve its natural conditions and which (I) generally appears to have been affected primarily by the forces of nature, *with the imprint of man's work substantially unnoticeable...* [All italics added for emphasis]¹⁰⁸⁸

The Leopold Report referenced fire multiple times as a necessary addition to protected areas. It argued that “of the various methods of manipulating vegetation, the controlled use of fire is the most ‘natural’ and much the cheapest and easiest to apply”, and recognised that thickened vegetation in the Sierra Nevada was due to the arrival of settlers (though it did not directly discuss Indigenous burning as having prevented this thickening prior to the arrival of settlers).¹⁰⁸⁹ In this way, agencies that paid more heed to the Report (such as the National Park Service) had some level of policy freedom. The language of the Act listed above, however, leaves no room for any acknowledgement of Native American burning or even culture. The pre-Columbian Native American burning extensively discussed in Chapter Two clearly constituted “permanent improvements”, and the idea of wilderness as being land where humans “do not remain” denies the cultural and material context of Native American occupancy.

This framework has hamstrung any effort to use prescribed fire by the agencies which were inspired by the Report and blinded the environmental movement which saw the Act as a major triumph. National Park Service researcher Bruce Kilgore and Forest Service forester Stephen Arno discussed the incompatibility of wilderness with pre-Columbian burning in 1985, indicating that at least some parts of the Federal agencies were aware that “current management directions are variable and nebulous regarding whether ‘natural fire’ includes those set by [Native Americans]”.¹⁰⁹⁰ With such ambiguity, the preferred use of fire came through the ‘prescribed natural fire’ as opposed to prescribed burns ignited by humans.

The prescribed natural fire was in essence a response to the dilemma of maintaining biotic associations without human interference. If lightning ignited a fire within an area judged ready for a

¹⁰⁸⁸ *Wilderness Act of 1964* (USA), Pub. L. No. 88-577, 78 Stat. 890 as amended; 16 U.S.C. 1131.

¹⁰⁸⁹ Leopold, “Wildlife Management in the National Parks (or, The Leopold Report),” 112.

¹⁰⁹⁰ S.F. Arno, “Ecological Effects and Management Implications of Indian Fires,” in *Proceedings of the Symposium and Workshop on Wilderness Fire, November 15-18, 1983, Missoula, Montana*, ed. James E. Lotan, General Technical Report INT-182 (Ogden, Utah: US Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station, 1985), 84.

burn, and under conditions judged to be favourable, it would be allowed to burn. If it got out of control, it became a wildfire. The branding of this practice as ‘prescribed natural fire’ as opposed to a ‘let burn’ policy reinforced a sense agencies held ultimate control, rather than implementing what could be labelled *laissez-faire* policies.¹⁰⁹¹ Fires lit by lightning and carefully monitored by humans were natural, fires lit by driptorch and carefully monitored by humans were not. Stephen Pyne has compared this to *Star Trek*’s Prime Directive in its promotion of non-intervention.¹⁰⁹² The tensions of this new embrace of ‘natural’ fire, wilderness, and the consequences of the fire suppression era exploded into the public arena when Yellowstone National Park burned in 1988.

The 1988 Yellowstone Fires

Public debate over ‘naturalness’, wilderness, and fire management erupted when between June and November 1988, Yellowstone National Park in the state of Wyoming burned in a number of wildfires. This debate over Yellowstone’s fire history cannot be understood without an acknowledgement of its Indigenous history. The Eastern Shoshone had lived in the Yellowstone area until they ceded their lands (but not their right to hunt) in a treaty the United States never ratified or recognised.¹⁰⁹³ The first Euro-American fire management in the area (and indeed, the first time the Federal Government became involved in forest fires) occurred in 1886 when US Army troops led by General Philip Sheridan entered the newly-declared Park to battle forest fires (which Native Americans were accused of lighting). It is illustrative of the relationship between settler-colonial violence and environmental conservation that General Sheridan is well known for allegedly saying “the only good Indians I ever saw were dead”.¹⁰⁹⁴ Thus ultimately, any debate around ‘naturalness’ in the Park was misguided from the start.

¹⁰⁹¹ For the origins of the prescribed natural fire, see Pyne, *Between Two Fires: A Fire History of Contemporary America*, 105–8; Trosper argues that Native American fires and lightning-ignited fires are not comparable as they differ in the season of ignition, see Ronald L Trosper, “Now That Pauite Forestry Is Respectable: Can Traditional Ecological Knowledge and Science Work Together?” (Unpublished paper, 2007).

¹⁰⁹² Pyne, “Vignettes of Primitive America: The Leopold Report and Fire History.” Pyne’s analogy is stronger than he might have intended. The Prime Directive has appeared in over 70 episodes or films of *Star Trek*, with the majority exploring tensions around the ethics and practicality of the concept. This internal critique of an ostensibly noble goal gathered pace in later iterations of the franchise, in roughly the same decades as the critiques of wilderness discussed in this chapter.

¹⁰⁹³ Merchant, *The Columbia Guide to American Environmental History*, 148.

¹⁰⁹⁴ Whether Sheridan ever said this is disputed, but folklore holds him as the origin of this violent proverb which was popular in the nineteenth century. See Wolfgang Mieder, “‘The Only Good Indian Is a Dead Indian’: History and Meaning of a Proverbial Stereotype,” *The Journal of American Folklore* 106, no. 419 (1993): 38–60; Barker, *Scorched Earth: How the Fires of Yellowstone Changed America*, 4–16.

Yellowstone itself had laboured under a major drought through early 1988, and the first major fire started outside the Park in mid-June of that year.¹⁰⁹⁵ Initially the National Park Service were content to allow the fires to burn through the Park, judging that wildfire was a natural presence in the Park and that these fires would help achieve Park Service goals of restoring the Park to a ‘vignette of primitive America’ before fire suppression. By 21 July it was clear that the wildfires were growing in size and intensity beyond what the Park Service could control, and it was decided to start suppression operations.¹⁰⁹⁶ Over the next few months suppression failed to satisfactorily contain the fires, despite the use of over 25,000 firefighters, liberal use of suppression via aircraft, and the expenditure of US\$120 million.¹⁰⁹⁷ In a peculiar double irony, the worst day was when Yellowstone experienced a ‘Black Saturday’ of its own on the 20 August anniversary of the Big Burn discussed in Chapter Two, when 165,000 acres (66,000 ha) burned within just 24 hours.¹⁰⁹⁸ However, unlike the 2009 Black Saturday firestorm discussed in Chapter Six, no firefighters died directly from fighting the fires, and there were no civilian casualties. By the end of the season, approximately 1.2 million acres (480,000 ha) of the ‘Yellowstone Greater Area’ (including private land bordering Yellowstone National Park) had burned; affecting roughly 35-40% of the Park.¹⁰⁹⁹

The Yellowstone fires were big, bold, and extensively covered in the popular press and in academic papers. They were the world’s first “prime-time forest fire”,¹¹⁰⁰ and ignited a disproportionately intense and ill-informed debate in the popular press. A then-somewhat obscure station called the Cable News Network began to broadcast hourly updates on 25 July.¹¹⁰¹ The media coverage rapidly intensified – even Presidential hopeful Mike Dukakis visited the Park,¹¹⁰² and Park Superintendent Robert Barbee later lamented “I kept waiting for Gaddafi or somebody to do something outrageous, because we were the only game in town”.¹¹⁰³ While the extent and high intensity of the fires had devastated much of the Park, the coverage from many outlets descended into hyperbole and even hysteria. An NBC anchor solemnly informed his audience that “This is what’s left of Yellowstone

¹⁰⁹⁵ Barker, *Scorched Earth: How the Fires of Yellowstone Changed America*, 187.

¹⁰⁹⁶ Conrad Smith, *Media and Apocalypse: News Coverage of the Yellowstone Forest Fires, the Exxon Valdez Oil Spill, and the Loma Prieta Earthquake* (Westport, Conn: Greenwood, 1992), 44.

¹⁰⁹⁷ Paul Schullery, “The Fires and Fire Policy,” *BioScience* 39, no. 10 (1989): 689. US\$120 million in 1988 is roughly US\$260 million in 2019. At the time, the base cost of a helicopter for use in aerial firefighting was US\$1700/hour, or US\$3600 in 2019 figures; see George Wuerthner, *Yellowstone and the Fires of Change* (Dream Garden Press, 1988).

¹⁰⁹⁸ Barker, *Scorched Earth: How the Fires of Yellowstone Changed America*, 2.

¹⁰⁹⁹ Barker, 220.

¹¹⁰⁰ Linda L. Wallace, Francis J. Singer, and Paul Schullery, “The Fires of 1988: A Chronology and Invitation to Research,” in *After the Fires: The Ecology of Change in Yellowstone National Park*, ed. Linda L. Wallace (New Haven: Yale University Press, 2004), ix.

¹¹⁰¹ Barker, *Scorched Earth: How the Fires of Yellowstone Changed America*, 201.

¹¹⁰² Rothman, *Blazing Heritage: A History of Wildland Fire in the National Parks*, 180.

¹¹⁰³ Rothman, 164.

tonight” while failing to acknowledge the majority of the Park was unburned.¹¹⁰⁴ This coverage was greatly disproportionate to previous coverage of wildfires in the US,¹¹⁰⁵ and during the fires themselves the overwhelming majority of it was negative and critical of the Park Service and its fire management strategy for allegedly allowing these fires to happen. Headlines such as “We could have stopped this” quoted unnamed firefighters internally critical of the Park Service’s strategy.¹¹⁰⁶

The aspect criticised was the Park Service’s new policies towards wildland fire which supposedly reflected the tenets of the Fire Revolution. An incident particularly damaging for public relations of the Park Service occurred when research scientist Don Despain, observing fires headed towards a fire ecology test plot, muttered “burn, baby, burn” in front of the media.¹¹⁰⁷ The climate of reporting at the time was largely ignorant of the sophisticated debates around fire management and naturalness; of 936 broadcast and print stories published in 1988 about the Yellowstone Fires, none “clearly explained how that policy came about”.¹¹⁰⁸ Despain’s comments contributed to this frenzy of criticism as they were widely reported. Even President Reagan dismissed the supposed ‘let burn’ policy as “cockamamie”.¹¹⁰⁹

The Park Service was blindsided by the vehemence of the reaction and media frenzy, and its attempts to explain a policy that allowed for ‘natural’ fire fell on deaf ears to an American public inoculated by Smokey Bear against the sight of smoke in the woods. Park Superintendent Barbee later reflected that media control might have been more effective than fire control.¹¹¹⁰ Once the fires were largely extinguished by changing weather in autumn of 1988, the media narrative slowly shifted in favour of what Barbee called the “happy-face fire ecology story”.¹¹¹¹ While the mechanisms for each species are obviously different, the evolutionary adaptation of the lodgepole pine forests found in Yellowstone and *Eucalyptus regnans* (mountain ash) discussed in Chapters One and Six seem analogous:¹¹¹² both reseed after high-intensity crown fires, and the 1988 fires were “exactly the kind of flashy fire” that

¹¹⁰⁴ Barker, *Scorched Earth: How the Fires of Yellowstone Changed America*, 213.

¹¹⁰⁵ By early September NBC alone had 26 staff covering the fires in the Yellowstone area; see Smith, *Media and Apocalypse: News Coverage of the Yellowstone Forest Fires, the Exxon Valdez Oil Spill, and the Loma Prieta Earthquake*, 46.

¹¹⁰⁶ Thomas Hackett, “A Reporter At Large: Fire,” *New Yorker*, 2 October 1989, 68.

¹¹⁰⁷ Barker, *Scorched Earth: How the Fires of Yellowstone Changed America*, 210.

¹¹⁰⁸ Smith, *Media and Apocalypse: News Coverage of the Yellowstone Forest Fires, the Exxon Valdez Oil Spill, and the Loma Prieta Earthquake*, 47; media coverage post-2000 has tended to include more space for ecological contextualisation, see Terracina-Hartman, “Fanning the Flames.”

¹¹⁰⁹ Struzik, *Firestorm: How Wildfire Will Shape Our Future*, 93.

¹¹¹⁰ Hackett, “A Reporter At Large: Fire,” 69.

¹¹¹¹ Barker, *Scorched Earth: How the Fires of Yellowstone Changed America*, 221.

¹¹¹² David Ashton speculated over this, see Ashton, “Fire in Tall Open Forests (Wet Sclerophyll Forests).”

lodgepole pine's "serotinous cones required to release their seeds".¹¹¹³ Nevertheless the initial narrative had already been set and propagated to Americans watching their fires live on television.

The ecological impact of the 1988 Yellowstone Fires was more ambivalent than either the National Park Service defence or the media storm suggested. One research team found no evidence that the 1988 Fires "impaired [the] long-term viability of any population of native species" and that while the fires certainly killed a significant proportion of fauna and some flora, they "appear to have had relatively small and transient effects on ecosystem processes related to energy flow, leaf area, and nutrient dynamics".¹¹¹⁴ In other words, when the Park is viewed from a wilderness perspective, the Fires did not irreparably damage the ecological processes that native species rely upon.¹¹¹⁵ At a more abstract level, the Fires resulted in significant growth in research on Yellowstone's fire ecology (at least 234 research projects on this have been conducted since 1988), potentially contributing to more sophisticated management within the Park.¹¹¹⁶

However, the ecological impact of the Yellowstone Fires was not restricted to the Park or even its greater area. Some academics have used the Yellowstone Fires and the initial controversy over its fire management as a textbook case to demonstrate how the initial framing of a disaster in public discourse influences and restricts the future direction of the policy response.¹¹¹⁷ Three days after Yellowstone's Black Saturday, National Park Service Director William Mott declared an immediate moratorium on all prescribed burns on Park Service lands – including both human-ignited prescribed burns and 'natural prescribed burns'. While prescribed burning was gradually re-endorsed (in a more cautious form with fewer 'natural prescribed burns' and more deliberate ignitions) this moratorium

¹¹¹³ Pyne, *Between Two Fires: A Fire History of Contemporary America*, 236; note that some have argued not all lodgepole pine subspecies are serotinous; see Dylan W. Schwilk and David D. Ackerly, "Flammability and Serotiny as Strategies: Correlated Evolution in Pines," *Oikos* 94, no. 2 (2001): 326–36.

¹¹¹⁴ William H. Romme and Monica G. Turner, "Ten Years After the 1988 Yellowstone Fires: Is Restoration Needed?," in *After the Fires: The Ecology of Change in Yellowstone National Park*, ed. Linda L. Wallace (New Haven: Yale University Press, 2004), 327, 350; Studies have also used alluvial deposition and lake sediment records to argue that the 1988 Fires were not unprecedented, and that stand-replacing high-intensity crown fires have occurred consistently (though not frequently). See Grant A. Meyer, "Yellowstone Fires and the Physical Landscape," in *After the Fires: The Ecology of Change in Yellowstone National Park*, ed. Linda L. Wallace (New Haven: Yale University Press, 2004), 29–54.

¹¹¹⁵ For an extreme version of this argument, see Dominic A. DellaSala and Chad T. Hanson, *The Ecological Importance of Mixed-Severity Fires: Nature's Phoenix* (Elsevier, 2015) Much of this collection relies upon unpublished data and makes questionable assumptions, especially about Native American burning practices.

¹¹¹⁶ Carle, *Burning Questions*, 204.

¹¹¹⁷ Fifer and Orr, "The Influence of Problem Definitions on Environmental Policy Change," 645.

had significant ecological consequences throughout the United States.¹¹¹⁸ The Fire Revolution stumbled, in a salient reminder of the power of Big Fires to cause shifts in policy, practice, and culture.

Assessing the legacy of the Yellowstone Fires at a political level, Pyne's observation that the Yellowstone Fires proved an exercise in ambivalent "pyromancy" seems apt, in that while many parties sought meaning in the flames, there was little agreement on what meaning was found.¹¹¹⁹ While at least some of the American public previously untouched by the Fire Revolution had been introduced to some form of an ecological understanding of fire, there was no central unifying forum or focus for public discourse and academic disputes as would have been provided through a Royal Commission in Australia, and thus no single purportedly authoritative analysis of this Big Fire and its accompanying debates as would have been provided in the resulting Royal Commission Report. There was still highly contentious political and academic debate, and its contentious nature would influence fire politics in the United States for decades.

This was particularly the case in how environmentalists reacted to the public discourse of the Yellowstone Fires, especially the appropriation of deconstruction of fire management by the conservative Wise Use movement. Philosopher Alston Chase and former Park ranger Thomas Bonnicksen had heavily criticised Yellowstone's fire management strategies before and during the 1988 Fires. Chase's 1986 book *Playing God in Yellowstone* provided critics with a detailed and sophisticated critique of wilderness ideology,¹¹²⁰ while Bonnicksen was able to use his expertise as a former fire manager to deconstruct Yellowstone's fire strategy.¹¹²¹ Their critiques were seized upon by the conservative Wise Use movement, a political grouping ascendant during the Reagan era that sought to use the Fires to discredit the management of public lands, arguing that "natural regulation, natural fire, and preservation [are] a way to close off use of the forests".¹¹²² It's a great shame that the Wise Use movement's use of Chase as a framework for criticism of the Park Service has led some environmentalist groups to dismiss rather than consider Chase's arguments.¹¹²³ Chase was one of the

¹¹¹⁸ Pyne, *Between Two Fires: A Fire History of Contemporary America*, 239; see also Norman L. Christensen et al., "The Report of the Ecological Society of America Committee on the Scientific Basis for Ecosystem Management," *Ecological Applications* 6, no. 3 (1996): 665.

¹¹¹⁹ "Pyromancy" was the reputed art of using flames for divination. Pyne, *Between Two Fires: A Fire History of Contemporary America*, 239.

¹¹²⁰ Alston Chase, *Playing God in Yellowstone: The Destruction of America's First National Park*, 1st ed. (Boston: The Atlantic Monthly Press, 1986).

¹¹²¹ Thomas B. Bonnicksen, "Fire Gods and Federal Policy," *American Forests* 95, no. 7 & 8 (1989): 14–16, 66–68. Both Chase and Bonnicksen's works were discussed in depth by environmentalist organisations including the Sierra Club; see Carton 22, BANC MSS 79/9c, David Brower Papers, The Bancroft Library, University of California, Berkeley, CA, USA.

¹¹²² Ed Wright quoted in Carle, *Burning Questions*, 198.

¹¹²³ Dave Foreman, "All Kinds of Wilderness Foes," *Wild Earth* 6, no. 4 (1997): i, 2–4.

few to popularise how a recognition of the scale and implications of Native American burning complicates the narrative of the Fire Revolution.

The policy response to the Yellowstone Fires relied on the same ideological framework which discounted Native American burning that underpinned the Fire Revolution. The parent organisations of both the National Park Service and the Forest Service commissioned a review of fire management policy in the wake of the Yellowstone Fires, but it is striking that throughout the document there is no mention of Native American fire. According to the review, the purpose of policy should be to “restore fire to a more natural ecological role” where “‘naturalness’ is defined as those dynamic processes and components which would likely exist today, and go on functioning, if technological humankind had not altered them”.¹¹²⁴ Native American pyrotechnology is obviously discounted in this definition of ‘technological humankind’, as is any sense of Native American fire as distinct from lightning fire. Native American burning is thus assumed to be natural rather than cultural, its material consequences negligible, its cultural context and meaning irrelevant. This ideological erasure is not terribly unexpected – as discussed, most of the Fire Revolutionaries failed to conceive of Indigenous burning in any other way – but it also reflects the direct (and violent) erasure of Native Americans from the history of Yellowstone as a National Park. This erasure of Native Americans in Yellowstone and in conceptions of the American environment more broadly was increasingly questioned after 1988.

After Yellowstone: Troubles with Wilderness in Academic Discourse

The 1988 Yellowstone Fires helped precipitate a broad wave of American academic deconstruction of the concept of wilderness in the 1990s, some of which relied upon conceptions of Indigenous burning. Researchers from the humanities and social scientists had already questioned wilderness, such as Roderick Nash’s 1967 *Wilderness and the American Mind*, Pyne’s 1982 observation that “wilderness is a human artefact”, and Alston Chase’s 1986 critique discussed above.¹¹²⁵ These challenges grew to a fever pitch in the 1990s with geographer William Denevan’s isolation of the “pristine myth”,¹¹²⁶ historian William Cronon’s meditation on the “trouble with wilderness”,¹¹²⁷ and historian

¹¹²⁴ US Forest Service, “Final Report on Fire Management Policy”, 5 May 1989, Folder: Fire: Forest Service Fire Management Policy, US Forest Service Headquarters History Collection, Library and Archives, Forest History Society, Durham, NC, USA.

¹¹²⁵ Nash, *Wilderness and the American Mind*; Pyne, *Fire in America: A Cultural History of Wildland and Rural Fire*, 15; Chase, *Playing God in Yellowstone: The Destruction of America’s First National Park*.

¹¹²⁶ W.M. Denevan, “The Pristine Myth: The Landscape of the Americas in 1492,” *Annals of the Association of American Geographers* 82, no. 3 (1992): 369–85. One of Denevan’s doctoral supervisors was Carl Sauer.

¹¹²⁷ Cronon, “The Trouble with Wilderness; Or, Getting Back to the Wrong Nature.”

Ramachandra Guha's critique of the dire consequences of exporting wilderness protection to the Third World.¹¹²⁸ These articles had real impact in the academy and inspired many responses (a later manifestation of this deconstruction by geographer Thomas R. Vale is discussed in depth in Chapter Seven).¹¹²⁹ These arguments debated many different examples of Indigenous impacts upon wilderness, but also drew upon the pre-colonial Indigenous use of fire. Arturo Gómez-Pompa and Andrea Kaus, for instance, drew upon the long-standing debate between fire ecologists Jon Keeley and Richard Minnich over Indian modification of fuels in chaparral in Southern and Baja California.¹¹³⁰ However, even critics of wilderness tended to generalise burning practices across large and diverse areas or relegate it entirely to the past tense, perhaps a reflection of how American environmental historians since the 1980s have tended towards disengagement with post-contact Native American history.¹¹³¹ Regardless, despite such shortcomings, the wave of academic critique of wilderness left many activist organisations wary that such deconstructions would compromise their conservation efforts.

Critically, some environmental historians grappling with this critique of wilderness as it pertained to Indigenous burning sought to use examples and analogies elsewhere – and where better than Australia and Aboriginal burning? Indigenous writers such as Fabienne Bayet and non-Indigenous philosophers such as Val Plumwood likened wilderness to *terra nullius* and argued that wilderness was “yet another form of dispossession and paternalism” which conceptually removed “Aboriginal people

¹¹²⁸ Ramachandra Guha, “Radical Environmentalism and Wilderness Preservation: A Third World Critique,” in *The Great New Wilderness Debate*, ed. J. Baird Callicott and Michael P. Nelson (Athens, Georgia: University of Georgia Press, 1998), 271–80.

¹¹²⁹ As of May 2019 a Google Scholar search reveals Denevan's article has been cited around 1600 times, Cronon's article has been cited roughly 3600 times, and Guha's article has been cited roughly 850 times. A particularly useful collection of responses is found in J. Baird Callicott and Michael P. Nelson, eds., *The Great New Wilderness Debate* (Athens, Georgia: University of Georgia Press, 1998).

¹¹³⁰ Arturo Gómez-Pompa and Andrea Kaus, “Taming the Wilderness Myth,” *BioScience* 42, no. 4 (1992): 271–79; see also Jon E. Keeley, “Native American Impacts on Fire Regimes of the California Coastal Ranges,” *Journal of Biogeography* 29, no. 3 (2002): 303–320; Brett R. Goforth and Richard A. Minnich, “Evidence, Exaggeration and Error in Historical Accounts of Chaparral Wildfires in Southern California,” *Ecological Applications* 17, no. 3 (2007): 779–90.

¹¹³¹ This argument has been advanced recently in two surveys of the field; see Rice, “Beyond ?”; James R. Allison, “Beyond It All: Surveying the Intersections of Modern American Indian, Environmental, and Western Histories,” *History Compass* 16, no. 4 (2018): e12447; there are of course exceptions to this trend, see Michael Eugene Harkin and David Rich Lewis, “Introduction,” in *Native Americans and the Environment: Perspectives on the Ecological Indian*, ed. Michael Eugene Harkin and David Rich Lewis (Lincoln: University of Nebraska Press, 2007), xix–xxxiv; Monika Bilka, “Klamath Tribal Persistence, State Resistance: Treaty Rights Activism, the Threat of Tribal Sovereignty, and Collaborative Natural Resource Management in the Pacific Northwest, 1954–1981,” *Western Historical Quarterly* 48, no. 3 (2017): 255–75; Marsha Weisiger, *Dreaming of Sheep in Navajo Country* (University of Washington Press, 2009); this contrasts unfavourably with Australian environmental history, which while a much smaller field has always had a strong commitment and engagement with Indigenous histories, as argued in Griffiths, “Environmental History, Australian Style.”

from the Australian landscape”.¹¹³² It is clear that such powerful arguments weighed on the minds of the defenders of wilderness.¹¹³³

After Yellowstone: Environmentalists and Native American Burning

The modern environmental movement’s activism (especially through its more strident wings) has transformed the politics of fire in the United States, and its close relationship with ‘wilderness’ and the tensions of the Wilderness Act have contributed to the movement’s unease with active fire management. As discussed earlier, the Act was both an expression of, and a driver behind, the growth of the modern environmental movement in the United States in the 1960s, and in this sense the Act helped frame an environmentalist unease with fire. It is not my intention in this thesis to chart in depth the evolution of the environmental movement’s attitudes towards fire, either in Australia or the United States, but a brief description reveals tensions and ambiguities between the ideal of nature conserved free of human influence, and the growing insights of the Fire Revolution that fire needed to be reintroduced to large parts of the American West.

Prescribed natural fires were tolerated by some environmentalists, but many groups and individuals were often sceptical of the Fire Revolution’s push towards more active fire management. For instance, the environmentalist group Save the Redwoods League had played a significant historical role in the protection of redwoods in California but in 1973 expressed great uneasiness in the “use of fire as a tool”.¹¹³⁴ Other activists such as David Brower (first Executive Director of the influential environmentalist group Sierra Club) reluctantly accepted the use of driptorches to ignite prescribed burns, but not the use of bulldozers or machines to create firebreaks that limited such prescribed burns.¹¹³⁵ Such activists were always wary of prescribed burning; Brower heavily protested when a prescribed burn was too intense and demanded that individual sequoia trees be protected from fire.¹¹³⁶

¹¹³² Fabienne Bayet, “Overturning the Doctrine: Indigenous People and Wilderness - Being Aboriginal in the Environmental Movement,” in *The Great New Wilderness Debate*, ed. J. Baird Callicott and Michael P. Nelson (Athens, Georgia: University of Georgia Press, 1998), 314; Val Plumwood, “Wilderness Skepticism and Wilderness Dualism,” in *The Great New Wilderness Debate*, ed. J. Baird Callicott and Michael P. Nelson (Athens, Georgia: University of Georgia Press, 1998), 652–90.

¹¹³³ Callicott and Nelson, “Introduction,” 8.

¹¹³⁴ Carle, *Burning Questions*, 162.

¹¹³⁵ Chase, *Playing God in Yellowstone: The Destruction of America’s First National Park*, 302.

¹¹³⁶ David Brower, “Letter to Superintendent of Sequoia-Kings Canyon National Parks”, 26 June 1986, Carton 22 Folder 25, BANC MSS 79/9c, David Brower Papers, The Bancroft Library, University of California, Berkeley, CA, USA.

This environmentalist unease with active fire use sprung from wariness that active fire management would open the door for more active forms of land management such as logging or grazing that would undermine the objectives of environmental conservation. As discussed, the Wise Use movement which emerged in the 1980s argued the 1988 Yellowstone Fires were evidence that active land management was needed, and that management of land by public agencies had failed.¹¹³⁷ Some radical environmentalists accused the Wise Use movement of being a front organisation that masqueraded as a popular movement but in reality was funded by and primarily represented corporate interests (a political tactic called astroturfing).¹¹³⁸ The 1988 Yellowstone Fires were therefore a turning point, as these debates were thrust into popular consciousness as the Fires were broadcast onto television sets across the United States. As a result, environmental political disputes grew more bitter and the ideological positions of those involved became more entrenched.

This embitterment in environmental political controversies after 1988 was seen in disputes such as the Spotted Owl controversy where environmentalists seeking to protect the threatened species from habitat destruction battled against logging industries and communities seeking to protect jobs.¹¹³⁹ This dispute further strained already tense environmental politics among these groups and left little faith between the various contestants for future political debates. A later landmark piece of legislation, the Bush Administration's 2003 Healthy Forests Restoration Act, was ostensibly designed to solve fuel management issues but dismissed as "Orwellian doublespeak".¹¹⁴⁰ As a result of this prevailing political climate, the attitude "They can talk all they want to about fire hazard, but behind that rhetoric is a desire to continue logging" is common among American environmental groups.¹¹⁴¹ Such scepticism is shared by many environmentalist groups wary of active fire management and logging in Australia as discussed in Chapters Three and Six, though American debates tend to involve a greater level of controversy surrounding the idea of "thinning" forests via chainsaw to reduce fire hazard.¹¹⁴²

¹¹³⁷ An important essay on the "Wise Use" movement is Richard White, "'Are You an Environmentalist or Do You Work for a Living?' Work and Nature," in *Uncommon Ground: Rethinking the Human Place in Nature*, ed. William Cronon (W. W. Norton & Company, 1995), 171–85.

¹¹³⁸ See for example Foreman, "All Kinds of Wilderness Foes."

¹¹³⁹ Barker, *Scorched Earth: How the Fires of Yellowstone Changed America*, 208; the above is a crude summary of the controversy - an excellent summary of the Spotted Owl controversy and the "timber wars" of the Pacific North West can be found in Lewis, *The Forest Service and the Greatest Good: A Centennial History*.

¹¹⁴⁰ Les AuCoin, "Don't Get Hosed: How Political Framing Influences Fire Policy," in *Wildfire: A Century of Failed Forest Policy*, ed. George Wuerthner (Sausalito, California: Foundation for Deep Ecology, by arrangement with Island Press, 2006), 35.

¹¹⁴¹ Jake Kreilick (National Forest Protection Alliance) quoted in Jim Nesbit, "Lessons from the Big Burn of 1910," *Seattle Times*, 11 August 2000; Folder: Articles - Forest Fire, US Forest Service Headquarters History Collection, Library and Archives, Forest History Society, Durham, NC, USA.

¹¹⁴² Perhaps due to how fuel structures differ between Australian and American forests.

For many environmentalists, unease with the active use of fire was intensified when the topic was narrowed down to Indigenous fire and its implications for wilderness. Some more radical environmentalists such as George Wuerthner (Director of the Foundation for Deep Ecology) sought to query the spatial patterns of Native American burning in order to defend some areas as being less touched by human presence than others.¹¹⁴³ A particularly strident critic of Indigenous burning's relevance was Dave Foreman (co-founder of extreme activist group Earth First!). Foreman has variously questioned the extent of Native American burning,¹¹⁴⁴ drawn upon Paul Martin's blitzkrieg megafauna extinction thesis (discussed in Chapter Seven) to argue Native Americans were poor environmental stewards,¹¹⁴⁵ or argued that "anthropology is like the Bible...you can use it to support any claim about humans and Nature you wish".¹¹⁴⁶ It is remarkable to note that in this latter case Foreman considers arguments about Native American burning as belonging to anthropologists and not actual Native Americans. In the same chapter Foreman reveals the influence of settler-colonial frameworks by arguing "I do not raise these questions to oppose *legitimate* land claims of Native Americans" [emphasis mine] – with the judge of legitimacy implied to be none other than a certain D. Foreman.¹¹⁴⁷ Apart from settler-colonial frameworks which relegate Native Americans to the Ecological Indian stereotype as only lightly (if at all) touching the land, much of this environmentalist unease with Native American use of fire can also be explained by concerns about how it may contribute to contemporary political debates.

A similar suspicion has been held towards academics who deconstruct wilderness. Among some environmentalists there has been a strong current of disdain for "high-paid" academics and researchers from the "ivory tower", especially those discussed above who have deconstructed wilderness.¹¹⁴⁸ Thus William Cronon was regarded as "high-falutin'" and Alston Chase as a "token intellectual".¹¹⁴⁹ According to such critics, "with historians like this, who needs enemies?"¹¹⁵⁰

¹¹⁴³ George Wuerthner, ed., *Wildfire: A Century of Failed Forest Policy* (Sausalito, California: Foundation for Deep Ecology, by arrangement with Island Press, 2006), xviii.

¹¹⁴⁴ Dave Foreman, "The Myth of the Humanized Pre-Columbian Landscape," in *Keeping the Wild: Against the Domestication of the Earth*, ed. George Wuerthner, Eileen Crist, and Tom Butler (Washington: Island Press, 2014), 119.

¹¹⁴⁵ Dave Foreman, "Wilderness Areas for Real," in *The Great New Wilderness Debate*, ed. J. Baird Callicott and Michael P. Nelson (Athens, Georgia: University of Georgia Press, 1998), 402.

¹¹⁴⁶ Foreman, 401.

¹¹⁴⁷ Foreman, 402. Foreman has form in questioning the ethnicity and thus the authority of Native Americans – see his scepticism around Dennis Martinez in Foreman, "All Kinds of Wilderness Foes," 4.

¹¹⁴⁸ Gary Snyder, "Is Nature Real?," in *The Wilderness Debate Rages on: Continuing the Great New Wilderness Debate*, ed. Michael P. Nelson and J. Baird Callicott (Athens, Georgia: University of Georgia Press, 2008), 351–52.

¹¹⁴⁹ Foreman, "All Kinds of Wilderness Foes," 4.

¹¹⁵⁰ D. Rothenberg, "Review of *Uncommon Ground: Toward Reinventing Nature*, Edited by W. Cronon," *Amicus Journal* 18, no. 2 (1996): 44.

Statements like this obviously played upon the stereotypes of academic knowledge as impractical and disconnected from ‘real world’ concerns, familiar to us from Chapters One and Two.

The standard concern around critiques of wilderness (whether they came from academics or from Indigenous peoples) was that if such debate made it into the public sphere, extractive industries and enemies of conservation would use these arguments to undermine public support for conservation. It is true that academic critiques of wilderness found some resonance with the American public. For instance, Cronon’s essay was adapted for the *New York Times* in 1995.¹¹⁵¹ Denevan’s arguments against the idea of ‘the pristine myth’ found popular advocacy through bestsellers such as Charles C. Mann’s books.¹¹⁵² Denevan’s doctoral supervisor was Carl Sauer – thus while Sauer may not have directly contributed much to the original Fire Revolution, his influence did eventually emerge.¹¹⁵³ Thus while it is clear that these ideas have reached a popular audience, it is far less clear whether such critiques of wilderness (academic or popular) have effectively compromised conservation causes.

There is certainly evidence that critiques of wilderness drawing upon Native American environmental modification have been *used* by some to propose alternative management of public land. Denevan’s article was reportedly used in a court case over old-growth forests on Native American reservations.¹¹⁵⁴ Mann’s book (and the work of ethnobotanists on the burning patterns of Californian Native Americans) inspired writers such as Dan Dagget to call for a greater human presence on country to avoid disastrous wildfires.¹¹⁵⁵ Most concerningly for environmentalists, a group calling itself the ‘Evergreen Foundation’ (funded by groups such as the American Pulpwood Association) quoted from Alston Chase and argued that the decision to remove “native fire” [sic] from the Western landscape had led to disastrous wildfires and thus “restoration forestry” (accomplished through selective logging and thinning) was the answer.¹¹⁵⁶

Unfortunately, this is only the barest of analyses and an authoritative judgement on whether such environmentalist concerns were warranted would require a dedicated study. Indeed, a sweeping and

¹¹⁵¹ William Cronon, “The Trouble with Wilderness,” *The New York Times Magazine*, 13 August, 1995.

¹¹⁵² Charles C. Mann, “1491,” *The Atlantic*, 2002, <https://www.theatlantic.com/magazine/archive/2002/03/1491/302445/>; Charles Mann, *1491: New Revelations of the Americas Before Columbus* (Knopf, 2005).

¹¹⁵³ Sauer also influenced Australians, including Keith Hancock, see Hancock, *Discovering Monaro: A Study of Man’s Impact on His Environment*, 23.

¹¹⁵⁴ William M. Denevan, “The ‘Pristine Myth’ Revisited,” *Geographical Review* 101, no. 4 (2011): 581.

¹¹⁵⁵ It is interesting to note that Dagget consistently uses the past tense when discussing Indian burning and does not include any Native voices in his book; D. Dagget, *Gardeners of Eden: Rediscovering Our Importance to Nature* (Reno: University of Nevada Press, 2005).

¹¹⁵⁶ The Evergreen Foundation, *Evergreen: The Magazine of the Evergreen Foundation*, Winter 2000, Folder: Articles – Forest Fires, US Forest Service Headquarters History Collection, Library and Archives, Forest History Society, Durham, NC, USA.

robust study is sorely needed to avoid shallow generalisations; it was “unconfirmed but widely reported in environmental academia” that right-wing American radio host Rush Limbaugh had sought to use Denevan’s article to argue that “anthropogenic environmental impact was ‘normal’ or ‘natural’ and therefore nothing to worry about”.¹¹⁵⁷ Decades after the alleged incident, determining the truth of this particular rumour was impractical for this thesis,¹¹⁵⁸ yet multiple tenured professors felt it worthwhile to make the qualified claim in print without bothering to fact check at a time when records might have been more available.¹¹⁵⁹ Ultimately, the question of whether the acknowledgement of Native American burning *has* weakened the wilderness justification behind environmental conservation is less important than whether it *should*.

To enable ecologically and ethically robust policy, Indigenous burning needs to be acknowledged in the United States, and this acknowledgement should weaken and perhaps shatter any concept of wilderness that is founded upon absence of humanity. Wilderness is conceptually limiting and clinging to it propagates settler-colonial frameworks of the American environment. As discussed in Chapter Four, Australian environmental thinkers (i.e. both academics and activists) largely moved on from considering or applying the concept of wilderness to an Australian context. Some American activists have done the same, but those who have not will find themselves tangled in increasingly Gordian knots of contradictions and qualifications. In Chapter Seven, I will demonstrate how this can be avoided by presenting a new conceptual model which reconciles Indigenous impacts and culture without ruling out a drive to understand, appreciate, and conserve environments.

After Yellowstone: The Ecological Indian

A similar academic debate with relevance to perceptions of Indigenous burning in the United States was the coalescing deconstruction of the Ecological Noble Savage or Ecological Indian trope. As established in the Thesis Introduction, concepts of savagery were one of the prime intellectual frameworks through which Euro-Americans understood Native American societies upon arrival in the Americas; both the noble and ignoble variations of savagery were used to justify settler-colonial policies. For instance, anthropologist Ter Ellingson has argued that the ‘Noble Savage’ as an explicit discursive construct was significantly reshaped by John Crawford in 1859, as part of a political coup by

¹¹⁵⁷ Denevan, “The ‘Pristine Myth’ Revisited,” 581.

¹¹⁵⁸ Limbaugh’s company did not respond to requests for comment or records of prior programmes.

¹¹⁵⁹ Michael P. Nelson and J. Baird Callicott “declined to listen to hour after hour of Limbaugh tapes to try to confirm it” - perhaps indicating the disciplinary differences between philosophers and historians. Nelson and Callicott, “Introduction: The Growth of Wilderness Seeds,” 3.

racists seeking to take over the Ethnological Society of London in order to justify colonial dominance over Indigenous peoples and gain support for their own “salvage ethnology”,¹¹⁶⁰ though historian Gareth Knapman has criticised Ellingson for misreading Crawford’s writings and ideology.¹¹⁶¹ Alternatively, such constructs of Indigenous savagery or nobility were used to internally criticise aspects of colonial American societies, especially as colonisation intensified and actual Native American culture receded from public view.¹¹⁶² In the nineteenth century, romantic writers such as Ralph Waldo Emerson praised this discursive construct of Native America for avoiding the excesses of civilisation and industrialised American society.¹¹⁶³ The idea of wilderness sometimes incorporated these ecologically noble Indians who lived without impacting the wilderness, in antithesis to modern industrial life. Anthropologist Paul Nadasdy has argued that conservationist Gifford Pinchot and preservationist John Muir used different conceptions of the ecological noble savage to argue for their environmental positions, a reminder of how constructs of Native Americans have been used in service of settler internal critiques.¹¹⁶⁴ For the purposes of this thesis, an examination of the Ecological Noble Savage or Ecological Indian stereotype as it manifested in popular culture and academia in the latter half of the twentieth century is important as it is one of the dominant frameworks through which non-Indigenous Americans have understood Native American burning.

The growth of the modern environmental movement breathed new life into the Ecological Indian stereotype in the United States, as has been identified by anthropologist Shepard Krech III in his 1999 book *The Ecological Indian: Myth and History*. Pointing to culturally persistent stereotypes such as the ‘Crying Indian’ featured in the Keep America Beautiful campaign of the early 1970s,¹¹⁶⁵ Krech argued that the Noble Savage trope was adopted and modified by the counterculture of the 1960s to become the Ecological Indian, reflecting the ethos of the burgeoning environmental movement. The construct of the Ecological Indian is “the Native North American as ecologist and conservationist” who “understands the systemic consequences of his actions, feels deep sympathy with all living forms, and take steps to conserve so that Earth’s harmonies are never imbalanced and resources never in

¹¹⁶⁰ Ter Ellingson, *The Myth of the Noble Savage* (University of California Press, 2001), 32.

¹¹⁶¹ Gareth Knapman, *Race and British Colonialism in South-East Asia, 1770–1870: John Crawford and the Politics of Equality* (New York: Routledge, 2017).

¹¹⁶² Deloria, *Playing Indian*.

¹¹⁶³ Gregory D. Smithers, “Beyond the ‘Ecological Indian’: Environmental Politics and Traditional Ecological Knowledge in Modern North America,” *Environmental History* 20, no. 1 (2015): 87.

¹¹⁶⁴ P. Nadasdy, “Transcending the Debate over the Ecologically Noble Indian: Indigenous Peoples and Environmentalism,” *Ethnohistory* 52, no. 2 (2005): 291–331.

¹¹⁶⁵ There is a persistent controversy over whether the actor, “Iron Eyes Cody”, was even of Native American ethnicity - a salient reminder that constructs of Native America can be created by settler societies to critique settler societies without any Indigenous involvement; see David Rich Lewis, “American Indian Environmental Relations,” in *A Companion to American Environmental History*, ed. Douglas Cazaux Sackman, Blackwell Companions to American History (Malden, MA: Wiley-Blackwell, 2010).

doubt”.¹¹⁶⁶ The Ecological Indian trope was pervasive during this period, and shaped how many Fire Revolutionaries conceived of Native Americans. For instance, as discussed above, Harold Weaver described the proverbial Native American as “natural man”,¹¹⁶⁷ while Harold Biswell approvingly quoted a 1977 Sierra Club Bulletin which described Native Americans as “our first ecologist”.¹¹⁶⁸

Importantly, Krech’s book was not just an attempt to trace the origins and persistence of the Ecological Indian image, but also an attempt to assess the stereotype and whether it “faithfully reflects Native North American cultures and behaviour through time”.¹¹⁶⁹ There is a vast amount of literature assessing or deconstructing the accuracy of this stereotype for Indigenous cultures,¹¹⁷⁰ but Krech’s attempt is particularly insightful for this thesis due to its impact and breadth. With chapters examining the extinction of megafauna in the Pleistocene, over-irrigation and salinity, overuse of wood, and overhunting of buffalo and other game, Krech’s book was extraordinarily ambitious in its attempt to evaluate the accuracy of a stereotype for a continent’s worth of cultures across several thousand years. Krech acknowledged the sophistication and diversity of Native American burning practices, but ultimately his chapter on fire failed through his overambitious scope. While he sought to describe burning in areas as diverse as the Great Plains, the longleaf pine forests of the South, and the chaparral of California, Krech himself acknowledged that “determining the ecological consequences of fire, and the precise Indian role, is a more daunting task than unearthing the widespread anecdotal evidence for burning”.¹¹⁷¹ As discussed, there is a vast amount of literature discussing or critiquing the Ecological Indian stereotype, but an examination of Krech’s book and the criticism it generated reveals it functions as a microcosm of these broader arguments.

As with the deconstructions of wilderness discussed above, *The Ecological Indian* was both popular and controversial to popular and academic audiences.¹¹⁷² Much of the criticism came from Native Americans. Standing Rock Sioux author Vine Deloria Junior used the relatively new academic website H-Net to call for mass protests against the book.¹¹⁷³ Penobscot anthropologist Darren J Ranco accused

¹¹⁶⁶ Krech III, *The Ecological Indian: Myth and History*, 16, 21.

¹¹⁶⁷ Weaver, “Man and Fire in Ponderosa Pine” [draft talk], FHS.

¹¹⁶⁸ Biswell, *Prescribed Burning in California Wildlands Vegetation Management*, 52.

¹¹⁶⁹ Krech III, *The Ecological Indian: Myth and History*, 16.

¹¹⁷⁰ See Michael Eugene Harkin and David Rich Lewis, eds., *Native Americans and the Environment: Perspectives on the Ecological Indian* (Lincoln: University of Nebraska Press, 2007); K.H. Redford, “The Ecologically Noble Savage,” *Cultural Survival Quarterly* 15 (1991): 46–48; Nadasdy, “Transcending the Debate over the Ecologically Noble Indian”; Raymond Hames, “The Ecologically Noble Savage Debate,” *Annual Review of Anthropology* 36, no. 1 (2007): 177–90.

¹¹⁷¹ Krech III, *The Ecological Indian: Myth and History*, 111.

¹¹⁷² There were more than ninety academic reviews in eight languages within the first three years of the book’s publication. Shepard Krech III, “Beyond the Ecological Indian,” in *Native Americans and the Environment: Perspectives on the Ecological Indian*, ed. Michael Eugene Harkin and David Rich Lewis (Lincoln: University of Nebraska Press, 2007), 5.

¹¹⁷³ Harkin and Lewis, “Introduction,” xxii.

Krech of failing to engage in an ethical research paradigm, in that Krech's book could assist scenarios whereby "if you stop acting like 'real Indians', your political authority (and land) might just disappear, even though the settler state has tried to assimilate you".¹¹⁷⁴ In other words, Ranco accused Krech of opening up Native groups to the cultural continuity discourse discussed in Chapter Four. This echoes a criticism Apache philosopher Viola F. Cordova made of environmental philosopher J Baird Callicott's writings. According to Cordova, understanding Native Americans through the Ecological Indian or Ecological Noble Savage stereotype risks an assumption that contemporary Native Americans are contaminated by colonisation, which ultimately has the effect of robbing contemporary Native Americans of their voices or agency.¹¹⁷⁵ Such assumptions have been used and the Ecological Noble Savage weaponised against Native Americans in environmental debates; during a debate over whaling, Paul Watson of extreme activist group Sea Shepherd drew upon the stereotype to contrast contemporary Makah (who wished to resume hunting whales using contemporary technology) against their "noble" predecessors.¹¹⁷⁶

Some of the criticism of the *Ecological Indian* related to Krech's chapter which attempted to measure whether pre-colonial Native American burning satisfied his framework of ecological or sustainable behaviour. In his scathingly sarcastic review, Deloria Jnr described the chapter on fire as having only fuzzy logic and poor evidence to support its confused arguments, revealing that "this book is not scholarship, it is plainly propaganda".¹¹⁷⁷ Deloria Jnr noted Krech's chapter on fire criticised Native Americans for allowing an occasional wildfire to rage on the Great Plains; as Deloria Jnr sarcastically noted, "Why didn't these people have bulldozers, tanker planes, and fire-fighting units ready in case they inadvertently started a fire that grew too large?"¹¹⁷⁸ Ultimately, the most pertinent of all these critiques is that Krech sought to judge Native American burning by nebulous standards set by colonisers that have rarely been met by any contemporary society. As Deloria caustically reflected, "the casual reader...will recoil in horror that these tribes did not think like Earth First [or] the Sierra

¹¹⁷⁴ Darren J. Ranco, "Critiquing The Ecological Indian in the Age of Ecocide," in *Native Americans and the Environment: Perspectives on the Ecological Indian*, ed. Michael Eugene Harkin and David Rich Lewis (Lincoln: University of Nebraska Press, 2007), 45.

¹¹⁷⁵ V.F. Cordova, "EcoIndian: A Response to J. Baird Callicott," *Ayaangwaamizin: The International Journal of Indigenous Philosophy* 1, no. 1 (1997): 31–44.

¹¹⁷⁶ Ellingson, *The Myth of the Noble Savage*, 359–72.

¹¹⁷⁷ Vine Deloria Jr., "The Speculations of Krech," *Worldviews* 4 (2000): 293; Sisseton-Wahpeton Oyate academic Kim TallBear has a more measured review of Krech, see Kimberly TallBear, "Shepard Krech's The Ecological Indian: One Indian's Perspective," International Institute for Indigenous Resource Management Publications, 2000.

¹¹⁷⁸ Deloria Jr., "The Speculations of Krech," 291; Nadasdy has echoed this by examining a range of environmental disputes to argue how "the image of ecological nobility is an unattainable ideal" and this allows non-Indigenous peoples to judge Indigenous peoples; see Nadasdy, "Transcending the Debate over the Ecologically Noble Indian," 293.

Club”.¹¹⁷⁹ Perhaps Sylvia Hallam might help us here; the Ecological Noble Savage/Ecological Indian was not as Native Americans made it; it was as settler-colonialism made it.

As with the academic deconstructions of wilderness discussed above, one line of critique about *The Ecological Indian* was that it was used in bad faith by culture warriors and extractionist groups to undermine Native or environmentalist goals. However, the evidence for this is modest, and that which does exist points largely to Native American environmental modifications that are not related to fire. In a similar fashion to the critiques of wilderness deconstruction discussed above, there is certainly evidence the book penetrated popular consciousness and was discussed on talkback radio and conservative booklists.¹¹⁸⁰ However, such discussion tended to relate more to the chapters on overhunting and megafauna extinction, rather than the chapter on fire, perhaps reflecting American environmental politics at the time being more contested about hunting and treaty rights. In this sense it is instructive to compare *The Ecological Indian* to the booklet sponsored by the NSW Farmers Federation in 1995, which used European explorer depictions of Indigenous fire to argue for looser restrictions on land clearing (see Chapter Six for a discussion of this).¹¹⁸¹ The shape of the controversy over *The Ecological Indian* helps reveal that in the post-War period, Native American burning has simply not attained the level of prominence that Aboriginal burning has in Australia.

Why isn't Native American burning more publicly prominent?

While there is little doubt that Native American burning has been actively discussed among fire management and academic communities in the United States, I contend it doesn't hold popular relevance to the same extent as Indigenous Australian burning. In 2013, Prime Minister Tony Abbott was entirely capable of rhetorically drawing upon Indigenous burning in the context of debates around climate change and energy policy.¹¹⁸² Abbott could only make this argument because he had the reasonable expectation that his intended audience (the Australian public) would relate to and understand his point. As a rule, successful politicians don't overestimate the intelligence of their audience. It is impossible to imagine a recent American President attempting to address a national audience by referring to Native American burning – the general American public simply does not hold

¹¹⁷⁹ Deloria Jr., “The Speculations of Krech,” 284.

¹¹⁸⁰ Krech III, “Beyond the Ecological Indian.”

¹¹⁸¹ Ryan, Ryan, and Starr, “The Australian Landscape-Observations of Explorers and Early Settlers”; Benson and Redpath, “The Nature of Pre-European Native Vegetation in South-Eastern Australia”; Griffiths, “How Many Trees Make a Forest?”

¹¹⁸² Judith Ireland, “UN Official ‘talking through Her Hat’ on Bushfires and Climate Change, Says Tony Abbott,” *The Sydney Morning Herald*, 23 October, 2013.

the same level of understanding. The light burning debate discussed in Chapter Two was regionally concentrated. The dominant discourse of the 1988 Yellowstone Fires discussed earlier in this chapter was around ecological renewal and federal agency firefighting decisions. Most public debate that has followed recent wildfires in the United States has focused on the wildland-urban interface, the politics of climate change, or the responsibility of utility companies. Fire is associated with Aboriginal Australians far more than it is with Native Americans; if Krech had chosen instead to write *The Ecological Aboriginal*, fire would take up far more than a single almost cursory chapter.

There are several potential explanations for this differing level of popular currency, but perhaps the most convincing is the differing politics of race in each country. The diversity and complexity of racial politics in the United States (both historical and contemporary) may simply focus social and political attention away from Native America. The dominant racialized discourse in American politics relates to African American or Latin American issues; the dominant racialized discourse in Australian politics relates to Indigenous Australians.

Another explanation is that non-Indigenous Americans have tended to understand Native American environmental practices as comprising a diverse array of non-burning practices. For non-Indigenous Americans, Native American modification of the environment might be more popularly understood to involve practices such as the Three Sisters style of agriculture in New England, the hunting of buffalo on the Great Plains, or the irrigation agriculture of the South West, rather than involving the deliberate use of fire to shape and manage environments.¹¹⁸³ An explanation for the prominence of understandings of Indigenous Australian burning is the deliberate choice by Rhys Jones to position it as akin to sedentary agriculture during a political era of increasing debate over Aboriginal land rights and the legitimacy of colonisation (after all, as discussed in the Introduction, “firestick farming” was a carefully chosen phrase). For activists and academics seeking to provide evidence of Indigenous environmental management and agency, there is less perceived need to describe Native American culture as practising environmental management akin to sedentary agriculture as there are many different examples of conventional agriculture being practised prior to European contact (even if this was debatably not the case in California).¹¹⁸⁴ There is simply less to ‘prove’ to a sceptical audience. Furthermore, as will be discussed in Chapters Seven & Eight, there have been numerous Indigenous Australian writers who have asserted a sense of collective or even national identity using burning (such as Marcia Langton and Bruce Pascoe), and these assertions have achieved high degrees of circulation.

¹¹⁸³ Lewis, “American Indian Environmental Relations.”

¹¹⁸⁴ Apart from debates discussed in Chapter Two, see Lightfoot and Parrish for a discussion on “agriculture” in pre-contact California; Lightfoot and Parrish, *California Indians and Their Environment: An Introduction*.

There are no Native American writers who have made such claims with equivalent reach in the United States.¹¹⁸⁵

Closely related to the argument of ‘proof’ of environmental modification (inextricably entangled with Lockean conceptions of property rights) is the issues of treaties and land rights. The Mabo decision and an Australian legal focus upon continued occupancy or connection to country as a means to gain land rights means that fire management, as a visible manifestation of connection to country, will receive more attention, whether from academics, courts, or from the general populace. In the United States, it is possible that the fixed nature of treaties between Native American groups and the Federal Government (where such treaties were ratified) shifts the discourse elsewhere. This may be reinforced by the differing land tenure contexts of each country; the United States has a much higher proportion of forests held under private ownership.¹¹⁸⁶

In Chapter Seven, I will explore debates surrounding the Pleistocene Megafauna extinction debates in more detail, but suffice to say that in the United States the major proponents for Indigenous involvement do not mention burning practices, while in Australia at least one major proponent does (Tim Flannery). In Australia there are very few archaeological sites that show evidence of human-megafauna interaction, while in the United States there are many more.¹¹⁸⁷ There is simply more meat for debaters to sink their fangs into. Perhaps because of this stronger direct link to hunting, megafaunal extinction or near-extinction ties straight into contemporary American debate around hunting or fishing rights.¹¹⁸⁸

Another explanation lies in the differing fire ecologies and social attitudes towards fire in each nation. Fire is ubiquitous in Australia. The dominance of eucalypts, the most successful pyrophiles on the planet, guarantees that fire is felt across the Australian continent. There are American species that need fire and are publicly known for it, but not a single genus – the United States has nothing as unifying as the eucalypt. Every major city in Australia has either lost homes directly to a bushfire or has been polluted by bushfire smoke. The ‘Bush Capital’ Canberra lost hundreds of homes in 2003. While many may associate the White House with fire thanks to Hollywood’s obsession with blowing up landmarks, the only fire that has threatened Washington was caused by British-Canadian forces in

¹¹⁸⁵ I am grateful to Tim Rowse for prompting this question.

¹¹⁸⁶ Department of Agriculture, “Australia’s Forests,” 4 November, 2019, <https://www.agriculture.gov.au/forestry/australias-forests>; Northern Research Station, “Who Owns America’s Forests? Forest Ownership Patterns and Family Forest Highlights from the National Woodland Owner Survey,” NRS-INF-06-08 (US Department of Agriculture, Forest Service, 2008).

¹¹⁸⁷ Giles Hamm et al., “Cultural Innovation and Megafauna Interaction in the Early Settlement of Arid Australia,” *Nature* 539, no. 7628 (2016): 280–83; Krech III, *The Ecological Indian: Myth and History*, 36.

¹¹⁸⁸ I am grateful to Phil Deloria for this insight.

the War of 1812. The United States has no real equivalent of Australia's tradition of bushfire Royal Commissions, which determine issues of responsibility and function to centralise, focus, and inspire fire discourse. Fire forms part of Australian national character – even if this could be more reflective of local fire regimes as argued in Chapter Six. Fire in America at best forms part of regional character.

Another major contrast is that for an increasing proportion of Australians, Indigenous burning has been encountered as something contemporary. Many Australians still conceive of pre-contact Indigenous society as simple hunter-gatherers, but the image of Indigenous environmental practice as having no impact upon environments is difficult to reconcile with a holiday in Kakadu where smoke from Indigenous burning lazily floats in the humid air. Kakadu's importance as a site of encounter with active Indigenous burning should not be underestimated, even if in Chapter Four we saw that the actual practice of burning is more ambiguous than promotional material might suggest. Furthermore, there is increasing media and public interest in restorative 'cultural burns', as will be demonstrated in Chapter Eight. While significant areas of North America are savannahs and theoretically could be fire managed for emissions trading, there are no projects attempting to link Native American burning of the Great Plains or elsewhere into the carbon economy as there are in Australia (discussed in Chapter Eight).

Finally, the dominant American fire discourse since the 1988 Yellowstone Fires has related to fires in the "Wildland-Urban Interface" (WUI), creating a focus on suppression rather than management (which would invite more references to, or engagement with Native American burning).¹¹⁸⁹ Defined roughly in opposition to true "wildland" or rural areas, the WUI represents perhaps 39% of homes in the United States, and is responsible for at least 50% and up to 95% of wildfire suppression costs as agencies such as the Forest Service are obligated to try to prevent fires affecting private property in the WUI from their adjacent lands.¹¹⁹⁰ Perhaps of most concern, the WUI is growing rapidly, with a 40% increase in WUI homes predicted between 2001 and 2030 alone.¹¹⁹¹ This is at least in part due to a perverse incentive from federal and state administrations due to a political expectation of guaranteed firefighting, low-interest loans, or even full payments for the rebuilding of fire-affected suburbs.¹¹⁹²

¹¹⁸⁹ Pyne, *Between Two Fires: A Fire History of Contemporary America*, 241.

¹¹⁹⁰ Roger B. Hammer et al., "Wildland-Urban Interface Housing Growth during the 1990s in California, Oregon, and Washington," *International Journal of Wildland Fire* 16, no. 3 (2007): 255–65; Jack Cohen, "The Wildland-Urban Interface Problem," *Forest History Today*, 2008.

¹¹⁹¹ Autumn Ellison, Cassandra Moseley, and R. Patrick Bixler, "Drivers of Wildfire Suppression Costs: Literature Review and Annotated Bibliography," Ecosystem workforce program working paper no. 53 (Oregon: Oregon State University, 2015).

¹¹⁹² Mike Davis made this point stunningly clear in Davis, *Ecology of Fear: Los Angeles and the Imagination of Disaster*.

The shift away from fire management to the WUI has become self-reinforcing in both budgetary and discursive terms, further limiting opportunities for Native American fire management to gain prominence. In 1995, the Forest Service allocated 16% of its annual budget to fire suppression; in 2015 it allocated 52%, and by 2025 it anticipates this will increase to at least 67%.¹¹⁹³ Expenditure on suppression can be crudely generalised to represent a classic feedback loop; assuming a relatively static budget (a reasonable assumption given current political attitudes towards the funding of federal agencies) the more expenditure there is on suppression, the less there is available for preparation – which in turn leads to more being spent on suppression in following years.¹¹⁹⁴ Furthermore, much of this expenditure may be driven by unnecessary “political smokes”; “visible smoke from burning material that don’t threaten control...but may cause political or social concern”.¹¹⁹⁵ Combined with the expectation of defending the WUI, and the complex liability issues that increase the cost of insuring prescribed burning, it is little wonder that many criticise the development of a “fire-industrial complex” of spiralling costs, growing bureaucracy, and an incentive to further the growth of the industry rather than resolving the issue that created the industry.¹¹⁹⁶

Nevertheless, there may be some cause for optimism in that the WUI has made pyro-politics personal, and this may represent a potential political opportunity for agencies attempting to push through mitigation efforts or tribes pushing for cultural burning (see Chapter Eight). There is some evidence that the general American public hold more sophisticated views of fire which allow for prescribed and natural fires.¹¹⁹⁷ Homeowners may become a constituency with an incentive to advocate for careful, effective policies. It’s one thing to watch a television anchor decry the mismanagement that allegedly caused the 1988 Yellowstone Fires; it is quite another when the fires are at your front window.

¹¹⁹³ USDA Forest Service, “The Rising Cost of Wildfire Operations,” 2015,

<https://www.fs.usda.gov/sites/default/files/2015-Rising-Cost-Wildfire-Operations.pdf>.

¹¹⁹⁴ This is an extremely crude generalisation. See Geoffrey H Donovan and Thomas C Brown, “Estimating the Avoided Fuel-Treatment Costs of Wildfire,” *Western Journal of Applied Forestry* 23, no. 4 (2008): 197–201; David E. Calkin et al., “Forest Service Large Fire Area Burned and Suppression Expenditure Trends, 1970-2002,” *Journal of Forestry* 103, no. 4 (2005): 179–83.

¹¹⁹⁵ Hannah, “The Smokey Generation,” 56; see also Timothy Ingalsbee and Urooj Raja, “The Rising Costs of Wildfire Suppression and the Case for Ecological Fire Use,” in *The Ecological Importance of Mixed-Severity Fires: Nature’s Phoenix*, ed. Dominic A. DellaSala and Chad T. Hanson (Elsevier, 2015), 348–71.

¹¹⁹⁶ Timothy Ingalsbee and George Wuerthner, “The War on Wildfire: Firefighting and the Militarisation of Forest Fire Management,” in *Wildfire: A Century of Failed Forest Policy* (Sausalito, California: Foundation for Deep Ecology, by arrangement with Island Press, 2006), 223.

¹¹⁹⁷ Fairbank, Maslin, Maullin and Associates (FMMA) et al., “Key Public Opinion Research Findings on the Ecological Role of Fire and the Benefits of Fire Management” (Partners in Fire Education, 30 April, 2008).

Conclusions: Future Challenges for American Fire Management

In 2017 I was chatting with Professor Don Hankins, preparing for a research trip to the US. We were discussing the Napa/Tubbs Fire, which seemed to be a new contender for the ‘worst ever’ fire in California. A year later we were proven wrong. In March of 2018 I began a Visiting Fellowship at California State University (Chico), a small city in the foothills of the Sierra Nevada range in California. For several months, I grew familiar with the community as I was hosted by Don and he inducted me into the guild of prescribed burners. Yet just months after I left, Chico’s outlying town Paradise, became a victim of the latest contender for California’s most devastating fire. The 2018 Camp Fire killed 86 people and destroyed nearly 14,000 houses; effectively obliterating an entire town.¹¹⁹⁸ It was shocking in its ferocity. The Camp Fire was in some ways what researchers would expect from the scenarios confronting California under anthropogenic climate change. A long drought over summer and an extended autumn drought meant a protracted ‘shoulder’ for California to sizzle without rain. This is the exact scenario researchers predicted over a decade ago.¹¹⁹⁹ I began researching this component of my thesis with a list of the ‘most devastating fires in Californian history to examine’. Yet it seems to be a function of writing environmental history in the Anthropocene that we must constantly update our superlatives. ‘Biggest’ or ‘worst’ are superseded, and slowly, we become ever more numb to calamity.

In the aftermath of the Camp Fire, with embers still warm and a death toll quickly mounting, President Trump decided to intervene, blaming the state of California and suggesting that broadscale raking the forests would have averted the damage by reducing fuel accumulated over the last century.¹²⁰⁰ Trump’s unhelpful contribution serves as a suitable backend to the 1910 Big Burn discussed in Chapter Two (his complaints were ludicrous, as the fire didn’t even happen on Californian state land, and broadscale raking for fuel reduction is uncoded, untried, and unworthy of public discussion). Once again, a nakedly partisan political fight distracted from genuine debate, reminiscent of Bollinger and Pinchot’s political clash over the light burning dispute following the 1910 Big Burn.

¹¹⁹⁸ Calfire, “Camp Fire Incident Information,” 4 January, 2019, http://cdfdata.fire.ca.gov/incidents/incidents_details_info?incident_id=2277.

¹¹⁹⁹ A. L. Westerling et al., “Warming and Earlier Spring Increase Western U.S. Forest Wildfire Activity,” *Science* 313, no. 5789 (2006): 940–43; see also Calkin et al., “Forest Service Large Fire Area Burned and Suppression Expenditure Trends, 1970-2002.”

¹²⁰⁰ Liam Butterworth, “Donald Trump Wants California to Rake Forests to Prevent Fires. Here’s the Backstory,” *ABC News*, 20 November, 2018, <https://www.abc.net.au/news/2018-11-19/why-donald-trump-says-raking-forests-would-stop-california-fires/10509984>; Donald Trump (@realDonaldTrump), *Twitter*, 10 November, 2018, <https://twitter.com/realDonaldTrump/status/1061168803218948096>.

The triumph of the fire suppressionists in the light burning dispute had profound ecological consequences for the American West. The Fire Revolution, led by fire ecologists from the South and from California, helped overthrow the fire suppression paradigm, but this triumph was characterised by an emphasis on natural rather than cultural fire. The lack of consideration of Native American burning can be partly explained through the influence of settler-colonial frameworks such as wilderness and the Ecological Indian. The 1988 Yellowstone Fires were a huge wildfire that inspired public debate among Americans over fire management. The contentious tone of this debate, influenced by the emergence of the Wise Use movement, shaped later fire management politics, as environmentalists grew suspicious of active fire management (including both prescribed and Native American burning). Academic trends in the 1990s contributed to philosophical polarisation; it was deconstruction and ideology at ten paces. Yet Yellowstone represents both a turning point and the end of an era. The emergence of the Wildland Urban Interface has crowded out public and political attention towards wildland fire, meaning there is precious little space for any engagement with Native American burning. Combined with the other structural factors I propose above, this has resulted in far less prominence for Native American burning among non-Indigenous Americans than for Aboriginal Australian burning among Australians. In Chapter Six I explore the reaction to the 2009 Black Saturday bushfires in Australia to demonstrate how Australian fire discourse has evolved a rich spectrum of responses to Indigenous burning, while Chapters Seven & Eight elaborate upon further factors driving this increasing prominence.

The Camp Fire never reached the ridge that Don Hankins and I burned in March 2018 – but it came close. If the wind had changed, perhaps that burn may have made a difference. Perhaps not. But these were calm flames, lit by a Native American professor of geography, describing his Miwko? cosmology and Western fire ecology, while engaging in stewardship over the land and thus repudiating the idea of wilderness, all while lighting fires with a gasoline/diesel driptorch. A complete appropriation of Native American burning practices isn't the singular answer to the many fire problems the United States faces, but as Chapter Eight will show, a greater conceptual and practical acknowledgement of Indigenous burning offers promise for fire management issues. The image of Don's flames offers a more promising future for the United States than a stubborn refusal to let wilderness go, or a paradigm where Native Americans are Ecological Noble Savages locked into pre-Columbian technologies, or a future of exponentially increasing suppression costs.

Chapter Six:

Black Saturday: Deepening Entanglement of Indigenous and Prescribed Burning

The green movement is directly responsible for the severity of these fires through their opposition to prescribed burning...the fuel levels were the highest in Victoria for 30,000 years – retired fire scientist David Packham¹²⁰¹

David Packham's comments were reported in *The Australian* in the week following the devastating Black Saturday bushfires in Victoria. These fires were in many ways a repeat of Black Friday,¹²⁰² but the debate after this latest Big Fire revealed significant developments in and expansion of the discourses of Indigenous burning, especially through their inextricable entanglement with prescribed burning. Packham's incendiary comments were among many that appropriated conceptualisations of Indigenous burning to support arguments about prescribed burning. However, as shall be shown, such entanglement between Indigenous burning and prescribed burning applied to a diverse array of views towards prescribed burning, including those vehemently opposed to the latter practice. Victorians in 1939 had some understanding of Indigenous burning, but Judge Stretton was still able to laugh at the idea of learning from it (see Chapter One). In Chapter Three I demonstrated how West Australians and fire researchers in 1961 were beginning to seriously grapple with Indigenous burning. In Chapter Four I portrayed Kakadu as a major site for non-Indigenous Australians to encounter Indigenous burning. There were other devastating fires in the post-millennium decade that attracted fierce public debate in which Indigenous burning was discussed, but none of those fires had the impact or proved as contentious as Black Saturday.¹²⁰³ Indeed, the remarkable thing about the post-Black Saturday debate was the diverse ways in which Indigenous burning was understood, and how it was conceptually deployed to support or dismiss positions around policy on prescribed burning. It was after Black Saturday that environmentalists took fire for supposedly opposing and even preventing prescribed burning, and it was after Black Saturday that the appropriation of nebulous concepts of Indigenous fire to support this political barrage reached its fullest extent. In these exchanges Indigenous burning was often inextricable from prescribed burning.

¹²⁰¹ Stephen Lunn, "Greenies Blamed for Fires' Scale," *The Australian*, 12 February, 2009.

¹²⁰² Griffiths, "We Have Still Not Lived Long Enough."

¹²⁰³ Substantial parts of this chapter – especially "A Spectrum of Views" – appear in May, "Shallow Fire Literacy Hinders Robust Fire Policy: Black Saturday and Prescribed Burning Debates."

I open this chapter by placing Black Saturday in context, before arguing for the need for a conceptual spectrum to best characterise views expressed towards the adequacy of prescribed burning. These views ranged from hyperbolic castigations of blame, to more reasoned advocacy for the practice, to more moderate positions occupied by people who did not oppose the practice in theory but who were concerned about excessive or inappropriate use of it, to those who resolutely opposed any use of it. Conceptualising responses through this spectrum reveals that while debates over contemporary prescribed burning may well prove intractable, they are greatly hindered by poor fire literacy and imprecise language, particularly among those on the far ends of the spectrum. Of course, many of the more passionate voices interpreted prescribed burning through the lens of the culture wars, highly polarised struggles within Australian society over social values, rather than on its own merits. I then demonstrate how prescribed burning and Indigenous burning were inextricably linked in this debate. Building upon Chapters One and Three, I propose a typology of how non-Indigenous Australians understood Indigenous burning and characterise this typology – more sophisticated than in 1939 or 1961 – as indicative of a fire discourse that is still maturing and does not reflect a continental vision of Australian fire. Previous chapters demonstrated the environmental and cultural continuity discourses (which in the context of Black Saturday can be combined as ‘dismissal’) and the political appropriation of Indigenous burning (such as Secretary Ballinger in Chapter Two or graziers in Chapter Three). The prevalence of appropriations of Indigenous burning after Black Saturday such as that by David Packham points both to the assumed familiarity of non-Indigenous Australians with Indigenous burning, and to the expectation that such appropriation would have political currency – a major shift in Australian culture. The aftermath of Black Saturday also demonstrated the full emergence of the consideration and caution/uncertainty discourses, indicating how non-Indigenous attitudes towards Indigenous burning had broadened. I then explore the policy aftermath of Black Saturday, particularly the short life of the policy recommendation of a 5% annual area target for prescribed burning. Poor fire literacy and appropriations of Indigenous burning do not solely explain this ecologically inappropriate policy, but they did help justify and legitimate it. I close this chapter by discussing two structural factors which continue to unsettle and challenge Victoria’s fire politics – demographic expansion and climate change.

The Black Saturday fires themselves generated a great deal of public discussion, and the subsequent Royal Commission attracted further engagement through hearings and submissions. Furthermore, the public nature of the Royal Commission (which live-streamed proceedings, visited several venues, and made documents available online) stimulated its own public comment. Indeed, a significant number of people gave supplementary submissions, especially following the reporting of the Commission in the media. In this chapter I examine both public and academic discourses. I examine newspaper

articles, letters to editors, Commission hearings, Commission submissions, Commission reports, popular books, and more – all responses inspired by Black Saturday. While these varied forms of media had different formats, conventions, and intended audiences, I have identified clear shared discourses across them and therefore examine them together.

Unlike Black Friday or the Dwellingup fires, the ease of digital communication and spread of affordable and sufficiently fast broadband in 2009 meant that the public sphere of debate also included the Internet. In the interests of practicality, I have largely limited this chapter’s analysis to more traditional printed sources (as opposed to including online forums or social media). While I acknowledge this represents a potential weakness in my analysis, I do not believe that the online sphere in 2009 was large enough to either represent or shape the views of the public.¹²⁰⁴ Furthermore, the immense amount of printed material available - over 20,000 pages of Commission transcript, roughly 1700 submissions, and a significant sample of media articles – represents a sufficiently large archive to reflect themes driving public debate. Nevertheless, any measures of public debate around comparable disasters (such as the 2019/20 bushfires in Australia) will need to take the online sphere into account.

In this chapter the phrase ‘Indigenous burning’ refers almost entirely to Indigenous burning practices in the pre-contact or early contact periods. This is a tactical choice to aid reading comprehension and is not an ideological reflection. Chapter Eight will demonstrate how Indigenous burning in Victoria as practised by Indigenous Victorians has enjoyed a minor resurgence in recent years, especially through the cultural burning movement, but this did not play a significant role in the discourse after Black Saturday. Furthermore, in Chapter Eight I will argue that the post-2009 growth in sophistication of understandings of Indigenous burning – and especially the spread of Indigenous burning as a living practice – will complicate the entanglement of Indigenous burning with prescribed burning that was a salient feature of the cultural response to Black Saturday.

Before Black Saturday

As discussed in Chapter One, parts of Victoria form what Stephen Pyne calls the “fire flume”,¹²⁰⁵ and in the years between 1939 and 2009 there were several large bushfires. These included the 1944 bushfires, the 1962 bushfires, the 1983 Ash Wednesday fires, the 2002-3 Alpine fires (which also devastated Canberra), and the 2006-7 ‘Great Divide’ fires. The latter two were relatively recent in the

¹²⁰⁴ For instance, Australians did not create new accounts on twitter in large numbers until mid-2009 according to Axel Bruns, “Australian Twitter Is More Diverse than You Think,” *The Conversation*, 3 May, 2017.

¹²⁰⁵ Pyne, *Burning Bush*.

minds of Victorians during and after Black Saturday, and had inspired a number of official inquiries which invited and attracted public comment, in turn raising the prevailing political temperature around land management.¹²⁰⁶ Similarly, the growth of the modern environmental movement since the 1960s had triggered persistent political disputes across Australia over the impact of logging on native forests – often referred to, collectively, as the “Forest Wars”.¹²⁰⁷ Long-standing tensions over the transfer of jurisdiction of lands from forestry to conservation bodies, general cultural resentment over policies perceived as overly influenced by environmentalists, and a blistering and concerted attack from some politicians ensured that the fires of the 2000s were increasingly politicised and partisan, a trend that would culminate in the explosive debates following Black Saturday. Environmentalism was especially attacked: activist groups had supposedly opposed prescribed burning or prevented it through direct action; they had infiltrated government agencies to ensure such burning would not be carried out; or politicians were seen to have been pressured to transfer lands to less environmentally-sympathetic agencies.¹²⁰⁸ Black Saturday was not the first post-millennium bushfire to be politicised, nor the first where Indigenous burning was discussed and disputed at length. However, both its impact upon Australian fire discourse and the volume of debate it generated far outweighed the 2002-3 or 2006-7 fires.

Much of this growing politicisation of land management was accompanied by expanding academic debates and growing public consciousness around Indigenous burning. In a general sense, Australia experienced a “time revolution” in the latter half of the twentieth century as archaeological investigations extended estimates of Indigenous occupation of Australia far earlier than previously thought.¹²⁰⁹ Indigenous Australian presence had been shown to easily predate the Pyramids and to stretch well into Australia’s dusty Pleistocene, a realisation which challenged and transformed non-Indigenous perceptions of Indigenous Australia. As discussed in previous chapters, the pioneering work of Sylvia Hallam, Rhys Jones, Duncan Merrilees, and Chris Haynes began to penetrate Australian popular consciousness, especially from the 1980s. Similarly, the argument from farmer-historian Eric Rolls in *A Million Wild Acres* that forests in some parts of Australia may have expanded and thickened

¹²⁰⁶ See, for example State Government of Victoria, *Report of the Inquiry into the 2002-2003 Victorian Bushfires* (Melbourne: State Government of Victoria, 2003); House of Representatives, “A Nation Charred: Report on the Inquiry into Bushfires”; Victoria et al., *Report of the Natural Resources Committee on the Inquiry into the Impact of Public Land Management Practices on Bushfires in Victoria*, Parliamentary Paper No. 116 Season 2006-2008 (Melbourne: Government Printer, 2008); P. J. Kanowski, R. J. Whelan, and S. Ellis, “Inquiries Following the 2002–2003 Australian Bushfires: Common Themes and Future Directions for Australian Bushfire Mitigation and Management,” *Australian Forestry* 68, no. 2 (2005): 76–86.

¹²⁰⁷ Ajani, *The Forest Wars*; Dargavel, “Views and Perspectives: Why Does Australia Have ‘Forest Wars’?”

¹²⁰⁸ I have previously written on the political aspects of the 2002-3 fires in May, “‘Fanning the Flames of Debate’: The Relationship between Concepts of Aboriginal Fire Regimes and Post-Bushfire Discussion in Australia”; See also Whittaker and Mercer, “The Politics of Blame”; and Pyne, *The Still-Burning Bush*.

¹²⁰⁹ Griffiths, *Deep Time Dreaming: Uncovering Ancient Australia*, 5.

since colonisation attracted much attention,¹²¹⁰ Stephen Pyne's *Burning Bush* had introduced many readers to debates around Australian fire,¹²¹¹ while Tim Flannery, David Horton and others debated Indigenous burning, megafaunal extinction, and the implications for contemporary conservation.¹²¹² The work of Rolls and Flannery in particular attracted popular debate following the 1995 publication of a NSW Farmers' Association pamphlet which drew upon notions of regrowth and the impact of Indigenous burning to argue against contemporary regulations on vegetation clearing.¹²¹³ The pamphlet was an "insubstantial piece of scholarship...selective and indiscriminating in its use of historical evidence",¹²¹⁴ and attracted a furious response from conservation scientists.¹²¹⁵ Nevertheless, it solidified the link between pre-contact Indigenous burning and contemporary land management politics that had originally been forged as early as Rhys Jones's "fire-stick farming" paper.¹²¹⁶ As these perspectives on Indigenous burning began to percolate through Australian popular consciousness, the issues were drawn upon liberally in commentary, including following the 2002-3 Alpine fires, and especially by those calling for increased and renewed prescribed burning.¹²¹⁷

In 1939 Judge Leonard Stretton had criticised the Forests Commission for its "ridiculously inadequate" use of prescribed burning.¹²¹⁸ It is important to note, however, that Stretton was referring to "strip and patch burning", and that he qualified his observation by stating "it is not suggested that the practice be followed in mountain ash [*Eucalyptus regnans*] country, except to a small extent, where necessity demands that it should be done" – a qualification we will return to later in this chapter.¹²¹⁹ As shown in Chapter Three, Stretton's official endorsement inspired the Australian Strategy of widespread prescribed burning, which was followed in Victoria. While statistics for the first few decades of the Australian Strategy are rather nebulous, it is generally agreed upon that levels of prescribed burning in Victoria peaked before the 1990s, so that at the end of 2001-2 the average area burnt of the 5,000,000 hectares of treatable public land administered was just 66,390 hectares.¹²²⁰

¹²¹⁰ Eric Rolls, *A Million Wild Acres: 200 Years of Man and an Australian Forest* (Melbourne: Nelson, 1981).

¹²¹¹ Pyne, *Burning Bush*.

¹²¹² Flannery, *The Future Eaters*; David Horton, *The Pure State of Nature* (Sydney: Allen & Unwin, 2000).

¹²¹³ Ryan, Ryan, and Starr, "The Australian Landscape-Observations of Explorers and Early Settlers."

¹²¹⁴ Griffiths, "How Many Trees Make a Forest?," 383.

¹²¹⁵ Benson and Redpath, "The Nature of Pre-European Native Vegetation in South-Eastern Australia."

¹²¹⁶ Jones, "Fire-Stick Farming."

¹²¹⁷ May, "'Fanning the Flames of Debate': The Relationship between Concepts of Aboriginal Fire Regimes and Post-Bushfire Discussion in Australia."

¹²¹⁸ Stretton, *Report of the Royal Commission into ... 1939*, 16.

¹²¹⁹ Stretton, *Report of the Royal Commission into ... 1939*, 16, 31.

¹²²⁰ Bernard Teague, Ronald McLeod and Susan Pascoe, *2009 Victorian Bushfires Royal Commission, Final Report, Volume II: Fire Preparation, Response and Recovery*, (Melbourne: Government Printer for the State of Victoria, 2010), 288–93.

Critics argued this decline in prescribed burning was a primary cause for the 2002-3 and 2006-7 fires, foreshadowing the major critiques following Black Saturday.

Black Saturday

As with Black Friday, Black Saturday was preceded by a long drought and severe heatwaves, drying forests and woodlands. The Victorian Premier John Brumby described the state as “tinder dry”, and temperatures on Saturday 7 February 2009 broke many records, including in Melbourne which reached 46.4°C.¹²²¹ The interaction of high and low-pressure atmospheric systems described by Stephen Pyne as the “fire flume” raged again,¹²²² first bringing hot air from Central Australia into Victoria, with winds of up to 91 kmh⁻¹ driving a number of fires through the morning and early afternoon.¹²²³ Short-range spot fires drove the fires onward, with some firebrands starting spot fires as far as 40 km from their source.¹²²⁴ Then the wind changed.

It is a simple sentence. Seemingly innocuous in isolation, the phrase ‘wind change’ is key to understanding Black Saturday. It was devastating, particularly to what was named the Kilmore East fire.¹²²⁵ The wind, previously driving this fire in a south-easterly direction, wrenched it to the north-east, converting its broad eastern flank into a vast front and hurling firebrands ahead of it.¹²²⁶ In the wake of Black Saturday it was common to hear the fires described as “unprecedented”; while not a focus of this thesis, this assessment inadequately analyses the fires as this wind change was reminiscent of 1983’s Ash Wednesday fires.¹²²⁷ Perhaps it was the scale of devastation after Black Saturday that was unprecedented. 173 people were killed. Approximately \$4 billion of economic damage was caused through the destruction of houses, infrastructure and other property.¹²²⁸ Coming hot on the heels of high-intensity fires in 2002/3 and 2006/7, these fires devastated mountain ash

¹²²¹ Bernard Teague, Ronald McLeod and Susan Pascoe, *2009 Victorian Bushfires Royal Commission, Final Report: Summary*, (Melbourne: Government Printer for the State of Victoria, 2010), 1.

¹²²² Pyne, *Burning Bush*.

¹²²³ M.G. Cruz et al., “Anatomy of a Catastrophic Wildfire: The Black Saturday Kilmore East Fire in Victoria, Australia,” *Forest Ecology and Management* 284 (2012): 275; There were 316 separate fires attended on Black Saturday alone. See Teague et al., *2009 VBRC, Summary*, 1.

¹²²⁴ Cruz et al., “Anatomy of a Catastrophic Wildfire,” 276.

¹²²⁵ For a forensic reconstruction of part of this particular fire, see Peter Stanley, *Black Saturday at Steels Creek* (Scribe, 2013).

¹²²⁶ Cruz et al., “Anatomy of a Catastrophic Wildfire,” 277.

¹²²⁷ A good deconstruction of the harmful consequences of conceptualising Black Saturday as “unprecedented” can be found in Christine Hansen, “Deep Time and Disaster,” *Environmental Humanities* 10, no. 1 (2018): 226–40; Cruz et al., “Anatomy of a Catastrophic Wildfire.”

¹²²⁸ Victoria. Bushfires Royal Commission et al., “Final Report, Summary,” 1.

forest regrowth – potentially causing irreversible ecological transformations and threatening the extinction of this iconic ecological community.¹²²⁹

The immediate aftermath of Black Saturday saw intense media attention, which included fierce debate over a perceived inadequacy in prescribed burning and who, if anyone, was to blame for the destruction. The tone of much commentary was vituperative. In the following week conservative commentator Miranda Devine argued in the *Sydney Morning Herald* that “it is not arsonists who should be hanging from lamp-posts but greenies”: environmentalists had supposedly prevented prescribed burning and fuel reduction through land clearing from being conducted both by direct action and through the supposed infiltration of environmentalist ideology into government agencies.¹²³⁰ Fire scientist David Packham argued that “the green movement is directly responsible for the severity of these fires through their opposition to prescribed burning...elements of the movement are behaving like eco-terrorists waging jihad against prescribed burning and fuel management”.¹²³¹ Environmentalists disputed this narrative of causation; Greens senator Bob Brown responded that his party “supports the ecologically appropriate use of fire”. The Wilderness Society added that it was “inappropriate, opportunistic and grossly insensitive” for anyone “from the anti-parks, pro-logging lobby to push their agenda” while the fires continued.¹²³² Environmental philosopher Freya Mathews foreshadowed a significant environmentalist concern that would be revealed through the following months when she argued that comparisons to Ash Wednesday or Black Friday were invalid and that Black Saturday was “the face of climate change”.¹²³³ Other factors debated included the controversial “stay or go” policy and the performance of agencies and individual authorities on Black Saturday itself.¹²³⁴

The media interest in the immediate aftermath of Black Saturday was intense and fanned debate over prescribed burning. Police were apparently bombarded with some 14,000 calls from national and international media agencies during February 2009,¹²³⁵ and media coverage far outstripped coverage

¹²²⁹ Bowman and Prior, “Fire-Driven Loss of Obligate Seeder Forests in the Alps (Synthesis)”; Ian Ferguson, “Fires, Forests and Futures: The ANU Westoby Lecture,” *Australian Forestry* 72, no. 4 (2009): 195–205.

¹²³⁰ Miranda Devine, “Green Ideas Must Take Blame for Deaths,” *The Sydney Morning Herald*, 12 February, 2009.

¹²³¹ Lunn, “Greenies Blamed for Fires’ Scale.”

¹²³² Lunn.

¹²³³ Freya Mathews, “Scientists Warned Us This Would Happen,” *The Sydney Morning Herald*, 10 February, 2009.

¹²³⁴ See for example Griffiths, “We Have Still Not Lived Long Enough.”

¹²³⁵ A Malcolm Gill and G. J. Cary, “Socially Disastrous Landscape Fires in South-Eastern Australia: Impacts, Responses, Implications,” in *Wildfire and Community: Facilitating Preparedness and Resilience*, ed. Douglas Paton and Fantina Tedim (Springfield: Charles C Thomas, 2012), 20.

of Black Friday or Ash Wednesday.¹²³⁶ Media scholar Susan Yell argued this coverage was far more emotional in tone than previous bushfire reporting,¹²³⁷ while numerous experts pointed to a lack of fire knowledge and critical analysis from the overwhelmingly metropolitan media.¹²³⁸ It is worthwhile to speculate that this lack of fire literacy and the emotional tone of the media helped drive the simplification of analysis and compression of nuance into simple blame games, especially over the role of prescribed burning in preventing or causing the disaster. Equally significant, and unlike 1939, or even 1961, this debate over prescribed burning frequently engaged with conceptualisations of Indigenous burning. Less than a week after the disaster Royal Botanic Gardens ecologist John Benson, former CSIRO bushfire scientist Phil Cheney, and CSIRO ecologist Michael Doherty were portrayed in the media as representing warring scientific camps disputing Indigenous burning.¹²³⁹ Indeed, Packham's highly charged diatribe directly referenced Indigenous burning when he warned that before Black Saturday "fuel levels were the highest in Victoria for 30,000 years", a clear implication that tied contemporary prescribed burning to Indigenous burning.¹²⁴⁰

Victorian Premier John Brumby reacted to the fires quickly, establishing the 2009 Victorian Bushfires Royal Commission on 16 February under the Honourable Bernard George Teague, Ronald Neville McLeod and Susan Mary Pascoe.¹²⁴¹ The Commission was given broad terms of reference, and as with Stretton's 1939 Royal Commission, chose to democratise its evidence-collection process as much as possible. This commissioners attended rural hearings, offered live-streaming of hearings, and published interim reports online. These policies – combined with the intense media storm, and a legacy of increasing public attention paid to land management and bushfires – generated a much larger amount of public material than the Stretton or Rodger Royal Commissions. As well as 155 days of hearings, the Commission received roughly 1700 submissions, heard from 434 witnesses, accepted more than 1000 exhibited documents into evidence, and generated over 20,700 pages of transcript.¹²⁴² Of the 1700 written submissions, the Commission identified "Fuel reduction/DSE/prescribed burning" (DSE refers to the then-Department of Sustainability and

¹²³⁶ Susan Yell, "'Breakfast Is Now Tea, Toast and Tissues': Affect and the Media Coverage of Bushfires," *Media International Australia* 137, no. 1 (2010): 109–19.

¹²³⁷ Yell.

¹²³⁸ Frank Campbell (former editor of *Wildfire*), *Submission*, 2009 VBRC, 14 May 2009, NLA Pandora Online Archive.

¹²³⁹ Daniel Lewis, "Experts Take Corners as Argument Reignites," *Sydney Morning Herald*, 13 February, 2009.

¹²⁴⁰ Lunn, "Greenies Blamed for Fires' Scale."

¹²⁴¹ Bernard Teague, Ronald McLeod and Susan Pascoe, *2009 Victorian Bushfires Royal Commission, Final Report, Volume III: Establishment and Operation of the Commission* (Melbourne: Government Printer for the State of Victoria, 2010), viii. The Hon. Teague was a retired judge; Mr McLeod a retired senior public servant who had led previous bushfire inquiries; Ms Pascoe a former commissioner and chief executive of multiple agencies with experience in many inquiries.

¹²⁴² Teague *et al.*, *2009 VBRC, Summary*.

Environment) as the topic which received the most attention (574 submissions).¹²⁴³ Many of these submissions discussed policy proposals to significantly increase the area of land prescribed burned in Victoria – often advocating prescriptive targets. As with the Stretton and Roger Royal Commissions, this evidence provides a rich archive of public conceptualisations of Indigenous burning, but unlike those earlier Commissions, Indigenous burning was much more prominent in such scrutiny.

Prescribed Burning: A Spectrum of Views

The disputes over prescribed burning in the 2000s that preceded Black Saturday attracted some scholarly interest, but these characterisations fail to explain the vehemence that followed Black Saturday, or how this polarised atmosphere effectively determined the views of some on Indigenous burning. Writing after the 2002-3 Alpine and Canberra fires, Stephen Pyne observed that prescribed burning functioned as a “synecdoche” and “proxy for the whole shebang of environmental politics” in Australia.¹²⁴⁴ Examining the same post-fire debate, Whittaker and Mercer observed that a “common feature” of Australian bushfires has been the “apportioning of blame” following the fires.¹²⁴⁵ They identified three discourses or thematic groupings of public responses: “conservationists”, “ruralists”, and the “wise use” group, and believed that there was some possibility for compromise between the conservationist and ruralist discourses, whereas the wise use discourse was “motivated by recreational and commercial interest”.¹²⁴⁶ In contrast, Altangerel and Kull examined submissions to a 2008 Inquiry and described three “narrative groups”: those advocating for a decrease in prescribed burning, those advocating for an increase in prescribed burning, those who were uncertain but accepting of prescribed burning. All three groups framed uncertainty and risk prominently, though from different viewpoints, and it was common to “highlight selective examples and omit contradictory evidence”.¹²⁴⁷ Altangerel and Kull also noted that all three “narrative groups” expressed concern for people, human assets, and the environment, though speculated this might on occasion be a rhetorical device.¹²⁴⁸

Such frameworks are insufficient to explain the vehemence that followed Black Saturday and fail to explain the entanglement of prescribed burning and Indigenous burning that distinguished Black

¹²⁴³ Teague *et al.*, 2009 VBRC, Vol. III, 6.

¹²⁴⁴ Pyne, *The Still-Burning Bush*, 9, 89.

¹²⁴⁵ Whittaker and Mercer, “The Politics of Blame,” 263.

¹²⁴⁶ Whittaker and Mercer, 282.

¹²⁴⁷ Khulan Altangerel and Christian A. Kull, “The Prescribed Burning Debate in Australia: Conflicts and Compatibilities,” *Journal of Environmental Planning and Management* 56, no. 1 (2013): 115.

¹²⁴⁸ Altangerel and Kull, 114.

Saturday from those earlier debates. Overly simplistic media articles tended to position the debate into two simple camps: those advocating for increased prescribed burning, and those opposed to the practice.¹²⁴⁹ A more robust characterisation flows from conceiving of the post-Black Saturday prescribed burning debate as a spectrum. At one end are those who were hyperbolically in favour of prescribed burning, explained through fire illiteracy and political partisanship. At the other end of the spectrum were those who rejected any legitimate basis for prescribed burning, also rejecting ecological complexities and interpreting proposals through political disputes. In between were those who favoured prescribed burning but who acknowledged some nuance, and those moderates who were not opposed to prescribed burning in theory but were concerned about excessive or ineffective use of it. The spectrum reveals that many, especially on the further ends of the spectrum, interpreted Indigenous burning primarily by how it affected discussion over prescribed burning, and that many responded to prescribed burning by how it affected broader issues such as logging policy rather than in its own right.

Many of those advocating for increased prescribed burning verged on hyperbole in their vigorous advocacy for it as a practice, or more accurately, a panacea. The simplistic slogan “No fuel, no fire” (occasionally seen as bumper stickers in rural Australia) was popular in Royal Commission submissions.¹²⁵⁰ The problem with this formulation is that it oversimplifies the realities of firestorms in the fire flume. Prescribed burning can be very effective in slowing and reducing the intensity of fire in moderate and severe conditions, or in reducing ember attack upon properties in moderate and severe conditions – but it is not a guarantee of preventing bushfire risk to lives or property, especially when winds of up to 100 kmh⁻¹ are hurling embers around in catastrophic conditions (discussed below in ‘The Expert Panel’).

These limitations on the practice of prescribed burning were not recognised by John Andison of Bowen (Queensland), who argued “No fuel, no fire” was “equally true whether you live in the savannah grasslands of Northern Australia or the eucalypt forests of Southern Australia”.¹²⁵¹ Ron Heitmann of Bray Park (also Queensland) took this even further, arguing that “All of Australia should be ‘burnt off’ every year, or at the very least every two years”.¹²⁵² The sheer expense and physical impossibility of this proposal (mountain ash forests are too damp to prescribe burn the overwhelming majority of the

¹²⁴⁹ Deb Anderson, Philip Chubb, and Monika Djerf-Pierre, “Fanning the Blame: Media Accountability, Climate and Crisis on the Australian ‘Fire Continent,’” *Environmental Communication* 12, no. 7 (2018): 935–36.

¹²⁵⁰ For example, see Honourable Wilson Tuckey MP, *Submission*, 2009 VBRC, 15 April 2009, NLA Pandora Online Archive; John Andison of Bowen (Queensland), *Submission*, 2009 VBRC, 2 June 2009, NLA Pandora Online Archive.

¹²⁵¹ Andison, *Submission*, 2009 VBRC.

¹²⁵² Ron Heitmann of Bray Park (Queensland), *Submission*, 2009 VBRC, 22 September 2009, NLA Pandora Online Archive.

time – and when they are not, it means that conditions are extremely dangerous) points to a lack of fire literacy and a notion that bushfire is a “problem” that can be “solved” completely.¹²⁵³ The ecological generalisations applied by these proposals from Queenslanders are a strong argument for viewing Australia as a fire continent. Former Victorian Country Party MP Bruce Evans supported more prescribed burning and argued that “it is a basic right to be safe in our own homes”, while simultaneously acknowledging that “there is always a chance that some unexpected natural event may upset a well planned project”.¹²⁵⁴ For Bruce Evans, as for the many I have characterised as hyperbolic pro-prescribed burning supporters, ideology was at play more than policy.

Examples include the submission from businessman Ray Evans (once named as a member of the “Greenhouse Mafia”) who argued that environmentalism as represented by Paul Watson of Sea Shepherd was now effectively the “established religion” of Australia, that “hardline greens” who believed trees to be sacred had infiltrated DSE (the “Department of Scorched Earth”), and that the choking of the native timber logging industry by these supposed infiltrants and their allies in shire councils had led to the tragedy on Black Saturday.¹²⁵⁵ Bizarrely, Ray Evans quoted fire scientist Ross Bradstock’s caution about prescribed burning’s effectiveness in extreme conditions at length but inexplicably preferred to discuss the lack of property rights in the Soviet Union instead of addressing this rather important issue.¹²⁵⁶ A common sentiment was that expressed by Federal Liberal MP Wilson Tuckey, who believed that a supposed decline in prescribed burning could to be traced to parliamentarians who had ignored past inquiries supporting prescribed burning in order to harvest environmentalist preferences in elections.¹²⁵⁷ *Quadrant* columnist Roger Franklin wrote that “in some circles, [prescribed] burning was seen as something not too far removed from murder”,¹²⁵⁸ while Roger Hurrey of Arthurs Creek claimed that anybody who conducted their own private fuel reduction was treated by local councils “worse than a convicted rapist or murderer”.¹²⁵⁹ Hyperbole is an effective rhetorical tool, but decades of hyperbole without a solid grounding in evidence had built up these highly charged tensions which exploded after Black Saturday.

¹²⁵³ The idea of bushfire as a “problem” that can be “solved” is critiqued in, among others, Neale, Weir, and McGee, “Knowing Wildfire Risk.”

¹²⁵⁴ Bruce Evans (former MP), *Submission*, 2009 VBRC, 25 March 2009, NLA Pandora Online Archive.

¹²⁵⁵ Ray Evans, *Submission*, 2009 VBRC, 17 May 2009, NLA Pandora Online Archive. The term ‘Greenhouse Mafia’ comes from Guy Pearse, *High and Dry: John Howard, Climate Change and the Selling of Australia’s Future* (Viking, 2007).

¹²⁵⁶ Evans, *Submission*, 2009 VBRC.

¹²⁵⁷ Tuckey *Submission*, 2009 VBRC.

¹²⁵⁸ Roger Franklin, *Inferno: The Day Victoria Burned* (Slattery Media Group, 2010), 38.

¹²⁵⁹ Roger Hurrey of Arthurs Creek (Victoria), *Submission*, 2009 VBRC, 18 May 2009, NLA Pandora Online Archive.

Indeed, much of the media coverage after Black Saturday gave disproportionate space to those demanding large increases in the area prescribed burned, rather than those cautioning that solutions may be more complex. A study analysing mainstream media articles in the wake of Black Saturday found that of 418 news stories, editorials and opinion pieces, more than half (230) blamed inadequate fuel reduction, with nearly a third of these 230 stories targeting environmentalists.¹²⁶⁰ Out of 19 articles in the initial post-fire period, the *Herald Sun* gave prominence to alternative interpretations beyond a need for a simple increase in area prescribed burned in just 1 article, while the ABC did not carry a single story that gave “significant space” to viewpoints calling for other strategies than “massive increases in the *total area* of land pre-emptively burnt” [emphasis mine].¹²⁶¹

Those promoting more nuanced but still positive policies and practices towards prescribed burning were given far less prominence but still present in the media and submissions. The Bushfire Front Inc., a group of former Western Australian forest managers, deferred to Victorian specificities and acknowledged the difficulties of prescribed burning in wet ash forests, but pointed out how prescribed burning complements bushfire management by slowing fires and reducing their potential to get out of control, aiding suppression. Pointing to Western Australia’s success in fire management, the Front also argued for greater independent monitoring and reporting standards to hold authorities accountable for their performance.¹²⁶² Michael Ryan, Victorian Chair of the Institute of Foresters of Australia, acknowledged “we need to manage fuels appropriately in diverse forest types” as it “is almost impossible to reduce fuel in fire-sensitive wetter ash forests”, but argued that “the only substantial areas of green forest after the fire over most of the Kinglake plateau were associated with large-scale fuel reduction burns and the area burnt by the 2006 fires”.¹²⁶³ Botanist Mark Adams and ecologist Peter Attiwill predicated their advocacy on the important point that “fuel-reduction burning must be acknowledged for what it is: a *part* of a program of fire management” [emphasis mine].¹²⁶⁴ They amended the 10 “excuses” for inadequate fuel-reduction burning identified by American Fire Revolutionary Harold Biswell (discussed in Chapter Five), further demonstrating the trans-Pacific links in fire science.¹²⁶⁵ As shall be elaborated on below, Adams and Attiwill’s understanding of Indigenous burning was similar to Biswell’s attitudes towards Native American burning in feeling it was somewhat of a distraction from contemporary issues. Perhaps most critically, Adams and Attiwill defended proposals that arose during the Commission for Victoria to adopt a state-wide target for 5% of public

¹²⁶⁰ Anderson et al, “Fanning the Blame”.

¹²⁶¹ Anderson, Chubb, and Djerf-Pierre, 933.

¹²⁶² Roger Underwood (Bushfire Front Inc), *Submission*, 2009 VBRC, 10 May 2009, NLA Pandora Online Archive.

¹²⁶³ Michael Ryan, “Victorian Fires: Retrospective and Prospective,” *Australian Forestry* 72, no. 2 (2009): 60.

¹²⁶⁴ Adams and Attiwill, *Burning Issues: Sustainability and Management of Australia’s Southern Forests*, 84.

¹²⁶⁵ Adams and Attiwill, 110–12; Biswell’s original 10 “reasons” are found in Biswell, *Prescribed Burning in California Wildlands Vegetation Management*.

lands to undergo prescribed burning on an annual basis.¹²⁶⁶ Adams and Attiwill defended the 5% target from criticism that it would lead to ecological homogeneity by pointing to the reality that repeated high-intensity bushfires had dealt far greater ecological damage to Victoria in the decade including Black Saturday than a 5% target *might* represent.¹²⁶⁷ Firefighter Rod Incoll supported more prescribed burning, arguing “in monetary terms, you can fund an annual budget for sufficient burning, or blow the national deficit every now and then for major fire damage and rehabilitation”.¹²⁶⁸ Incoll also pointed out that the decline in area prescribed burned leading up to Black Saturday also correlated with a loss in expertise and “fire culture” in public agencies,¹²⁶⁹ a point supported by Adams and Attiwill who pointed out there “there is now no School of Forestry anywhere within Australia”.¹²⁷⁰ This decline in expertise had already been noted by Stephen Pyne in his interpretation of the mid and early 2000s fires.¹²⁷¹

Unlike the caricature of environmentalists totally opposed to any prescribed burns, the aftermath of Black Saturday saw many environmentalists and others express positions towards prescribed burning that are best described as moderate. Former forester Andrew Campbell pointed to Kevin Tolhurst’s research which apparently showed that “fuel reduction in the forests would not have made any difference under Saturday’s conditions”.¹²⁷² Gregory Johnson, of Friends of Nillumbik, suggested his organisation would favour Tolhurst’s suggestion for fuel reduction as a “more strategic approach rather than a blanket one size fits all” approach.¹²⁷³ Phil Ingamells of the Victorian National Parks Association pointed out that Victoria’s lack of monitoring made it extremely difficult to assess the impacts of bushfires and fuel reduction over long time scales, while supporting a strategic approach to fuel reduction and a greater emphasis on ecologically-distinguished ‘zones’.¹²⁷⁴ Jo Tenner of the Upper Yarra and Dandenongs Environmental Council was supportive of evidence-based burns to

¹²⁶⁶ It is a little unclear who first proposed the 5% target specifically in the context of Black Saturday. As shown below, annual area-based rolling targets were proposed based on the Western Australian success in jarrah forests and had been proposed in earlier inquiries. The expert panel discussed a figure of five to ten percent. See Kevin Tolhurst in “Transcript of Proceedings, 22/2/2010”, 2009 VBRC, 2010, 15246, NLA Pandora Online Archive.

¹²⁶⁷ Adams and Attiwill, *Burning Issues: Sustainability and Management of Australia’s Southern Forests*, 99. It is worthwhile remembering that Adams had been a member of the expert panel (see below) which had recommended the 5-8% target to the Royal Commission.

¹²⁶⁸ Rod Incoll of Endeavour Hills (Victoria), *Submission*, 2009 VBRC, 16 May 2009, NLA Pandora Online Archive.

¹²⁶⁹ Incoll, *Submission*, 2009 VBRC.

¹²⁷⁰ Adams and Attiwill, *Burning Issues: Sustainability and Management of Australia’s Southern Forests*, 117.

¹²⁷¹ Pyne, *The Still-Burning Bush*.

¹²⁷² Andrew Campbell, “Thoughts on the Victorian Bushfires”, attached to Lesley Dalziel, *Submission*, 2009 VBRC, 8 May 2009, NLA Pandora Online Archive. Campbell claims to be a Victorian forester with professional training in fire behaviour, fire suppression and fire management.

¹²⁷³ Gregory Johnson of Eltham (Former Councillor and Committee Member of the Friends of Nillumbik), *Submission*, 2009 VBRC, 11 February 2010, NLA Pandora Online Archive.

¹²⁷⁴ Phil Ingamells in “Transcript of Proceedings, 24/2/2010”, 2009 VBRC, 2010, 15443-8, NLA Pandora Online Archive.

protect houses and assets.¹²⁷⁵ It can be seen that moderates tended to possess academic expertise or express environmentalist concerns. Many moderates weren't opposed to prescribed burning *per se*, but rather opposed to what they saw as excessive or ineffective prescribed burning. This was particularly the case when responding to proposals for a statewide 5% area hectare-based target. Tenner, for instance, was worried about "perverse outcomes".¹²⁷⁶ Bernard Slattery of Friends of the Box Ironbark Forests Inc. was concerned that the 5% target might mean "that the random counting of hectares will take precedence over any 'strategic' objective".¹²⁷⁷ Even the VNPA was concerned that the "simplicity" of the 5% target might mean "it is rather like having a medical system to treat so many patients a year" rather than "highly strategic fuel reduction burns".¹²⁷⁸

The characterisation of these views as moderate does not preclude the fact that there were other voices in the wake of Black Saturday who heavily opposed prescribed burning. Lesley Dalziel of Seymour argued that prescribed burns "are doing no good at all" and were actually "causing increased dryness in the forests",¹²⁷⁹ while Ian Gierck of Gladstone Park argued there was no evidence that bushfire was biologically "beneficial" for the Australian biota, pointing to forests elsewhere in the world that had not seen fires in over 2000 years.¹²⁸⁰ Kathryn Hamann of Blackburn South criticised "backburning" (which she claimed was a euphemism for prescribed burning, rather than an entirely separate form of fire-usage) as "an article of faith rather than a tested theory", asking "what actual evidence is there that backburning works?".¹²⁸¹ The Conservation Council of WA Inc. argued that prescribed burning in Western Australia had "not prevented major wildfires" and had "very likely caused widespread extinction of both flora and fauna".¹²⁸² However, the Council failed to present any evidence linking these alleged extinctions with prescribed burning. As will be discussed below, many of these anti-prescribed burning views (such as Gierck) interpreted Indigenous burning on the same terms as prescribed burning.

Most voices heavily opposing prescribed burning were responding as much to what they perceived as broader issues at play, than the actual nuances of prescribed burning. Indeed, the legacy of suspicion

¹²⁷⁵ Jo Tenner (Upper Yarra & Dandenongs Environmental Council), *Submission*, 2009 VBRC, 18 May 2009, NLA Pandora Online Archive.

¹²⁷⁶ Tenner, *Submission*, 2009 VBRC, 5

¹²⁷⁷ Bernard Slattery (Friends of the box ironbark forests Inc.), *Submission*, 2009 VBRC, 7 April 2010, NLA Pandora Online Archive, 5.

¹²⁷⁸ Ingamells in "Transcript of Proceedings, 24/2/2010", VBRC, 15451, 15457.

¹²⁷⁹ Dalziel, *Submission*, 2009 VBRC.

¹²⁸⁰ Ian Gierck of Gladstone Park (Victoria), *Submission*, 2009 VBRC, 22 November 2009, NLA Pandora Online Archive.

¹²⁸¹ Kathryn Hamann of Blackburn South (Victoria), *Submission*, 2009 VBRC, 11 April 2010, NLA Pandora Online Archive.

¹²⁸² Piers Verstegen (Conservation Council of WA Inc.), *Submission*, 2009 VBRC, 31 July 2009, NLA Pandora Online Archive.

left by the Forest Wars meant any proposals for greater prescribed burning as delivered by the forestry and logging industries were regarded with great suspicion by environmentalists. Simon Birrell of the Otway Ranges Environment Network accused the logging industry of a “dirty trick” campaign and argued that if anything forestry increased bushfire risks.¹²⁸³ The logging industry allegedly represented a drag on management efforts as foresters needed to conduct prescribed burns for timber regeneration, consuming personnel and resources during the short window in which burns could take place, and logging practices increased fire risk.¹²⁸⁴ A report commissioned and used by the Wilderness Society of Victoria was most concerned with arguing that coverage of the fires had disproportionately focussed on public rather than private land (a defence of public land management under the national park system). This report reflected the growing concern environmentalist groups felt for Black Saturday as a possible harbinger of a fiery future in a warming planet and it engaged in a short and superficial analysis of climate change to argue the fires were “unprecedented”.¹²⁸⁵

It can be seen that the accusations levelled at environmentalists of being opposed to prescribed burning were not without *some* foundation; even the moderate environmental groups identified above were hardly enthusiastic in their endorsement of prescribed burning as a bushfire mitigation measure. Most wanted more evidence of its efficacy and were wary of negative effects on biodiversity or native vegetation. Similarly, activist groups largely failed to discriminate their comments for ecological communities *less* ecologically vulnerable to prescribed burning, or to address the operational benefits claimed from prescribed burning. It is easy to see how the moderates could thus be conceptually lumped in with the anti-burners.

Upon examination of the debates around Black Saturday it will be obvious that much of the rhetoric wasn’t solely about fuel levels but was instead a skirmish in larger culture wars. The “culture war” phenomenon is especially prominent in the United States and Australia, and is generally used to describe polarised disputes over social values and ideology where careful policy analysis and weighing of evidence is abandoned in favour of personal attacks and ideological denunciation.¹²⁸⁶ Packham’s opening salvo was addressed specifically towards policy, but hyperbolic arguments from hyper-partisan commentators such as Miranda Devine and Ray Evans were directed as much at

¹²⁸³ Simon Birrell (Otway Ranges Environment Network Inc. & Melbourne Water Catchment Network Inc.), *Submission*, 2009 VBRC, 18 February 2010, NLA Pandora Online Archive.

¹²⁸⁴ Birrell, *Submission*, 2009 VBRC.

¹²⁸⁵ Richard Hughes, *Report commissioned by Australian Conservation Foundation, Victorian National Parks Association and The Wilderness Society Victoria*, 2009 VBRC, 2009, NLA Pandora Online Archive.

¹²⁸⁶ The culture wars in Australia are closely tied to the History Wars mentioned in Chapter One – a dispute in the 1990s and 2000s over the interpretation and teaching of violence in Indigenous history. See Macintyre and Clark, *The History Wars*; and Rodney Tiffen, “Our Thirty Year Culture Wars”, *Inside Story*, 12 March, 2020, <https://insidestory.org.au/our-thirty-year-culture-wars/>.

delegitimising environmentalist activist groups as much at addressing policy issues. The febrile post-Black Saturday atmosphere created an obvious opportunity to stick the boot in to matters ranging from complaints around suburban footpath clearing laws to the philosophical influence of “green ideologues” upon Australian society as a whole.¹²⁸⁷ Environmentalists were clearly aware they were taking heavy fire from culture war enemies, and some responded by appealing to culture war rhetoric of their own.¹²⁸⁸

The question of whether these accusations of blame directed at environmentalists were accurate is unclear. Activist groups have held differing positions on prescribed burning which have evolved over time. The Australian Conservation Foundation, for instance, as early as 1970 published a reasoned discussion of burning.¹²⁸⁹ Whether their public position matched private lobbying is another consideration, as is the pragmatic question of whether activist groups even possess a sufficient degree of influence over both policy and practice.¹²⁹⁰ There is also the related accusation from hyperbolic figures such as Devine that a more nebulous green ideology is at fault, not through direct activist action, but through influencing staff members or even institutional culture of government agencies. Whether or not these accusations are true, they are certainly politically potent. Furthermore, they hinder an effective social response to bushfires by focussing political energy on blame games rather than identifying areas of consensus.

A good example is the case of the Stretton Group. A lobby group formed after the 2002/3 fires to advocate for changes in bushfire policy, the Stretton Group was active in the wake of Black Saturday both individually and as an institution.¹²⁹¹ The policy concerns of many of its members – David Packham, Peter Attiwill, and forester Roger Underwood – deserve detailed consideration due to their expertise and experience in forest management (especially in the jarrah forests of the South West). However, they could be easily dismissed by environmentalists when the Chair of the Group was a Liberal MP and much of its time was spent attacking supposed political motivations and ideologies. It

¹²⁸⁷ Without a trace of irony, Roger Franklin of *Quadrant* claimed that "Black Saturday's red glare was an invitation too enticing to resist" for those "compelled to project their passions and prejudices", while at the same time he opened his book by complaining about Victoria's "ostentatious fetish of protecting public safety". Franklin, *Inferno*, 9–10. See also Joe Lenzo, Safety Beach (Victoria), *Submission*, 2009 VBRC, 30 March 2009, NLA Pandora Online Archive.

¹²⁸⁸ Birrell, *Submission*, 2009 VBRC.

¹²⁸⁹ Australian Conservation Foundation, *Bushfire Control and Conservation*, Viewpoint Series, No. 5 (Parkville, Victoria, 1970).

¹²⁹⁰ As Chapter Five's analysis of the Fire Revolution showed, changes in policy do not necessarily lead to changes in practice.

¹²⁹¹ The Stretton Group's name was an explicit attempt to identify with Judge Stretton and his perceived success in changing forest management in Australia.

is difficult to get people to study your views in good faith if you accuse them of being members of the “effete intelligentsia”.¹²⁹²

Such characterisations of views on prescribed burning are relevant to my own analysis of the Black Saturday debate, as the characterisation of views as moderate based only on analysing their stated positions could be accused as being methodologically weak. In other words, were moderate views duplicitous? Were these positions taken solely to deflect criticism in the wake of Black Saturday rather than reflecting overall policy and activism? This possibility was clearly felt by the conservative lobby group National Civic Council,¹²⁹³ who argued calls for further research were a “stalling tactic” in the vein of those used by tobacco companies.¹²⁹⁴ This possibility does exist – but equally, if it does, one must acknowledge that much of the hyperbolic advocacy for prescribed burning was also duplicitous, and as much about bashing greenies as it was about contributing to better bushfire management in Australia. There are legitimate uncertainties in prescribed burning – and the low depth of fire literacy in Australia hinders consensus being reached over more certain aspects.

It is striking just how much of the commentary and public debate around prescribed burning in the wake of Black Saturday reflected a lack of fire literacy. Aside from the usual confusion between back burning (a fire lit as a firefighting technique to deny fuel from an advancing bushfire’s probable path) and prescribed burning,¹²⁹⁵ there was no consensus upon how to refer to different types of prescribed burning for fuel reduction. Thus environmental groups could be accused of opposing prescribed burning even while they defensibly claimed to be in favour (albeit with qualifications). One explanation for this was that there is no apparent consensus on how to refer to different *types* of prescribed burning. Prescribed burning in strategic strips immediately around settlements might be called a ‘targeted’ burn, as opposed to ‘broad area’ burns which seek to reduce the chance of fires becoming uncontrollable before they approach settled areas. Yet this nuance was not conveyed in the submissions.¹²⁹⁶ As productive as it would be to stop thinking of fuel as simply ‘fuel’, perhaps we can move beyond thinking of fire as ‘fire’. The Black Saturday Royal Commission failed to reflect this nuance, choosing instead to confine its recommendations to simply advocate agencies replace the

¹²⁹² See for example Roger Underwood, Stewart McArthur, and Stretton Group, “The Catastrophe Australia Had To Have Which Crippled Victoria” (Stretton Group Inaugural Oration, Melbourne, 18 March, 2009).

¹²⁹³ A group formed by B.A. Santamaria and not ideologically inclined to be sympathetic to environmentalism.

¹²⁹⁴ Patrick Byrne (National Civic Council), *Submission*, 2009 VBRC, 18 August 2009, NLA Pandora Online Archive.

¹²⁹⁵ Such as Greg Sheridan, “Crisis Survived, We Must Quickly Apply the Lessons,” *The Australian*, 12 February, 2009.

¹²⁹⁶ Clode and Elgar provocatively suggest that the apparent expert disagreement over prescribed burning might be explained by acknowledging differences in how different disciplines measure “success”; see Danielle Clode and Mark A. Elgar, “Fighting Fire with Fire: Does a Policy of Broad-Scale Prescribed Burning Improve Community Safety?,” *Society & Natural Resources* 27, no. 11 (2014): 1192–99.

American term “wildfire” with “bushfire”.¹²⁹⁷ Deeper fire literacy requires a richer and more sophisticated language of fire that reflects clear distinctions between fire’s myriad forms and complexities.

The Expert Panel

The Commission itself chose to be guided on fuel management by a panel of experts, who presented a complex view of the benefits and limitations of prescribed burning that culminated in a qualified judgement that despite its limitations, prescribed burning “is the most effective mechanism” to reduce fuel.¹²⁹⁸ Research of previous case studies in Victoria demonstrated the factors which determine the effectiveness of prescribed burning; for instance, that weather was the most important factor in determining fire intensity, and that the benefits of prescribed burning diminish over time as fuel grows back. Members of the panel noted that a major issue in fire management is the risk of spotting and thus “size does matter”; for burns to be effective in preventing spotting they need to be sufficiently large to capture the majority of falling embers (1000 hectares or greater).¹²⁹⁹ The panel’s assessment of the effectiveness of prior prescribed burning on Black Saturday itself demonstrated the issues with a simple assessment of efficacy. Previous prescribed burns couldn’t stop the fires during the catastrophic conditions (especially during the wind change), but they may have reduced ember production and slowed the fires down. Furthermore, they had made a significant contribution to the ultimate containment of the fires (which was necessarily accomplished in less challenging conditions).¹³⁰⁰

The panel unanimously recommended that Victoria should perform more prescribed burning but gave a careful and nuanced discussion around the proposed measure of state-wide targets which was ultimately not reflected in the Commission’s findings. The panel agreed a target should be considered as a guide as not every hectare burned is of equal value in reducing risk. A blanket target considered in isolation would not be helpful as detailed studies were necessary that would likely show “some areas should be burned more, and that others should be burned less”, which would be considered primarily by weighing up risk reduction and the strategic value of burning against adverse ecological outcomes.¹³⁰¹ I argue that the expert panel took great pains to emphasise this kind of nuance; the 5%

¹²⁹⁷ Teague *et al.*, 2009 VBRC, Summary, 35.

¹²⁹⁸ Teague *et al.*, 2009 VBRC, Vol. II, 280. The panel included Professor Mark Adams, Professor Ross Bradstock, Mr Phil Cheney, Dr Michael Clarke, Dr Malcolm Gill, Dr Kevin Tolhurst, and Mr Jerry Williams. The group thus comprised fire ecologists, fire behaviour specialists, and experienced fire management specialists.

¹²⁹⁹ Teague *et al.*, 2009 VBRC, Vol. II, 280.

¹³⁰⁰ Teague *et al.*, 2009 VBRC, Vol. II, 282–84.

¹³⁰¹ *Fuel Management Topic Facilitated Experts’ Conference 20 February 2010: Summary of Discussion by Panel*, 2009 VBRC, February 2010, Exhibits, Public Record Office of Victoria.

target was not considered by them to be a panacea. The panel also heavily emphasised that the recommended increase in prescribed burning needed to be accompanied by an increased commitment to monitor and research Victoria's fire ecology, including the impact of the implementation of the policy upon landscapes. The Commission itself supported these recommendations for more research, but the panel's nuanced findings on prescribed burning became translated into the simple Recommendation 56: "The State fund and commit to implementing a long-term program of prescribed burning based on an annual rolling target of 5 per cent minimum of public land".¹³⁰² The Commission's decision to endorse this simple target also reflects its concerns around the "inexplicable" failures of Victorian agencies to provide detailed data on prescribed burning despite multiple prior inquiries recommending this.¹³⁰³

It is significant to understanding the shape of Australian fire politics that the Black Saturday debates over prescribed burning featured references to the forests of south-western Western Australia (discussed in Chapter Three), almost entirely as an example of 'what to do'. Stretton loomed large over Black Saturday – but so too did Dwellingup. As discussed in Chapter Three, the result of the 1961 Dwellingup bushfires was a consistent and extensive program of broadscale prescribed burning throughout the South-Western forests. Despite some persistent environmentalist criticism, the South West has been suggested as a prescribed burning "exemplar" for Australia – and perhaps the world.¹³⁰⁴ Comparisons between Victoria and the South West were not historically unprecedented – the 2002/3 Inquiry had briefly speculated on the applicability of the South-Western experience – but were a particularly significant feature of the Black Saturday debate.¹³⁰⁵ For instance the Bush Fire Front submitted to the Commission that WA's lack of major bushfires since 1961 was evidence of the success of their strategy. While the Bush Fire Front acknowledged that wet ash forests would be difficult to burn under mild conditions, they argued that empirical research in WA had demonstrated the effectiveness of prescribed burning in periods of high (but not catastrophic) fire danger.¹³⁰⁶ Other submissions continued this theme.¹³⁰⁷

¹³⁰² Teague *et al.*, 2009 VBRC, *Summary*, 35. 5% represented roughly 380,000 hectares of the 7.7 million hectares considered public land.

¹³⁰³ Teague *et al.*, 2009 VBRC, *Vol. II*, 295.

¹³⁰⁴ Burrows and McCaw, "Prescribed Burning in Southwestern Australian Forests."

¹³⁰⁵ State Government of Victoria, *Esplin Report*, 113.

¹³⁰⁶ Underwood (Bushfire Front Inc.), *Submission*, 2009 VBRC.

¹³⁰⁷ See, for instance Max Rheese (Victorian Lands Alliance), *Submission*, 2009 VBRC, 28 January 2010, NLA Pandora Online Archive; Michael Sewell of Harkaway, Victoria, *Submission*, 2009 VBRC, 13 May 2009, NLA Pandora Online Archive.

The expert panel discussed the South-Western experience at some length and clearly felt this “yardstick” of success in prescribed burning held lessons for Victoria.¹³⁰⁸ Nevertheless, the members of the panel were naturally cautious about the direct translation of these experience. Tolhurst, for instance, pointed out that the available data showed the Dwellingup bushfires probably had “less severe weather conditions” than Black Saturday, and that the variation in topography of the South West was “less pronounced” than in Victoria.¹³⁰⁹ Similarly, Cheney acknowledged that the South West is “blessed with the most benign burning conditions that you would find anywhere in Australia, if not the world”, allowing prescribed burns in spring as well as autumn.¹³¹⁰ Jerry Williams of the USFS even suggested the differences might be analogous to the differences between Florida and California in the US.¹³¹¹ While the Commission itself did partly acknowledge these differences in its final report,¹³¹² it paid only scant attention to them and how they might hinder a root and branch adoption of this model.

The manner in which the Western Australian analogy lay unresolved highlights how a continental view of Australian fire is critically needed for more robust policy. Environmental historian Tom Griffiths has criticised the Commission for failing to include any maps of vegetation in its reports.¹³¹³ Griffiths was referring to the differences between Victorian vegetation, yet this lack of ecological curiosity also applies to the South-Western analogy. The Commission had considerable resources at its disposal to test the analogy more deeply or might have decided to push the expert panel to resolve some of the ambiguities noted above – but failed to do so. The result is that the applicability of the South-Western experience remained somewhat unresolved and indeed has remained so since Black Saturday.

A Typology of Understandings of Indigenous Burning

These debates over prescribed burning were inextricably entangled with discourses of Indigenous burning following Black Saturday, which displayed a greater variety of attitudes than previous post-fire debates. Broadly speaking, I argue that conceptualisations of Indigenous burning expressed in the wake of Black Saturday can fit within a typology of 5 rough categories: appropriation, consideration, caution/uncertainty, dismissal, and disagreement. The conceptualisation of this typology and identification of responses within one or more categories is open to interpretation, of course, but I

¹³⁰⁸ Kevin Tolhurst in “Transcript of Proceedings, 23/2/2010”, 2009 VBRC, 2010, 15345, NLA Pandora Online Archive.

¹³⁰⁹ Tolhurst in “Transcript of Proceedings, 23/2/10”, VBRC, 15346-7.

¹³¹⁰ Phil Cheney in “Transcript of Proceedings, 23/2/2010”, VBRC, 15439.

¹³¹¹ Jerry Williams in “Transcript of Proceedings, 23/2/2010”, VBRC, 15352.

¹³¹² Teague *et al.*, 2009 VBRC, Vol. II, 281–86.

¹³¹³ Griffiths, “From the Ashes.”

argue that the diversity of this typology reveals how characterisations of Indigenous burning have developed since the debates discussed in Chapters One and Three, partly as a result of the Small Fires and Fires in the Mind discussed in Chapter Four. Contrasting the spectrum of views towards prescribed burning with this typology reveals that generally – but not always – views towards Indigenous burning tended to reflect views towards prescribed burning. For many, their position on prescribed burning determined their views towards Indigenous burning.

One of the most common conceptualisations of Indigenous burning in the wake of Black Saturday was that of appropriation. I use the term here advisedly. Appropriation, in this instance, does not imply that Indigenous burning was culturally appropriated in all quoted examples in the same sense of a white American college student wearing a Plains Indian headdress to Burning Man. Instead, responses to Black Saturday that I characterise as appropriation fall under several different sub-categories, all of which essentially do not engage with Indigenous burning in an appropriately thorough fashion. Some, for instance, did not account for any historical, cultural, or ecological specificities of pre-contact Indigenous burning. Val Dorothy Burnett of Rathburnie Estate Nature Refuge, for instance, referred to European explorer accounts from Cook and argued “there is little difference between eucalypts of south-east Queensland and Victoria”.¹³¹⁴ The Australian Forest Growers compared contemporary thick vegetation in Cooktown (Queensland) to Cook’s description of a grassland in order to make a point about the effect of the cessation of Indigenous burning across Australia.¹³¹⁵ Max Rheese of the Victorian Lands Alliance argued “it is generally accepted that Aboriginal burning...together with lightning-ignited ‘natural’ fire...meant that most Australian ecosystems have evolved in an environment subject to regular or periodic fire”, and that prescribed burning aimed to “mimic the natural process of burning” – statements which, while true for many ecological communities, fail to account for the wet ash forests.¹³¹⁶ Such statements reflect shallow fire literacy and support the utility of a continental vision of Australian fire.

Others engaged with Indigenous burning in a superficial fashion in order to make a political or policy point, often to support hyperbolic arguments in favour of prescribed burning. In the wake of Black Saturday, Wurundjeri elder Aunty Joy Murphy briefly spoke at the National Day of Mourning service, including a quick description of how her people, pre-colonisation, had burned the country every seven years. Aunty Joy was not intending to give a detailed policy prescription, but many of those arguing for increased prescribed burning appropriated her words as the sole evidence of Indigenous burning

¹³¹⁴ Val Dorothy Burnett (Rathburnie Estate Nature Refuge), *Submission*, 2009 VBRC, 9 May 2009, NLA Pandora Online Archive.

¹³¹⁵ Warwick Ragg (Australian Forest Growers), *Submission*, 2009 VBRC, 18 May 2009, NLA Pandora Online Archive.

¹³¹⁶ Rheese (Victorian Lands Alliance), *Submission*, 2009 VBRC.

to bolster their case.¹³¹⁷ I also characterise this response as appropriation; a superficial rather than sophisticated engagement with Indigenous burning ('Indigenous burning means I am right', whereas a deeper engagement would have considered further questions such timing, frequency, and intensity, or cultural aspects of Indigenous burning). Federal Liberal MP Wilson Tuckey argued for a major increase in prescribed burning under the familiar simplistic paradigm "NO FUEL – NO FIRE" [SIC] and referenced "Aboriginal forest management"; however his submission is revealing for describing the "forest resource *inherited* by the colonists" (emphasis mine).¹³¹⁸ Edgar Knott of Nedlands (Western Australia) used the exact same phrase in a similar message.¹³¹⁹ As with the descriptions of Native Americans who had "transmitted" the lands of North America to non-Indigenous settlers discussed in Chapter Two, this language is based on settler-colonial frameworks and conceals the violence and dispossession that characterised much of the settlement period of Australia.

The appropriation characterisation can sit awkwardly with expertise in Western fire science. For instance, given his long experience in fire research, David Packham's arguments about the efficacy of prescribed burning are worthy of consideration (inflammatory rhetoric notwithstanding), but his allusion to "30,000 years" of Indigenous burning reducing fuel levels is a weaker form of this appropriation response.¹³²⁰ Why 30,000 years? Why not 60,000? What evidence is there that Indigenous burning only affected fuel levels from 30,000 years onwards? A lot can happen in 30,000 years. The extinction of many of Australia's megafauna. The peak of the last glacial period – Australia's Dust Age.

Nevertheless, the appropriation response is revealing of something else beyond superficial engagement with Indigenous burning. For political benefit to occur from rhetorical allusions to (as opposed to detailed considerations of) Indigenous land management, a certain recognition and legitimacy must be attached to this Indigenous land management. The popularity of the appropriation response thus suggests several things. First, that a significant portion of the public was understood in 2009 to be reasonably familiar and accepting of Indigenous land management. Second, that this familiarity also implies a degree of political currency. One would not expect to derive political benefit from alluding to Indigenous land management if one understood Indigenous Australians to have been Noble Savages who left no trace upon the continent. Contrast this to Judge Stretton jesting about the

¹³¹⁷ See for example Nillumbik Ratepayers Association, *Submission*, 2009 VBRC, 18 May 2009, NLA Pandora Online Archive; Reverend Trevor Gordon of Nerrena (Victoria), *Submission*, 2009 VBRC, 20 March 2009, NLA Pandora Online Archive; Dr Carole Webb of Strathewen (Victoria), *Submission*, 2009 VBRC, 18 May 2009, NLA Pandora Online Archive; Franklin, *Inferno*, 96–104.

¹³¹⁸ Tuckey, *Submission*, 2009 VBRC.

¹³¹⁹ Edgar Knott of Nedlands (Western Australia), *Submission*, 2009 VBRC, 8 November 2009, NLA Pandora Online Archive.

¹³²⁰ Lunn, "Greenies Blamed for Fires' Scale."

idea of adopting Indigenous burning in 1939, and it becomes clear just how public understandings and cultural norms towards Indigenous Australia have changed since 1939.

Another category of conceptualisations of Indigenous burning is consideration, whereby Indigenous burning is considered in a nuanced, sophisticated fashion, with an optimistic or didactic tone ('we can learn from Indigenous burning'). This category included responses reflecting a material or methodological consideration of Indigenous burning through factors such as timing or spacing of ignition. This included fire ecologist Kevin Tolhurst's aspiration that despite knowledge limitations, it may be possible to "learn from some of the patterns and some of the processes they had in place",¹³²¹ building surveyor William Barber's argument "we should seek some advice" from Indigenous Australians in northern Australia who he understood to rotationally burn grid systems of 5-10 hectares,¹³²² designer David Holmgren's suggestion that the supposed pre-colonial burning of ridgelines protected dense gully vegetation in Victoria,¹³²³ and even John Lain's recounting of an Indigenous fuelbreak in Cape York (reminiscent of the escape fire famously depicted in Norman Maclean's book *Young Men and Fire*).¹³²⁴

There were also consideration responses reflecting a didactic consideration of Indigenous burning, where Indigenous burning was conceived as involving a much more sophisticated knowledge of fire/greater fire literacy – even if specific knowledge was lost or irrelevant to Victorian circumstances, the ethic, attitude, or familiarity with fire was worthy of consideration. This includes the submission from Attiwill and Mark Adams, which, reflective of the arguments in Chapter Four and reinforcing the importance of Kakadu as a site of pyro-cultural contact, referred to the use of fire in Kakadu National Park by traditional owners: "The smell of smoke and the sight of fire is a powerful experience for visitors to Kakadu, contrasting strongly with the fear and objections to fire that are so strongly held by people from Australia's south".¹³²⁵ As with the appropriation response, the much greater prevalence of the consideration discourse (Chapter Three showed just one witness expressing such sentiments following the Dwellingup fires) reflects a partial maturing of the discourse of Indigenous burning in Australia.

¹³²¹ Kevin Tolhurst in "Transcript of Proceedings, 22/2/2010", 2009 VBRC, 2010, 15227-8, NLA Pandora Online Archive.

¹³²² William J. Barber, *Submission*, 2009 VBRC, 18 May 2009, NLA Pandora Online Archive.

¹³²³ David Holmgren of Holmgren Design Services, *Submission* 2009 VBRC, 14 May 2009, NLA Pandora Online Archive.

¹³²⁴ John Lain of New South Wales, *Submission*, 2009 VBRC, 14 February 2010, NLA Pandora Online Archive; Norman Maclean, *Young Men and Fire* (Chicago: University Of Chicago Press, 1992).

¹³²⁵ Peter Attiwill and Mark Adams, *Submission*, 2009 VBRC, 18 May 2009, NLA Pandora Online Archive.

A less prominent, but still present, response, was caution or uncertainty when conceiving of Indigenous burning. This could include the more considered response by CSIRO scientist Malcom Gill, who gave a detailed answer to the Commission in testimony that touched on the type of evidence available. His understanding was that “burning could not have been the same across Australia for all time, or the 50,000 years everywhere”, and that “we don’t have good records...in relation to the frequency, intensity, [or] seasons of burning” for Victorian Indigenous peoples.¹³²⁶ This attitude was echoed by Liam Fogarty of DSE when he was under cross-examination for DSE’s prescribed burning performance before Black Saturday.¹³²⁷ Other manifestations of the caution/uncertainty response came from environmentalists who were concerned about the wrong lessons being learned from Indigenous burning; i.e. that prescribed burning might be implemented in certain ecological communities based on flawed or incomplete conceptualisations of pre-colonial Indigenous burning practices – usually reflecting the moderate position towards prescribed burning.¹³²⁸ While less prominent than the other typologies I have identified, this was a persistent response to Indigenous burning after Black Saturday.

Closely related to the caution response is the dismissal response. Responses reflecting dismissals may acknowledge that pre-contact Indigenous burning was significant, but that certain factors have changed since then to render Indigenous burning irrelevant to contemporary concerns (‘maybe it did happen, but things have changed’). This can then be further subdivided into the environmental continuity and cultural continuity arguments discussed in Chapter Four, where the legitimacy or relevance of Indigenous burning in Kakadu National Park was challenged on environmental or cultural grounds. The dismissal response to notions of Indigenous burning in the wake of Black Saturday is typified by the submission from Kathryn Hamann of Blackburn South, who pointed to both “white settlement” (and especially the urban nature of contemporary Australia) and climate change as complicating Indigenous burning; “no scientist worth anything would say you can transpose one mode of action into a new situation where there are now a whole host of new variables”.¹³²⁹ Hamann was especially concerned with climate change, conflating Indigenous burning and “backburning” (contextually, she was referring to prescribed burning rather than backburning), and questioning whether “backburning” would contribute to climate change.¹³³⁰ Jo Tenner argued that “traditional practices are generally lost as a sustained practice in Victoria”.¹³³¹ Adams and Attiwill gave a more

¹³²⁶ A. Malcolm Gill in “Transcript of Proceedings, 22/2/2010”, VBRC, 15157-9.

¹³²⁷ Liam Fogarty in “Transcript of Proceedings, 17/2/2010”, 2009 VBRC, 2010, 14734-14735, NLA Pandora Online Archive.

¹³²⁸ See, for instance, Slattery (Friends of the box ironbark forests Inc.), *Submission*, 2009 VBRC.

¹³²⁹ Hamann, *Submission*, 2009 VBRC.

¹³³⁰ Hamann, *Submission*, 2009 VBRC.

¹³³¹ Tenner, *Submission*, 2009 VBRC.

nuanced approach, pointing to “more than 200 years of continuous change to fire regimes” as meaning the debates over the extent of Indigenous burning “will become increasingly irrelevant”.¹³³² For Adams and Attiwill, Indigenous burning was at best an example of admirable attitudes towards fire (as discussed above, the consideration response), and at worst a distraction from the far more pressing need for more contemporary prescribed burning. Interestingly, the dismissal response appears to have been far less than prevalent than the response of outright disagreement.

A significant strand of responses was disagreement, whereby Indigenous burning was either questioned to have occurred in certain areas or to have occurred entirely (‘it didn’t happen’/‘it didn’t happen *here*’). In some cases, strong disagreement was where indigenous burning was argued to have occurred - but been a negative thing (‘it did happen, and it was bad’). Perhaps the most common manifestation of this response was the former, where it was acknowledged that Indigenous burning may have (or did) occur pre-contact in other parts of Australia, but that it did not occur in some or all of the areas being discussed in the wake of Black Saturday. Forester Ron Hateley’s *The Victorian Bush* – although not published solely as a response to Black Saturday – is an example of the academic manifestation of this argument.¹³³³ Jo Tenner argued that the very existence of large mountain ash forests indicated that fire must have been excluded for “hundreds of years at a time”.¹³³⁴ Bernard Mace of Healesville conceded that “so-called firestick farming” occurred in northern Australia and to the west of the Great Dividing Range in southern Australia, but that Indigenous burning in the mountain forests of Victoria “would have been of no productive benefit, and in fact would have been potentially suicidal”.¹³³⁵ Mace’s comment is typical of many (regardless of the category of response) in that it reflects an intellectual framework in which Indigenous burning is only understood in a material, rather than cultural fashion. A submission from Peter Lang of Lara is especially notable to view in this regard; Lang acknowledged the possibility that plains west of Geelong might have been burned to encourage grazing, but questions “why would a nomadic race without permanent habitation place themselves at risk in the forest?”¹³³⁶ The allusion to nomadic behaviour indicates a framework of understanding with no room for deliberate, long-term Indigenous land management, or for a lifestyle whereby habitation was the result of consideration rather than carelessness. It’s a good reminder that while for many, public understandings of Indigenous Australia have evolved from the timeless people in a timeless land trope, in 2009 there was still a long way to go.

¹³³² Adams and Attiwill, *Burning Issues: Sustainability and Management of Australia’s Southern Forests*, 6.

¹³³³ Hateley, *The Victorian Bush; Its “Original and Natural” Condition*.

¹³³⁴ Jo Tenner (Upper Yarra & Dandenongs Environmental Council), SUBM.002.028.0172_R, 18/5/2009

¹³³⁵ Bernard Mace of Healesville (Victoria), *Submission*, 2009 VBRC, 18 May 2009, NLA Pandora Online Archive.

¹³³⁶ Peter Lang of Lara (Victoria), *Submission*, 2009 VBRC, 15 May 2009, NLA Pandora Online Archive.

Another manifestation of the disagreement response disputed whether Indigenous Australians had ever used fire at all, or used it in a deliberate fashion, or that this burning had had any effect upon Australia's landscape and vegetation. Ian McCallan of Cardwell (Queensland) argued that the Indigenous use of fire was "totally false...there are no documented records of this, yet it has assumed the status of fact".¹³³⁷ For Ian Gierck of Gladstone Park, "'firestick management' [was] based on myth" as he was "unable to find any verifiable scientific evidence to support [it]".¹³³⁸ In both cases it is important to note the implied hierarchy of information; documentary evidence, or scientific data, are valued over other sources. This is typical of academic debates around Indigenous burning; as discussed in Chapter Seven, where geographer Thomas Vale defends the American notion of wilderness by dismissing historical accounts of Native American burning as subjective and biased.¹³³⁹

A submission from Lesley Dalziel of Seymour turned the disagreement response on its head when she disagreed that Indigenous burning had neutral or positive effects. Dalziel pointed to historical Indigenous burning as negative as it "contributed to the demise of the mega fauna of Australia" (the megafauna extinction debate is discussed in Chapter Seven), and argued contemporary Indigenous burning in Kakadu "is leading to documented species decline or loss", especially Gouldian finches.¹³⁴⁰ For Dalziel, as for so many Australians, Kakadu served as a major point of encounter (whether conceptually or physically) with Indigenous burning – but instead seems to have firmed her opposition to Indigenous burning.

Critically, for many whom I have characterised under the disagreement response, their major concerns were around contemporary prescribed burning – and their conceptualisations should be understood in that vein. Therefore, it is possible that a deeper interrogation of their attitudes towards Indigenous burning might reveal more considered opinions, but equally, it demonstrates that Indigenous burning is inextricable from the politics of prescribed burning. In the wake of Black Saturday, there was little chance of Indigenous burning being regarded on its own terms.

Despite the conceptual prominence of Indigenous burning, the debate after Black Saturday is remarkable for how little space was made in popular discourse for contemporary Indigenous voices. The most prominent Indigenous voice was that of Wurundjeri elder Aunty Joy Murphy, as described above. The profligate appropriation of Aunty Joy's words – originally delivered as a brief comment during a televised mourning service for the victims of Black Saturday – indicates that while Indigenous

¹³³⁷ Ian McCallan of Cardwell (Queensland) *Submission*, 2009 VBRC, 26 May 2009, NLA Pandora Online Archive.

¹³³⁸ Gierck, *Submission*, 2009 VBRC.

¹³³⁹ Vale, *Fire, Native Peoples and the Natural Landscape*; Stephen J. Pyne, "'Fire, Native Peoples, and the Natural Landscape', Thomas R. Vale, Editor, 2002. Island Press, Washington D.C., 315 Pages, \$25.00, ISBN 1-55963-888-5 (Paper) [Book Review]," *Restoration Ecology* 11, no. 2 (2003): 257–59.

¹³⁴⁰ Dalziel, *Submission*, 2009 VBRC.

burning may have been a familiar concept to Victorians in 2009/10, many non-Indigenous Victorians were grasping to find local specifics. As in 1939 and 1961, the voices of Indigenous Victorians themselves were not prominent in the Commission or popular debate. Furthermore, the discussion of Indigenous burning was almost entirely in the past tense (as was the case in 1939 and 1961). In Chapter Eight I argue this is no longer the case in Victoria. Indigenous Victorians are reclaiming Indigenous burning – conceptually, and as a practice. Any discussion of bushfires in Victoria in the future that incorporates Indigenous burning will no longer treat it entirely as an abstract concept – but as one that involves lived experience.

Despite all the heat and light surrounding the issue, the Victorian Bushfires Royal Commission paid relatively little attention to Indigenous burning. The final report devotes very little space to it, especially in comparison with the 2002/3 Inquiry which devoted an entire chapter to exploring the evidence and relevance of Indigenous burning.¹³⁴¹ For the 2009 Commission, Indigenous burning belonged under the heading “The Past” – and the section “Lessons from the past” solely discussed post-settlement prescribed burning.¹³⁴² Perhaps the Commission’s findings could be characterised as a dismissal response. This is especially disappointing given the 2002/3 Inquiry had engaged in a fairly considered response, addressing, among other things, how Indigenous burning complicates notions of wilderness.

The concept of wilderness came under heavy fire in the wake of Black Saturday, especially due to Indigenous burning. Prior to Black Saturday, religious historian Paul Collins had argued in favour of a minimal interference policy for fire management based on underlying notions of wilderness, though this had been heavily critiqued by fire experts.¹³⁴³ The Prospectors & Miners Association of Victoria Inc. took inspiration from American philosopher Alston Chase’s critique of wilderness as applied to Yellowstone (discussed in Chapter Five) to argue “Australia’s forests are not untouched, pristine...prior to 1788 they were manipulated by man for his own benefit for 50,000 years”.¹³⁴⁴ The Association disputed those who claimed there was doubt around the extent of Indigenous burning in alpine regions of Victoria, arguing that historical records “do not support this particular form of alpine ‘terra nullius’”.¹³⁴⁵ This critique of wilderness was echoed by academic responses to Black Saturday.

¹³⁴¹ Teague *et al.*, 2009 VBRC, Vol. II, 289; State Government of Victoria, “Traditional Burning Practices of Aboriginal People and the Prescribed Burning Debate in Victoria.”

¹³⁴² Teague *et al.*, 2009 VBRC, Vol. II, 290.

¹³⁴³ Paul Collins, *Burn: The Epic History of Bushfire in Australia*, 1st ed. (Crows Nest: Allen & Unwin, 2006); for an example of the scathing reception Collins’s work received from fire practitioners, see Tolhurst, “Fuel for the Tinderbox [Review of Paul Collins: Burn].”

¹³⁴⁴ Bush Users Group, “Flamin’ Parks – Neighbours from Hell”, attached to Rita Bentley (Prospectors & Miners Association of Victoria Inc.), *Submission*, 2009 VBRC, 15 May 2009, NLA Pandora Online Archive.

¹³⁴⁵ Bush Users Group, “Flamin’ Parks”, in Bentley, *Submission*, 2009 VBRC.

Historian Robert Kenny's memoir *Gardens of Fire* contains his speculation upon the assumption of pre-settlement Australia as "pristine", and that "to suggest that pre-settlement Australia was 'pristine' is to place Aboriginal Australians in the category nature, and thus deny them humanity".¹³⁴⁶ This was echoed by Adams and Attiwill, who curiously believed that while the wilderness debate had been thoroughly debated in North America, especially by Thomas R. Vale's edited collection discussed in Chapter Seven,¹³⁴⁷ Stephen Pyne, David Bowman and Bill Gammage's work represented "outstanding exceptions" to an apparently otherwise "limited" debate in Australia.¹³⁴⁸ The latter characterisation is a little disappointing as it overlooks much earlier Australian critiques of wilderness (especially Marcia Langton's "Burning Questions" oration),¹³⁴⁹ though it is perhaps understandable given the extraordinary breadth of academic disciplines that have discussed these issues. Nevertheless, the fact that so many felt it necessary to engage with notions of wilderness and its relation to Indigenous burning demonstrates the power this ideal was perceived to exercise over Australian environmental politics in this time.

Ultimately, the breadth of this typology demonstrates significant development and broadening of the discourses of Indigenous burning. It was entirely possible to hold beliefs concerning Indigenous burning under more than one of the categories of this typology simultaneously; this was not necessarily a contradiction, and the delineation of typologies proposed in this thesis should not be interpreted as exclusive. Adams & Attiwill, for instance, felt that while Indigenous burning as a material practice was mostly irrelevant for the present day given changes in contemporary land use (cities, infrastructure etc.), there was a lot to be learned from Indigenous burning in the broader sense of representing a deeper relationship with fire. Therefore, their work could be characterised as both dismissing and considering Indigenous burning. There was a great deal of imprecision in discussions of Indigenous burning – while pointing to Cooktown or Sydney might support general points about the impact of settlement and settler land management practices, such imprecision fails to take into account the diversity and locally-specific nature of Indigenous burning. Clearly there is a risk that an impossibly high bar might be set for details of pre-colonial Indigenous burning practices, but a defensible analysis of Indigenous burning must reflect the sophistication and breadth of Indigenous burning. Chapter Seven outlines a model for considering how this might be achieved for a truly robust discourse of Indigenous burning.

¹³⁴⁶ Robert Kenny, *Gardens of Fire: An Investigative Memoir* (UWA Publishing, 2013), 145.

¹³⁴⁷ Vale, *Fire, Native Peoples and the Natural Landscape*.

¹³⁴⁸ Peter M. Attiwill and Mark A. Adams, "Mega-Fires, Inquiries and Politics in the Eucalypt Forests of Victoria, South-Eastern Australia," *Forest Ecology and Management* 294 (2013): 51.

¹³⁴⁹ Langton, *Burning Questions: Emerging Environmental Issues for Indigenous Peoples in Northern Australia*.

Grazing Reduces Blazing?

As with the Black Friday bushfires discussed in Chapter One and the light burning dispute discussed in Chapter Two, prescribed burning for fuel reduction was not alone as a form of knowledge and environmental practice that was entangled with Indigenous burning. The role of grazing in fire management – and how introduced grazers might interact with post-settlement fire regimes – was a contentious topic discussed in the wake of Black Saturday. While endorsing a greater use of prescribed burning, Judge Stretton had declared that the Black Friday fires were “lit by the hands of man”, condemning timber workers, miners, and graziers alike for irresponsible use of fire.¹³⁵⁰ Stretton particularly criticised graziers as one of the “most prolific fire causing agents” for “burning to promote grass growth”.¹³⁵¹ It is not the focus of this thesis to explore the convoluted and contentious history of grazing in the High Country of South Eastern Australia (especially in national parks), but after the 2002-3 Alpine fires the Victorian Government’s Inquiry investigated whether grazing prevents blazing. The Inquiry concluded that in 2003 there was “no scientific support for the view that ‘grazing prevents blazing’”.¹³⁵² Consequently, the Victorian Government terminated licenses to graze in the Alpine National Park in 2005.¹³⁵³ The Mountain Cattlemen’s Association of Victoria – a group representing the interests of graziers, including those whose grazing licenses had not been renewed, protested this decision vigorously over the next few years, arguing that the cessation of grazing had led to the fires in 2002-3, 2006-7, and Black Saturday.

The Association claimed that the 2002/3 Inquiry had misrepresented their position: grazing does not *prevent* blazing but *reduces* it. Since occupying the High Country in the mid-nineteenth century, graziers had reduced fuel at lower altitudes through prescribed burning and at higher altitudes through grazing.¹³⁵⁴ Critically, for the Association, mountain graziers were the heirs of Indigenous burning practices; cattle grazing “replicated” Indigenous burning.¹³⁵⁵ This claimed continuity with

¹³⁵⁰ Stretton, *Report of the Royal Commission into ... 1939*, 5.

¹³⁵¹ Stretton, *Report of the Royal Commission into ... 1939*, 11.

¹³⁵² State Government of Victoria, *Esplin Report*, 84.

¹³⁵³ Grant J. Williamson, Brett P. Murphy, and David M. J. S. Bowman, “Cattle Grazing Does Not Reduce Fire Severity in Eucalypt Forests and Woodlands of the Australian Alps,” *Austral Ecology* 39, no. 4 (2014): 463.

¹³⁵⁴ Mountain Cattlemen’s Association of Victoria, “The Links between Cattle Grazing and Fuel Reduction in the Grazing Zones of the High Country”, , attached to Colin Wood (Sporting Shooters Association of Australia (Victoria)), *Submission*, 2009 VBRC, 18 February 2010, NLA Pandora Online Archive.

¹³⁵⁵ Timothy Barker (Mountain Cattlemen’s Association of Victoria), *Submission*, 2009 VBRC, 14 May 2009, NLA Pandora Online Archive.

Indigenous burning practices was widely associated in other submissions to the Royal Commission.¹³⁵⁶ It is noteworthy that the MCAV submission alternated between depicting the High Country prior to European colonisation as having been subject to Indigenous “patch burning”, and having been “burnt naturally”.¹³⁵⁷ Even a voice apparently sympathetic to Indigenous land management still carried unconscious implications of naturalness and Indigeneity, denying the essential agency of this deliberate alteration of the environment. The Association even speculated on whether cattle might fill the role argued by Tim Flannery for Australia’s extinct megafauna (discussed in Chapter Seven), and drew upon Stephen Pyne’s work to make general inferences about the evolving nature of scientific knowledge in fire management.¹³⁵⁸ For the Association, the 2002-3 Inquiry and subsequent scientific investigation was highly suspect. They believed this “so-called” science was tainted by an “underlying philosophical belief that cattle grazing should be removed from Victorian public land”.¹³⁵⁹ As with the contests over types of knowledge depicted in Chapter One and Chapter Two, the Association disputed the primacy of science and academic knowledge, arguing that “the views of people with vast generational experience must be given due recognition”.¹³⁶⁰

The Victorian Bushfires Royal Commission did not resolve the dispute over alpine grazing. Cattle did return to the National Park in 2010 under a so-called scientific trial to assess the effects of cattle grazing on fire risk, but Mark Adams – the scientist who was purported by the Baillieu Government to oversee the trial – was unaware of its commencement and there was no baseline data collection.¹³⁶¹ This gave ample ammunition to conservationists who had long suspected the trial was more about securing electoral support from the Association and its supporters than about science.¹³⁶² The election of the Andrews Government resulted in the trial being ended in 2014. Adams later conducted a review of all available scientific information on fire management in the High Country, declaring much of the historical work was marred by poor experimental design and would not pass contemporary peer review, and that long-term monitoring was greatly needed.¹³⁶³ A subsequent paper utilised remote sensing across the High Country to argue there was no evidence grazing reduced fire severity in forests

¹³⁵⁶ For example, Laurence Heale of Bueaumaris (Victoria), *Submission*, 2009 VBRC, 13 September 2009, NLA Pandora Online Archive; Roger David Jennings of Upper Beaconsfield (Victoria), *Submission*, 2009 VBRC, 12 May 2009, NLA Pandora Online Archive.

¹³⁵⁷ Barker, *Submission*, 2009 VBRC, 3.

¹³⁵⁸ Appendix 6 in Barker, *Submission*, 2009 VBRC.

¹³⁵⁹ Barker, *Submission*, 2009 VBRC.14

¹³⁶⁰ Mountain Cattleman’s Association of Victoria, “The Links between Cattle Grazing and Fuel Reduction”, in Wood, *Submission*, 2009 VBRC, 1.

¹³⁶¹ Adam Morton, “Grazing Adviser Rebuffs Baillieu,” *The Age*, 6 April, 2011.

¹³⁶² Michael A. McCarthy, Georgia Garrad, and Libby Rumpff, “The Alpine Grazing Debate Was Never about Science,” *The Conversation*, 16 April, 2015, <http://theconversation.com/the-alpine-grazing-debate-was-never-about-science-40219>.

¹³⁶³ Adams, Cunningham, and Taranto, “A Critical Review of the Science Underpinning Fire Management in the High Altitude Ecosystems of South-Eastern Australia.”

and woodlands, and that there was no demonstrable effect in treeless vegetation – though it found good evidence for the effect of grazing upon fire in tropical grasslands elsewhere.¹³⁶⁴ However, since the publication of Bill Gammage’s *The Biggest Estate on Earth* (discussed in Chapter Seven), the Association has drawn upon Gammage’s work to push their case in the public arena,¹³⁶⁵ and indeed, Bill Gammage is listed on the MCAV website as a consultant.¹³⁶⁶ Clearly the dispute over whether ‘grazing reduces blazing’, and whether Indigenous burning and grazing should be considered as analogous, remains unresolved in both an empirical and a political sense.

After Black Saturday: Rise and Fall of a Disaster Policy

The Victorian Bushfires Royal Commission’s four-volume Final Report was published in July 2010 after the release of some interim reports, and included recommendations aimed at increasing the amount of prescribed burning conducted on Victorian public land. Recommendation 56 suggested that 5% of public land be prescribed burnt on an annual basis, while Recommendation 57 advised for annual reporting on prescribed burning to meet “public accountability objectives”.¹³⁶⁷ Over the next few years the Department of Environment, Land, Water and Planning (DELWP) did increase its prescribed burning commitment higher than at any point in Victoria over the last 2 decades, though it failed to get within 100,000 hectares of the 360,000 hectare target.¹³⁶⁸ In 2013 the Implementation Monitor concluded that the 5% target was not “achievable, affordable or sustainable” and argued the Victorian Government should reconsider the target; in 2015 the Inspector-General for Emergency Management (IGEM) was tasked with this.¹³⁶⁹ After receiving public and expert submissions, IGEM recommended the hectare-based target be replaced with a strategy centred on ‘risk reduction’. It argued DELWP now possessed greater capability to determine the value of burning different areas (at least partly through the aid of computer simulation program PHOENIX RapidFire) and a greater level of ecological knowledge around the effects of prescribed burning on fire-sensitive vegetation.¹³⁷⁰ By 2017 the shift was complete. A simple state-wide measure based on area burned had been replaced with a system where Victoria was divided into 7 regions, allowing a complicated measure of “risk” to be more

¹³⁶⁴ Williamson, Murphy, and Bowman, “Cattle Grazing Does Not Reduce Fire Severity.”

¹³⁶⁵ Tim Lee, “Fire Power,” *Landline* (ABC, 26 May, 2013), <http://www.abc.net.au/landline/content/2013/s3767527.htm>.

¹³⁶⁶ Mountain Cattlemen’s Association of Victoria, “Other Resources,” 2019, <https://www.mcav.com.au/news-events/other-resources>.

¹³⁶⁷ Teague *et al.*, 2009 VBRC, *Summary*, 35.

¹³⁶⁸ Inspector-General for Emergency Management and State of Victoria, “Review of Performance Targets for Bushfire Fuel Management on Public Land” (Department of Justice and Regulation, 2015), 15.

¹³⁶⁹ Inspector-General for Emergency Management and State of Victoria, 2.

¹³⁷⁰ Inspector-General for Emergency Management and State of Victoria, “Review of Performance Targets.”

precisely targeted to each region based on PHOENIX modelling which compared scenarios involving different levels of prescribed burning.¹³⁷¹ The hectare-based target had lasted less than a decade.

There is no doubt that the 5% policy had increased the *amount* land prescribed burnt in Victoria – but it was heavily criticised for encouraging the wrong *kind* of burning. The target was publicly criticised as leading to a situation explainable through “Goodhart’s Law”, where management actions evolve to meet a target rather than solve the problem the target was implemented to address.¹³⁷² For instance, the Department of Environment and Primary Industries estimated that less than 3% of Victorian bushfire risk was located in the Murray Mallee area, yet in 2012-13 16.9% of the area prescribed burnt occurred there; although the more populated areas around Melbourne accounted for 31% of risk, just 1.6% of the total area of Victoria prescribed burnt was in this section.¹³⁷³ This was not just a missed opportunity for prevention; the Mallee has many faunal species which appear to rely upon long-unburnt vegetation and this particular burning was argued to actively threaten their habitat.¹³⁷⁴ Defenders of the target pointed out that the ecological threat from high-intensity bushfires is much higher than the threat from low-intensity prescribed burns, and that the previous policy was simply not working to prevent bushfires.¹³⁷⁵

Shallow understandings of Indigenous burning in the wake of Black Saturday (such as those drawing on the appropriation discourse) cannot be considered as the sole cause for this ecologically inappropriate fire management, but they certainly helped justify and legitimate it. The entanglement of prescribed burning and Indigenous burning and lack of fire literacy help to explain how such a blunt policy was conceived and enacted. The new risk-based strategy’s commitment to regionalised prescribed burning targets is welcome and should reduce the incentivisation of burning for hectares rather than burning for need. However, there is cause for scepticism around whether the new strategy will improve upon the second major reason for the 5% target: public accountability.

¹³⁷¹ Inspector-General for Emergency Management and State of Victoria, “Annual Report: Implementation of Recommendations on Bushfire Fuel Management” (Department of Justice and Regulation, 2017); Department of Environment, Land, Water & Planning Victoria, “Measuring Bushfire Risk in Victoria,” 2015.

¹³⁷² Lindenmayer et al., *Mountain Ash: Fire, Logging and the Future of Victoria’s Giant Forests*, 31; Luke Kelly, Katherine Giljohann, and Michael A. McCarthy, “Percentage Targets for Planned Burning Are Blunt Tools That Don’t Work,” *The Conversation*, 30 March, 2015, <http://theconversation.com/percentage-targets-for-planned-burning-are-blunt-tools-that-dont-work-39254>; Trent Penman, “Saving Homes, Saving Wildlife: Victoria Ditches Burnoff Targets,” *The Conversation*, 25 November, 2015, <http://theconversation.com/saving-homes-saving-wildlife-victoria-ditches-burnoff-targets-51114>; Martin McKenzie-Murray, “Bushfire prevention strategy questioned after Lancefield,” *The Saturday Paper*, 18 March, 2016; Clode and Elgar, “Fighting Fire with Fire.”

¹³⁷³ Andrew Bennett, Dale Nimmo, and Michael Clarke, “Burnoff Policies Could Be Damaging Habitats for 100 Years,” *The Conversation*, 8 August, 2014, <http://theconversation.com/burnoff-policies-could-be-damaging-habitats-for-100-years-30240>.

¹³⁷⁴ Simon J. Watson et al., “The Mallee Fire and Biodiversity Project,” *Proceedings of the Royal Society of Victoria* 124, no. 1 (2012): 38–46.

¹³⁷⁵ Adams and Attiwill, *Burning Issues: Sustainability and Management of Australia’s Southern Forests*, 99.

A significant justification behind the Commission’s decision to recommend the 5% target was that while crude, it represented a clear and easily understandable measure which would satisfy the public’s considerable concerns around fire management. Even during the IGEM review (conducted without the high profile of a royal commission), many of the 127 public submissions reflected a desire for greater transparency and accountability around prescribed burning.¹³⁷⁶ A 5% hectare target is easily understandable. A reduction of risk from 85% to 60% using an opaque algorithm-driven number is not; indeed the use of PHOENIX RapidFire (or other simulators) has a political role in “rhetorically depoliticising subjective decisions by individuals and institutions about planned burning”.¹³⁷⁷ The new strategy has more room for fire nuances and may thus prove more ecologically effective. However, in the absence of greater public fire literacy, it may struggle to find legitimacy and thus prove less politically effective. Indeed, it is suggestive to note how the new strategy was publicly announced at the same time as the results of the Lancefield Inquiry were publicly released – a prescribed burn gone wrong.¹³⁷⁸

Conclusion

After hearing conflicting testimony over the desirability of prescribed burning in 1939, Judge Stretton judged that long-term fire exclusion may in theory be beneficial for mountain ash forests and might eventually produce fire-resistant forests, but that this strategy was impractical under Australian conditions. For Stretton, therefore, pursuing it would endanger neighbouring landholders and threaten public safety. It is telling to reflect on how little the contours of debate have changed since. Recent research, for instance, has demonstrated the need for long-unburned areas to exist for some reptiles to thrive in parts of the High Country;¹³⁷⁹ it is easy to imagine Stretton acknowledging this but judging the protection of these areas during a lengthy transition period impossible.

The politics of burning in Victoria are likely to intensify in the future due to shifts in demographics. The population of Melbourne’s peri-urban fringe (areas which straddle the boundary between urban development and rural or bush areas) is growing rapidly and is forecast to grow from 1.36 million to

¹³⁷⁶ Inspector-General for Emergency Management and State of Victoria, “Review of Performance Targets.”

¹³⁷⁷ Timothy Neale and Daniel May, “Bushfire Simulators and Analysis in Australia: Insights into an Emerging Sociotechnical Practice,” *Environmental Hazards* 17, no. 3 (2018): 200–218; see also Neale, Weir, and McGee, “Knowing Wildfire Risk.”

¹³⁷⁸ Minister for Energy, Environment and Climate Change and Minister for Water, “Government Responds To Lancefield And Sets Out Future Of Planned Burning,” Premier of Victoria, 19 November, 2015, <http://www.premier.vic.gov.au/government-responds-to-lancefield-and-sets-out-future-of-planned-burning/>.

¹³⁷⁹ Kelly M. Dixon et al., “The Disproportionate Importance of Long-Unburned Forests and Woodlands for Reptiles,” *Ecology and Evolution* 8, no. 22 (2018): 10952–63.

1.76 million in 2021, while the population of the “green wedge” is also expected to grow.¹³⁸⁰ This rapid population growth is somewhat analogous to the issues experienced in the United States (described in Chapter Five) where the wildland-urban interface accounts for roughly 30% of the population in the coterminous states and is growing rapidly.¹³⁸¹ While it should be remembered that fires close to the expanding suburbs of Melbourne are by no means new,¹³⁸² these changes are perhaps occurring more rapidly and at greater intensity than ever before. The assumption from most researchers is that the future represents challenges as these vulnerable suburbs expand with more people with little fire literacy who may thus be less likely to prepare their homes for bushfire, and more likely to object to prescribed burns.¹³⁸³

Similarly, the effects of anthropogenic climate change are likely to increase bushfire risk in the fire flume, though the exact nature of changes are uncertain. For instance, projected decreased rainfall may dry out existing fuels, increasing fire danger, but lead to decreased fuel production, lowering fire danger. The number of days with low fire danger conditions is expected to decrease, while the number of days with dangerous conditions is expected to increase.¹³⁸⁴ This increases the dangers of high-intensity firestorms like Black Saturday (independent of the other major factors of fuel and ignition). Furthermore, it represents a shrinking of the annual window in which prescribed burns are currently accepted as possible. This window is already short; averaging perhaps 10 days a year in parts of Victoria.¹³⁸⁵ Either there will be fewer prescribed burns in future, or authorities will need to change the window frames and loosen restrictions while balancing public health concerns around smoke. The

¹³⁸⁰ Holly Foster et al., “Peri-Urban Melbourne in 2021: Changes and Implications for the Victorian Emergency Management Sector,” *The Australian Journal of Emergency Management* 28, no. 3 (2013): 6–11; Lesley Hughes and David Alexander, “Climate Change and the Victorian Bushfire Threat: Update 2017” (Climate Council of Australia, 2017); Michael Buxton et al., “Vulnerability to Bushfire Risk at Melbourne’s Urban Fringe: The Failure of Regulatory Land Use Planning: Vulnerability to Bushfire Risk at Melbourne’s Urban Fringe,” *Geographical Research* 49, no. 1 (2011): 1–12.

¹³⁸¹ Volker C. Radeloff et al., “Rapid Growth of the US Wildland-Urban Interface Raises Wildfire Risk,” *Proceedings of the National Academy of Sciences* 115, no. 13 (2018): 3314–19.

¹³⁸² Hansen and Griffiths point to the 1962 fires in the Dandenong ranges as signalling “a new type of bushfire in Australian history” in Hansen and Griffiths, *Living with Fire: People, Nature and History in Steels Creek*, 82.

¹³⁸³ Holly Foster et al., “Peri-Urban Melbourne in 2021: Changes and Implications for the Victorian Emergency Management Sector,” *The Australian Journal of Emergency Management* 28, no. 3 (2013): 6–11; Anton and Lawrence, “Does Place Attachment Predict Wildfire Mitigation and Preparedness?”; see also A. Malcolm Gill, “Fire, Science and Society at the Urban-Rural Interface,” in *Proceedings of the Royal Society of Queensland*, vol. 115 (Bushfire 2006 Conference Special Edition, Royal Society of Queensland, 2009), 153–60; A Malcolm Gill and Scott L Stephens, “Scientific and Social Challenges for the Management of Fire-Prone Wildland-Urban Interfaces,” *Environmental Research Letters* 4, no. 3 (2009): 1–10.

¹³⁸⁴ Geoffrey J. Cary et al., “Global Change and Fire Regimes in Australia,” in *Flammable Australia: Fire Regimes, Biodiversity and Ecosystems in a Changing World*, ed. Ross A. Bradstock, A. Malcolm Gill, and Richard J. Williams (Collingwood: CSIRO Publishing, 2012), 149–70; Hughes and Alexander, “Climate Change and the Victorian Bushfire Threat: Update 2017.”

¹³⁸⁵ State Government of Victoria, *Report of the Inquiry into the 2002-2003 Victorian Bushfires*, 20.

only certainty around climate change and fire is uncertainty.¹³⁸⁶ Worryingly, high-intensity firestorms in some ecological communities can represent positive feedback loops. A crown fire in some dry eucalypt forests increases the probability of future crown fires,¹³⁸⁷ and the repeated high-intensity fires in 2003, 2006 and 2009 (including Black Saturday) have already caused local extinctions of mountain and alpine ash.¹³⁸⁸ Nevertheless the public, policymakers, and agencies should not over-attribute climate change. As has been argued throughout this chapter and by others, much of what made Black Saturday so devastating was not unprecedented – or indeed unexpected. Overly enthusiastic causal explanations that rely on climate change rob individuals and institutions of their agency in the face of vast atmospheric forces and may encourage despair rather than action.

The debates that followed Black Saturday generated a huge volume of cultural debate over fire. The discourses of prescribed burning and Indigenous burning practices were inextricably linked. This chapter argues that greater fire literacy – built on a more sophisticated language of fire – will help elevate Victorian fire debate above the mudslinging and culture wars that characterised the aftermath of Black Saturday. Conceptualising a spectrum of attitudes towards prescribed burning helps to delineate attitudes beyond simple binaries, allowing for areas of consensus and disagreement to be clearly mapped. Black Saturday saw the emergence of the consideration and caution/uncertainty discourses of Indigenous burning, indicating how the Small Fires of Kakadu and the Fires in the Mind of academic theory had shifted non-Indigenous attitudes towards fire. In a curious way, even the widespread shallow appropriation of Indigenous burning to bolster arguments over prescribed burning point to cultural shifts in Australian society. In 1939, Judge Stretton comfortably joked about the idea of learning from or incorporating Indigenous burning. In 2009, Indigenous burning had gained political currency. As Chapter Eight will show, Indigenous burning will increasingly resemble lived reality.

¹³⁸⁶ Australasian Fire and Emergency Service Authorities Council and Forest Fire Management Group, “Overview of Prescribed Burning in Australasia.”

¹³⁸⁷ James W. Barker and Owen F. Price, “Positive Severity Feedback between Consecutive Fires in Dry Eucalypt Forests of Southern Australia,” *Ecosphere* 9, no. 3 (2018).

¹³⁸⁸ Bowman and Prior, “Fire-Driven Loss of Obligate Seeder Forests in the Alps (Synthesis).”

Chapter Seven:

Grand Unified Theories and Beyond: An Analysis of Martin, Flannery, and Gammage

Whether at the pub or at a conference, whether in formal or casual conversation, whether their collars are white or high-vis, the question is usually much the same. As soon as I start to explain that I research Indigenous burning practices, I see the light of recognition in their eyes and the question gets asked: “Have you read Bill Gammage?” Read the comments on online academic work on Indigenous history or Indigenous burning, and after you have lost your faith in humanity and civil discourse, search for how many times his work is referenced. Billy Griffiths and Lynette Russell did exactly that, and, as discussed below, found the same “recurring refrain”.¹³⁸⁹

This chapter is about Grand Unified Theories of Indigenous environmental impact, and how they have driven perceptions of Indigenous burning outside of major bushfire events.¹³⁹⁰ First, I demonstrate how theories proposed by figures such as Tim Flannery and Paul Martin to explain the extinction of Pleistocene megafauna have been conflated with (and even incorporate) ideas around Indigenous burning. They are subject to similar tropes, are similarly proposed with eyes to the present, and come with political implications. Second, I critique a second set of Grand Unified Theories, chiefly represented by Bill Gammage, more explicitly focused on Indigenous burning in Australia. In less than a decade, these works have rapidly reshaped the discourse of Indigenous burning but come with significant flaws. Third, I adapt and build upon another Grand Unified Theory from the United States (albeit one with far less popular impact) to highlight how both prior sets have been hamstrung by conceptualising discourses of Indigenous burning within binaries. I offer a constructive way of moving past such unproductive discussions.

Megafauna Extinction Theories

Related to the discourse of Indigenous burning is a similar discourse around Indigenous environmental impact: Pleistocene megafaunal extinction debates. Megafauna is a term used to apply to large animals (weighing more than 40 kg). Essentially, a variety of archaeological and palaeontological

¹³⁸⁹ Billy Griffiths and Lynette Russell, “What We Were Told: Responses to 65,000 Years of Aboriginal History,” *Aboriginal History* 42 (2018).

¹³⁹⁰ This term is a reference to a particular branch of particle physics which seeks to unify most of the fundamental forces of the universe. I am grateful to Dr Buzz Lightyear for the chapter title.

evidence indicates that across the globe over relatively short spans of time (by geological standards), a large number of species of megafauna went extinct at a rate and in numbers far greater than at any comparable time over the entire Pleistocene.¹³⁹¹ As these extinctions appear to have roughly coincided with the arrival of humans at various times for various continents, many explanations for these extinctions incorporate some degree of human agency through overhunting. Furthermore, some of the more popular theories that have been proposed incorporate (or even rely upon) Indigenous burning practices. As (in the case of Australia and North America) these humans were the ancestors of Aboriginal Australians and Native Americans, these theories have developed political implications beyond a simple academic debate. Indeed, megafauna extinction theories have achieved a level of popular awareness beyond the vast majority of academic theories. Partly this is due to their political implications, for instance when actions of Pleistocene humans are conflated with arguments over land rights and environmental resources for contemporary Indigenous peoples, but mostly it is because they are a powerful parable. Megafauna extinction by human agency can be used didactically to argue humans are inherently destructive or focused solely on immediate rather than sustainable goals; it is no surprise that the most influential of these theories (Paul Martin's blitzkrieg thesis explored below) was popularised in an intellectual milieu of concern over human impact upon the environment. Martin's first major paper on this topic was published five years after Rachel Carson's *Silent Spring* and one year before Paul Erlich's *The Population Bomb*.¹³⁹² Much in the way Garrett Hardin's original "Tragedy of the Commons" idea has taken on a life of its own despite a lack of supporting evidence,¹³⁹³ the blitzkrieg extinction thesis is too academically and politically convenient to abandon despite a lack of empirical support.

This thesis will present only a very brief summary and exploration of the megafauna extinction debates as they are relevant to understanding the politics of Indigenous burning in Australia and the United States. Both concepts have been discussed with reference to similar tropes of environments and Indigenous peoples; both explanations of a deep past have been used to argue over contemporary issues. Some megafauna extinction theories (especially that proposed by Tim Flannery) rely upon

¹³⁹¹ In the Americas, for instance, roughly two-thirds of the extant megafauna went extinct relatively quickly. Robert L. Kelly and Mary M. Prasciunas, "Did the Ancestors of Native Americans Cause Animal Extinctions in Late-Pleistocene North America? And Does It Matter If They Did?," in *Native Americans and the Environment: Perspectives on the Ecological Indian*, ed. Michael Eugene Harkin and David Rich Lewis (Lincoln: University of Nebraska Press, 2007), 99.

¹³⁹² Donald K. Grayson and David J. Meltzer, "A Requiem for North American Overkill," *Journal of Archaeological Science* 30, no. 5 (2003): 590; Carson, *Silent Spring*; Paul R. Ehrlich, *The Population Bomb* (Sierra Club/Ballantine Books, 1968); P.S. Martin, "Prehistoric Overkill," in *Pleistocene Extinctions: The Search for a Cause*, ed. P.S. Martin and H.E. Wright Jr. (New Haven: Yale University Press, 1967), 75–120.

¹³⁹³ Garrett Hardin, "The Tragedy of the Commons," *Science* 162, no. 3859 (1968): 1243–48; Peter A. Walker, "From 'Tragedy' to Commons: How Hardin's Mistake Might Save the World," *Journal of Natural Resources Policy Research* 1, no. 3 (2009): 283–86.

Indigenous burning practices. Finally, the debates are also a valuable reminder of the ecological nature of any consideration of Indigenous burning. Indigenous burning didn't and does not only affect flora.

Megafauna in Australia: Tim Flannery

In Australia Rhys Jones is well known for his insight of “fire-stick farming” (perhaps in part due to his high-profile archaeological career),¹³⁹⁴ but another author independently developed a similar theory regarding the extent of environmental impact from Indigenous burning practices, although that contribution has received less popular and academic attention. Palaeontologist Duncan Merrilees proposed in 1968 that “modification or destruction of marsupial habitats by man-made fires has resulted in extinction of many species of marsupials in prehistoric time”.¹³⁹⁵ “Peripatetic pyromania”, he said, could explain the extinction of Australia’s megafauna,¹³⁹⁶ and Merrilees drew analogies and inspiration from similar theories of human agency in extinction. Merrilees especially drew from the United States, where (as discussed in Chapter Five) Omer Stewart had proposed that “burning by primitive peoples may thus be considered a determining factor” in explaining why prairies exist rather than forests.¹³⁹⁷ Revealingly, Merrilees’ paper was titled “Man the Destroyer”, and concluded by arguing that “we [non-Indigenous settlers] ignore the lessons of conservation at even more peril than the pyromaniac Aboriginal ignored or failed to conceive his”.¹³⁹⁸ Clearly, just like his contemporary Jones, Merrilees was writing with an eye to the present.

The most famous Australian megafauna extinction theories come from palaeontologist and writer Tim Flannery. In the 1990s through a series of papers and his popular science book *The Future Eaters: An Ecological History of the Australasian Lands and People*, Flannery developed a thesis proposing that Indigenous burning practices did not cause megafaunal extinction, but rather developed as a response to it.¹³⁹⁹ For Flannery, firestick farming “ameliorated the ‘trophic cascade’” that had resulted from the extinction of grazing animals.¹⁴⁰⁰ These large herbivores had previously played essential ecological roles in recycling nutrients and reducing fuel biomass by digesting and defecating vegetation. Their extinction had resulted in a “remarkable change in fire frequency in prehistoric Australia”; “something

¹³⁹⁴ See Griffiths, *Deep Time Dreaming: Uncovering Ancient Australia*.

¹³⁹⁵ Merrilees, “Man the Destroyer: Late Quaternary Changes in the Australian Marsupial Fauna,” 1.

¹³⁹⁶ Merrilees, 20.

¹³⁹⁷ Stewart, “Fire as the First Great Force Employed by Man.”

¹³⁹⁸ Merrilees, “Man the Destroyer: Late Quaternary Changes in the Australian Marsupial Fauna,” 20.

¹³⁹⁹ Tim Flannery, “Pleistocene Faunal Loss: Implications of the Aftershock for Australia’s Past and Future,” *Archaeology in Oceania* 25, no. 2 (1990): 45–55; Flannery, *The Future Eaters*.

¹⁴⁰⁰ Flannery, “Pleistocene Faunal Loss: Implications of the Aftershock for Australia’s Past and Future,” 45.

must have happened, therefore, that left more combustible plant matter lying around”.¹⁴⁰¹ Indigenous Australians thus developed firestick farming to reduce fuel loads and prevent high-intensity, nutrient-stripping fires. However, “fire is a far inferior way of recycling nutrients” compared to digestion through herbivores (taking a longer time and with greater net loss of nutrients), and so firestick farming slowly resulted in the extension of poor soils and selection of plants that were comparatively better-adapted to increased fire frequency and degraded soil fertility, creating a feedback loop of fire.¹⁴⁰² Flannery had drawn inspiration from the blitzkrieg theories of American Paul Martin,¹⁴⁰³ and pointed to the “great disparity of timing” of megafauna extinctions worldwide as presenting “almost insurmountable” evidence against extinction theories which emphasised global climate changes over human agency.¹⁴⁰⁴ Flannery’s work “changed Australia’s national conversation” and ensured he became a genuine household name and public intellectual, with *The Future Eaters* selling over 100,000 copies.¹⁴⁰⁵

Even with all its popularity (and perhaps partially because of it), Flannery’s thesis has been extremely controversial. Among academics, archaeologist Judith Field has stated Flannery “doesn’t let the facts get in the way of a good story”, while palaeontologist Stephen Wroe has called Flannery an “opportunist”, especially with regard to his advocacy pivot towards anthropogenic climate change.¹⁴⁰⁶ Archaeologist Jim Allen once said of Flannery “I wish I could be as sure of anything as Tim is of everything”.¹⁴⁰⁷ Criticisms of his thesis are not just personal. The extent of the role that human hunting played in the megafauna extinction is especially contested. For instance, several recent papers have argued there is good evidence that some now-extinct megafauna species co-existed with humans for many thousands of years, undermining the speed required by the rapid “blitzkrieg” hunting component of Flannery’s thesis.¹⁴⁰⁸ The overhunting aspect of the theory relies upon analogies with well-documented overhunting on Pacific islands, and there is evidence that Indigenous Australians did

¹⁴⁰¹ Flannery, *The Future Eaters*, 229.

¹⁴⁰² Flannery, 232.

¹⁴⁰³ Flannery, “Pleistocene Faunal Loss: Implications of the Aftershock for Australia’s Past and Future,” 50.

¹⁴⁰⁴ Flannery, *The Future Eaters*, 185.

¹⁴⁰⁵ Paul Sheehan, “The Flannery Eaters,” *The Sydney Morning Herald*, 5 June, 2004, sec. Spectrum.

¹⁴⁰⁶ Sheehan.

¹⁴⁰⁷ Sheehan.

¹⁴⁰⁸ Hamm et al., “Cultural Innovation and Megafauna Interaction in the Early Settlement of Arid Australia”; Michael C. Westaway, Jon Olley, and Rainer Grün, “At Least 17,000 Years of Coexistence: Modern Humans and Megafauna at the Willandra Lakes, South-Eastern Australia,” *Quaternary Science Reviews* 157 (2017): 206–11; Clive NG Trueman et al., “Prolonged Coexistence of Humans and Megafauna in Pleistocene Australia,” *Proceedings of the National Academy of Sciences of the United States of America* 102, no. 23 (2005): 8381–8385.

cause extinctions of some species on smaller islands around continental Australia.¹⁴⁰⁹ Nevertheless, Wroe, Field, and American archaeologist Donald Grayson have argued “islands are not continents writ small” and therefore this analogy, “the lynchpin” of any blitzkrieg overhunting thesis, is flawed.¹⁴¹⁰

Ultimately, the megafauna extinction debate in Australia is probably, as David Bowman described it, “intractable” as there is great scarcity of uncontested evidence.¹⁴¹¹ There are very few archaeological sites to provide a conclusive picture of the dating of human arrival in Sahul.¹⁴¹² Explanatory models which combine human agency and climate in various ways, perhaps through staggered extinctions, may prove increasingly popular.¹⁴¹³ As with discourses of Indigenous burning, there are strong entanglements with theories of megafauna extinction in North America.

Megafauna in the US: Paul Martin

As with Flannery in Australia, the extinction of Pleistocene megafauna in North America has been explained by many different theories beyond the most famous – Paul Martin’s blitzkrieg theory. Geographer Carl Sauer (discussed in Chapter Five) turned to American Indian fire as an explanation decades before both Martin and Flannery. Sauer noted in 1944 that “it was the big and clumsy animals that disappeared” and the only new element added was humans.¹⁴¹⁴ For Sauer, the stone tools available to Pleistocene hunters were inadequate to hunt animals such as mastodon, but there was “one terrible weapon available”: fire.¹⁴¹⁵ Fire was used to drive animals along particular paths where they would be vulnerable. The repetition of these fire drives over a long period of time explained why Sauer returned to the “old view, held by the American pioneers of the West, that prairies are caused by fires” where there would otherwise be forests.¹⁴¹⁶

¹⁴⁰⁹ Spriggs, “Future Eaters in Australia, Future Eaters in the Pacific?”; Ian Abbott, “Aboriginal Man as an Exterminator of Wallaby and Kangaroo Populations on Islands Round Australia,” *Oecologia* 44, no. 3 (1979): 347–54.

¹⁴¹⁰ Stephen Wroe, Judith Field, and Donald K. Grayson, “Megafaunal Extinction: Climate, Humans and Assumptions,” *Trends in Ecology & Evolution* 21, no. 2 (2006): 62.

¹⁴¹¹ Bowman, “The Impact of Aboriginal Landscape Burning,” 100.

¹⁴¹² Christopher N. Johnson, “Fire, People and Ecosystem Change in Pleistocene Australia,” *Australian Journal of Botany* 64, no. 8 (2016): 643–51; Hamm et al., “Cultural Innovation and Megafauna Interaction in the Early Settlement of Arid Australia.”

¹⁴¹³ D. Burney and T. Flannery, “Fifty Millennia of Catastrophic Extinctions after Human Contact,” *Trends in Ecology & Evolution* 20, no. 7 (2005): 395–401; Stephen Wroe and Judith Field, “A Review of the Evidence for a Human Role in the Extinction of Australian Megafauna and an Alternative Interpretation,” *Quaternary Science Reviews* 25, no. 21–22 (2006): 2692–2703.

¹⁴¹⁴ Sauer, “A Geographic Sketch of Early Man in America,” 541.

¹⁴¹⁵ Sauer, 543.

¹⁴¹⁶ Sauer, 551.

Undoubtedly the most well-known Pleistocene extinction theory is Paul Martin's blitzkrieg hypothesis. While the hypothesis evolved over several decades, it was based on four principles: human colonisation of islands had invariably led to extinctions; the Clovis were the first peoples in the Americas; the Clovis preyed on the now-extinct megafauna; and the megafauna extinctions occurred at a similar time to the arrival of the Clovis peoples (roughly 11,000 years ago).¹⁴¹⁷ For Martin, the scarcity of archaeological evidence for direct hunting of these extinct megafauna could be explained through behavioural naivety; "a rapid rate of killing would wipe out the more vulnerable prey before there was time for the animals to learn defensive behaviour".¹⁴¹⁸ This "poor paleontological visibility" is thus an entirely "predictable condition" as the killing had occurred so rapidly – a 'blitzkrieg' of overhunting.¹⁴¹⁹ No doubt inspiring Flannery, Martin compared these supposed human-caused extinctions to contemporary rates of human-driven extinction, warning that "we could become the 'Planet of Doom'".¹⁴²⁰ Thus a theory about the past is also about the present.

Martin's work achieved a tremendous amount of popular impact and has appeared in the popular press, cultural imagination, and university syllabi for decades. Yet this acclaim is probably undeserved. As noted above, "there is little archaeological evidence" for "direct association between people and megafauna" (such as evidence of hunting, butchering, or cooking on bones) – this is sometimes called the "associational critique".¹⁴²¹ Martin's thesis sought to explain this lack of evidence (and indeed, relied upon it), yet this aspect has been extensively criticised. As Standing Rock Sioux historian Vine Deloria Jr. argued, "If you can't test the thesis because there is no evidence, why does it still qualify as a thesis?"¹⁴²² It certainly fails the classic test of falsifiability proposed by philosopher of science Karl Popper.¹⁴²³ Less contestable criticisms are that human settlement of the Americas predates the Clovis culture and that there is decent evidence that many Pleistocene megafauna actually went extinct before human arrival.¹⁴²⁴ This has led to the critique that the blitzkrieg overhunting thesis has evolved into a "faith-based policy statement" rather than a testable hypothesis about the past.¹⁴²⁵ Yet despite

¹⁴¹⁷ Martin was a prolific author and his work was developed over many decades. A good summary can be found in Grayson and Meltzer, "A Requiem for North American Overkill."

¹⁴¹⁸ P.S. Martin, "The Discovery of America," *Science* 179, no. 4077 (1973): 969.

¹⁴¹⁹ Martin, 969.

¹⁴²⁰ Martin, "40,000 Years of Extinctions on the 'Planet of Doom,'" 200.

¹⁴²¹ Lisa Nagaoka, Torben Rick, and Steve Wolverton, "The Overkill Model and Its Impact on Environmental Research," *Ecology and Evolution* 8, no. 19 (2018): 9685.

¹⁴²² Deloria Jr., "The Speculations of Krech," 286.

¹⁴²³ As Grayson and Meltzer wryly note, "it is a rare hypothesis that predicts a lack of supporting evidence", see Grayson and Meltzer, "A Requiem for North American Overkill," 588; Karl Popper, *Conjectures and Refutations* (London: Routledge, 1963).

¹⁴²⁴ Grayson and Meltzer, "A Requiem for North American Overkill"; Nagaoka, Rick, and Wolverton, "The Overkill Model and Its Impact on Environmental Research."

¹⁴²⁵ Grayson and Meltzer, "A Requiem for North American Overkill," 591.

these serious criticisms, the overkill hypothesis is still popular, and relevant to an analysis of Indigenous burning for a number of reasons.

Megafauna, Burning Questions, and Questions of Burning

While the direct link between overhunting and Indigenous fire is not especially prominent in North America (indeed, as for Native American fire in general – see Chapter Five), through Flannery’s adaptation of the blitzkrieg hypothesis the two conceptions of Indigenous environmental impact have become inextricably linked in Australia.¹⁴²⁶ Both theories can take the form of grand, universalising narratives that are motivated by similar concerns and subject to the same tropes. In a 1982 polemic, David Horton speculated that the theory of firestick farming was a reaction against the idea that hunter-gatherers “are somehow second class citizens in comparison to farmers”, and that overhunting theories were similarly “a reaction against the idea of hunter-gatherers being [in] harmony with nature”.¹⁴²⁷ Matthew Spriggs classified *The Future Eaters* as an “antipodean version of the Fall with Aborigines as Adam and Eve”,¹⁴²⁸ while Peter Hiscock identified it with Carolyn Merchant’s observations of the dominant trend towards “recovery narratives” in Western histories of the colonisation of the ‘New World’.¹⁴²⁹ For Hiscock, both overhunting extinction and firestick farming “follow the narrative arc of Genesis”; the arguments only differ “in their assigning of culpability for the Fall” (Indigenous for megafauna, European settlers for disrupting firestick farming).¹⁴³⁰ Similarly, Shepard Krech used Martin’s blitzkrieg thesis as one of his prime supporting planks for deconstructing the ‘Ecological Indian’ stereotype (see Chapter Five).¹⁴³¹ These observations further demonstrate a key explanation for the popularity of overhunting theories: the underlying theme or trope is that “humans as a species are inherently destructive”.¹⁴³² Even if megafauna overkill extinction is

¹⁴²⁶ Bowman, “Future Eating and Country Keeping.”

¹⁴²⁷ David Horton, “The Burning Question: Aborigines, Fire, and Australian Ecosystems,” *Mankind* 13, no. 3 (1982): 248.

¹⁴²⁸ Spriggs, “Future Eaters in Australia, Future Eaters in the Pacific?,” 53.

¹⁴²⁹ Peter Hiscock, “Creators or Destroyers? The Burning Questions of Human Impact in Ancient Aboriginal Australia,” *Humanities Australia* 5 (2014): 40–52; Carolyn Merchant, “Reinventing Eden: Western Culture as a Recovery Narrative,” in *Uncommon Ground: Rethinking the Human Place in Nature*, ed. William Cronon (New York: Norton, 1996), 132–70.

¹⁴³⁰ Hiscock, “Creators or Destroyers? The Burning Questions of Human Impact in Ancient Aboriginal Australia,” 41.

¹⁴³¹ Krech III, *The Ecological Indian: Myth and History*; Vine Deloria Jr uncovered Krech’s hidden ambivalence towards the blitzkrieg thesis and suspected Krech was “simply paying his dues to establishment scholars who hold this view”, see Deloria Jr., “The Speculations of Krech”, 286.

¹⁴³² Nagaoka, Rick, and Wolverton, “The Overkill Model and Its Impact on Environmental Research,” 9689.

disproven, another parable will be found to support and demonstrate such embedded views of humanity as inherently destructive.

It is remarkable how overhunting theories are more popular outside the expert arena than in it. This disparity is due to the inferences and supposed lessons that can be drawn from each hypothesis. Citation analyses and surveys of archaeologists and palaeontologists have shown that the majority of currently-practising academics in these fields tend to emphasise multi-factor explanations, whereas ecologists continue to emphasise overhunting as a single-factor explanation.¹⁴³³ Overhunting's "most vocal adherents are primarily those whose expertise lies outside the place and time period involved".¹⁴³⁴ This phenomenon is more than merely suggestive that these theories are popular for reasons other than elegance and evidentiary salience. They are resonant, and appealing both to a powerful and enduring cultural trope, and for myriad contemporary political uses.

The first of these political uses is how megafauna overhunting can be used to conflate Pleistocene human irresponsibility with contemporary Indigenous peoples.¹⁴³⁵ During the Coronation Hill mining debate in Kakadu National Park, the corporate-oriented Institute of Public Affairs attempted to use Flannery's thesis to undermine Indigenous connections to country (and thus smooth the path for modern mining).¹⁴³⁶ This theme was continued when conservative columnist David Barnett declared in 1998 Kakadu was nothing more than a "hunting preserve for Aborigines", and condemned Indigenous practices in Kakadu as illegitimate because Flannery had shown "Aborigines obliterated the flora and fauna which they found when they arrived, impoverishing the soil and desiccating the continent".¹⁴³⁷ Flannery himself pointed out this conflation was "just about as sensible as confusing Neanderthal mammoth hunting with contemporary European park management" (and thus quite clearly an appropriation in the typology identified in Chapter Six).¹⁴³⁸ Nevertheless, Indigenous academic Marcia Langton furiously attacked Flannery for providing the "apparently unintentional scientific justification" for "neo-colonial parks and wildlife services to deny Aboriginal people access to, occupation and use...of areas which they own under Australian law".¹⁴³⁹ Furthermore, Langton charged Flannery with responsibility for the use and misrepresentation of his theory "by settler Australians seeking to assert their purportedly superior custodianship of the Australian continent", as

¹⁴³³ For instance see Nagaoka, Rick, and Wolverton, "The Overkill Model and Its Impact on Environmental Research."

¹⁴³⁴ Grayson and Meltzer, "A Requiem for North American Overkill," 586.

¹⁴³⁵ Geographer Lesley Head had warned of this outcome in Head, "Prehistoric Aboriginal Impacts on Australian Vegetation; An Assessment of the Evidence."

¹⁴³⁶ Spriggs, "Future Eaters in Australia, Future Eaters in the Pacific?," 58.

¹⁴³⁷ Barnett, "Fire-Stick Farmers Are Killing Kakadu."

¹⁴³⁸ Flannery, "Gross Ignorance in Kakadu Claim [Letter]."

¹⁴³⁹ Langton, *Burning Questions: Emerging Environmental Issues for Indigenous Peoples in Northern Australia*, 53.

it allowed them to claim “modern Australian pastoralism constitutes restoration of the Australian environment”.¹⁴⁴⁰

Indeed, this disputation demonstrates the second and third political resonances of these issues – how overhunting theories can be used to variously justify or resist interventionist environmental policy. Flannery himself has argued for the contemporary adoption of Indigenous firestick farming to resist nutrient loss and prevent high-intensity bushfires, in order to restore the post-overhunting environment.¹⁴⁴¹ In her criticisms of Flannery’s influence, Langton referred to the mid-1990s dispute over a NSW Farmers Federation-sponsored pamphlet. This pamphlet relied upon *The Future Eaters* and selective quotation from explorer journals to argue that regrowth of native species on pastoral and agricultural lands was due to a cessation of Indigenous burning; clearing, therefore, was a restoration of pre-European vegetation.¹⁴⁴² The pamphlet was “an insubstantial piece of scholarship” which earned “more attention than it deserved”,¹⁴⁴³ but nevertheless was used to argue against regulations restricting land clearing and remained influential in some circles for many years,¹⁴⁴⁴ demonstrating how academic and political spheres have increasingly intersected in megafauna debates.

Conversely, overhunting theories have been used to argue *against* contemporary environmental interventions by humans. Radical environmentalist David Foreman quoted from Martin to argue against efforts to reintroduce a more interventionist style of management of protected lands in America.¹⁴⁴⁵ A letter from an environmental activist to Fire Revolutionary Harold Biswell challenged Biswell’s call for a reintroduction of fire on public lands by labelling the proverbial Indian as a “pyromaniac with a torch” who had destroyed the “fabulous food resource” that was the Pleistocene megafauna.¹⁴⁴⁶ Just like Indigenous burning, we could interpret the discourse of megafaunal extinction debates using the typology outlined in Chapter Six. Just like Indigenous burning, megafauna overhunting can be resonant but harmonise with very different melodies.

¹⁴⁴⁰ Langton, 12–13.

¹⁴⁴¹ Flannery, *The Future Eaters*, 381.

¹⁴⁴² Ryan, Ryan, and Starr, “The Australian Landscape-Observations of Explorers and Early Settlers”; Benson and Redpath, “The Nature of Pre-European Native Vegetation in South-Eastern Australia.”

¹⁴⁴³ Griffiths, “How Many Trees Make a Forest?,” 383.

¹⁴⁴⁴ J. S. Benson, “Beautiful Lies: Correspondence,” *Quarterly Essay* 13 (2004): 127–34.

¹⁴⁴⁵ Foreman, “Wilderness Areas for Real,” 402.

¹⁴⁴⁶ McMillan, “Letter to Harold Biswell”, BANC.

The Biggest Estate on Earth

The second set of Grand Unified Theories to explore come from historian Bill Gammage and author Bruce Pascoe. These have been tremendously popular, even more so than Flannery, and certainly more immediately than the work of Rhys Jones or Sylvia Hallam. This brings me to a major concern of this chapter. What has happened in Australia to make these messages so resonant? What social, environmental, and cultural changes made it possible for first Gammage and then Pascoe to sell thousands of books, win prizes, and deliver many guest lectures to packed-out audiences? The series of devastating bushfires in Victoria in the 2000s, culminating in Black Saturday, ensured that bushfire was on the mind of Australians – and as Chapter Six demonstrated, the resulting series of inquiries elevated and encouraged diverse contributions to debates around the impact of Indigenous burning. The emergence of anthropogenic climate change as a major political issue in the late 2000s elevated the environment to a level of prominence in popular culture it had not enjoyed since the 1983 federal election, with its ‘No Dams’ resonances. Temperature records both local and global have been exceeded, transforming climate change from an abstract future concern to a present-day worry.¹⁴⁴⁷

Most significantly, there has been a hesitant embrace of Aboriginality by non-Indigenous Australians, and a flourishing of Indigenous culture, at least as recognised in political and public ceremony. Prime Minister Kevin Rudd’s Apology to the Stolen Generations has been accompanied over the last decade by what Wotabaluk historian Lynette Russell calls an “Indigenous renaissance”, as Acknowledgements of Country become increasingly common, sporting and cultural organisations incorporate various interpretations of Indigeneity into their activities, and Indigenous Australians increasingly assert their identity themselves.¹⁴⁴⁸ There is of course good cause to be cautious about pronouncing grand cultural shifts in the contemporary period, but as Denis Byrne argues, “there is something quite radical and extraordinary in the prospect of a settler culture which for so long had pronounced indigenous culture to be a savage anachronism suddenly turning to embrace the past of that culture as its own.”¹⁴⁴⁹ Chapter Eight will explore the growth of Indigenous burning as a practice in these years.

It is in this context that Bill Gammage’s *The Biggest Estate on Earth* was published in 2011, and Bruce Pascoe’s *Dark Emu: Black Seeds: Agriculture or Accident?* in 2014.¹⁴⁵⁰ While *Dark Emu* has been wildly influential, it discusses Indigenous burning in a problematic fashion and most of the book focusses on

¹⁴⁴⁷ National Oceanic and Atmospheric Administration, “2018 Was 4th Hottest Year on Record for the Globe,” 6 February, 2019, <https://www.noaa.gov/news/2018-was-4th-hottest-year-on-record-for-globe>.

¹⁴⁴⁸ Lynette Russell, “Living in the Indigenous Space,” *Australian Book Review*, 2019.

¹⁴⁴⁹ Denis Byrne, “Deep Nation: Australia’s Acquisition of an Indigenous Past,” *Aboriginal History* 20 (1996): 82.

¹⁴⁵⁰ Gammage, *The Biggest Estate on Earth*; Bruce Pascoe, *Dark Emu: Black Seeds: Agriculture or Accident?* (Broome, Western Australia: Magabala Books, 2014).

other issues, unlike the more fire-oriented and certainly more scholarly *The Biggest Estate*. Pascoe over-reads the available sources in a determination to prove pre-colonial Indigenous Australians practised European-style ‘agriculture’, making little room for cultural diversity, contradictory evidence, or reflection on how proving agricultural practices can reinforce hierarchical interpretations of human societies.¹⁴⁵¹ Furthermore, *Dark Emu* made much less of an original contribution to debates than *The Biggest Estate*. Consequently, in this section I devote attention to critiquing *The Biggest Estate*. While Gammage has written scholarly articles which draw from and perhaps extend *The Biggest Estate*,¹⁴⁵² here I explore only this monograph as its demonstrable influence and flaws as a book should stand on its own.

The most comprehensive historical exploration of Indigenous burning in print, *The Biggest Estate* has achieved an admirable level of impact inside and outside academia. It has won a swag of awards and was shortlisted for many others. Together with *Dark Emu*, *The Biggest Estate* is shaping a major reconfiguration of how non-Indigenous Australians understand Indigenous Australia. Yet the critical response has not been uniformly positive. Reviews from contemporary fire managers,¹⁴⁵³ ecologists,¹⁴⁵⁴ pyrogeographers,¹⁴⁵⁵ and anthropologists have found much to criticise.¹⁴⁵⁶ Some of the perceived negative reaction to *The Biggest Estate* is certainly overstated,¹⁴⁵⁷ and some of it may be due to irritation at publisher hype and careless journalism that argued *The Biggest Estate* ‘discovered’ Indigenous burning (Gammage himself was careful to acknowledge the work of Sylvia Hallam, Rhys Jones and others). I argue that many of the criticisms are compelling and could have been addressed before publication, but my criticisms do not overshadow the monumental achievement of this book. Nearly a decade since the publication of *The Biggest Estate*, and with benefit of cooled hype and a view of work published in response, it is timely to examine both the book itself and its impact.

¹⁴⁵¹ *Dark Emu* received renewed attention in late 2019 as a new front in the culture wars, prompting a much-needed corrective to its hyperbolic claims. See Tom Griffiths, “Reading Bruce Pascoe,” *Inside Story*, 26 November, 2019, <https://insidestory.org.au/reading-bruce-pascoe/>; Russell Marks, “Taking Sides over ‘Dark Emu’: How the History Wars Avoid Debate and Reason,” *The Monthly*, 5 February, 2020.

¹⁴⁵² Bill Gammage, “Fire in 1788: The Closest Ally,” *Australian Historical Studies* 42, no. 2 (2011): 277–88.

¹⁴⁵³ Adam Leavesley, “[Review] ‘The Biggest Estate on Earth - How Aborigines Made Australia,’” *Ecological Management & Restoration* 13, no. 2 (2012): e4–5.

¹⁴⁵⁴ Steve J. Sinclair, “[Review] ‘The Biggest Estate on Earth - How Aborigines Made Australia,’” *Ecological Management & Restoration* 13, no. 2 (2012): e6–e6.

¹⁴⁵⁵ David Bowman, “The Biggest Estate on Earth: How Aborigines Made Australia by Bill Gammage [Review],” *Australian Historical Studies* 43, no. 2 (2012): 321–22.

¹⁴⁵⁶ Timothy Neale, “Review of ‘The Biggest Estate on Earth,’” *Arena Magazine*, February 2012.

¹⁴⁵⁷ It is difficult to reconcile the narrative of strident academic “scorn” depicted by Bruce Pascoe with the swathe of academic awards and lecture invitations resulting from *The Biggest Estate*. See Bruce Pascoe, “Andrew Bolt’s Disappointment,” *Griffith Review*, 2012, <https://griffithreview.com/articles/andrew-bolts-disappointment/>.

There is little doubt that *The Biggest Estate* has had a major impact on how non-Indigenous Australians understand both Indigenous Australia and antipodean fire. Quite apart from the many awards it has won,¹⁴⁵⁸ the book was drawn upon significantly in later published memoirs from Black Saturday as survivors strove to understand the disaster that had befallen them.¹⁴⁵⁹ As discussed in Chapter Six, bushfire scientists and practitioners debating Victorian prescribed burning policy extensively referenced *The Biggest Estate*.¹⁴⁶⁰ Furthermore, there is strong evidence that Gammage's work has reached the broader public. In 2017 the news website *The Conversation* published a short article describing recent archaeological finds that suggested an even earlier antiquity for humans in Sahul than previously thought.¹⁴⁶¹ The article attracted a great deal of public attention, was read over 50,000 times, and attracted over 1,000 comments on various online platforms. The authors quickly realised this represented an opportunity to "take the pulse" (albeit in a non-representative fashion) of the Australian public's views of Aboriginal Australia, and thus engaged in an analysis of the comments.¹⁴⁶² Despite the original article never once even mentioning 'wilderness' or 'fire', over 10% of the comments used these terms!¹⁴⁶³ There was very little dismissal or disputation of Indigenous burning; instead the commenters "were asking how, not if, Aboriginal fire had shaped the environment", and the most referenced source was *The Biggest Estate*.¹⁴⁶⁴ Indeed, as related in the opening to this chapter, when describing my own doctoral studies in general conversation, Gammage's book is invariably a common (perhaps the most common) point of reference for non-specialists. As Griffiths and Russell relate, a "recurring refrain" in the comments they analysed was: "Have you read Bill Gammage?"¹⁴⁶⁵

On the surface, this is marvellous. Eight decades ago, Judge Leonard Stretton laughed about the prospect of Indigenous burning.¹⁴⁶⁶ Today, Prime Ministers talk of fire-stick farming and education

¹⁴⁵⁸ Including the Prime Minister's Prize for Australian History, Victorian Prize for Literature, and shortlisted for the Australian Historical Association's Kay Daniels Award.

¹⁴⁵⁹ See, for instance Kenny, *Gardens of Fire*, 96.

¹⁴⁶⁰ See for instance David Packham, "Submission to Mr Tony Pearce," 2015, <http://www.igem.vic.gov.au/documents/CD/15/186510>; Roger Underwood, "Academia's Flaming Nincompoops," *Quadrant Online* (blog), 28 December, 2015, <https://quadrant.org.au/opinion/doomed-planet/2015/12/academias-flaming-nincompoops/>; Attiwill and Adams, "Mega-Fires, Inquiries and Politics in the Eucalypt Forests of Victoria, South-Eastern Australia," 51–52; Dick Pegg, "Fuel Management Programs a 'Must' ...before It's Too Late [Letter to the Editor]," *Timber & Forestry E News*, 2014, 12; Lindenmayer et al., *Mountain Ash: Fire, Logging and the Future of Victoria's Giant Forests*, 24.

¹⁴⁶¹ Billy Griffiths et al., "Friday Essay: When Did Australia's Human History Begin?" *The Conversation*, 17 November 2017, <https://theconversation.com/friday-essay-when-did-australias-human-history-begin-87251>

¹⁴⁶² Griffiths and Russell, "What We Were Told."

¹⁴⁶³ Billy Griffiths, "[Personal Communication with Author]," 9 October, 2019.

¹⁴⁶⁴ Griffiths and Russell, "What We Were Told."

¹⁴⁶⁵ Griffiths and Russell.

¹⁴⁶⁶ Stretton Day 16, p 1134

authorities recommend *The Biggest Estate* as a teaching guide.¹⁴⁶⁷ Yet I am troubled. Gammage's work encourages a view of Indigenous burning that is broad, rather than deep.

The Biggest Estate: Message, Strengths, and Methodology

The core thesis of *The Biggest Estate* is beguilingly simple: the "chief ally" for Indigenous Australians before colonisation was fire.¹⁴⁶⁸ A single unifying "ecological philosophy enforced by religious sanction" compelled Indigenous Australians to care for country, meaning Australia was no wilderness but rather a managed landscape – a huge continental estate maintained by fire.¹⁴⁶⁹ "Templates" and patterns were repeated across the continent as "means were local, ends were universal", and ensured predictable utilisation of resources.¹⁴⁷⁰ Furthermore, a number of the environmental issues afflicting Australia today – salinity, soil erosion, even drought – can all be traced to the cessation of Indigenous burning.¹⁴⁷¹ Gammage used three main sources in developing his argument: colonial art and documentary sources, anthropological accounts of contemporary Indigenous societies from central and northern Australia, and "what plants tell of their fire history and habitats" (for instance interpreting contemporary shape and distribution of trees to trace their life history).¹⁴⁷²

The Biggest Estate was a thoroughly deserving prize-winner. It directly references an astonishing amount of documentary evidence (perhaps 1500 books, theses, and articles). Readers are invited to read country through the eyes of an environmental historian, interpreting the shape and distribution of eucalypts today as the process of historical forces. Some chapters are excellent and deserve reconsideration from critics ('Farms without fences' is where Gammage really hits his stride). The deep empathy for Indigenous Australians and the trauma of colonisation is introduced subtly, ensnaring the conservative section of Gammage's readership who may have been turned off by more direct advocacy. This subtle approach is also used in Gammage's implicit criticism that unrestrained capitalism's profit motive drove the soil exhaustion and degradation afflicting Australia today. *The*

¹⁴⁶⁷ Peter Hartcher, "Barbed Wire Fence Tangle for PM," *The Sydney Morning Herald*, 26 October, 2013; Victorian Curriculum and Assessment Authority, "Advice for Teachers - Agricultural and Horticultural Studies: Unit 1 – Area of Study 1: Food and Fibre Industries," accessed 20 November, 2019, <https://www.vcaa.vic.edu.au/curriculum/vce/vce-study-designs/agricultural-and-horticultural-studies/advice-for-teachers/Pages/Unit1AreaofStudy1.aspx>.

¹⁴⁶⁸ Gammage, *The Biggest Estate on Earth*, 2.

¹⁴⁶⁹ Gammage, 2.

¹⁴⁷⁰ Gammage, 2.

¹⁴⁷¹ Gammage, 103-111.

¹⁴⁷² Gammage, xv.

Biggest Estate drags the lingering laggards of fire research far beyond the vague paradigms of ‘fire was used for hunting’ or ‘fire was patch burning’, making much deeper and more sophisticated arguments about (for instance) Indigenous fire as a form of crop rotation. My criticisms should not diminish these achievements; I greatly admire this book and most aspects of it – and, as we shall see, I suspect many of its critics would reach similar conclusions if Gammage had made some relatively simple editorial changes.

Gammage is upfront about the lack of Indigenous voices directly used in his work, instead favouring his three main types of evidence (artwork and written accounts, reading country, and selective use of ecological literature). This puts him out of step with contemporary trends in Indigenous scholarship but is understandable given he is attempting to address a presumably sceptical audience.¹⁴⁷³ More problematic, as Tim Neale has noted, are his universal interpretations of the Dreaming as a continent-wide cosmology.¹⁴⁷⁴ I do not intend to dwell on this point in any depth as it deserves a response from Indigenous Australians themselves. Nevertheless, the problematic nature of the ecological universalism renders the cultural universalism suspect.

The Biggest Estate focuses upon “1788 fire”; it “interrupts” Indigenous burning patterns at this time,¹⁴⁷⁵ and the choice to do so can imply a cultural fixity and temporal universalism that weakens the overall thesis. During the Pleistocene sea levels were over 100m lower than today, with temperatures and rainfall significantly different to today or 1788. As archaeologist Peter Hiscock has argued, this complicates the image of fixed burning practices implied by *The Biggest Estate*. Indeed, there is abundant evidence to show cultural change in Indigenous societies before 1788, and strong evidence from pollen and charcoal cores showing significant changes in burning patterns across Sahul before 1788.¹⁴⁷⁶ There is no real sense of this in *The Biggest Estate*; the “intensification” thesis is just briefly touched upon,¹⁴⁷⁷ and Gammage only obliquely discusses the theory that consistent Indigenous burning may have had detrimental environmental impacts in the long term by replacing nutrient recycling through composting with nutrient-degrading burning.¹⁴⁷⁸ Geographer Lesley Head noted three decades ago that most discussion of pre-colonial Indigenous environmental impact assumes a

¹⁴⁷³ Don L. Hankins, “Review of *The Biggest Estate on Earth: How Aborigines Made Australia*. By Bill Gammage,” *Environmental History* 17, no. 3 (2012): 653–55.

¹⁴⁷⁴ Neale, “Review of ‘*The Biggest Estate on Earth*.’”

¹⁴⁷⁵ Gammage, *The Biggest Estate on Earth*, 323.

¹⁴⁷⁶ Hiscock, “Creators or Destroyers? The Burning Questions of Human Impact in Ancient Aboriginal Australia.”

¹⁴⁷⁷ For an in-depth account of the “intensification” debate, see Griffiths, *Deep Time Dreaming: Uncovering Ancient Australia*; Harry Lourandos and Anne Ross, “The Great ‘Intensification Debate’: Its History And Place In Australian Archaeology,” *Australian Archaeology* 39, no. 1 (1994): 54–63.

¹⁴⁷⁸ A criticism made by Hallam in Sylvia J. Hallam, “*The Biggest Estate on Earth: How Aborigines Made Australia* [Review],” *Australian Aboriginal Studies* 2 (2011): 123–26.

“single ongoing impact...rarely is allowance made for the possibility of changes over time”.¹⁴⁷⁹ Gammage chose to fix *The Biggest Estate* in 1788 (perhaps to avoid ambiguities over these changes in burning), but an elaboration of this reasoning would have been welcome.

This point about an assumption of pre-contact uniformitarianism matters because when Indigenous burning is extended before 1788, we can view a much richer and deeply nuanced story of societies adapting to forces outside their control over tens of thousands of years. Similarly, Gammage chose not to discuss contemporary Indigenous burning in any depth – making just cursory references to burning in the central and northern parts of Australia (and none at all to burning in the southern states). While *The Biggest Estate* aims to discuss Indigenous burning as it was just before colonisation, this omission may reinforce perceptions of cultural and environmental discontinuity in the minds of readers.

One of the reasons for the negative reception of *The Biggest Estate* among many communities of experts is its imprecise and idiosyncratic language.¹⁴⁸⁰ A key concept for Gammage’s argument is his conceptualisation of the “template”, which he defines as “plant communities deliberately associated, distributed, sometimes linked to natural features, and maintained for decades or centuries to prepare country for day-to-day working”.¹⁴⁸¹ Sylvia Hallam herself noted that “template” usually refers to a plan, rather than the entity resulting from a plan.¹⁴⁸² I spotted perhaps half a dozen discernible and distinct “templates” throughout the text; the readership may have benefited from explicit labelling of these such as a ‘sawtooth template’ or ‘cliff trap template’, with the later identification of similar templates bolstering the sense of repeated patterning of vegetation.¹⁴⁸³ This would have avoided giving the reader the impression that *everything* was a template – rather than a vast estate of many different templates. It also highlights the need for a discerning and complete continental vision of fire.

The imprecision of language in *The Biggest Estate* also implies a universality of Indigenous burning patterns. At times the book states “plant patterns were unnatural but universal...everywhere [Indigenous people] made similar templates for similar purposes”, or that “most of Australia was burnt about every 1-5 years depending on local conditions and purposes”, while at other times Gammage gives slippery figures (northern grasslands burned annually, dry ridges “perhaps every 15-25 years”, and so on).¹⁴⁸⁴ Yet Gammage also states

¹⁴⁷⁹ Head, “Prehistoric Aboriginal Impacts on Australian Vegetation; An Assessment of the Evidence,” 41.

¹⁴⁸⁰ Ecologist and botanist Paul Adam called it “beguiling” in Paul Adam, “Can Ideas Be Dangerous?,” *Australian Zoologist* 38, no. 3 (2017): 352.

¹⁴⁸¹ Gammage, *The Biggest Estate on Earth*, xix.

¹⁴⁸² Hallam, “The Biggest Estate on Earth.”

¹⁴⁸³ Gammage, *The Biggest Estate on Earth*, 59, 72.

¹⁴⁸⁴ Gammage, 280, 165.

I once assumed that different environments would impose different 1788 patterns. Not so. Across Australia the end was the same: to make resources abundant, convenient and predictable. Only the means varied.¹⁴⁸⁵

Historian Grace Karskens describes this as “slippage”¹⁴⁸⁶; for Gammage wrote “sooner or later they burnt everywhere” while rainforest “never burnt”.¹⁴⁸⁷ What does ‘sooner or later’ even mean? Are we talking 10 years? 100? 1000? The simple existence of peatland and old rainforest implies that there were areas of Australia in 1788 where fire was not the dominant shaping force.¹⁴⁸⁸ This slippage also conceals the diversity of burning practices within Indigenous Australia. For instance, Gunei and Gundjeihmi speakers in the Top End manage similar areas but commence their burning at different times of year, adapting to local climate patterns.¹⁴⁸⁹ The significant thing is that such complexity of burning can *support* Gammage’s thesis of sophistication! As Trawulwuy scholar Greg Lehman noted in 2001, diversity of practice can be interpreted as “innovation”,¹⁴⁹⁰ rather than indicative of Indigenous Australians as powerless to shape their environment.

One consequence of the imprecision of *The Biggest Estate* is how it is inspiring a wave of work seeking to either test or disprove this interpretation of Indigenous burning for local regions.¹⁴⁹¹ For instance a collaboration between Ngadju fire users and CSIRO researchers found Gammage’s depiction didn’t quite match the use of fire in the Great Western Woodlands of Western Australia. While a template system was “evident in intensely used areas” such as rockholes, in the main Ngadju fire was “characterised by its selectivity rather than its ubiquity” and large areas of Ngadju land were influenced less by “planned fire” and more by soil patterns.¹⁴⁹² Similarly, Karskens has argued that there is little evidence for Indigenous burning in the river-flat forests of Dyarubbin (also known as the Hawkesbury-Nepean River of NSW), that the exclusion of fire was the more important Indigenous

¹⁴⁸⁵ Gammage, 87.

¹⁴⁸⁶ Karskens, “Fire in the Forests?,” 17.

¹⁴⁸⁷ Gammage, *The Biggest Estate on Earth*, 162, 121.

¹⁴⁸⁸ Lindenmayer et al., *Mountain Ash: Fire, Logging and the Future of Victoria’s Giant Forests*; Lehman, “Turning Back the Clock: Fire, Biodiversity, and Indigenous Community Development in Tasmania”; Adam, “Can Ideas Be Dangerous?”

¹⁴⁸⁹ David MJS Bowman, Angie Walsh, and L. D. Prior, “Landscape Analysis of Aboriginal Fire Management in Central Arnhem Land, North Australia,” *Journal of Biogeography* 31, no. 2 (2004): 207–223; Russell-Smith et al., “Aboriginal Resource Utilization and Fire Management Practice in Western Arnhem Land, Monsoonal Northern Australia: Notes for Prehistory, Lessons for the Future”; C.D. Haynes, “Use and Impact of Fire,” in *Monsoonal Australia: Landscape, Ecology and Man in the Northern Lowlands*, ed. C.D. Haynes, M.G. Ridpath, and M.A.J. Williams (The Netherlands: Balkema, 1991).

¹⁴⁹⁰ Lehman, “Turning Back the Clock: Fire, Biodiversity, and Indigenous Community Development in Tasmania.”

¹⁴⁹¹ Other examples not discussed include Cahir et al., “Why Set the Bush [On] Fire?”

¹⁴⁹² Prober et al., “Ngadju Kala,” 716, 729; similar findings were also made by researchers investigating Martu burning practices in spinifex, see Bird et al., “The ‘Fire Stick Farming’ Hypothesis.”

practice, and that Dyarubbin was shaped more by patterns of alluvial flooding.¹⁴⁹³ Her argument is supported by Matthew Colloff's examination of the scant evidence from historical accounts for Indigenous burning in river red gum floodplain forests (as opposed to neighbouring reed beds).¹⁴⁹⁴

Of course, the lack of Indigenous burning in some areas does not disprove Gammage's arguments for the centrality of burning for the maintenance of other areas, but a structural change in the book may have avoided this ambiguity. Perhaps a chapter, or significant section of a chapter chronicling areas *not burned* would have driven home the point, rather than leaving it to the reader to find a phrase here or a sentence there. This might have undermined his central thesis of an entire continent being actively managed, yet the thesis of *The Biggest Estate* rests upon a simple understanding of pre-colonial Australia as either entirely managed or entirely natural: a binary. Pyne has previously criticised the shape of academic debate over Indigenous burning in Australia by criticising those who have "demanded impossibly precise accounts of site-specific burning by Aborigines before they would accept an ecological lineage".¹⁴⁹⁵ However, I do not believe this applies to my critiques of *The Biggest Estate*. Not only is there a way to navigate between Scylla and Charybdis,¹⁴⁹⁶ it is imperative we do so. As discussed later in this Chapter, the binary paradigm of Indigenous impact is crippling considerations of Indigenous burning.

The Biggest Estate: Evidence and Implications

For a book that engages so deeply with historical evidence, it is a great shame that *The Biggest Estate* did not engage more systematically with the ecological and palaeobotanical work which also offers insights into change and continuity over time. Gammage liberally references the promising and exciting technique of using burn rings in grasstrees (*Xanthorrea/balga*) to reconstruct pre-contact burning patterns (discussed in Chapter Three), but barely engages with the researchers who contest this methodology. He quotes John Banks's work on snowgums (*Eucalyptus pauciflora*) to show that fire frequency has changed since colonisation but does not point to Banks's insight that fire frequency in the Brindabellas under Indigenous occupation appeared fairly low.¹⁴⁹⁷ Other reviewers have pointed

¹⁴⁹³ Karskens, "Fire in the Forests?"

¹⁴⁹⁴ Colloff, *Flooded Forest and Desert Creek: Ecology and History of the River Red Gum*, 102–15.

¹⁴⁹⁵ Pyne, *The Still-Burning Bush*, 104.

¹⁴⁹⁶ I have adapted this analogy from Michael E. Harkin, "Swallowing Wealth: Northwest Coast Beliefs and Ecological Practices," in *Native Americans and the Environment: Perspectives on the Ecological Indian*, ed. Michael Eugene Harkin and David Rich Lewis (Lincoln: University of Nebraska Press, 2007), 211–32.

¹⁴⁹⁷ Banks, "The Use of Dendrochronology in the Interpretation of the Dynamics of the Snow Gum Forest."

to inconsistencies in *The Biggest Estate's* interpretation of explorer accounts,¹⁴⁹⁸ paintings,¹⁴⁹⁹ or use of dendrochronology (tree rings).¹⁵⁰⁰ Most disappointingly, *The Biggest Estate* fails to deeply engage with the emerging and nuanced story of past burning told to us by charcoal and pollen records.¹⁵⁰¹ It is not harsh to criticise a researcher for not incorporating the insights of half a dozen very different and highly specialised disciplines; the bigger the theory, the higher the evidentiary bar.

I cannot escape the suspicion that *The Biggest Estate* overly emphasises fire (and the disruption of Indigenous fire) and neglects other factors as explanatory factors for landscapes in 1788 and since. Fauna often seem absent. Where, for instance, are the megafauna discussed earlier in this chapter? The effect of the introduction of grazing animals by settlers seems underrated – a point made by Karskens for Dyarubbin.¹⁵⁰² The effect of introduced diseases is barely mentioned. What about insects? How did fungi interact with “1788 fire” and its cessation, given how vast its importance seems to be, and where the difference between the low intensity burns of “1788 fire” and higher intensity burns of bushfires might make a huge difference? Some of these gaps are not unique to *The Biggest Estate* (fire science has an enormous bias to flora over fauna, for instance) but others are not. *The Biggest Estate* argues that fire was the dominant shaping factor in producing landscapes in 1788 – and readers are left little choice but to agree it was a key ingredient for many (if not most) landscapes, but no meal relies on a single ingredient.

Such nitpicking might seem pedantic – after all, Gammage does acknowledge that there were areas where Indigenous burning was less frequent, or had less of an impact (even if *The Biggest Estate* does consistently confuse on this point, as noted above) – except for a particular writing technique that strengthens the implication of universality. The narrative leaps between distinct geographic areas, pulling primary and secondary evidence from across the country. In a single paragraph, for instance, Gammage takes evidence from Gippsland (Victoria), Arnhem Land (the Top End), and the Brindabellas (ACT/NSW). The intent is to illuminate; the effect is to exhaust. The aim is to present a Grand Unified Theory; the result is that the specialist is left with more questions than answers. “But what about...” the ecologists cry – and with reason! The downside of presenting a Grand Unified Theory of Everything

¹⁴⁹⁸ Andy MacQueen, “The Biggest Estate on Earth: How Aborigines Made Australia” by Bill Gammage, 2011 A Blue Mountains Critique,” *Heritage (Newsletter of the Blue Mountains Association of Cultural Heritage Organisations Inc.)*, August 2013.

¹⁴⁹⁹ Neale, “Review of ‘The Biggest Estate on Earth’”; Bowman, “The Biggest Estate on Earth: How Aborigines Made Australia by Bill Gammage [Review]”; Adam, “Can Ideas Be Dangerous?”

¹⁵⁰⁰ Leavesley, “Review of ‘The Biggest Estate on Earth - How Aborigines Made Australia.’”

¹⁵⁰¹ For an introduction into the evolving debate and importance of this research, see David, Haberle, and Walker, “Peopled Landscapes.”

¹⁵⁰² Karskens, “Fire in the Forests?”

is that people invariably try to poke holes in it; the problem arises when Grand Unified Theories are used to unreflexively shape contemporary and future policy.

The imprecision continues regarding one of the issues with the most relevance to contemporary debates and land management: Indigenous burning and what Gammage terms ‘hot’ fires. *The Biggest Estate* acknowledges that mountain ash forests probably burned irregularly, every 400 years or so (as discussed in Chapter One),¹⁵⁰³ and that Indigenous Australians “could not have survived” fires such as Ash Wednesday and Black Saturday,¹⁵⁰⁴ but nevertheless speculates mountain ash was “managed”.¹⁵⁰⁵ In later interviews Gammage has extended this to claim the kind of fires hitting the fringes of capital cities today (or in 1939) “could never have happened in Aboriginal times”.¹⁵⁰⁶ Is it that hard to concede that uncontrollable firestorms occurred before European colonisation (albeit probably less frequently), and that Indigenous Australians might have simply got out of Dodge rather than defend McMansions?¹⁵⁰⁷ Anthropologist Tim Neale has critiqued *The Biggest Estate* as contributing to a discourse that “authorises an ecomodernist imaginary of control” over bushfire, giving readers the impression that the natural factors such as the Victorian fire flume can be rendered completely “benign”.¹⁵⁰⁸ It is this reluctance to concede a role for genuinely *natural* fire that has led ecologists to interpret *The Biggest Estate* as claiming Indigenous Australians “managed the whole continent, and in so doing, *tamed* fire” [emphasis mine], and for them to respond by pointing to evenly-aged stands of mountain ash and palaeoecological proxies as evidence of past firestorms pre-1788.¹⁵⁰⁹ The emphasis on cool burns is also inappropriate for areas other than mountain ash forests; the Ngadju of the Great Western Woodlands accept a role for occasional high-intensity and large fires.¹⁵¹⁰ It hardly undermines the thesis of Indigenous management to point to the *occurrence* of firestorms – even with aerial waterbombers, predictive algorithms, and motorised on-ground suppression, firestorms still occur in the modern world. Surely it is the *frequency* of high-intensity bushfires that sets a more realistic metric? To deny the existence of vulnerabilities (or mistakes) to Indigenous management is to set an impossibly high bar – one not supported by palaeoecological evidence, and one which almost denies the essential humanity of Indigenous management.

¹⁵⁰³ Gammage, *The Biggest Estate on Earth*, 120.

¹⁵⁰⁴ Gammage, 157.

¹⁵⁰⁵ Gammage, 166.

¹⁵⁰⁶ Lee, “Fire Power.”

¹⁵⁰⁷ See Tom Griffiths’ description of the mountain ash hills surrounding Steels Creek in Victoria in Hansen and Griffiths, *Living with Fire: People, Nature and History in Steels Creek*, 29–54.

¹⁵⁰⁸ Neale, “Digging for Fire,” 81.

¹⁵⁰⁹ Leavesley, “Review of ‘The Biggest Estate on Earth - How Aborigines Made Australia’”; See also Adam, “Can Ideas Be Dangerous?”

¹⁵¹⁰ Prober et al., “Ngadju Kala.”

This ambivalence towards the existence of intense fire is necessary to raise because of the implications for contemporary land management. While *The Biggest Estate* does not make many explicit ventures into the contemporary (and indeed that is not its aim), it has been used by groups pushing for greater prescribed burning. There is a curious lack of acknowledgement of this potential usage by Gammage. While he states “there is no return to 1788”, he does call for more “control burns”.¹⁵¹¹ Further, the Appendix glosses over the political context behind the mid-1990s dispute over the use of European settler quotes by Ryan *et al* to argue for more lenient land clearing laws.¹⁵¹² This curious relationship with contemporary land management politics is spread throughout the book; the spread of scrub since colonisation is apparently one of Australia’s “least recognised” landscape changes, which is fairly remarkable given that claims national parks have “thickened up” have been present in rural politics for decades.

In the Appendix Gammage lists a potential objection to his thesis: that even if Indigenous burning had been as sophisticated and extensive as he depicts, “it is unwise to say so, because this would license ill-informed burning and extensive environmental damage”.¹⁵¹³ *The Biggest Estate* addresses this concern...in just two sentences, labelling it “subjective”.¹⁵¹⁴ As a response to good-faith concerns for Australia’s threatened species, I think this is hopelessly naïve. It is clear there is a good chance that in some areas Indigenous burning differed from contemporary prescribed burning in terms of size, intensity, frequency, and timing (see Chapter Eight). Furthermore, *The Biggest Estate* has clearly been drawn upon by advocates for greater and potentially ecologically inappropriate prescribed burning (see, for instance, the Mountain Cattlemen’s Association of Victoria – a lobby group intimately involved with the grazing debate discussed in Chapter Six).¹⁵¹⁵

Another particular manifestation of this curious relationship with contemporary politics occurs in the Appendix, when Gammage states “no-one suggests that people burnt all Australia with the same fires at the same intervals”.¹⁵¹⁶ There is some defence for Sylvia Hallam expressing similar attitudes to this in an earlier era, when she dismissed David Horton’s 1982 polemic against firestick farming by scoffing that “No student of Aboriginal firing has ever maintained that it was applied simultaneously and non-selectively over wide areas”.¹⁵¹⁷ But this attitude is less forgivable after Black Saturday. This thesis has demonstrated this assertion – the denial that much fire discourse assumes universal burning patterns

¹⁵¹¹ Gammage, *The Biggest Estate on Earth*, 321.

¹⁵¹² Ryan, Ryan, and Starr, “The Australian Landscape-Observations of Explorers and Early Settlers”; Benson and Redpath, “The Nature of Pre-European Native Vegetation in South-Eastern Australia.”

¹⁵¹³ Gammage, *The Biggest Estate on Earth*, 327.

¹⁵¹⁴ Gammage, 327.

¹⁵¹⁵ See for example Lee, “Fire Power.”

¹⁵¹⁶ Gammage, *The Biggest Estate on Earth*, 340.

¹⁵¹⁷ Hallam, “The History of Aboriginal Firing,” 14.

– is categorically incorrect. *The Biggest Estate* does describe diversity of burning practices (e.g. “the means were local”) but the imprecision noted above is especially present in this aspect.¹⁵¹⁸ Greater precision and emphasis upon diversity of practice would have avoided this issue, and perhaps in turn might lead to a more informed and sophisticated public discussion around contemporary land management.

The Biggest Estate was, as Gammage admits, written for both the general reader and the specialist and nowhere is the latter more apparent than the oddly combative first Appendix. Accusing some of his critics of being “deniers” who “decree against 1788 fire”,¹⁵¹⁹ Gammage is clearly responding to years of methodological and analytical debate. The combative tone must have been a contributing factor to the book’s frosty reception among many fire specialists.¹⁵²⁰ While there are indeed a small minority of voices who doubt the impact of Indigenous burning, *The Biggest Estate* mischaracterises the overall shape of academic debate. *The Biggest Estate* acknowledges that “almost everyone” accepts that Indigenous burning involved the burning of “random patches to hunt and lure game”, but to Gammage this acceptance has been limited to that crucial world *random* – for Gammage, most of academia has failed to recognise both the intention and extent of Indigenous burning practices. This is a clear mischaracterisation of academic debate, and it stems from a common fundamental flaw: viewing landscapes in a binary as either natural or cultural.

Ultimately, *The Biggest Estate* has achieved remarkable things. Anyone writing about Indigenous burning in Australia (and many in North America) should feel compelled to refer to *The Biggest Estate*. It is an impressive piece of scholarship and we should celebrate its success. Nevertheless, it is an artefact of a particular historical time, and the discourse of Indigenous burning has been shaped by other contemporary factors. It is increasingly difficult to credibly write of Indigenous burning only in the past tense, as Indigenous Australians are grasping the torch in both rhetoric and practice.

Moving Beyond Binaries

A potential way to move beyond the criticisms I have made of Grand Unified Theories of Indigenous Environmental Impact¹⁵²¹ is to examine a theory proposed by American geographer Thomas R. Vale.

¹⁵¹⁸ Gammage, *The Biggest Estate on Earth*, 2.

¹⁵¹⁹ Gammage, 326.

¹⁵²⁰ Plant ecologist Steve Sinclair concluded Gammage wrote “with a chip on his shoulder” in Sinclair, “[Review] ‘The Biggest Estate on Earth - How Aborigines Made Australia.’”

¹⁵²¹ GUTIEI really just rolls off the tongue, doesn’t it

Vale's theory appeared in a collection of chapters he edited from various authors,¹⁵²² all grouped under the theme of determining whether pre-Columbian North America (particularly what is now the American West) was in a simple "wilderness condition – a state of nature" or a "universally humanised landscape".¹⁵²³ Unlike other attempts (Krech's *Ecological Indian*, for instance), this book was framed around answering a question about single form of Indigenous environmental impact (or humanising factor): "was Indian burning critical to the appearance of the American West before the arrival of Columbus?"¹⁵²⁴ The book has had far less impact upon the popular imagination than the ideas proposed by Gammage, Pascoe, Flannery, or Martin, and has several salient flaws as a collection of individual chapters, but the model proposed by Vale is worth examining for the manner in which it can illuminate and improve these popular theories.

Vale proposes what I characterise as a spectrum model to determine the impact of Indigenous burning practices. Vale conceives of seven levels of human impact, ranging from "intensely humanised landscapes" (which have been subject to both ubiquitous and major modification) to "untouched landscape" (where there is no human presence or any parts existing through human modification).¹⁵²⁵ For Vale, most of pre-Columbian North America fitted into a "mosaic landscape" (described as a "middle ground, with spatial variability in the human modification on nature").¹⁵²⁶ In between are "unevenly humanised" landscapes, "amplified human" landscapes, "natural" landscapes, and "inhabited wilderness" landscapes.¹⁵²⁷ Vale thought these seven levels could be determined through a matrix of three factors: the degree to which the landscape has been modified, the degree to which this modification depends upon proximity to human settlements, and the degree to which this modification persists following the cessation of human practices.¹⁵²⁸ These would be assessed through the "fundamental characteristics" of vegetation distribution, wildlife, landforms, soils, hydrology, and climate.¹⁵²⁹ Such a concept is echoed by the recent "mallee spectrum" which depicts variable environmental modification and occupation by Indigenous Australians in the mallee regions.¹⁵³⁰ It was Vale's hope that his model "should elevate the [scholarly] dialogue from its current domination from

¹⁵²² Vale, *Fire, Native Peoples and the Natural Landscape*.

¹⁵²³ Thomas R. Vale, "Reflections," in *Fire, Native Peoples and the Natural Landscape*, ed. Thomas R. Vale (Washington: Island Press, 2002), 296.

¹⁵²⁴ Thomas R. Vale, "The Pre-European Landscape of the United States: Pristine or Humanised?," in *Fire, Native Peoples and the Natural Landscape*, ed. Thomas R. Vale (Washington: Island Press, 2002), 31.

¹⁵²⁵ Vale, "Reflections," 298–99.

¹⁵²⁶ Vale, 298–99.

¹⁵²⁷ Vale, 298–99.

¹⁵²⁸ Vale, "The Pre-European Landscape of the United States: Pristine or Humanised?"

¹⁵²⁹ Vale, 5.

¹⁵³⁰ Richard Broome et al., *Mallee Country: Land, People, History* (Clayton: Monash University Publishing, 2020), 38.

arm-waving, careless generalisations”.¹⁵³¹ This aspiration should resonate given the simplifications, appropriations, and sweeping statements that have been analysed throughout this thesis.

It is a shame that the collection as a whole does not reflect the potential strength of this model. As Pyne has pointed out, there are significant evidentiary concerns. All chapters focus on lands where there is comparatively less evidence for Native American fire, rather than lands where Native American fire is well-documented. All but one of the authors are geographers and accept and discredit certain kinds of evidence in line with narrow disciplinary conventions; Pyne notes that at the extreme this becomes an “intellectual sleight of hand and double standard toward various data” (especially oral histories and anthropogenic sources).¹⁵³² Such evidence is even discounted as “biased” – a term certain to send a shudder up the spine of any historian.¹⁵³³ Pyne has noted that debates over the impact of Indigenous burning have “long had a metaphysical cast” and the “predictable upshot is scholasticism; windy verbiage full of competing authorities, endless glosses, and rampant semanticism”.¹⁵³⁴ This is especially the case for this book, which is really a defence of wilderness (as so much American environmental writing is – see Chapter Five). The work of ethnoecologist M Kat Anderson on Californian Indian environmental use in the Sierra Nevada is thus dismissed as her words are “charged with a political agenda”,¹⁵³⁵ yet this book would have heavily benefited from a little more self-awareness from the authors. Thus Vale concludes the book by declaring that “a western wilderness, and American wilderness – a natural landscape – greeted the first Europeans”.¹⁵³⁶ It is more than a little odd to propose a spectrum, declare that physical modifications by American Indians meant that at least part of North America was a mosaic, and then conclude the book with a sweeping statement characterising an entire continent as a wilderness.

Nevertheless, Vale’s model (rather than his use of it) has promise for Indigenous burning because it proposes a move away from the binaries that have suffocated these discussions. As Pyne memorably describes, “arguing over the dominance of nature and culture in Earthly fire history is like demanding that physicists decide once and for all whether an electron is truly a particle or a wave”.¹⁵³⁷ For the

¹⁵³¹ Vale, “The Pre-European Landscape of the United States: Pristine or Humanised?,” 6.

¹⁵³² Pyne, “‘Fire, Native Peoples, and the Natural Landscape’, Thomas R. Vale, Editor, 2002. Island Press, Washington D.C., 315 Pages, \$25.00, ISBN 1-55963-888-5 (Paper) [Book Review],” 257.

¹⁵³³ Craig D. Allen, “Lots of Lightning and Plenty of People: An Ecological History of Fire in the Upland Southwest,” in *Fire, Native Peoples and the Natural Landscape*, ed. Thomas R. Vale (Washington: Island Press, 2002), 163.

¹⁵³⁴ Pyne, “‘Fire, Native Peoples, and the Natural Landscape’, Thomas R. Vale, Editor, 2002. Island Press, Washington D.C., 315 Pages, \$25.00, ISBN 1-55963-888-5 (Paper) [Book Review],” 257.

¹⁵³⁵ Parker, “Fire in Sierra Nevada Forests: Evaluating the Ecological Impact of Burning by Native Americans,” 260.

¹⁵³⁶ Vale, “Reflections,” 300.

¹⁵³⁷ Pyne, “‘Fire, Native Peoples, and the Natural Landscape’, Thomas R. Vale, Editor, 2002. Island Press, Washington D.C., 315 Pages, \$25.00, ISBN 1-55963-888-5 (Paper) [Book Review],” 258.

mathematically-inclined, I propose an addition to Vale's spectrum. Rather than a one-dimensional (itself an apt description of so much of the discourse outlined throughout this thesis) axis running from 'intensely humanised' to 'untouched', a second axis can be added. The x-axis would be *material*. It would represent the degree of modification; the degree to which human actions have changed various systems (ecological, geological, climatological etc.) from where they would otherwise be. The y-axis would be *cultural*. It would represent the degree of cultural importance/link/connection; the degree of human connection to country. Conceptualising Indigenous burning in this way is not the final word – it is a useful heuristic to reframe the fundamental flaws with Grand Unified Theories such as those from Gammage, Pascoe, and Flannery – or, for that matter, Vale. A landscape did not have to be burned, or burned in an identical fashion, for it to be a cultural landscape. For instance, Gammage argues

Five features marked 1788 fire. It was planned; it was precise; it could be repeated hence predicted; it was organised locally; and it was universal.¹⁵³⁸

Of these five features, it is only the last – universality - that is disputed by most of Gammage's interlocutors. As briefly outlined above, debates over megafaunal extinction have begun to move past a simplistic climate/human binary. It is more than time for debates over Indigenous burning to do the same. The alternative is for the vapid, generalised, politicised, appropriation/denial types of Indigenous burning discourse to continue to dominate discussion. Such discourse, however, will prove increasingly untenable as Indigenous Australians increasingly grasp the torch themselves, further highlighting the critical need for more nuanced considerations of Indigenous burning.

The Firestick Anthropocene and the Pyrocene

Such Grand Unified Theories as discussed above have proven popular, yet there is another (though far less developed) strain of intellectual thought that deserves a brief examination to highlight how environmental change complicates discourses of Indigenous burning. The Earth's climate has changed significantly in the past (occasionally with great rapidity), but some scholars have proposed that these changes may have been influenced by historical human action. Various pre-industrial starting dates for the Anthropocene have been proposed including the beginning of the agricultural revolution and large-scale land clearing in the Fertile Crescent some 5,000 to 8,000 years ago.¹⁵³⁹ Building on the

¹⁵³⁸ Gammage, *The Biggest Estate on Earth*, 185.

¹⁵³⁹ Libby Robin, "Histories for Changing Times: Entering the Anthropocene?," *Australian Historical Studies* 44, no. 3 (2013): 329–40.

principle of pre-industrial environmental change, some have sought to push the Anthropocene to commence with the theorised human extinction of Pleistocene megafauna across several continents (discussed above).¹⁵⁴⁰ Given the links between megafauna extinction and Indigenous burning practices, it was inevitable that a novel corollary would be proposed which attempts to look at societies that did not use traditionally-understood agriculture, but still engaged in landscape-scale burning, and explore whether their practices may have contributed to an early Anthropocene.¹⁵⁴¹ A suitable descriptor is the ‘Firestick Anthropocene Hypothesis’.

Lightfoot and Cuthrell make a worthy argument that such attempts to date the Anthropocene to agrarian land-clearing display a great deal of bias towards traditional hierarchies of economic production, and implicitly discount the possibility of large-scale environmental modification by societies which used the firestick rather than the plough.¹⁵⁴² Given the links previously made between Indigenous burning and megafauna extinction, perhaps it will not be long before the Firestick Anthropocene Hypothesis grows to include megafauna. Nevertheless, Libby Robin’s critique of the agrarian Anthropocene origin is cogent; these practices were regional in character, not global, and commenced at different times.¹⁵⁴³ Furthermore, Clive Hamilton’s argument against theories which posit a pre-industrial Anthropocene is devastating: the Anthropocene represents a “rupture in *Earth* history...it begins when humans first play a significant role in shaping the *Earth*” [emphasis mine].¹⁵⁴⁴ The firestick or the hunting of megafauna was not as powerful nor as immediate or all-encompassing as the Industrial Revolution, nuclear testing, and other changes of the past 200-odd years. As this thesis has demonstrated, perceptions of past environmental impacts are powerful political tools. It is all too easy to envision a Firestick Anthropocene being used to undermine actions to address climate change, or to morph into another declension story where humans are inevitable wreckers and destroyers of a prelapsarian wilderness.

Recently, Stephen Pyne has begun to develop his own grand narrative of fire’s role in human history – the Pynocene.¹⁵⁴⁵ Pyne centres fire, defining three types of fire in history. The first is natural fire, relying upon lightning ignition. The second is human fire, including firestick farming, burning agricultural fallow, swidden burning – all human practices that can shape landscapes, but which

¹⁵⁴⁰ See Nagaoka, Rick, and Wolverton, “The Overkill Model and Its Impact on Environmental Research,” 9691.

¹⁵⁴¹ Kent G. Lightfoot and Rob Q. Cuthrell, “Anthropogenic Burning and the Anthropocene in Late Holocene California,” *The Holocene* 25, no. 10 (2015): 1581–87.

¹⁵⁴² Lightfoot and Cuthrell.

¹⁵⁴³ Robin, “Histories for Changing Times”; Lightfoot and Cuthrell also make this point Lightfoot and Cuthrell, “Anthropogenic Burning and the Anthropocene in Late Holocene California.”

¹⁵⁴⁴ Clive Hamilton, *Defiant Earth: The Fate of Humans in the Anthropocene* (Sydney: Allen & Unwin, 2017), 17, 19.

¹⁵⁴⁵ If it catches on, presumably someone will write a biographical article of him titled “The Pynocene”.

cannot exceed the ecological limits of a landscape. Then there is the third fire: fires from oil, coal, and gas, which escape the fundamental fuel cycles of the first two categorisations. The third conceptual type of fire also helps explain much of today's fires: Pyne has noted the irony that both the 2018 Camp Fire (discussed in Chapter Five) and one of the largest fires on Black Saturday in 2009 (discussed in Chapter Six) were ignited by power lines: the symbol of humanity's capture of fire into furnaces, and the application of fire to burn lithic, not living, landscapes. By centring fire, Pyne is trying to find "the historical continuity that Cassandras of a climate-addled Anthropocene prophesise the future will lack".¹⁵⁴⁶ Pyne is yet to fully conceptualise the Pyrocene, but it and the Firestick Anthropocene thesis point to an essential principle: the planet is changing. A warming planet is a planet on fire. As Chapter Eight will demonstrate, this is transforming the discourses and practices of Indigenous burning in surprising ways.

Conclusion

Big Fires and Small Fires have shaped discourses of Indigenous burning, but these discourses are also shaped by conceptual fires – Fires in the Mind. This chapter has demonstrated how Grand Unified Theories of Indigenous environmental impact including megafauna extinction theories and theories of burning have indeed reshaped these discourses. Theories of megafauna extinction from both Tim Flannery and Paul Martin draw on similar tropes to discourses of Indigenous burning and can be subject to the typology proposed in Chapter Six (and can thus be read as similarly flexible to support or undermine interventionist environmental policies). Bill Gammage's *The Biggest Estate on Earth* has rapidly reshaped and expanded discourses of Indigenous burning but comes with significant evidentiary flaws. Such flaws are important as Fires in the Mind frame policy debates. Both megafauna extinction theories and *The Biggest Estate* can be read as fundamentally flawed as they rely upon binaries of impact. Extending this framework into natural and cultural dimensions offers a way past unproductive debate. All the major authors explored in depth in this chapter are non-Indigenous, reflecting the overwhelming dominance of the discourses of Indigenous burning by non-Indigenous peoples. Yet as the following and final substantive chapter shows, Indigenous burning in both a discursive and a material sense has been – and is being – significantly reshaped by Indigenous peoples themselves.

¹⁵⁴⁶ Stephen Pyne, "The Planet Is Burning," *Aeon*, 20 November, 2019, <https://aeon.co/essays/the-planet-is-burning-around-us-is-it-time-to-declare-the-pyrocene>.

Chapter Eight:

Taking Back Fire: Cultural Burning and Carbon Credits

In mid-2019, as part of events commemorating and exploring the tenth and eightieth anniversaries of Black Saturday and Black Friday in Victoria, I attended a symposium at La Trobe University themed 'Living with Fire'. Despite not being handed out by the organisers, multiple printouts of a document called the Victorian Traditional Owner Cultural Fire Strategy were in evidence. After introductions with the bloke next to me (one of many non-Indigenous fire professionals in the packed room), the first thing he asked me was "What happens when they [referring to Indigenous peoples] have lost their knowledge?"

In this chapter I investigate processes through which Indigenous peoples themselves are reshaping discourses and practices of Indigenous burning, moving uncomfortable and poorly conceived questions such as the above from abstract to immediate concerns. The chapter begins by investigating the West Arnhem Land Fire Abatement (WALFA) project and similar savannah burning schemes, exploring their impressive environmental, economic, and cultural results, but also demonstrating the complex tensions and debates they have spurred. WALFA also serves to consider how Indigenous burning is being confronted by anthropogenic climate change. This chapter finishes with an examination of the cultural burning movement in Australia's southern states. The concerns of the fire practitioner with which I opened this chapter are discussed, as are other related issues. Cultural burning is slowly but surely functioning to redistribute power over fire – and represents an example of decolonisation. David Ritchie noted in 2009 that in the northern and central parts of Australia, where Indigenous Australians hold comparatively greater land tenure and the impacts of colonisation were less severe, "the right to burn country in accordance with tradition has become central to the political construction of Indigenous identity".¹⁵⁴⁷ Through cultural burning (and through the popularity of Gammage and Pascoe's continental narratives), the concept of burning country in accordance with culture is becoming increasingly central to pan-Aboriginal identity. Through WALFA and cultural burning, Indigenous peoples themselves are grasping the torch, both discursively asserting agency, and literally igniting burns. They are taking back fire.

It is necessary to explain why a historical thesis finishes in the contemporary moment. In settler societies, histories and popular discourses of Indigenous peoples have often been tinged with tropes such as the "vanishing indigene" which conceal and even justify violence and dispossession.¹⁵⁴⁸ This

¹⁵⁴⁷ Ritchie, "Things Fall Apart: The End of an Era of Systematic Indigenous Fire Management," 37.

¹⁵⁴⁸ Hixson, *American Settler Colonialism: A History*, 185.

thesis has focussed on discourses of Indigenous burning rather than the practice of Indigenous burning, but it is essential not to contribute, even inadvertently, to the suppression of Indigenous agency. More importantly, Indigenous burning has been changing even as non-Indigenous Australians have been talking about it; Gammage's almost-exclusive use of the past tense looks increasingly anachronistic in 2020. The overwhelming majority of Indigenous burning discourse is in the past tense. This chapter moves beyond this tyranny of the past tense. It depicts how Indigenous burning can be thought of not only in the present, but even with a future tense.

Climate Change

As discussed in Chapters Five and Six, anthropogenic climate change is projected to greatly change fire patterns in the areas studied in this thesis; this hypothesis also applies globally.¹⁵⁴⁹ Shifts in precipitation, higher temperatures, and changes in prevailing weather may increase the potential fire danger and reduce the windows of opportunity to conduct prescribed burns or increase the danger of large bushfires.¹⁵⁵⁰ Climate changes that drive changes in fire weather have already been observed, largely matching predictions.¹⁵⁵¹ As climate change (and the Anthropocene) has been driven by industrial combustion and clearing fires, Stephen Pyne has described the modern era as the "Pyrocene".¹⁵⁵² How does climate change complicate humanity's relationship with the environment? What role is there for environmental history in a world changing beyond any experience that documentary history may use to guide us?¹⁵⁵³ Is there any point seeking to preserve environments as they are today, or to seek to restore to historical conditions in the face of such vast forces?¹⁵⁵⁴ How

¹⁵⁴⁹ Jason J. Sharples et al., "Natural Hazards in Australia: Extreme Bushfire," *Climatic Change* 139 (2016): 85-99; Geoffrey J. Cary et al., "Global Change and Fire Regimes in Australia," in *Flammable Australia: Fire Regimes, Biodiversity and Ecosystems in a Changing World*, ed. Ross A. Bradstock, A. Malcolm Gill, and Richard J. Williams (Collingwood: CSIRO Publishing, 2012), 149-70.

¹⁵⁵⁰ Such shifts have already been observed in the United States; see Westerling et al., "Warming and Earlier Spring Increase Western U.S. Forest Wildfire Activity"; For an overview of how climate change may affect fires in Australia, see Cary et al., "Global Change and Fire Regimes in Australia"; Sharples et al., "Natural Hazards in Australia"; Philip E. Higuera, "Taking Time to Consider the Causes and Consequences of Large Wildfires," *Proceedings of the National Academy of Sciences* 112, no. 43 (2015): 13137-38.

¹⁵⁵¹ W. Matt Jolly et al., "Climate-Induced Variations in Global Wildfire Danger from 1979 to 2013," *Nature Communications* 6, no. 7537 (2015); Sarah Harris and Chris Lucas, "Understanding the Variability of Australian Fire Weather between 1973 and 2017," *PLOS ONE* 14, no. 9 (2019): e0222328.

¹⁵⁵² Pyne, "Big Fire; or, Introducing the Pyrocene."

¹⁵⁵³ A robust defence of the urgent need for environmental history is found in Katie Holmes et al., "Doing environmental history in urgent times", *History Australia* 17, no. 2 (2020): 230-251.

¹⁵⁵⁴ An introduction to discussions around the ethics of ecological restoration under climate change can be found in James A. Harris et al., "Ecological Restoration and Global Climate Change," *Restoration Ecology* 14, no. 2 (2006): 170-176.

does the Pyrocene shape Indigenous burning? What role is there for Indigenous burning in a warming planet?

There is most certainly a role – in concept, and in practice – for Indigenous burning in a world warmed by climate change. It is possible that aspects of specific knowledge (such as reading country and bio-indicators which inform decisions around when to burn, or prevailing wind patterns) may become unsettled with environmental change, but Indigenous knowledge of ecological connections and interactions may prove to be even more useful than presently. However, such a consideration treats Indigenous knowledge in an extractive fashion; as something to be mined for what is deemed useful by a powerful authority, with non-useful knowledge to be discarded – a formulation that is at best problematic and at worst settler-colonial. Apart from ignoring the holistic and sovereign nature of Indigenous knowledge, such a formulation makes the mistake of viewing Indigenous knowledge as fixed and purely in terms of practice. Indigenous societies in Australia and North America have lived through vast environmental changes in the past – whether the enormous changes of the Pleistocene-Holocene transition, or more recent changes. Indigenous burning in California is a story of continual change and adaptation. Indeed, Dean Yibarbuk, one of the *Bininj* founders of the West Arnhem Land Fire Abatement project discussed below, has legitimated it by placing it in context of a tradition of *Bininj* adaptation to environmental change as told through oral histories.¹⁵⁵⁵

Another potential complication for Indigenous burning discourse is how invasive species may be boosted by climate change. For instance, in the Top End of the Northern Territory, gamba grass (*Andropogon gayanus*) was “specifically fostered to achieve the mythic ‘northern development’” by providing feed for pastoralists.¹⁵⁵⁶ Unless it is grazed repeatedly, gamba grass grows taller and denser than native grasses (carrying up to seven times the fuel load of native grasses), supporting fires that are on average eight times more intense than fires in native savannah grasses.¹⁵⁵⁷ These fires kill trees and shrubs, facilitating the spread of gamba grass over the next year, which then promote further fires in what researchers dub the “grass-fire cycle”.¹⁵⁵⁸ In other words, gamba grass is an invasive species which alters local environments to suit itself, and which is advantaged by the projected increases in temperature for the Top End. Tim Neale interviewed fire managers in the Top End and uncovered a “broad consensus... that it [is] not possible to eradicate the species or limit its spread beyond its

¹⁵⁵⁵ Dean Yibarbuk, Kim McKenzie, and Peter Cooke, “Fighting Carbon with Fire,” United Nations University, 2009, <http://ourworld.unu.edu/en/fighting-carbon-with-fire>.

¹⁵⁵⁶ Timothy Neale, “‘Are We Wasting Our Time?’: Bushfire Practitioners and Flammable Futures in Northern Australia,” *Social & Cultural Geography* 19, no. 4 (2018): 480.

¹⁵⁵⁷ Rossiter et al., “Testing the Grass-Fire Cycle: Alien Grass Invasion in the Tropical Savannas of Northern Australia,” 169.

¹⁵⁵⁸ Rossiter et al., “Testing the Grass-Fire Cycle: Alien Grass Invasion in the Tropical Savannas of Northern Australia.”

present bounds”.¹⁵⁵⁹ However, as discussed in Chapter Four via Asian water buffalo in Kakadu National Park, and Chapter Two via wild mustard and wild oat in the Sierra Nevada, Indigenous cosmology may evolve to accept a role for invasive species on country.

Abatement Through Fire: WALFA

One of the most striking examples of how Indigenous groups are taking back fire while responding to climate change is the West Arnhem Land Fire Abatement (WALFA) Project and associated savannah burning programmes. WALFA inspires a provocative clash of preconceptions and cultural tropes surrounding Indigenous burning, promoted as restoring traditional burning practices through modern technology to address a very modern problem – anthropogenic climate change. An exploration of WALFA and how it is represented thus deepens our analysis, pushing Indigenous burning beyond the historical, even beyond the contemporary, and into the future tense.

Perhaps it is no surprise that this project developed in Arnhem Land. The impacts of colonisation arrived later and at lower intensity in Arnhem Land than most areas of Australia. Consequently, it has always held a special place in the national imaginary. As Billy Griffiths wrote, “this dramatic landscape is where many archaeologists came to ‘discover’ Aboriginal Australia” due to a perception of deeper cultural continuity,¹⁵⁶⁰ and this holds true for ‘discovering’ Indigenous burning. It was while working in Arnhem Land that forester Chris Haynes made his observations that inspired his series of papers describing day-to-day patterns of burning.¹⁵⁶¹ Marcia Langton’s important *Burning Questions* oration opened with a short paper from Arnhem Land fire ecologist and Gurrgoni speaker Dean Yibarbuk.¹⁵⁶²

Arnhem Land borders Kakadu National Park (indeed, part of the Arnhem Land Plateau has been incorporated into the Park) and shares its monsoonal climate, leading to highly seasonal rainfall.¹⁵⁶³ The sandstone plateau is rugged, meaning it supports very high levels of plant diversity and specialisation – indeed, the Plateau has the highest level of biodiversity in the Top End (and its partial

¹⁵⁵⁹ Neale, “Are We Wasting Our Time?,” 485.

¹⁵⁶⁰ Griffiths, *Deep Time Dreaming: Uncovering Ancient Australia*, 146.

¹⁵⁶¹ Haynes, “Land, Trees and Man (Gunret, Gundulk, Dja Bining)”; Haynes, “The Pattern and Ecology of Munwag: Traditional Aboriginal Fire Regimes in North-Central Arnhemland”; C.D. Haynes, “Man’s Firestick and God’s Lightning: Bushfire in Arnhemland” (ANZAAS 52nd Congress, Sydney, 1982). As discussed in Chapter Four, Haynes would later work in Kakadu National Park.

¹⁵⁶² Langton, *Burning Questions: Emerging Environmental Issues for Indigenous Peoples in Northern Australia*.

¹⁵⁶³ Russell-Smith et al., “Aboriginal Resource Utilization and Fire Management Practice in Western Arnhem Land, Monsoonal Northern Australia: Notes for Prehistory, Lessons for the Future.”

inclusion into Kakadu National Park helped justify the inclusion of the Park on World Heritage Lists).¹⁵⁶⁴ The environment of Arnhem Land also holds an iconic species: *Callitris intratropica* (often known as blue cypress pine). Following speculations from Chris Haynes who recorded that Indigenous people believed the death of *Callitris intratropica* to be the result of *bininj* who “didn’t look after their country properly”,¹⁵⁶⁵ fire ecologist David Bowman characterised it as a “miner’s canary” for displaying changes over time.¹⁵⁶⁶ It is long-lived and resilient to termite damage even after dying. Most pertinently, it is relatively unscathed by low-intensity fires but is scarred or killed by intense fires.¹⁵⁶⁷ Bowman and Panton dated the decline in *Callitris* stands to the 1940s – which is when *bininj* “finally abandoned” the Arnhem Land Plateau.¹⁵⁶⁸ The miner’s canary indicated a “wilderness effect”: the cessation of Indigenous burning had resulted in a changed fire regime which damaged or killed previously protected *Callitris* stands.¹⁵⁶⁹

There is archaeological evidence for human occupation in Arnhem Land perhaps 50,000 years ago,¹⁵⁷⁰ and the Plateau is host to a staggering array of ochre images and paintings which point to a long history of habitation.¹⁵⁷¹ As described in Chapter Four the people of Western Arnhem Land (often called *Bininj Kunwok*) recognise six seasons, and their traditional boundaries include part of Kakadu National Park.¹⁵⁷² Land is owned “communally through membership in patrilineal clans”, but *Bininj* also hold rights to their mother’s lands as *djungkay* who should be consulted for actions such as burning.¹⁵⁷³ As

¹⁵⁶⁴ John CZ Woinarski et al., “Fire Management and Biodiversity of the Western Arnhem Land Plateau,” in *Culture, Ecology and Economy of Fire Management in North Australian Savannas: Rekindling the Wurrk Tradition*, ed. Jeremy Russell-Smith, Peter J. Whitehead, and Peter M. Cooke (Collingwood: CSIRO Publishing, 2009), 234–63; Yibarbuk et al., “Fire Ecology and Aboriginal Land Management in Central Arnhem Land, Northern Australia: A Tradition of Ecosystem Management.”

¹⁵⁶⁵ Haynes, “The Pattern and Ecology of Munwag: Traditional Aboriginal Fire Regimes in North-Central Arnhemland,” 212.

¹⁵⁶⁶ Bowman, “Why the Skillful Use of Fire Is Critical for the Management of Biodiversity in Northern Australia,” 105.

¹⁵⁶⁷ Bowman and Panton, “Decline of *Callitris intratropica* R. T. Baker & H. G. Smith in the Northern Territory,” 373–74.

¹⁵⁶⁸ Bowman and Panton, 379.

¹⁵⁶⁹ Bowman et al., “The ‘wilderness Effect’ and the Decline of *Callitris intratropica* on the Arnhem Land Plateau, Northern Australia”; Trauernicht et al., “Local and Global Pyrogeographic Evidence That Indigenous Fire Management Creates Pyrodiversity.” Trauernicht *et al* found that it was not just the fact Indigenous fires were low-intensity and burned only small areas; the *placement* of these fires was also a critical factor.

¹⁵⁷⁰ Jeremy Russell-Smith et al., “Managing Fire Regimes in North Australian Savannas: Applying Aboriginal Approaches to Contemporary Global Problems,” *Frontiers in Ecology and the Environment* 11, no. s1 (2013): 60.

¹⁵⁷¹ P.M. Cooke, “Buffalo and Tin, Baki and Jesus: The Creation of a Modern Wilderness,” in *Culture, Ecology and Economy of Fire Management in North Australian Savannas: Rekindling the Wurrk Tradition*, ed. Jeremy Russell-Smith, Peter J Whitehead, and P. Cooke (Collingwood: CSIRO, 2009).

¹⁵⁷² Garde, “The Language of Fire: Seasonality, Resources and Landscape Burning on the Arnhem Land Plateau.”

¹⁵⁷³ Garde, 109; Dean Yibarbuk, Peter Cooke, and others, “Bininj Mak Balanda Kunwale Manwurrk-Ken,” *Ngoonjook: A Journal of Australian Aboriginal Issues* 20 (2001): 33–37.

elsewhere in the Top End, introduced disease wreaked havoc on the people of the stone country, and while the impacts of colonisation arrived late relative to most of Australia, most estates had been abandoned by the 1940s – often to move closer to opportunities to trade for tobacco and other goods.¹⁵⁷⁴ The creation of Maningrida in the eastern part of Arnhem Land attracted *bininj* to the settlement. The establishment of a forestry project in the area illuminated differences in attitudes towards fire. Peter Cooke recalls:

Forestry branch workers (and I was one of them briefly) routinely climbed specially constructed watchtowers to spot Indigenous fires and provide locations to fire-fighting teams back at Maningrida. These exercises would often end with a fire fighting tanker truck slowly working its way through the bush extinguishing a low trickling fire until eventually it caught up with a sometimes bemused, but sometimes angry Aboriginal landowner with matches and gun or spear going about his customary business of hunting¹⁵⁷⁵

The demographic move away from estates somewhat reversed from the 1970s with the “outstation” movement,¹⁵⁷⁶ and it was in this context that WALFA was born. In the 1990s Wamud Namok, a respected *Bininj Kunwok* elder, returned to map the Plateau with his companion Peter Cooke.¹⁵⁷⁷ Cooke’s description of Wamud Namok’s reaction to the environmental state of the Plateau is moving:

He cried out for the emptiness of the plateau – the smokeless horizons of the early dry season, where once lines of smoke indicated people going about the management which controlled late dry season wildfires and helped maintain the remarkable diversity of the rock country. He looked with sadness at springs and waterholes where feral buffalo, and more recently pigs, were destroying the bush foods that sustained him in his youth. He saw deep waterholes filled with sand and changed forever by the erosion produced by buffalo and wildfire¹⁵⁷⁸

This was not just a reaction to the environmental degradation of the Plateau; as Wamud said, “this country needs its people”.¹⁵⁷⁹ Walks on country were organised for younger generations, with helicopters used for Wamud and other elders to plot out and confirm old cultural routes and sites. After years of experimentation, a contract was signed with liquefied natural gas company

¹⁵⁷⁴ Cooke, “Buffalo and Tin, Baki and Jesus: The Creation of a Modern Wilderness,” 2009.

¹⁵⁷⁵ Not all interactions were as harmless; Haynes recalled the accidental destruction of a sacred Dreaming site during fire suppression caused severe distress. See Cooke, 96.

¹⁵⁷⁶ See Billy Griffiths, “Caring for Country: The Place Where the Dreaming Changed Shape,” *Griffith Review*, 2017 for a description of the “outstation” movement in Arnhem Land.

¹⁵⁷⁷ This is the culturally appropriate name for this deceased individual as written in Peter Cooke, “A Long Walk Home to the Warddewardde,” in *People on Country: Vital Landscapes, Indigenous Futures*, ed. Jon Altman and Seán Kerins (Sydney: The Federation Press, 2012), 146–61.

¹⁵⁷⁸ Cooke, “Buffalo and Tin, Baki and Jesus: The Creation of a Modern Wilderness,” 2009, 147.

¹⁵⁷⁹ Cooke, 147.

ConocoPhillips to offset the emissions equivalent of 100,000t CO₂ per year beginning in 2006.¹⁵⁸⁰ The rationale is “simple...if you reduce the extent of relatively intense late dry season fires through more strategic fire management, you can substantially reduce the amount of fire emissions”.¹⁵⁸¹ More material is retained in living and non-living matter, and more of this biomass is biologically decomposed, producing lower overall emissions than would have been the case with larger fires.¹⁵⁸² Due to the ruggedness of the Plateau, lack of infrastructure, and the relative concentration of *Bininj kunwok* population, these fires are lit by incendiaries dropped from helicopters or planes, with some on-ground ignition.¹⁵⁸³

Results and Questions from WALFA

The results from WALFA have been impressive. The seasonality of fire has greatly shifted, with more fires in the early dry season and less area burnt in the late dry season. Furthermore, the *shape* of fire has changed, with individual burn patches becoming smaller and less concentrated.¹⁵⁸⁴ This change in fire regime has resulted in a (mean) annual emissions reduction of 37.7 percent for the first seven years of the project – with a good chance that the reduction will only increase as patch dispersal accumulates over time.¹⁵⁸⁵ Economically, WALFA has delivered a substantial amount of revenue (over \$1 million a year) to an agriculturally unproductive and economically undeveloped area.¹⁵⁸⁶ Its founders have pointed out this compares favourably to the long history of failed and uneconomic agricultural development in the so-called “empty north”,¹⁵⁸⁷ and argued that savannah burning

¹⁵⁸⁰ It is important to note that WALFA initially only accounted for the emissions of methane and nitrous oxide, as carbon dioxide was assumed to be reabsorbed in following growing seasons. See Russell-Smith, “Fire Management Business in Australia’s Tropical Savannas.”

¹⁵⁸¹ Russell-Smith, 4.

¹⁵⁸² Russell-Smith et al., “Managing Fire Regimes in North Australian Savannas,” 57.

¹⁵⁸³ Peter J. Whitehead et al., “The West Arnhem Land Fire Abatement (WALFA) Project: The Institutional Environment and Its Implications,” in *Culture, Ecology and Economy of Fire Management in North Australian Savannas: Rekindling the Wurrk Tradition*, ed. Jeremy Russell-Smith, Peter J. Whitehead, and Peter M. Cooke (Collingwood: CSIRO Publishing, 2009), 331.

¹⁵⁸⁴ Jay Evans and Jeremy Russell-Smith, “Delivering Effective Savanna Fire Management for Defined Biodiversity Conservation Outcomes: An Arnhem Land Case Study,” *International Journal of Wildland Fire* 29, no. 5 (2020): 386-400.

¹⁵⁸⁵ Russell-Smith et al., “Managing Fire Regimes in North Australian Savannas.”

¹⁵⁸⁶ Kamaljit K. Sangha and Jeremy Russell-Smith, “Ecosystems Based Enterprise Opportunities for Indigenous People in Northern Australian Savannas” (Occasional paper series, Darwin: Darwin Centre for Bushfire Research, 2015).

¹⁵⁸⁷ For an account of the historical context of these failed proposals, see Russell McGregor, *Environment, Race, and Nationhood in Australia: Revisiting the Empty North* (Palgrave Macmillan, 2016); Lyndon Megarrity, *Northern Dreams: The Politics of Northern Development in Australia* (Australian Scholarly Publishing, 2018); for an analysis of the environmental factors hindering greater agricultural development in the Top End, see

represents a “totally new land sector industry”.¹⁵⁸⁸ While harder to quantify, the social and cultural benefits have also been substantial. *Bininj* WALFA staff are reporting “satisfaction that management of country is improved”, especially as this has been “secured largely through application of Indigenous knowledge and methods”.¹⁵⁸⁹ This is supported by what has been reported from Indigenous-led ranger programmes more generally, where rangers report a sense of “personal and community pride in their work”, especially where they are able to direct their efforts to fulfil cultural responsibilities to country on their own terms.¹⁵⁹⁰ As discussed below, however, this should not imply the programmes do not come without tensions.

WALFA is important to examine not only in its own right, but as it is also the standard bearer for a number of savannah burning schemes in Australia and around the world. As of August 2016, there were 71 savannah burning projects in Australia using similar methodologies to WALFA (though not all were Indigenous-led or on Indigenous lands – a critique we shall return to).¹⁵⁹¹ Estimates for the potential expansion of savannah burning across Australia project that it could result in the annual offset of 5 to 10 MtCO₂eq;¹⁵⁹² Australia’s annual emissions in 2017 were 530.8 MtCO₂eq, with a current policy goal to reduce these emissions by 26-28% by 2030.¹⁵⁹³ However, this expansion is limited to the north of Australia, as the potential for an overall reduction in emissions via prescribed burning in temperate forests is much lower.¹⁵⁹⁴ Given the enormous size of savannahs elsewhere in the world (accounting for perhaps one-sixth of global land area), it is no surprise that expansion of savannah

Jeremy Russell-Smith et al., “Moving beyond Evidence-Free Environmental Policy,” *Frontiers in Ecology and the Environment* 13, no. 8 (2015): 441–48.

¹⁵⁸⁸ Russell-Smith, “Fire Management Business in Australia’s Tropical Savannas,” 5; see also Jon Altman, “People on Country as Alternative Development,” in *People on Country: Vital Landscapes, Alternative Futures*, ed. Jon Altman and Seán Kerins (Sydney: The Federation Press, 2012): 1-25.

¹⁵⁸⁹ Whitehead et al., “The West Arnhem Land Fire Abatement (WALFA) Project: The Institutional Environment and Its Implications,” 336; The Department of Prime Minister and Cabinet commissioned an analysis that confirmed these benefits, see Social Ventures Australia, “Warddeken Indigenous Protected Areas (IPA) Social Return on Investment Analysis” (Department of the Prime Minister and Cabinet, 2015).

¹⁵⁹⁰ Kerins, “Caring for Country to Working on Country,” 34.

¹⁵⁹¹ Aboriginal Carbon Fund, “Savanna Burning,” Aboriginal Carbon Fund, 30 August, 2016, <http://aboriginalcarbonfund.com.au/savanna-burning/>.

¹⁵⁹² Russell-Smith et al., “Managing Fire Regimes in North Australian Savannas,” 61.

¹⁵⁹³ Department of Environment and Energy and Commonwealth of Australia, “Australian National Greenhouse Accounts: National Inventory by Economic Sector 2017,” 2019. With a current policy goal of reducing emissions by 26-28% by 2030, savannah burning clearly represents a potentially substantial contribution to this effort. That said, given the policy instability in Australia surrounding climate change, such an assessment requires some heroic assumptions.

¹⁵⁹⁴ R. A. Bradstock et al., “Modelling the Potential for Prescribed Burning to Mitigate Carbon Emissions from Wildfires in Fire-Prone Forests of Australia,” *International Journal of Wildland Fire* 21, no. 6 (2012): 629–39.

burning schemes to areas such as Kavango-Zambezi in Africa and the Cerrado of Brazil has been proposed.¹⁵⁹⁵

WALFA's success contributes to a significant body of evidence which demonstrates a link between Indigenous burning and Indigenous health. The health of Indigenous Australians is statistically much worse than the non-Indigenous population, yet research has demonstrated that those Indigenous Australians living on country and especially those engaged in "traditional" management practices enjoy "considerably better physical and mental health".¹⁵⁹⁶ This observation has been explained by increased physical activity, a healthier diet incorporating traditional resources, and most importantly – the emotional, social, and psychological benefits from caring for country.¹⁵⁹⁷ Similarly, the Karuk tribe in Northern California and Oregon have poor health outcomes demonstrated to be linked to "fire exclusion": not only are they unable to access and utilise their traditional food resources on public lands, but their inability to participate in their traditional management duties affects "both the mental health of individuals and generates a level of chronic community stress".¹⁵⁹⁸ Clearly there is great potential for beneficial public health outcomes that could come from an expansion of Indigenous management schemes. Indeed, one researcher pointed to WALFA as a case study which "demonstrated the possibility of substantial savings in primary health care" and presented a "strong economic argument in favour of consideration of traditional caring-for-country practices".¹⁵⁹⁹

While WALFA has demonstrated impressive results and has been publicly represented in an enthusiastic fashion,¹⁶⁰⁰ there are significant questions and tensions arising from it and similar savannah burning schemes relating to ideas of Indigenous burning as a practice. Some of these relate to the specific technology being used. In other projects, some Indigenous community members have objected to the use of helicopter-delivered aerial incendiaries as an "appropriate way of caring for

¹⁵⁹⁵ International Savanna Fire Management Initiative, "The Global Potential of Indigenous Fire Management: Findings of the Regional Feasibility Assessments" (United Nations University, 2015); Jayalaxshmi Mistry, Bibiana A. Bilbao, and Andrea Berardi, "Community Owned Solutions for Fire Management in Tropical Ecosystems: Case Studies from Indigenous Communities of South America," *Philosophical Transactions of the Royal Society B: Biological Sciences* 371, no. 1696 (2016).

¹⁵⁹⁶ C. P. Burgess et al., "Healthy Country: Healthy People? Exploring the Health Benefits of Indigenous Natural Resource Management," *Australian and New Zealand Journal of Public Health* 29, no. 2 (2005): 120.

¹⁵⁹⁷ Burgess et al., "Healthy Country."

¹⁵⁹⁸ Norgaard, "The Politics of Fire and the Social Impacts of Fire Exclusion on the Klamath," 87.

¹⁵⁹⁹ David Campbell, "Economies through Application of Nonmedical Primary-Preventative Health: Lessons from the Healthy Country Healthy People Experience of Australia's Aboriginal People," *International Journal of Environmental Research and Public Health* 13, no. 4 (2016): 10–11.

¹⁶⁰⁰ See for example Peter Hannam, "'Smoke Money' Offers an Unexpected Way Forward for Indigenous Communities," *Sydney Morning Herald*, 5 November, 2017; "Indigenous Rangers," *The Project* (Channel Ten, 30 November, 2016), <https://www.facebook.com/TheProjectTV/videos/10154112757483441/>.

their country”;¹⁶⁰¹ in Kakadu one Indigenous man compared helicopter burning to “buying chicken at the grocery store instead of hunting”.¹⁶⁰² Cultural burning practitioner Victor Steffensen relates that some Elders he has met are concerned that helicopter burning may replace the “fine art” of Indigenous burning.¹⁶⁰³

This scepticism is shared by some non-Indigenous researchers and writers. In 1994 David Bowman questioned whether “flying around in machines throwing fire out of helicopters” could “simulate to any degree the fineness of detail which is required for firestick farming”.¹⁶⁰⁴ More recently, some anthropologists have noted how the methodology of savannah burning pioneered by WALFA has spread onto non-Indigenous properties and questioned “is the trope of customary knowledge meaningful or informative in describing the early dry season drops of incendiary devices from helicopters to create firebreaks on pastoral properties in return for carbon emission reduction funds?”¹⁶⁰⁵ As Indigenous affairs journalist Nicholas Rothwell has observed, projects such as WALFA must answer sceptics for both the “scientific and economic worth” of their projects, in addition to the “indigenous content”.¹⁶⁰⁶

Similar scepticism and criticism has surrounded the purpose and governance behind comparable schemes. Pointing to the perceived difference between contemporary land management for carbon credits and prior fire management for the Wik people of the Cape York Peninsula, some anthropologists have argued that Wik fire management was undertaken at a local scale and “selectively and nonrandomly to protect and promote resources”.¹⁶⁰⁷ However, the dominant practice of helicopter burning “suggests that traditional burning has been relegated to an historical rather than continuing practice”.¹⁶⁰⁸ This is a heady charge for schemes that are often publicly represented and legitimated by appeals of restoring or continuing traditional burning. A team of social scientists led by

¹⁶⁰¹ Elodie Fache and Bernard Moizo, “Do Burning Practices Contribute to Caring for Country? Contemporary Uses of Fire for Conservation Purposes in Indigenous Australia,” *Journal of Ethnobiology* 35, no. 1 (2015): 175.

¹⁶⁰² Petty, deKoninck, and Orlove, “Cleaning, Protecting, or Abating?,” 152.

¹⁶⁰³ Steffensen, *Fire Country: How Indigenous Fire Management Could Help Save Australia*, 99–100.

¹⁶⁰⁴ Bowman, “Why the Skillful Use of Fire Is Critical for the Management of Biodiversity in Northern Australia,” 120–21.

¹⁶⁰⁵ Kim de Rijke, Richard J. Martin, and David S. Trigger, “Cultural Domains and the Theory of Customary Environmentalism in Indigenous Australia,” in *Engaging Indigenous Economy: Debating Diverse Approaches*, ed. Will Sanders, Research Monograph (Australian National University. Centre for Aboriginal Economic Policy Research); No. 35 (Acton, ACT: ANU Press, 2016), 47.

¹⁶⁰⁶ Nicolas Rothwell, “Indigenous Policy: Academic Jon Altman and His ‘Hybrid Economy,’” *The Australian*, 4 June, 2016,

<http://at.theaustralian.com.au/link/c59b516aceef21bcdf34b0e7772a7007?domain=theaustralian.com.au>.

¹⁶⁰⁷ Justin J. Perry et al., “The Divergence of Traditional Aboriginal and Contemporary Fire Management Practices on Wik Traditional Lands, Cape York Peninsula, Northern Australia,” *Ecological Management & Restoration* 19, no. 1 (2018): 29.

¹⁶⁰⁸ Perry et al., 29.

Aaron Petty argue that unlike “place-based knowledge, dynamic decision making, and attention to unique seasonal changes in vegetation”, WALFA’s focus on emissions reduction “forces a close registering and recording of burning” dependent upon external metrics.¹⁶⁰⁹ Richard J Martin has recorded that in the Gulf Country, Indigenous people are beginning to “talk about ‘hot’ fires and ‘cool’ fires, and ‘biodiversity’ and even ‘climate change’”, which he interprets as indicative of changes in the nature of traditional management roles and indeed the very “meaning of caring for country”.¹⁶¹⁰ The critiques discussed here are powerful and can be expanded to encompass contemporary Indigenous burning beyond greenhouse gas mitigation schemes. As discussed below, the cultural burning movement has also faced these criticisms.

Cultural Burning

It would be tempting to relegate Indigenous burning in the contemporary sense to the central and northern parts of Australia and to suggest that such present-day burning only occurs ‘up North’. However, a small but significant movement to implement cultural burning in the more densely populated southern states has gained momentum in the twenty-first century. It has already begun to shape fire discourse in the South and will continue to shape and unsettle fire discourse in the future.

Cultural burning has been understood rather loosely, but I define it here as a specific movement which promotes burning undertaken with substantial involvement of Indigenous people to reflect Indigenous priorities on land not legally Indigenous. In the Australian Capital Territory, cultural burning occurs under the aegis of the ACT Parks & Conservation Service, a legislated body that is charged with managing conservation reserves and national parks.¹⁶¹¹ While Ngunnawal people do not have legal rights to access or manage lands and waters in the ACT, the Service has sponsored the creation of the Murumbung Rangers after a suggestion from Ngunnawal man Adrian Brown – a group of Indigenous staff who conduct cultural activities including cultural burning.¹⁶¹² The example of the Murumbung Rangers points to how public institutions can encourage cultural burning even with legal impediments.¹⁶¹³ In Victoria, a leading example of cultural burning is run by the Dja Dja Wurrung of

¹⁶⁰⁹ Petty, deKoninck, and Orlove, “Cleaning, Protecting, or Abating?,” 157.

¹⁶¹⁰ Richard J. Martin, “Sometime a Fire: Re-Imagining Elemental Conflict in Northern Australia’s Gulf Country,” *Australian Humanities Review* 55 (2013): 84.

¹⁶¹¹ Bhiemie Williamson, “Reigniting Cultural Burning in South-Eastern Australia: The ACT Aboriginal Cultural Fire Initiative,” *Native Title Newsletter*, no. 2 (2017): 18–20.

¹⁶¹² Williamson; Jessica K. Weir, Stephen Sutton, and Gareth Catt, “The Theory/Practice of Disaster Justice: Learning from Indigenous Peoples’ Fire Management,” in *Natural Hazards and Disaster Justice*, ed. Anna Lukasiewicz and Claudia Baldwin (Singapore: Springer Singapore, 2020), 299–317.

¹⁶¹³ See also Neil Cooper, “Indigenous Fire Management,” *Fire Australia*, 2016.

central Victoria. A Recognition and Settlement Agreement with the Victorian state government in 2013 granted funding and management access to public lands to the Dja Dja Wurrung Clans Aboriginal Corporation, and subsequently cultural burning has expanded.¹⁶¹⁴ Burns conducted by the Dja Dja Wurrung are thought to be “among the first Aboriginal-led traditional burns on public lands in southeast Australia since the settler invasion began more than 180 years ago”.¹⁶¹⁵ The perceived success of the Dja Dja Wurrung in leading their own burns has led to the development of a pan-Victorian Traditional Owner Cultural Fire Strategy authored and distributed by the Federation of Victorian Traditional Owner Corporations which aims to promote and expand cultural burning throughout the state.¹⁶¹⁶ One of the remarkable features of the cultural burning movement is that it often occurs upon private land. Fire historiography is dominated by public lands, with iconic images of Yellowstone burning and easily traceable policy shifts revealed through public documents. Cultural burning is different. It is happening from the bottom up, rather than being a state-directed activity.

Results and Questions from Cultural Burning

One of the most critical aspects of cultural burning is that it must be led by or at least be mostly *directed* by Indigenous people, not just with Indigenous people approving pre-designed plans or igniting the flames. Neil Cooper recognised this when he wrote “it’s more than tokenistic inclusion”,¹⁶¹⁷ while the Traditional Owner Cultural Fire Strategy makes this point repeatedly.¹⁶¹⁸ As discussed in Chapter Four, models of co-management or joint management on public lands have not necessarily worked as originally envisioned to balance the power arrangements.¹⁶¹⁹ Cultural burning represents a different model to redistribute power over ignition. It is in this way that cultural burning is unsettling the prior discourse of fire in the southern states of Australia. Aboriginal Australians and Native Americans are taking back fire.

Building on this, cultural burning practitioners emphasise that it cannot be separated from culture; it cannot be viewed as simply another form of hazard reduction burning. It is “a cultural

¹⁶¹⁴ Neale et al., “Walking Together.”

¹⁶¹⁵ Neale et al., 344. Whether these burns were the ‘first’ cultural ignitions since colonisation can be contested; Matt Colloff notes that in 2008 a burn was undertaken by the Yorta Yorta Aboriginal Corporation in cooperation with Parks Victoria. See Colloff, *Flooded Forest and Desert Creek: Ecology and History of the River Red Gum*, 119.

¹⁶¹⁶ Federation of Victorian Traditional Owner Corporations et al., “Cultural Fire Strategy.”

¹⁶¹⁷ Cooper, “Indigenous Fire Management,” 18.

¹⁶¹⁸ Eg Federation of Victorian Traditional Owner Corporations et al., “Cultural Fire Strategy,” 5, 16.

¹⁶¹⁹ See also Haynes, “Seeking Control”; Nadasdy, “The Anti-Politics of TEK: The Institutionalisation of Co-Management Discourse and Practice.”

responsibility...according to Lore” and is “not simply about asset protection”.¹⁶²⁰ In the words of Victor Steffensen, one of the main promoters of cultural burning and a Tagalaka-descended man from the Gulf country who teaches cultural burning workshops to Indigenous Australians from all across the continent, “it is about the responsibility that [Indigenous Australians] have to the country”.¹⁶²¹

This is not to say there aren’t complications and tensions with cultural burning. For instance, there are grounds for internal tensions, such as Indigenous rights over who has responsibility and rights to burn where (including gendered divisions).¹⁶²² Land tenure under Australian law can be a significant complication.¹⁶²³ Public agencies and private landholders need to adjust to management schedules whereby cultural burners burn based on bio-indicators and Indigenous knowledge, and not on the “normal habits of working nine to five and getting home in time for the football”.¹⁶²⁴ Equally, obtaining requisite permits and local support to conduct burns can be an exhausting process even for established agencies conducting prescribed burning, due both to public health considerations and to the kind of conservation concerns discussed in earlier chapters.

Indeed, perhaps the most vexing complication for cultural burning lies in its complex relationship with Western prescribed burning. Cultural burning does not necessarily produce the same results or use similar methods of burning to contemporary burning for hazard reduction.¹⁶²⁵ It is often represented as using fires of lower intensity, or burning a smaller area than contemporary prescribed burns.¹⁶²⁶ This practice will help wildlife escape the burn, reduce damage to existing plants, and allow greater risk management, but it will also likely result in less fuel being consumed in the course of that single burn. A counterargument is that this is a false equivalence and that cultural burning should be viewed *programmatically*; that consistent and well-planned cultural burns will over time result in much greater fuel reduction than contemporary prescribed burns. Similarly, cultural burning often occurs at

¹⁶²⁰ Federation of Victorian Traditional Owner Corporations et al., “Cultural Fire Strategy,” 7–8.

¹⁶²¹ Brett Ellis and Victor Steffensen in Victoria, Standing Committee on the Environment and Planning, Inquiry into fire season preparedness, Hearing Transcripts 26 October 2016.

¹⁶²² Weir and Freeman, “Fire in the South: A Cross-Continental Exchange,” 12; Christine Eriksen and Don L. Hankins, “Colonisation and Fire: Gendered Dimensions of Indigenous Fire Knowledge Retention and Revival,” in *The Routledge Handbook of Gender and Development*, ed. A. Coles, L. Gray, and J. Momsen (New York: Routledge, 2015), 129–37; Annick Thomassin, Timothy Neale, and Jessica K. Weir, “The Natural Hazard Sector’s Engagement with Indigenous Peoples: A Critical Review of CANZUS Countries,” *Geographical Research* 57, no. 2 (2019): 170.

¹⁶²³ Federation of Victorian Traditional Owner Corporations et al., “Cultural Fire Strategy,” 15; Williamson, “Reigniting Cultural Burning in South-Eastern Australia,” 18–19; Weir and Freeman, “Fire in the South: A Cross-Continental Exchange,” 15–16.

¹⁶²⁴ Steffensen, *Fire Country: How Indigenous Fire Management Could Help Save Australia*, 160.

¹⁶²⁵ Steffensen, *Fire Country: How Indigenous Fire Management Could Help Save Australia*.

¹⁶²⁶ Weir and Freeman, “Fire in the South: A Cross-Continental Exchange,” 17; Busam, “Characteristics and Implications of Traditional Native American Fire Management on the Orleans Ranger District, Six Rivers National Forest,” 147; in the words of fire manager Stuart Ellis “it is not the big fire that causes the big plume that we see every autumn” in Ellis and Steffensen, Inquiry into fire season preparedness.

a greater variety of times than contemporary prescribed burning (which, as discussed in Chapter Six, may have very narrow windows of opportunity under current policy).¹⁶²⁷ Because cultural burning aims to use Indigenous knowledge to read country's readiness for fire, it is not structured around plans fixed months or years in advance. Cultural burning may occur with different patterns of ignition and plans for burns, resulting in differently shaped burned areas.¹⁶²⁸ These differences explain Victor Steffensen's criticism of "treating the land as a quota...when [agencies] just pick two weeks off a calendar".¹⁶²⁹

Despite these differences, it is clear that in the minds of the public and indeed of many agency employees these two quite different approaches to pyrotechnology are conflated. Cultural burners are not unaware of this; as one said "We've tried to keep the connection separate, but people are joining the dots [between cultural burning and contemporary prescribed burning] themselves".¹⁶³⁰ Some have speculated on the political reaction in the situation where a cultural burn escapes or fails to reduce the action of a large bushfire. This is a reasonable concern – after all, escaped prescribed burns do occur.¹⁶³¹ Neale speculates if a cultural burn did escape, "what would be the epistemological basis for defending" cultural burning, and relates that several Dja Dja Wurrung cultural burners were doubtful that their "knowledge and authority to speak for their country would be respected" in the inevitable political fallout.¹⁶³² Such a situation would be immensely revealing of changed power and cultural dynamics in Australian and North American society. Neale critiqued *The Biggest Estate on Earth* for contributing to an ecomodernist paradigm that assumed bushfires can always be controlled.¹⁶³³ This critique seems pertinent to such concerns around perceptions of cultural burning; there is a danger that such an escaped cultural burn would shatter such an unrealistic standard and undermine the basis for the movement. It would be absurd to judge cultural burning (and by extension Indigenous knowledge) for being imperfect, which is why it is so important for researchers and policymakers to leave room for human imperfection and error in portrayals and depictions of Indigenous knowledge. Otherwise we will end up with a public disappointed and perhaps angry that their image of Pyro-Ecological Indians didn't match reality.

The cultural burning movement has (inevitably) been confronted with the cultural continuity/discontinuity discourse. Cultural burning is often legitimated to the non-Indigenous public

¹⁶²⁷ Steffensen has been confident of conducting cultural burns in Victoria in winter, as opposed to the usual autumn prescribed burning period. See Ellis and Steffensen, *Inquiry into fire season preparedness*.

¹⁶²⁸ Ellis and Steffensen.

¹⁶²⁹ Ellis and Steffensen.

¹⁶³⁰ Neale et al., "Walking Together," 353.

¹⁶³¹ Burrows, "The Great Escapes."

¹⁶³² Neale et al., "Walking Together," 353.

¹⁶³³ Neale, "Review of 'The Biggest Estate on Earth.'"

through continuity with pre-colonial Indigenous culture; Steffensen (from North Queensland) has been represented to the Victorian Parliament as “one of [very] few people that have got connection to the traditional burning practices that have occurred within Australia for thousands of years”.¹⁶³⁴ The fact that cultural burning in many southern areas has been extensively legitimated through workshops in North Queensland speaks to the importance of this cultural continuity discourse – what does it mean that parts of the cultural burning movement in temperate states have been inspired by Indigenous Australians from tropical/semi-tropical Australia?

Nevertheless, cultural burners are aware of concerns around cultural discontinuity. As Dja Dja Wurrung/Yorta Yorta man Trent Nelson reflected, “It’s a common thing, we run across it every day”.¹⁶³⁵ Cultural discontinuity perceptions are not limited to fire – as Sarah Maddison notes, “the concept of tradition is still used to divide Aboriginal people or at least to maintain a hierarchy of authenticity”.¹⁶³⁶ Historian Denis Byrne reminds us that even from the earliest days of the Sydney colony, Europeans increasingly lost interest in local Indigenous Australians who “were seen to have lost or to be fast losing that quality which for so many Europeans was the only excuse for being a native, the quality of being authentically primitive”.¹⁶³⁷ Maddison observed that in the twenty-first century urban Indigenous Australians face particular challenges in this regard, though I argue that for cultural burning, this extends throughout the southern states of Australia. Perhaps in response to such concerns, the Victorian Cultural Fire Strategy emphasises that “cultural fire is *living* knowledge” (my emphasis).¹⁶³⁸ It supports this message by quoting a Ngintait Elder, who

...talks about having controlled burns backed up by the CFA and the fire brigade and the use of wind breaks and other standard fuel reduction burn techniques. When it is pointed out that this is not cultural burning, [Ngintait Elder] responds: ‘Yeah but it’s still protecting the country. So you gotta look at it both ways sometimes.’¹⁶³⁹

In this way conceptual space is left for fire knowledge to evolve and change.

¹⁶³⁴ Ellis and Steffensen, *Inquiry into fire season preparedness*.

¹⁶³⁵ Amy Cardinal Christianson et al., “Burning on Territory in Victoria, Australia with Trent Nelson and Tim Kanoa,” *Good Fire*, accessed 26 October, 2019, <https://yourforestpodcast.com/good-fire-podcast/2019/9/2/burning-on-territory-in-victoria-australia-with-trent-nelson-and-tim-kanoa>.

¹⁶³⁶ Sarah Maddison, “Indigenous Identity, ‘Authenticity’ and the Structural Violence of Settler Colonialism,” *Identities: Global Studies in Culture and Power* 20, no. 3 (2013): 292.

¹⁶³⁷ Byrne, “Deep Nation,” 83; see also Griffiths, *Hunters and Collectors: The Antiquarian Imagination in Australia*.

¹⁶³⁸ Federation of Victorian Traditional Owner Corporations et al., “Cultural Fire Strategy,” 7; this emphasis on living knowledge is also held by other Indigenous groups that burn, such as the Ngadju; see Prober et al., “Ngadju Kala,” 718; Williamson, “Reigniting Cultural Burning in South-Eastern Australia.”

¹⁶³⁹ Federation of Victorian Traditional Owner Corporations et al., “Cultural Fire Strategy,” 16.

The similar preconception demonstrated throughout this thesis is environmental discontinuity, which cultural burners have nimbly used to bolster their argument. The Victorian Cultural Fire Strategy acknowledges that “significant ecological changes” have occurred due to European colonisation, and quotes a Gunditj Mara Elder acknowledging that today “we got fences, we got poles, we got houses...we can’t do burns like we used to”.¹⁶⁴⁰ However, to Steffensen, this only increases the urgency towards cultural burning. “Everywhere I go, the country is unhealthy...all of my projects in the southern areas...they are all sick country” but “we need to be healing that country...you have to realise that when we burn for making the country healthy, we are giving [native species] and the country a boost to its immune system.”¹⁶⁴¹ Thus environmental discontinuity is mobilised not *against*, but *for*, a reconsideration of Indigenous burning.

Cultural burning is attractive to policymakers and the public for a variety of reasons, so it is worthwhile to speculate about whether this is because it has potential to be appropriated for existing ends (after all, the goals sought by agencies and by cultural burners may not match). Instrumentally, cultural burns may help achieve existing land management agency goals for fuel reduction. Similarly, cultural burns can help ecological and biodiversity conservation goals on a material level. It might even be possible that some cynical agencies might seek to use cultural burns as rhetorical cover for existing prescribed burning programmes – a form of ‘blackwashing’ to confound supposed objections from progressive critics of prescribed burning. In an incendiary, conspiratorial, and often empirically incorrect polemic in the journal *Overland*, Katherine Wilson raised this explanation for why the Victorian Liberal National Coalition would offer \$29 million for cultural burning before the 2018 state election, calling it a “a tactic, some conservationists believe [Wilson included], to buy social license for the planned burns industry”.¹⁶⁴² Steffensen has acknowledged this possibility, recounting “there have been government Indigenous fire programs dressing up Aboriginal people with full safety gear and a drip torch, then teaching how to burn the Western way and calling it cultural burning”.¹⁶⁴³ Steffensen has stressed that cultural burning is “not about agencies taking the knowledge and then running off with it and then calling it biodiversity burning or giving it a different name”.¹⁶⁴⁴ Such concerns are probably misplaced at present. Through their rhetoric and actions, agencies have thus far demonstrated that they view cultural burning through a lens of reconciliation, and cultural burners and academics have raised the interpretative possibility of viewing cultural burning as an opportunity to decolonise.

¹⁶⁴⁰ Federation of Victorian Traditional Owner Corporations et al., 19, 21.

¹⁶⁴¹ Ellis and Steffensen, Inquiry into fire season preparedness.

¹⁶⁴² Katherine Wilson, “The Fire Cult: On Whistleblowers and Pyrowankers,” *Overland*, Autumn 2019, 34.

¹⁶⁴³ Steffensen, *Fire Country: How Indigenous Fire Management Could Help Save Australia*, 94.

¹⁶⁴⁴ Ellis and Steffensen, Inquiry into fire season preparedness.

Another possibility is for the actual knowledge underpinning cultural burning to be appropriated, which is a consistent concern in Indigenous issues. As discussed in Chapter Four, anthropologist Paul Nadasdy investigated the relations between Indigenous peoples and Canadian government bodies in a ‘co-managed’ institution in the Yukon Territory. Nadasdy noted that for many conservation biologists and state authorities, the “value of TEK [Traditional Ecological Knowledge – a particular academic interpretation of Indigenous environmental knowledge] lies in its *incorporation into* the management process [sic]”, and this integration of Indigenous knowledge should be primarily considered “as a purely technical, rather than political or ethical, problem”.¹⁶⁴⁵ Political scientist Arun Agrawal has explored how even well-meaning efforts to categorise and “save” Indigenous knowledge can result in only “useful” knowledge being preserved, how the usefulness of this knowledge must be validated under scientific criteria, and once this preservation process is complete, there is “little reason to pay much attention to Indigenous peoples themselves”.¹⁶⁴⁶ Such extractive framing of knowledge can be especially galling to Indigenous societies where fire knowledge can be seen as privileged and only accessible to those who have earned trust.¹⁶⁴⁷

While these analyses apply to different political contexts, the response of the cultural burning movement has been to become mindful – subtly but strongly – of the concerns of power. The Cultural Fire Strategy discusses appropriation concerns and examines “the sacred nature of Intellectual Property associated with [cultural] fire”.¹⁶⁴⁸ Non-Indigenous fire manager Scott Falconer of the then-Department of Environment, Land, Water and Planning undertook a Churchill Fellowship to study cultural burning across Australia and North America, and has recommended that agencies develop formal protocols to recognise and appropriately respect Indigenous sovereign knowledge of fire.¹⁶⁴⁹ Indeed, cultural burning is mindful of power more broadly, and it is through this aspect that much of the optimism around the movement is revealed.

The most exciting aspect of cultural burning is how it represents a genuine shift in power relations between Indigenous and non-Indigenous Australia and might just function as a working demonstration of reconciliation or even decolonisation. Building off Maōri scholar Linda Tuhiwai-Smith, who defines decolonisation as “a long-term process involving the bureaucratic, cultural, linguistic and

¹⁶⁴⁵ Nadasdy, “The Anti-Politics of TEK: The Institutionalisation of Co-Management Discourse and Practice,” 220.

¹⁶⁴⁶ Arun Agrawal, “Indigenous Knowledge and the Politics of Classification,” *International Social Science Journal* 54, no. 3 (2002): 290, 294.

¹⁶⁴⁷ For instance, see description by Ngarigo fire practitioner Rod Mason in Zylstra, “Fire History of the Australian Alps: Prehistory to 2003”; or descriptions by Tagalaka descendant Victor Steffensen in Steffensen, *Fire Country: How Indigenous Fire Management Could Help Save Australia*.

¹⁶⁴⁸ Federation of Victorian Traditional Owner Corporations et al., “Cultural Fire Strategy,” 18.

¹⁶⁴⁹ Scott Falconer, “The Return of Cultural Burning,” The Lord Mayor’s Bushfire Appeal Churchill Fellowship Report, 2017.

psychological divesting of colonial power”, Neale *et al* point to the Dja Dja Wurrung cultural burning experience as a site of “emerging experiments in the redistribution of legal and political authority over country”.¹⁶⁵⁰ It is not “decolonisation in the sense of a complete and irreversible transfer of authority, or withdrawal of settler colonial government, but rather the iterative decolonising renovation of the political and practical dominance of settler agencies” – especially their authority over fire.¹⁶⁵¹ Indeed, the Cultural Fire Strategy describes cultural burning as a *literal* “process of decolonising the land”.¹⁶⁵² Even the less lofty goal of reconciliation is a constant refrain around cultural burning.¹⁶⁵³

It is through this lens that the arguably outsized media, political and public interest is explained. The actual number of burns or extent of land burned thus far by cultural burning is insignificant in the southern states,¹⁶⁵⁴ yet the movement still attracts considerable popular attention which would seem disproportionate when assessed only at a material level. As has been argued throughout this thesis, fire has been one of the chief ways in which non-Indigenous Australians have understood Indigenous Australia. Cultural burning points to a new understanding, a practical demonstration of what a redistribution of cultural and political authority might look like, of how we might live together. It’s an experiment, a grand one. Through cultural burning, Indigenous Australians are taking back fire, and lighting a way forward for us all.

Cultural Burning in the United States

While there are growing cultural burning movements in the United States, especially in parts of California and Oregon, they are not as advanced as in Australia and do not have the same level of institutional support and public attention as in Australia. Why is cultural burning less prominent in the United States than in Australia? For the same reasons outlined in Chapter Five relating to the ways in which Indigenous burning in general is less prominent in the US than in Australia: a lack of a need to ‘prove’ legitimacy of environmental knowledge to a public which views a hunter-gatherer/agriculturalist binary, different politics of land rights and treaties, and a lesser cultural emphasis on Indigenous history. Nevertheless, they do share a number of aspects, so a comparison is instructive.

¹⁶⁵⁰ Neale et al., “Walking Together,” 346.

¹⁶⁵¹ Neale et al., 355.

¹⁶⁵² Federation of Victorian Traditional Owner Corporations et al., “Cultural Fire Strategy,” 16.

¹⁶⁵³ Federation of Victorian Traditional Owner Corporations et al., 20.

¹⁶⁵⁴ Neale et al., “Walking Together.”

In both countries similar connotations and distinctions are made between contemporary prescribed burns (as practised by agencies) and cultural burning. This distinction echoes in the words of a California Indian cultural burner who recounted his surprise at a Forest Service fire manager telling him “we burn for acres; you burn for resources”.¹⁶⁵⁵ Another tension relates to the need to ‘authenticate’ knowledge and the power tensions this demand reflects. Even when fire management of resources (including for basketry materials) is permitted on public land, the onus of proof is on tribes to prove their techniques do not have a detrimental environmental impact (as described by Agrawal above).¹⁶⁵⁶

This authentication also touches on issues of rights to knowledge similar to those for Indigenous Australians. A California Indian cultural fire practitioner explained this problem to social geographer Christine Eriksen in describing her efforts to persuade the Forest Service to cooperate on burns for both hazard reduction and basketry:

Unfortunately agencies don’t believe in it unless it’s in black and white. They want to see it written down and a lot of our people are not writers. We have always had oral traditions and they are uncomfortable writing or they don’t feel they are going to write well enough. Then you have that, ‘How much do you want to tell them?’ How much do we have to tell them to convince them? Because sometimes they want to know things they have no right to know.¹⁶⁵⁷

Yet while these political, ideological, and cultural challenges certainly exist for the cultural burning movement in the US, there are also shared opportunities. This is particularly the case in Northern California, in the territories of the Hupa, Karuk, and Yurok in the Klamath Mountains. The slow growth in capacity of the tribal burners means that electrical utility companies are now confident to award contracts to tribes in order to fulfil their responsibilities for wildfire mitigation efforts and build infrastructural resilience against climate change.¹⁶⁵⁸ As Pyne points out, there are many examples of communities in the United States that attempt to put fire back on the land, but the Klamath area is different. The fact the tribes were included from the beginning, and in a serious manner, meant they “unsettled the usual discourse”; the old battle between environmentalists and conservationists has

¹⁶⁵⁵ Michael Boero, “Traditional Ecological Knowledge and Collaborative Forest Restoration in the Sierra Nevada” (MA diss., San José State University, 2017), 51.

¹⁶⁵⁶ Anderson, *Tending the Wild*, 324.

¹⁶⁵⁷ Eriksen and Hankins, “The Retention, Revival, and Subjugation of Indigenous Fire Knowledge through Agency Fire Fighting in Eastern Australia and California,” 1296.

¹⁶⁵⁸ Will Houston, “PG&E Awards Karuk Tribe \$100K Grant for Wildfire Prevention, Prescribed Burns,” *Eureka Times-Standard*, 27 September, 2017, <http://www.times-standard.com/article/NJ/20170927/NEWS/170929820>.

been superseded by the addition of the Karuk wanting burning for their own reasons.¹⁶⁵⁹ In other words, there has been a slow redistribution of power over fire.

The cultural burning movements in Australia and the United States are linked not just by academic analogy but also through direct exchange of ideas and key personnel.¹⁶⁶⁰ Indigenous burning workshops run in Queensland had significant contributions by Miwko? cultural fire practitioner and pyrogeographer Don Hankins.¹⁶⁶¹ Study tours between Australia and North America for cultural burners occur.¹⁶⁶² Perhaps it is possible to imagine that just as fire has become crucial to assertion of pan-Aboriginal identity, it may become key to the assertion and political construction of pan-Indigenous identity. Such examples remind us that colonisation was a global process, and that the intellectual models that inspired, legitimated, and reinforced it were a transnational experience shared in both Australia and the United States. It shouldn't be a surprise that the discourses of cultural burning share these features – but it does point to optimism. If such attitudes can effectively be countered in one jurisdiction, the adoption of similar rhetorical or cultural tactics may yield success in comparable contexts.

Conclusion: Taking Back Fire

The final stages of editing this thesis coincided with the hearings of the 2020 Royal Commission into National Natural Disaster Arrangements (better known as the 'Bushfires Royal Commission'). One of the Commission's terms of reference was to investigate "any ways in which the traditional land and fire management practices of Indigenous Australians could improve Australia's resilience to natural disasters".¹⁶⁶³ Note the extractive framing – how is Indigenous burning useful for this specific purpose? Note the use of 'traditional'. There is much work to be done.

The West Arnhem Land Fire Abatement project has achieved substantial environmental, economic, and cultural benefits for its Indigenous owners, functioning as a trailblazer for similar savannah burning schemes across Australia and globally. It has also raised questions around the use of modern

¹⁶⁵⁹ Stephen J. Pyne, *Sloppers: Fire Surveys of the Mid-American Oak Woodlands, Pacific Northwest, and Alaska* (Tucson: University of Arizona Press, 2019), 104.

¹⁶⁶⁰ This also applies, to some extent, to First Nations groups in Canada, though the differing ecologies complicate these links. See Christianson, "Social Science Research on Indigenous Wildfire Management in the 21st Century and Future Research Needs"; Falconer, "The Return of Cultural Burning."

¹⁶⁶¹ Peter McConchie et al., *Fire: And the Story of Burning Country* (Avalon: Cyclops Press, 2013).

¹⁶⁶² Falconer, "The Return of Cultural Burning."

¹⁶⁶³ Australia, Governor-General, *Letters Patent* Vol 55, (20 February 2020).

<https://naturaldisaster.royalcommission.gov.au/publications/commonwealth-letters-patent-20-february-2020>

technology, difference in ignition patterns, and transformation of the purpose and language of burning. WALFA exists to service an economic market founded on concerns over anthropogenic climate change; the superficial ironic take invariably references the idea of an 'ancient' practice 'saving' settler-colonial society from its own environmental sins. Climate change is increasingly changing the patterns of fire across the globe but understanding Indigenous burning as flexible rather than static reveals its role in a warming planet. Savannah burning, for all its promise, conforms to the North-South divide of non-Indigenous understandings of Indigenous history as it largely occurs in rural and remote regions, often on lands owned by Indigenous peoples. The cultural burning movement unsettles this. Cultural burning has thus far played a vanishingly small role in transforming physical environments, but it is upending discursive environments and represents a genuine vision of reconciliation and even decolonisation. Nevertheless, it faces considerable structural challenges, and is still confronted by the tropes demonstrated throughout this thesis, especially notions of cultural and environmental discontinuities.

Conclusion: Lighting The Way Forward

2020 started in smoke. It's not unusual for Canberra to be wreathed in fog on winter mornings, but the new decade began in the nation's capital in high summer with yellow smoke so thick you could not see your neighbour's house, and quantification showing that Canberra had the worst air quality in the world. The 2019-20 bushfires burned a "globally unprecedented percentage of any forest biome",¹⁶⁶⁴ thrust climate change to the forefront of global debates (at least before COVID-19 spread),¹⁶⁶⁵ and, as with other bushfires before it, spawned an intense dispute over cause and blame. Familiar arguments that activists had prevented prescribed burning were promulgated, despite serving fire chiefs and leading fire researchers disputing that this prevention had occurred or that more prescribed burning would even have made a difference under the prevailing extreme circumstances.¹⁶⁶⁶ Less familiar allegations emerged, extending activist culpability to include deliberate arson (false flags, apparently, to drive action on climate change, expand Islamic State, or free land for high speed rail), assertions almost certainly driven by coordinated disinformation and astroturfing campaigns.¹⁶⁶⁷ The existence of such conspiratorial nonsense should not elide the evidence that some activists have opposed prescribed burning, or that rural communities have felt genuine grievances over land management strategies – these are common themes throughout this thesis. But 2020 began with a marked ramping-up of the discursive frameworks within which these arguments are advanced.

History was used, weaponised, over and over, most prominently for discourses on climate change. Even debate over the name for the fires reflected this. Tom Griffiths initially characterised this as the "Savage Summer" as it lacked a single defining day or crisis – a 'black' Friday or Saturday.¹⁶⁶⁸ Stephen Pyne named them the "Forever Fires" to signal their connection with his evolving narrative of the

¹⁶⁶⁴ Matthias M. Boer, Victor Resco de Rios, and Ross Bradstock, "Unprecedented Burn Area of Australian Mega Forest Fires," *Nature Climate Change* 10, no. 3 (2020): 171. It should be noted this study was only able to use data from recent decades, as evidence of the area burned in historical bushfires prior to remote sensing is unreliable.

¹⁶⁶⁵ Tom Griffiths, "Season of Reckoning," *Australian Book Review*, March 2020.

¹⁶⁶⁶ Hamish Goodall, "NSW Fire Service Boss Shane Fitzsimmons Shoots down Barnaby Joyce's Bushfire Claim," *7NEWS.com.au*, 8 January, 2020, <https://7news.com.au/sunrise/on-the-show/shane-fitzsimmons-dismisses-barnaby-joyces-claims-bushfires-caused-by-green-caveats-c-637354>.

¹⁶⁶⁷ A false flag is a tactic where an act is committed under disguise in order to pin blame on a different cause or actor, usually to mobilise support for military or political campaigns. Christopher Knaus, "Bots and Trolls Spread False Arson Claims in Australian Fires 'Disinformation Campaign,'" *The Guardian*, 8 January, 2020, <https://www.theguardian.com/australia-news/2020/jan/08/twitter-bots-trolls-australian-bushfires-social-media-disinformation-campaign-false-claims>.

¹⁶⁶⁸ Tom Griffiths, "Savage Summer," *Inside Story*, 8 January 2020, <https://insidestory.org.au/savage-summer/>.

Pyrocene.¹⁶⁶⁹ The Prime Minister (Scott Morrison) referred to them as a “Black Summer”, no doubt a careful formulation that sought to link them to previous “Black” days and thus hide any politically-inconvenient discussions about the unprecedented scale and duration of the events and their likely connection to more systematic climate change dynamics.¹⁶⁷⁰ Australia generally has a boom-bust attention economy to match its ecology,¹⁶⁷¹ but the discussion around these fires was different. Indigenous voices were both heard and listened to,¹⁶⁷² reflecting a combination of factors not significantly present in prior popular debates. It is too early to tell whether the Royal Commission into National Natural Disaster Arrangements will make a significant difference in Australian fire culture or policy, although – as noted already – the Commission’s initial framing of Indigenous burning as “traditional” is highly problematic, given the issues traversed in preceding chapters. But at least this formal recognition of Indigenous burning practices has moved beyond the abstract or token gesture, signalling that Indigenous expertise is now valued to some extent by settler-colonial governments and cultures, as is the Indigenous self-assertion of expertise.

This thesis has explained the processes influencing how this has happened, not simply as an evolving awareness but through the changing terms of distinct discursive formations. By tracing the ways in which practices of Indigenous burning have been increasingly recognised, operationalised and appropriated, I have sought to demonstrate that understandings of Indigenous burning are socially, culturally, and politically constructed. Changes in these understandings have reflected and driven changes in understandings of Indigenous Australia more broadly. Fire is always political.

Summary

The thesis began with the Black Friday bushfires in Victoria and the following Stretton Royal Commission which set a paradigm for later cultural responses to bushfires. The Stretton Commission functioned as a debate between different visions of how to live in Australia, specifically pitting broadcast burning and the interests of grazing against fire exclusion and the interests of forestry. History and ecology were key to arguments about the power over ignition, in determining what was

¹⁶⁶⁹ Konrad Marshall, “The ‘Forever Fires’ and Australia’s New Reality,” *The Sydney Morning Herald*, 25 January, 2020, <https://www.smh.com.au/national/the-forever-fires-and-australia-s-new-reality-20200122-p53tk0.html>.

¹⁶⁷⁰ Griffiths, “Season of Reckoning.”

¹⁶⁷¹ Libby Robin, Leo Joseph, and Robert Heinsohn, eds., *Boom and Bust: Bird Stories for a Dry Country* (CSIRO Publishing, 2009).

¹⁶⁷² B. Williamson, F. Markham, and J.K. Weir, “Aboriginal Peoples and the Response to the 2019-2020 Bushfires,” CAEPR Working Paper No. 134/2020 (Canberra: Centre for Aboriginal Economic Policy Research, Australian National University, 2020).

natural or what Australia's pre-colonial natural state was as a framework in which to learn the lessons of living with these forests and their fires. Very few witnesses considered the burning practices of Indigenous peoples, and just two recognised any sense of Indigenous agency or discussed the specifics of Indigenous burning patterns. This omission is partly explained through the likely low level of influence from pre-colonial burning in mountain ash forests, but also through the dominance of settler-colonial frameworks which legitimated and justified the violent dispossession of Indigenous peoples. The 'light burning' dispute in the United States influenced some to promote fire exclusion, indicating the importance of imported expertise in predetermining the terms of debate.

Chapter Two explored this light burning dispute, which pitted newly-empowered conservationist foresters who favoured fire suppression against a diverse array of landowners and graziers who advocated for a loose assembly of practices called light burning. The debate was greatly intensified by the Big Burn of 1910, especially in California. The eventual victory of the fire suppressionists had profound ecological consequences and was in part shaped by conceptualisations of burning practices of Native Americans. Settler colonialism in California had been especially violent in the dispossession of Native Americans, prompted and legitimated by ideological frameworks. Even light burners who were sympathetic to Native American burning practices were profoundly influenced by these discursive structures, while fire suppressionists gleefully ridiculed the Native American link from the same frameworks, enhanced by racial pejoratives. Race was thus used in service of a debate between elite and folk knowledge and practices. Black Friday and the light burning dispute had different outcomes: one saw fire taken off the land, the other endorsed fire on the land.

In Chapter Three the jarrah forests of South-Western Australia offered another continental and discursive context for these frameworks. European settlers forcibly suppressed Noongar fires and those who lit them, and brought their own fire practices into a process of pyro-ecological imperialism. As in Victoria and California, foresters initially sought to implement total fire suppression but then began to experiment with broadscale prescribed burning for fuel reduction in the 1950s. The 1961 Dwellingup fires and following Rodger Royal Commission again saw arguments between foresters and farmers. In this case, however, the Forests Commission's experimentation with broadscale prescribed burning revealed that these disputes were more about authority over ignition than they were about outcomes. Noongar burning was largely understood only as simplistic and for hunting, with the landscapes of the South West an emergent property rather than deliberately engineered firescapes. The Rodger Royal Commission endorsed the Australian Strategy of broadscale prescribed burning, but the expansion of this process was also assisted by empirical guidance and the glamour and low cost of aerial ignition. This Australian Strategy significantly shaped ecologies and fire cultures across the Australian continent over the following decades. Nevertheless, in the Australian Strategy, Indigenous

burning did not function as inspiration but as post-hoc justification. Any links made were later grafts onto an already-established doctrine.

These first three chapters explored the aftermaths of Big Fires, but Chapter Four explored the power of Small Fires and Fires in the Mind in shaping discourses of Indigenous burning. Kakadu National Park has provided an important site in shaping non-Indigenous understandings of Indigenous burning. The Park is well-visited and prominent in the national imagination of Australia, and Indigenous burning by local *bininj* actively occurs under the evolving and ambiguous practice of joint management. This chapter exposed some of the tensions that arise when Indigenous burning moves from the historical reference point to the present practice, identifying discourses of cultural continuity, environmental continuity, and pyro-essentialism. Park staff used *bininj* burning to defend Kakadu against external criticism of Park management but were initially wary of incorporating *bininj* burning as a practice. Academics influenced by their experiences of *bininj* burning in Kakadu have shaped broader intellectual frameworks for Indigenous burning in Australia and North America, laying the foundations for schemes such as those explored in Chapter Eight. *Bininj* burning in Kakadu helped confront the Australian environmentalist movement with the contradictions and implications of wilderness philosophy, helping to explain how this movement could diverge from the American environmental movement in its relationship towards Indigenous peoples.

Chapter Five returned to the United States to survey the post-Second World War era. This chapter explained how and why concepts of Native American burning have been far less influential or prominent in the United States than concepts of Aboriginal Australian burning have been in Australia. The victory of the fire suppressionists caused drastic ecological and social consequences in the American West. The Fire Revolutionaries undermined the fire suppression paradigm but emphasised natural over culturally-prescribed fire, largely setting aside any engagement with Native American burning. This omission is explained in part by the strong influence of a prevailing wilderness philosophy. The 1988 Yellowstone Fires caused the Fire Revolution to falter and threw the failures of wilderness philosophy into public and academic debate. Academics deconstructed the wilderness framework, along with that of the Ecological Indian. American environmentalists grew wary of such deconstructions and any other engagement with Native American burning, suspicious of mischievous appropriation by culture warriors.

Chapter Six returned to the fire flume of Victoria to investigate the aftermath of the 2009 Black Saturday bushfires, where Indigenous burning and prescribed burning were again entangled. This chapter moved characterisation of prescribed burning debate away from simplistic 'pro' and 'anti' positioning of the popular media or academic frameworks based on distinguishing between discourses

of risk and interest. Instead, it offered a spectrum of views, ranging from hyperbole in favour, to nuanced advocacy, to moderately wary, to heavily against. Some of the disagreement across this spectrum is explained through poor fire literacy and inadequate language to reflect the diversity of ecological relationships to fire across the Australian continent. Other disagreement was explained as being fodder for highly polarised culture wars over social values. The spectrum explained the entanglement between prescribed burning and Indigenous burning following Black Saturday. Black Saturday generated such a distinct range of views towards Indigenous burning that a full typology was developed. Appropriation and dismissal of Indigenous burning had been demonstrated in previous chapters, but this chapter analysed the emergence of consideration (in both a methodological and didactic sense) and caution/uncertainty as distinct discourses of Indigenous burning. The appropriation of Indigenous burning to wage broader culture wars points to general changes in how non-Indigenous Australia understood Indigenous Australia.

Fires in the Mind were further explored in Chapter Seven. Megafauna extinction theories have been conflated with, and incorporate ideas around, Indigenous burning. These sets of academic theories can both be seen as Grand Unified Theories: they are subject to similar tropes, they were similarly composed in part with an eye to the present, and they similarly have contemporary policy and political implications for conservation and land management. This chapter demonstrates the influence of Bill Gammage's *Biggest Estate on Earth* in shaping post-Black Saturday discourses in Australia, and critiques it in depth to demonstrate the ways in which this influence is problematic. Weaknesses in Grand Unified Theories stem from their fundamentally binary nature. This chapter proposed a unified spectrum of natural impact and cultural importance to move academic debate past such unproductive formulations. Moving beyond binaries will liberate discourses of Indigenous burning from the domination of appropriation and dismissal, enabling more robust and ecologically sensitive fire management policy that reflects a continental vision of fire.

The final substantive chapter explored how, through Small Fires and Fires in the Mind, Indigenous Australians themselves are reshaping discourses of Indigenous burning. Climate change is altering patterns and drivers of fire, but Indigenous burning as a practice is already creatively responding to this. The West Arnhem Land Fire Abatement project shows that savannah burning schemes reproduce some of the discourses identified from Kakadu National Park such as pyro-essentialism and cultural and environmental continuities, suggesting that expanded Indigenous burning programmes will face similar discourses. In the southern states, cultural burning reproduces these discourses, but is gradually finding greater acceptance at a policy level. In this way, cultural burning is slowly but surely redistributing power over ignition. Through cultural burning, Indigenous Australians are taking back fire, and moving Indigenous burning beyond the tyranny of the past tense.

Fire History's Role in Building *Terra Ignis*

This thesis has also outlined a new approach to fire history and fire literacy. It outlines the diversity and complexity that combines to form a continental vision of fire and Indigenous burning. Binaries of impact have been rejected in favour of spectrums of both natural modification and cultural importance. Replacing *terra nullius* with *terra ignis* does not imply that all of Australia was literally burned in the same fashion. This thesis has used floral protagonists and contextualised Big Fires to point to the importance of historical perspectives. As Neale has observed, many bushfires are remembered by the name of their ignition point or major day of impact,¹⁶⁷³ a temporal positioning which can hide the structural causes and explanations. This is not limited to the past tense; the victory of the fire suppressionists in the light burning dispute following the 1910 Big Burn in America contributed to fire management policies and cultures in Australia which shaped Black Friday in 1939 and the Dwellingup bushfires in 1961. In this way, a fire's ecological context is not limited solely to its immediate impact.

This thesis has also strongly argued for the importance of considering fire history beyond the impact of destructive Big Fires. The typical assumption from fire practitioners is that "policy windows" follow large bushfires through processes such as inquiries and royal commissions, leading to better processes and policies, but the example of the area-based prescribed burning target, its short life and ambiguous legacy, undermines this vaguely positivist narrative.¹⁶⁷⁴ For fire historians, focussing on such inquiries is methodologically attractive, for they generate large volumes of public material.¹⁶⁷⁵ However, this focus on public lands, public institutions, and public policies can hide how policy is translated into practice or what occurs on private lands.¹⁶⁷⁶ Furthermore, this thesis has demonstrated how the slow processes of Small Fires (such as the regular patterns and tensions of burning in Kakadu National Park) or Fires in the Mind (such as the influence of the Fire Revolution or Bill Gammage's *Biggest Estate*) can also shape fire cultures and fire policies. "Can ideas be dangerous?" asked botanist, ecologist, and geographer Paul Adams, in his review of Bill Gammage's *The Biggest Estate on Earth*.¹⁶⁷⁷ For historians, the answer is obvious, but ideas can also be liberating. Building a deeper fire literacy does not imply

¹⁶⁷³ Neale, "Digging for Fire," 80.

¹⁶⁷⁴ Neale, Weir, and McGee, "Knowing Wildfire Risk," 23.

¹⁶⁷⁵ Gill et al supply a logarithmically-scaled graph which shows the explosion of length of official reports generated from these inquiries; see A. Malcolm Gill, Scott L. Stephens, and Geoffrey J. Cary, "The Worldwide 'Wildfire' Problem," *Ecological Applications* 23, no. 2 (2013): 438–454.

¹⁶⁷⁶ Lawson Cole et al., "Can Major Post-Event Inquiries and Reviews Contribute to Lessons Management?," *Australian Journal of Emergency Management* 33, no. 2 (2018): 38.

¹⁶⁷⁷ Adam, "Can Ideas Be Dangerous?"

restricting fire literacy to conceptions of Indigenous burning. Rather it will support a greater sense of fire stewardship and a rapprochement with the element that the Industrial Revolution banished from the fields and homes of Western society. Developing a deeper language of fire is critical.

For non-Indigenous Australians, burning is the most visible evidence of Indigenous land management, and the most understandable aspect of the connection to country. In this way, changes in the discourses of Indigenous burning are both signalling, and indeed driving, shifts in the way non-Indigenous Australia understands Indigenous Australia. Perceptions of Indigenous burning have inspired and been appropriated for the legitimization of policy; culture shapes nature, which in turn shapes culture. In the minds, speech, and policy of non-Indigenous Australians, Indigenous burning has transformed from academic curiosity to political incendiary – and, increasingly, to a lived reality.

Bibliography

Archives

The Bancroft Library (BANC)

BANC MSS C-B 728	Emanuel Fritz Papers
BANC MSS 71/103c	Sierra Club Records
BANC MSS 79/9c	David Brower Papers

California State Archives (CSA)

F3849	Department of Forestry Records
-------	--------------------------------

Forest History Society Library and Archives (FHS)

US Forest Service Headquarters History Collection
Harold Weaver Collection

National Archives of Australia (NAA)

E1509	Northern Land Council, correspondence files
E1527	Parks Australia, correspondence files

National Archives (NARA)

RG95	Records of the Forest Service
------	-------------------------------

National Library of Australia (NLA)

Bib ID 2684009	<i>The Greener Times: WA's Environmental News Magazine</i>
----------------	--

Northern Territory Archives Service (NTAS)

NTRS 2972	Graham McMahon, Papers relating to the Kakadu National Park fighting committee
NTRS 3615	Territory Parks and Wildlife Commission, Correspondence files, 1961-1984, Fire, planning and control

State Records Office of Western Australia (SROWA)

AU WA S2001	Transcripts of Evidence
AU WA S4643	Report – Royal Commission on Bushfires
AU WA S4644	Exhibits
AU WA S4645	Correspondence Files
AU WA S4647	Relevant legislation, regulation and department manuals
AU WA S4648	Collated cuttings from local newspapers
AU WA S4649	Statements

Documents relating to Royal Commissions and Kakadu National Park

1939 Black Friday bushfires

“Transcript of evidence given before the Royal Commission to enquire into the causes and origins and other matters arising out of bush fires in Victoria during the month of January 1939”. Melbourne: Government Printer, 1939. University of Melbourne Digitised Collections.

Stretton, L.E.B. *Report of the Royal Commission into the Causes of and Measures Taken to Prevent the Bush Fires of January, 1939*. Melbourne: Government Printer, 1939. University of Melbourne Digitised Collections.

1961 Dwellingup bushfires

“Report of evidence taken by Mr G.J. Rodger appointed on the 27th April, 1961, as a Royal Commissioner to inquire into and report upon bush fires in Western Australia”. Western Australia Parliament, 1961. SROWA S2001.

Rodger, G.J. *Report of the Royal Commission Appointed to Enquire Into and Report upon the Bushfires of December, 1960, and January, February, and March, 1961 in Western Australia*. Western Australia Parliament, 1961. SROWA S4643.

2009 Victorian Bushfires Royal Commission (2009 VBRC)

Exhibits, 2009 Victorian Bushfires Royal Commission, Series VPRS 16497, Public Record Office of Victoria.

Hearings Transcripts, 2009 Victorian Bushfires Royal Commission, National Library of Australia Pandora Online Archive. <http://nla.gov.au/nla.arc-96781-20100923-0223-www.royalcommission.vic.gov.au/Hearing-Schedule.html>

Public Submissions, 2009 Victorian Bushfires Royal Commission, National Library of Australia Pandora Online Archive. <http://nla.gov.au/nla.arc-96781-20100923-0223-www.royalcommission.vic.gov.au/Submissions/View-Submissions.html>

Teague, Bernard, Ronald McLeod and Susan Pascoe. *2009 Victorian Bushfires Royal Commission, Final Report: Summary*. Melbourne: Government Printer for the State of Victoria, 2010.

Teague, Bernard, Ronald McLeod and Susan Pascoe. *2009 Victorian Bushfires Royal Commission, Final Report, Volume III: Establishment and Operation of the Commission*. Melbourne: Government Printer for the State of Victoria, 2010.

Teague, Bernard, Ronald McLeod and Susan Pascoe. *2009 Victorian Bushfires Royal Commission, Final Report, Volume II: Fire Preparation, Response and Recovery*. Melbourne: Government Printer for the State of Victoria, 2010.

Kakadu National Park documents

“Representations on the Fourth Plan of Management in Respect of Kakadu National Park.” National Parks And Wildlife, 1997.

A.N.P.W.S. “Representations Received in Connexion with the Plan of Management for Kakadu National Park.” Australian National Parks and Wildlife Service, 1980.

Australian National Parks and Wildlife Service. “Kakadu National Park Plan of Management.” Canberra: Commonwealth of Australia, 1980.

Australian National Parks and Wildlife Service. “Kakadu National Park Plan of Management.” Canberra: Australian National Parks and Wildlife Service, 1986.

Australian National Parks and Wildlife Service. “Comments on the Representations Concerning the Kakadu National Park Plan of Management.” Canberra: Australian National Parks and Wildlife Service, 1991.

Australian National Parks and Wildlife Service, and Kakadu Board of Management and Parks Australia. “Kakadu National Park Plan of Management.” Canberra: Australian National Parks and Wildlife Service, 1991.

Director of National Parks. “Report of the Director of National Parks on the Preparation of the Sixth Kakadu National Park Management Plan.” Parks Australia, 2015.

Kakadu Board of Management, and Parks Australia. “Kakadu National Park Plan of Management.” Jabiru: Commonwealth of Australia, 1998.

Kakadu Board of Management, and Director of National Parks and Wildlife. “Comments on the Representations on the Fourth Plan of Management in Respect of Kakadu National Park.” Canberra, 1997.

Kakadu National Park Board of Management, and Parks Australia. “Kakadu National Park Management Plan 2007-2014.” Darwin: Director of National Parks Australia, 2007.

Kakadu National Park Board of Management, and Australian Government: Director of National Parks. “Kakadu National Park Management Plan 2016-2026: A Living Cultural Landscape.” Director of National Parks Australia, 2016.

Ovington, J.D., and Australian National Parks and Wildlife Service. "Comments on the Representations on the Plan of Management for Kakadu National Park." Canberra: Australian National Parks and Wildlife Service, 1980.

Ovington, J.D. "Comments on the Representations Concerning Kakadu National Park Plan of Management as Released for Public Comment." Canberra: Australian National Parks and Wildlife Service, 1986.

Online material

ABC News (Australia). *WA Leads the Force in Tackling Bushfires*, 30 July 2010.
<https://www.youtube.com/watch?v=XHi9CAPXwvs>.

Aboriginal Carbon Fund. "Savanna Burning." Aboriginal Carbon Fund, 30 August, 2016.
<http://aboriginalcarbonfund.com.au/savanna-burning/>.

Australia. Governor-General. *Letters Patent* Vol 55, 20 February 2020.
<https://naturaldisaster.royalcommission.gov.au/publications/commonwealth-letters-patent-20-february-2020>.

Bowman, David, and Lynda Prior. "Fire-Driven Loss of Obligate Seeder Forests in the Alps (Synthesis)." *Hot Topics in Ecology, Ecological Society of Australia* (blog), 2016.
<https://www.ecolsoc.org.au/hot-topics/fire-driven-loss-obligate-seeder-forests-alps>.

Burnett, Governor Peter. "State of the State Address." 6 January, 1851.
http://governors.library.ca.gov/addresses/s_01-Burnett2.html.

Butterworth, Liam. "Donald Trump Wants California to Rake Forests to Prevent Fires. Here's the Backstory." *ABC News*, 20 November, 2018. <https://www.abc.net.au/news/2018-11-19/why-donald-trump-says-raking-forests-would-stop-california-fires/10509984>.

Calfire. "Camp Fire Incident Information," January 4, 2019.
http://cdfdata.fire.ca.gov/incidents/incidents_details_info?incident_id=2277.

Christianson, Amy Cardinal, Matthew Kristoff, Trent Nelson, and Tim Kanoa. "Burning on Territory in Victoria, Australia with Trent Nelson and Tim Kanoa." *Good Fire* (podcast). Accessed 26 October, 2019. <https://yourforestpodcast.com/good-fire-podcast/2019/9/2/burning-on-territory-in-victoria-australia-with-trent-nelson-and-tim-kanoa>.

Christophersen, Peter, Gundjeihmi Aboriginal Corporation, and Aboriginal Carbon Fund. "Northern Kakadu Emissions Abatement Project." Melbourne, 2016.
<http://summit2016.carbonmarketinstitute.org/wp-content/uploads/2016/05/Peter-Christophersen.pdf>.

- Cooke, Peter. "Forward to Which Past?" *Tropical Savannas CRC Savanna Links*, March 1998. http://savanna.cdu.edu.au/publications/savanna_links_issue5.html?tid=27693.
- Gabbert, Bill. "National Survey – the Use of Prescribed Fire." *Wildfire Today*, January 11, 2016. <http://wildfiretoday.com/2016/01/11/national-survey-the-use-of-prescribed-fire/>.
- Goodall, Hamish. "NSW Fire Service Boss Shane Fitzsimmons Shoots down Barnaby Joyce's Bushfire Claim." *7NEWS.com.au*, 8 January, 2020. <https://7news.com.au/sunrise/on-the-show/shane-fitzsimmons-dismisses-barnaby-joyces-claims-bushfires-caused-by-green-caveats-c-637354>.
- Houston, Will. "PG&E Awards Karuk Tribe \$100K Grant for Wildfire Prevention, Prescribed Burns." *Eureka Times-Standard*, 27 September, 2017. <http://www.times-standard.com/article/NJ/20170927/NEWS/170929820>.
- "Indigenous Rangers." *The Project*. Channel Ten, 30 November, 2016. <https://www.facebook.com/TheProjectTV/videos/10154112757483441/>.
- Johnson, Eric Michael. "How John Muir's Brand of Conservation Led to the Decline of Yosemite." *Scientific American Blog Network*, 13 August, 2014. <https://blogs.scientificamerican.com/primate-diaries/how-john-muir-s-brand-of-conservation-led-to-the-decline-of-yosemite/>.
- Johnson, Lizzie. "150 Minutes of Hell: Death and Survival in California's Fire Tornado." *The San Francisco Chronicle*, 5 December, 2018. <https://projects.sfchronicle.com/2018/carr-fire-tornado>.
- Lee, Tim. "Fire Power." *Landline*. ABC, 26 May, 2013. <http://www.abc.net.au/landline/content/2013/s3767527.htm>.
- MacEachern, Alan. "Who Had 'America's Best Idea'?" *NICHE* (blog), 23 October, 2011. <http://niche-canada.org/2011/10/23/who-had-americas-best-idea/>.
- Marshall, Konrad. "The 'Forever Fires' and Australia's New Reality." *The Sydney Morning Herald*, 25 January, 2020. <https://www.smh.com.au/national/the-forever-fires-and-australia-s-new-reality-20200122-p53tk0.html>.
- Mountain Cattlemen's Association of Victoria. "Other Resources," 2019. <https://www.mcav.com.au/news-events/other-resources>.
- National Oceanic and Atmospheric Administration. "2018 Was 4th Hottest Year on Record for the Globe," 6 February, 2019. <https://www.noaa.gov/news/2018-was-4th-hottest-year-on-record-for-globe>.

- Packham, David. "Submission to Mr Tony Pearce," 2015.
<http://www.igem.vic.gov.au/documents/CD/15/186510>.
- Parks Australia. "Our Stories." *Kakadu National Park*. 2013.
<https://parksaustralia.gov.au/kakadu/people/stories.html>
- Pascoe, Bruce. "Andrew Bolt's Disappointment." *Griffith Review*, 2012.
<https://griffithreview.com/articles/andrew-bolts-disappointment/>.
- Pyne, Stephen J. "Pyne on Boyd, 'Indians, Fire and the Land in the Pacific Northwest.'" H-Net, February 2000. <https://networks.h-net.org/node/2718/reviews/3284/pyne-boyd-indians-fire-and-land-pacific-northwest>.
- Raff, Jennifer. "Rejecting the Solutrean Hypothesis: The First Peoples in the Americas Were Not from Europe." *The Guardian*, 21 February, 2018.
<https://www.theguardian.com/science/2018/feb/21/rejecting-the-solutrean-hypothesis-the-first-peoples-in-the-americas-were-not-from-europe>.
- Smith, Joshua Emerson. "California, Trump Eye Logging to Fight Wildfire as Scientists Point to Climate Change and Housing Sprawl." *The San Diego Union-Tribune*, 25 November, 2018.
<https://www.sandiegouniontribune.com/news/environment/sd-me-wildfire-logging-climate-change-20181125-story.html>.
- The Forest History Society. "The 1910 Fires." foresthistor.org, 18 December, 2014.
<https://foresthistor.org/research-explore/us-forest-service-history/policy-and-law/fire-u-s-forest-service/famous-fires/the-1910-fires/>.
- Tidwell, Tom. "The Greatest Good | USDA," 31 March, 2015.
<https://www.usda.gov/media/blog/2015/03/31/greatest-good>.
- Trump, Donald. *Twitter*, 10 November, 2018.
<https://twitter.com/realDonaldTrump/status/1061168803218948096>.
- Underwood, Roger. "Academia's Flaming Nincompoops." *Quadrant Online* (blog), 28 December, 2015. <https://quadrant.org.au/opinion/doomed-planet/2015/12/academias-flaming-nincompoops/>.
- . "Bushfires and Global Warming." *Quadrant Online* (blog), 26 November, 2015.
<http://quadrant.org.au/opinion/doomed-planet/2015/11/bushfires-global-warming/>.
- USDA Forest Service. "The Rising Cost of Wildfire Operations," 2015.
<https://www.fs.usda.gov/sites/default/files/2015-Rising-Cost-Wildfire-Operations.pdf>.

Victorian Curriculum and Assessment Authority. "Advice for Teachers - Agricultural and Horticultural Studies: Unit 1 – Area of Study 1: Food and Fibre Industries." Accessed 20 November, 2019. <https://www.vcaa.vic.edu.au/curriculum/vce/vce-study-designs/agricultural-and-horticultural-studies/advice-for-teachers/Pages/Unit1AreaofStudy1.aspx>.

Ward, David. "Balga Grasstrees." Roleybushcare. Accessed 4 September, 2017. <http://roleybushcare.com.au/bush-topics/18-balga-grasstrees>.

Williams, Gerald W. "References on the American Indian Use of Fire in Ecosystems," 12 June, 2003. <http://www.geo.arizona.edu/palynology/geos462/wildlandfire.html>.

Yibarbuk, Dean, Kim McKenzie, and Peter Cooke. "Fighting Carbon with Fire." United Nations University, 2009. <http://ourworld.unu.edu/en/fighting-carbon-with-fire>.

Newspapers and periodicals frequently cited

The Argus (Melbourne)

The Australian (Sydney)

San Francisco Call (San Francisco)

Sunset (California)

The Sydney Morning Herald (Sydney)

The Timberman (Portland)

Theses

Banks, J.C.G. "The Use of Dendrochronology in the Interpretation of the Dynamics of the Snow Gum Forest." PhD thesis, The Australian National University, 1982.

Boero, Michael. "Traditional Ecological Knowledge and Collaborative Forest Restoration in the Sierra Nevada." MA diss., San José State University, 2017.

Busam, Heather M. "Characteristics and Implications of Traditional Native American Fire Management on the Orleans Ranger District, Six Rivers National Forest." MA diss., California State University, 2006.

Hannah, Bethany E. "The Smokey Generation: A Wildland Fire Oral History and Digital Storytelling Project." MA diss., Prescott College, 2015.

Haynes, C.D. "Defined by Contradiction: The Social Construction of Joint Management in Kakadu National Park." PhD thesis, Charles Darwin University, 2009.

Reynolds, Benjamin Thomas. "A History of the Prepare, Stay and Defend or Leave Early Policy in Victoria." PhD thesis, RMIT University, 2017.

Terracina-Hartman, Carol Marie. "Fanning the Flames: How US Newspapers Have Framed Ten Historically Significant Wildfires 2003—2013." PhD diss., Michigan State University, 2017.

Ward, David Jefford. "People, Fire, Forest and Water in Wungong: The Landscape Ecology of a West Australian Water Catchment." PhD thesis, Curtin University of Technology, 2010.

Wells, Samantha Jane. "Negotiating Place in Colonial Darwin: Interactions between Aborigines and Whites, 1869-1911." PhD thesis, University of Technology, Sydney, 2003.

Published works

Abbott, I. "Aboriginal Fire Regimes in South Western Australia: Evidence from Historical Documents." In *Fire in Ecosystems of South West Western Australia: Impacts and Management*, edited by I Abbott and N. Burrows, 119–46. Leiden: Backhuys, 2003.

Abbott, Ian. "Aboriginal Man as an Exterminator of Wallaby and Kangaroo Populations on Islands Round Australia." *Oecologia* 44, no. 3 (1979): 347–54.

Abbott, Ian, and Per Christensen. "Objective Knowledge, Ideology and the Forests of Western Australia." *Australian Forestry* 59, no. 4 (1996): 206–212.

Aboriginal Project Committee. "Kakadu Region Social Impact Study: Report of the Aboriginal Project Committee." Canberra: Supervising Scientist, 1997.

Adam, Paul. "Can Ideas Be Dangerous?" *Australian Zoologist* 38, no. 3 (2017): 329–74.

Adams, Mark A., Shaun C. Cunningham, and Maria T. Taranto. "A Critical Review of the Science Underpinning Fire Management in the High Altitude Ecosystems of South-Eastern Australia." *Forest Ecology and Management* 294 (2013): 225–37.

Adams, Mark, and Peter Attiwill. *Burning Issues: Sustainability and Management of Australia's Southern Forests*. Acton, ACT: CSIRO Publishing and Bushfire CRC, 2011.

Agrawal, Arun. "Indigenous Knowledge and the Politics of Classification." *International Social Science Journal* 54, no. 3 (2002): 287–97.

- Ajani, Judith. *The Forest Wars*. Carlton: Melbourne University Press, 2007.
- Allen, Craig D. "Lots of Lightning and Plenty of People: An Ecological History of Fire in the Upland Southwest." In *Fire, Native Peoples and the Natural Landscape*, edited by Thomas R. Vale, 143–94. Washington: Island Press, 2002.
- Allison, James R. "Beyond It All: Surveying the Intersections of Modern American Indian, Environmental, and Western Histories." *History Compass* 16, no. 4 (2018): e12447.
- Altangerel, Khulan, and Christian A. Kull. "The Prescribed Burning Debate in Australia: Conflicts and Compatibilities." *Journal of Environmental Planning and Management* 56, no. 1 (2013): 103–20.
- Altman, J.C. "Manwurrk (Fire Drive) at Namilewohwo: A Land-Management, Hunting and Ceremonial Event in West Arnhem Land." In *Culture, Ecology and Economy of Fire Management in North Australian Savannas: Rekindling the Wurrk Tradition*, edited by Jeremy Russell-Smith, Peter M. Cooke, and Peter J. Whitehead, 195–211. Collingwood: CSIRO Publishing, 2009.
- Altman, Jon. "People on Country as Alternative Development." In *People on Country: Vital Landscapes, Alternative Futures*, edited by Jon Altman and Seán Kerins, 1–25. Sydney: The Federation Press, 2012.
- Andersen, Alan, Garry D. Cook, and Richard J. Williams, eds. *Fire in Tropical Savannas: The Kapalga Experiment*. Ecological Studies Vol 169. New York: Springer, 2003.
- Andersen, A.N., and B.J. McKaige. "Burning Issues: Communicating Fire Research in Northern Australia." In *Ecology for Everyone: Communicating Ecology to Scientists, the Public and the Politicians*, edited by R.J. Hobbs and R.T. Wills, 88–96. Chipping Norton, NSW: Surrey Beatty and Sons, 1998.
- Anderson, Deb, Philip Chubb, and Monika Djerf-Pierre. "Fanning the Blame: Media Accountability, Climate and Crisis on the Australian 'Fire Continent.'" *Environmental Communication* 12, no. 7 (2018): 928–41.
- Anderson, M. Kat. "An Ecological Critique." In *Forgotten Fires: Native Americans and the Transient Wilderness*, edited by Henry T. Lewis and M. Kat Anderson, 37–64. Norman: University of Oklahoma Press, 2002.
- . *Tending the Wild*. Berkeley, California: University of California Press, 2005.
- . "The Use of Fire by Native Americans in California." In *Fire in California's Ecosystems*, edited by Jan W. Wagtendonk, Neil G. Sugihara, Scott L. Stephens, Andrea E. Thode, Kevin E. Shaffer, and Jo Ann Fites-Kaufman, 2nd ed., 381–98. University of California Press, 2018.

- Anderson, M. Kat, and Michael J. Moratto. "Native American Land-Use Practices and Ecological Impacts." In *Sierra Nevada Ecosystem Project: Final Report to Congress*, vol 2: Assessments and scientific basis for management options: 187–206. University of California, Center for Water and Wildland Resources Davis, 1996.
- Anderson, M. Kat, and Jeffrey Rosenthal. "An Ethnobiological Approach to Reconstructing Indigenous Fire Regimes in the Foothill Chaparral of the Western Sierra Nevada." *Journal of Ethnobiology* 35, no. 1 (2015): 4–36.
- Anton, Charis E., and Carmen Lawrence. "Does Place Attachment Predict Wildfire Mitigation and Preparedness? A Comparison of Wildland–Urban Interface and Rural Communities." *Environmental Management* 57 (2016): 148–62.
- Arno, S.F. "Ecological Effects and Management Implications of Indian Fires." In *Proceedings of the Symposium and Workshop on Wilderness Fire, November 15-18, 1983, Missoula, Montana*, edited by James E. Lotan, 81–86. General Technical Report INT-182. Ogden, Utah: US Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station, 1985.
- Ashton, David. "Fire in Tall Open Forests (Wet Sclerophyll Forests)." In *Fire and the Australian Biota*, edited by A. Malcolm Gill, R. H. Groves, and I. R. Noble, 339–66. Canberra: Australian Academy of Science, 1981.
- Ashton, David, and D.G. Martin. "Changes in a Spar-Stage Ecotonal Forest of Eucalyptus Regnans, Eucalyptus Obliqua and Eucalyptus Cypellocarpa Following Wildfire on the Hume Range in November 1982." *Australian Forestry* 59, no. 1 (1996): 32–41.
- Attiwill, Peter M., and Mark A. Adams. "Mega-Fires, Inquiries and Politics in the Eucalypt Forests of Victoria, South-Eastern Australia." *Forest Ecology and Management* 294 (2013): 45–53.
- Attiwill, P.M., M.F. Ryan, N. Burrows, N.P. Cheney, L. McCaw, M. Neyland, and S. Read. "Timber Harvesting Does Not Increase Fire Risk and Severity in Wet Eucalypt Forests of Southern Australia: Timber Harvesting Does Not Increase Fire Risk and Severity." *Conservation Letters* 7, no. 4 (2014): 341–54.
- Attwood, Bain. *The Good Country: The Djadja Wurrung, the Settlers, and the Protectors*. Clayton, Victoria, Australia: Monash University Publishing, 2017.
- Attwood, Bain, and S.G. Foster. "Introduction." In *Frontier Conflict: The Australian Experience*, edited by Bain Attwood and S.G. Foster, 1–30. Canberra: National Museum of Australia, 2003.

- AuCoin, Les. "Don't Get Hosed: How Political Framing Influences Fire Policy." In *Wildfire: A Century of Failed Forest Policy*, edited by George Wuerthner, 33–36. Sausalito, California: Foundation for Deep Ecology, by arrangement with Island Press, 2006.
- Austin, B. J., C. J. Robinson, D. Mathews, D. Oades, A. Wiggin, R. J. Dobbs, G. Lincoln, and S. T. Garnett. "An Indigenous-Led Approach for Regional Knowledge Partnerships in the Kimberley Region of Australia." *Human Ecology* 47, no. 4 (2019): 577–88.
- Australasian Fire and Emergency Service Authorities Council, and Forest Fire Management Group. "Overview of Prescribed Burning in Australasia." Report for the National Burning Project - Subproject 1, 2015.
- Australia. Department of the Interior. *Proposal for a Northern National Park, Northern Territory: Plan of Management*. Canberra: Australian Government Publishing Service, 1971.
- Australian Conservation Foundation. *Bushfire Control and Conservation*. Viewpoint Series, No. 5. Parkville, Victoria, 1970.
- Bailey, Janette-Susan. *Dust Bowl: Depression America to World War Two Australia*. Palgrave MacMillan, 2016.
- Baker, Richard. *Land Is Life: From Bush to Town - The Story of the Yanyuwa People*. Allen & Unwin, 1999.
- Banivanua Mar, Tracey. "Carving Wilderness: Queensland's National Parks and the Unsettling of Emptied Lands, 1890-1910." In *Making Settler Colonial Space*, edited by Tracey Banivanua Mar and Penny Edmonds, 73–94. Palgrave Macmillan, 2010.
- Bankoff, Greg. "Time Is of the Essence: Disasters, Vulnerability and History." *International Journal of Mass Emergencies and Disasters* 22, no. 3 (2004): 23–42.
- Bankoff, Greg, Uwe Lübken, and Jordan Sand, eds. *Flammable Cities: Urban Conflagration and the Making of the Modern World*. University of Wisconsin Press, 2012.
- Barker, Rocky. *Scorched Earth: How the Fires of Yellowstone Changed America*. Island Press, 2005.
- Barnett, D. "Fire-Stick Farmers Are Killing Kakadu." *The Australian Financial Review*, January 22, 1998.
- Barrass, Tony. "Learning to Live with Nature." *The Australian*, 10 December, 2011.
- Barrett, L.A. "A Record of Forest and Field Fires in California: From the Days of the Early Explorers to the Creation of the Forest Reserves." San Francisco: US Forest Service, 1935.

- Bayet, Fabienne. "Overturning the Doctrine: Indigenous People and Wilderness - Being Aboriginal in the Environmental Movement." In *The Great New Wilderness Debate*, edited by J. Baird Callicott and Michael P. Nelson, 314–25. Athens, Georgia: University of Georgia Press, 1998.
- Bednall, Brian Herbert. "Rodger, Geoffrey James (1894–1982)." *Australian Forestry* 46, no. 1 (1983): 4–5.
- Belich, James. *Replenishing the Earth: The Settler Revolution and the Rise of the Angloworld, 1783-1939*. Oxford University Press, 2009.
- Bell, D.T., N.D. Burrows, and W.L. McCaw. "Influence of Fire on Jarrah Forest Vegetation." In *The Jarrah Forest: A Complex Mediterranean Ecosystem*, edited by B. Dell, J.J. Havel, and N. Malajczuk, 203–18. Dordrecht: Kluwer Academic Publishers, 1989.
- Bennett, Andrew, Dale Nimmo, and Michael Clarke. "Burnoff Policies Could Be Damaging Habitats for 100 Years." *The Conversation*, 8 August, 2014. <http://theconversation.com/burnoff-policies-could-be-damaging-habitats-for-100-years-30240>.
- Benson, J. S. "Beautiful Lies: Correspondence." *Quarterly Essay* 13 (2004): 127–34.
- Benson, J. S., and P.A. Redpath. "The Nature of Pre-European Native Vegetation in South-Eastern Australia: A Critique of Ryan, D.G., Ryan J.R. and Starr, B.J. (1995), *The Australian Landscape: Observations of Explorers and Early Settlers*." *Cunninghamia* 5, no. 2 (1997): 285–328.
- Bilka, Monika. "Klamath Tribal Persistence, State Resistance: Treaty Rights Activism, the Threat of Tribal Sovereignty, and Collaborative Natural Resource Management in the Pacific Northwest, 1954–1981." *Western Historical Quarterly* 48, no. 3 (2017): 255–75.
- Bird, Caroline, and David Frankel. *An Archaeology of Gariwerd. From Pleistocene to Holocene in Western Victoria*. Vol. 8. Tempus: Archaeology and Material Culture Studies in Anthropology. Anthropology Museum, University of Queensland, 2005.
- Bird, Caroline, and R. Esmee Webb, eds. *Fire and Hearth Forty Years On: Essays in Honour of Sylvia J. Hallam*. Perth: Western Australian Museum, 2011.
- Bird, R. B., N. Taylor, B. F. Coddling, and D. W. Bird. "Niche Construction and Dreaming Logic: Aboriginal Patch Mosaic Burning and Varanid Lizards (*Varanus Gouldii*) in Australia." *Proceedings of the Royal Society B: Biological Sciences* 280, no. 1772 (2013): 20132297–20132297.
- Bird, R. Bliege, Douglas W. Bird, Brian F. Coddling, Christopher H. Parker, and James H. Jones. "The 'Fire Stick Farming' Hypothesis: Australian Aboriginal Foraging Strategies, Biodiversity, and

Anthropogenic Fire Mosaics." *Proceedings of the National Academy of Sciences* 105, no. 39 (2008): 14796–14801.

Biswell, H.H. *Prescribed Burning in California Wildlands Vegetation Management*. Berkeley: University of California Press, 1989.

Black, Manu P., and Scott D. Mooney. "The Response of Aboriginal Burning Practices to Population Levels and El Niño–Southern Oscillation Events during the Mid- to Late-Holocene: A Case Study from the Sydney Basin Using Charcoal and Pollen Analysis." *Australian Geographer* 38, no. 1 (2007): 37–52.

Blackburn, T.C., and M.K. Andersen, eds. *Before the Wilderness: Environmental Management by Native Californians*. Menlo Park, California: Ballena Press, 1993.

Boer, Matthias M., Victor Resco de Rios, and Ross Bradstock. "Unprecedented Burn Area of Australian Mega Forest Fires." *Nature Climate Change* 10, no. 3 (2020): 171–72.

Boer, Matthias M., Rohan J. Sadler, Roy S. Wittkuhn, Lachlan McCaw, and Pauline F. Grierson. "Long-Term Impacts of Prescribed Burning on Regional Extent and Incidence of Wildfires—Evidence from 50 Years of Active Fire Management in SW Australian Forests." *Forest Ecology and Management* 259, no. 1 (2009): 132–42.

Boerker, R.H. "Light Burning vs Forest Management in Northern California." *Forestry Quarterly* 10 (1912): 184–94.

Boisramé, Gabrielle F.S., Sally E. Thompson, Maggi Kelly, Julia Cavalli, Kate M. Wilkin, and Scott L. Stephens. "Vegetation Change during 40 Years of Repeated Managed Wildfires in the Sierra Nevada, California." *Forest Ecology and Management* 402 (2017): 241–52.

Bolton, Geoffrey. *Spoils and Spoilers: A History of Australians Shaping Their Environment*. Allen & Unwin, 1981.

Bond, W. J., and B. W. van Wilgen. "Fire, Competition and the Organization of Communities." In *Fire and Plants*, edited by W. J. Bond and B. W. van Wilgen, 148–63. London: Chapman and Hall, 1996.

Bond, W, and J Keeley. "Fire as a Global 'Herbivore': The Ecology and Evolution of Flammable Ecosystems." *Trends in Ecology & Evolution* 20, no. 7 (2005): 387–94.

Bond, William J., F. Ian Woodward, and Guy F. Midgley. "The Global Distribution of Ecosystems in a World without Fire." *New Phytologist* 165, no. 2 (2005): 525–538.

- Bonnicksen, Thomas B. "Fire Gods and Federal Policy." *American Forests* 95, no. 7 & 8 (1989): 14–16, 66–68.
- Bonta, Mark, Robert Gosford, Dick Eussen, Nathan Ferguson, Erana Loveless, and Maxwell Witwer. "Intentional Fire-Spreading by 'Firehawk' Raptors in Northern Australia." *Journal of Ethnobiology* 37, no. 4 (2017): 700–718.
- Bonyhady, Tim. *The Colonial Earth*. Carlton South: Melbourne University Press, 2000.
- Bosomworth, Karyn. "A Discursive-Institutional Perspective on Transformative Governance: A Case from a Fire Management Policy Sector." *Environmental Policy and Governance* 28, no. 6 (2018): 415–25.
- Boucher, Leigh, and Lynette Russell. "Introduction: Colonial History, Postcolonial Theory and the 'Aboriginal Problem' in Colonial Victoria." In *Settler Colonial Governance in Nineteenth-Century Victoria*, edited by Leigh Boucher and Lynette Russell, 1–26. Canberra: Australian National University Press, 2015.
- Bowden, M.J. "The Invention of American Tradition." *Journal of Historical Geography* 18 (1992): 3–26.
- Bowman, D. M. J. S. "Future Eating and Country Keeping: What Role Has Environmental History in the Management of Biodiversity?" *Journal of Biogeography* 28, no. 5 (2001): 549–564.
- . "Tansley Review No. 101: The Impact of Aboriginal Landscape Burning on the Australian Biota." *New Phytologist* 140, no. 3 (1998): 385–410.
- Bowman, D. M. J. S., M. Garde, and A. Saulwick. "Fire Is for Kangaroos: Interpreting Aboriginal Accounts of Landscape Burning in Central Arnhem Land." In *Histories of Old Ages: Essays in Honour of Rhys Jones*, edited by Atholl Andersen, Ian Lilley, and Sue O'Connor, 61–78. Canberra: Pandanus Books, 2001.
- Bowman, D. M. J. S., and W. J. Panton. "Decline of *Callitris Intratropica* R. T. Baker & H. G. Smith in the Northern Territory: Implications for Pre- and Post-European Colonization Fire Regimes." *Journal of Biogeography* 20, no. 4 (1993): 373–81.
- Bowman, D. M. J. S., Owen Price, P. J. Whitehead, and Angie Walsh. "The 'wilderness effect' and the decline of *Callitris Intratropica* on the Arnhem Land Plateau, Northern Australia." *Australian Journal of Botany* 49, no. 5 (2001): 665–672.
- Bowman, David. "The Biggest Estate on Earth: How Aborigines Made Australia by Bill Gammage [Review]." *Australian Historical Studies* 43, no. 2 (2012): 321–22.

- . “Why the Skillful Use of Fire Is Critical for the Management of Biodiversity in Northern Australia.” In *Country in Flames: Proceedings of the 1994 Symposium on Biodiversity and Fire in North Australia*, edited by Deborah Bird Rose, Biodiversity Series Paper No. 3: 103–9. Darwin: Jointly published by the Biodiversity Unit (Department of the Environment, Sport and Territories) and the North Australia Research Unit (The Australian National University), 1994.
- Bowman, David M. J. S., Jennifer K. Balch, Paulo Artaxo, William J. Bond, Jean M. Carlson, Mark A. Cochrane, Carla M. D’Antonio, et al. “Fire in the Earth System.” *Science* 324, no. 5926 (2009): 481–484.
- Bowman, David M. J. S., George L. W. Perry, Steve I. Higgins, Chris N. Johnson, Samuel D. Fuhlendorf, and Brett P. Murphy. “Pyrodiversity Is the Coupling of Biodiversity and Fire Regimes in Food Webs.” *Philosophical Transactions of the Royal Society B: Biological Sciences* 371, no. 1696 (2016).
- Bowman, David M.J.S., Jessica A. O’Brien, and Johann G. Goldammer. “Pyrogeography and the Global Quest for Sustainable Fire Management.” *Annual Review of Environment and Resources* 38, no. 1 (2013): 57–80.
- Bowman, David MJS, Angie Walsh, and L. D. Prior. “Landscape Analysis of Aboriginal Fire Management in Central Arnhem Land, North Australia.” *Journal of Biogeography* 31, no. 2 (2004): 207–223.
- Boyd, R. “Introduction.” In *Indians, Fire, and the Land in the Pacific Northwest*, edited by R. Boyd, 1–30. Corvallis, Oregon: Oregon University Press, 1999.
- Bradshaw, S. Don, Kingsley W. Dixon, Stephen D. Hopper, Hans Lambers, and Shane R. Turner. “Little Evidence for Fire-Adapted Plant Traits in Mediterranean Climate Regions.” *Trends in Plant Science* 16, no. 2 (2011): 69–76.
- Bradstock, R. A., M. M. Boer, G. J. Cary, O. F. Price, R. J. Williams, D. Barrett, G. Cook, et al. “Modelling the Potential for Prescribed Burning to Mitigate Carbon Emissions from Wildfires in Fire-Prone Forests of Australia.” *International Journal of Wildland Fire* 21, no. 6 (2012): 629–39.
- Braithwaite, Richard W. “Guest Editorial: Black and Green.” *Journal of Biogeography* 19, no. 2 (1992): 113–16.
- . “The Biological Value of Kakadu National Park.” *Search* 18, no. 18 (1987): 296–301.
- Breeden, Stanley, and Belinda Wright. *Kakadu, Looking after the Country - the Gagudju Way*. Simon & Schuster, 1992.
- Brookhouse, Matthew. “Eucalypt Dendrochronology: Past, Present and Potential.” *Australian Journal of Botany* 54, no. 5 (2006): 435–49.

- Broome, Richard. "Changing Aboriginal Landscapes of Pastoral Victoria, 1830–1850." *Studies in the History of Gardens & Designed Landscapes* 31, no. 2 (2011): 88–96.
- Broome, Richard, Charles Fahey, Andrea Gaynor, and Katie Holmes. *Mallee Country: Land, People, History*. Clayton: Monash University Publishing, 2020.
- Brown, A.J., and Noel Pearson. "Keeping the Land Alive: Aboriginal People and Wilderness Protection in Australia." Sydney: The Wilderness Society, 1992.
- Brown, Sarah, Steve Dovers, Jodi Frawley, Andrea Gaynor, Heather Goodall, Grace Karskens, and Steve Mullins. "Can Environmental History Save the World?" *History Australia* 5, no. 1 (2011): 1–24.
- Bruce, Donald. "Light Burning: Report of the California Forestry Committee." *Journal of Forestry* 21, no. 2 (1923): 129–33.
- Brueckner, Martin. "The Western Australian Regional Forest Agreement: Economic Rationalism and the Normalisation of Political Closure." *Australian Journal of Public Administration* 66, no. 2 (2007): 148–58.
- Bruns, Axel. "Australian Twitter Is More Diverse than You Think." *The Conversation*, 3 May, 2017. <https://theconversation.com/australian-twitter-is-more-diverse-than-you-think-76864>
- Buizer, Marleen, and Tim Kurz. "Too Hot to Handle: Depoliticisation and the Discourse of Ecological Modernisation in Fire Management Debates." *Geoforum* 68 (2016): 48–56.
- Bunbury, Bill. *Invisible Country: South-West Australia: Understanding a Landscape*. Crawley, W.A.: University of Western Australia Press, 2015.
- Burgess, C. P., F. H. Johnston, D. M. J. S. Bowman, and P. J. Whitehead. "Healthy Country: Healthy People? Exploring the Health Benefits of Indigenous Natural Resource Management." *Australian and New Zealand Journal of Public Health* 29, no. 2 (2005): 117–22.
- Burney, D., and T. Flannery. "Fifty Millennia of Catastrophic Extinctions after Human Contact." *Trends in Ecology & Evolution* 20, no. 7 (2005): 395–401.
- Burrows, N.D. "Planning Fire Regimes for Nature Conservation Forests in South Western Australia." In *Fire Ecology and Management of Western Australian Ecosystems: Proceedings of a Symposium Held in Perth on 10-11 May 1985*, edited by Julian R. Ford, WAIT Environmental Studies Group Report No. 14 :129–38. Perth: Western Australian Institute of Technology, 1985.

- Burrows, Neil. "The Great Escapes." *Fire Australia* Issue 3, 2017.
- Burrows, N.D., B. Ward, and A.D. Robinson. "Jarrah Forest Fire History from Stem Analysis and Anthropological Evidence." *Australian Forestry* 58 (1995): 7–16.
- Burrows, Neil, and Ian Abbott. "Critique of a Paper Submitted to the Environmental Protection Authority (EPA) of Western Australian Entitled 'Fire Regimes and Biodiversity Conservation: A Brief Review of Scientific Literature with Particular Emphasis on Southwest Australian Studies' by Grant Wells, Stephen D Hopper and Kingsley W Dixon." Department of Conservation and Land Management WA, 21 June, 2004.
- . "Fire in South-West Western Australia: Synthesis of Current Knowledge, Management Implications and New Research Directions." In *Fire in Ecosystems of South West Western Australia: Impacts and Management*, edited by I Abbott and N. Burrows, 437–52. Leiden: Backhuys, 2003.
- Burrows, Neil, and Jane Chapman. "Traditional and Contemporary Fire Patterns in the Great Victoria Desert, Western Australia." Perth: Department of Biodiversity, Conservation and Attractions, 2018.
- Burrows, Neil D., Andrew A. Burbidge, Phillip J. Fuller, and Graeme Behn. "Evidence of Altered Fire Regimes in the Western Desert Region of Australia." *Conservation Science Western Australia* 5, no. 3 (2006): 272–84.
- Burrows, Neil, and Lachlan McCaw. "Prescribed Burning in Southwestern Australian Forests." *Frontiers in Ecology and the Environment* 11, no. s1 (2013): e25–34.
- "Bushfires and the Australian Environment, 1983-1984: Transcript of Evidence. Reference: Environmental Impact of Bushfires: Official Hansard Report." Canberra: Government Printer, 1984.
- Bushfires Council N.T. "Discussion Paper to Formalise a Strategy for Management of Wildfires in the NT." Darwin: Bushfires Council N.T., 1992.
- Butler, Orpheus M., James J. Elser, Tom Lewis, Brendan Mackey, and Chengrong Chen. "The Phosphorus-Rich Signature of Fire in the Soil-Plant System: A Global Meta-Analysis." *Ecology Letters* 21, No. 3 (2018), 335-344.
- Byrne, Denis. "Deep Nation: Australia's Acquisition of an Indigenous Past." *Aboriginal History* 20 (1996): 82–107.
- Cahir, Fred, Ian D. Clark, and Philip A. Clarke, eds. *Australian Biocultural Knowledge in South-Eastern Australia: Perspectives of Early Colonists*. Clayton: CSIRO Publishing, 2018.

- Cahir, Fred, Sarah McMaster, Ian Clark, Rani Kerin, and Wendy Wright. "Winda Lingo Parugoneit or Why Set the Bush [On] Fire? Fire and Victorian Aboriginal People on the Colonial Frontier." *Australian Historical Studies* 47, no. 2 (2016): 225–40.
- Calkin, David E., Krista M. Gebert, J. Greg Jones, and Ronald P. Neilson. "Forest Service Large Fire Area Burned and Suppression Expenditure Trends, 1970-2002." *Journal of Forestry* 103, no. 4 (2005): 179–83.
- California. Appendix to the Journals of the State and Assembly of the Twenty-Eighth Session of the Legislature of the State of California (Volume VIII), § In the Matter of the Investigation of the Yosemite Valley Commissioners (1889).
- Callicott, J. Baird. "That Good Old-Time Wilderness Religion." In *The Great New Wilderness Debate*, edited by J. Baird Callicott and Michael P. Nelson, 387–94. Athens, Georgia: University of Georgia Press, 1998.
- Callicott, J. Baird, and Michael P. Nelson. "Introduction." In *The Great New Wilderness Debate*, edited by J. Baird Callicott and Michael P. Nelson, 1–22. Athens, Georgia: University of Georgia Press, 1998.
- , eds. *The Great New Wilderness Debate*. Athens, Georgia: University of Georgia Press, 1998.
- Campbell, David. "Economies through Application of Nonmedical Primary-Preventative Health: Lessons from the Healthy Country Healthy People Experience of Australia's Aboriginal People." *International Journal of Environmental Research and Public Health* 13, no. 4 (2016): 400.
- Carey, Jane, and Ben Silverstein. "Thinking with and beyond Settler Colonial Studies: New Histories after the Postcolonial." *Postcolonial Studies* 23, no. 1 (2020), 1–20.
- Carle, David. *Burning Questions: America's Fight with Nature's Fire*. Westport, Conn: Praeger, 2002.
- Carron, L.T. "Lane-Poole, Charles Edward (1885–1970)." In *Australian Dictionary of Biography*, Vol. 9, 1983.
- Carson, Rachel. *Silent Spring*. Houghton Mifflin, 1962.
- Cary, Geoffrey J., Ross A. Bradstock, A. Malcolm Gill, and Richard J. Williams. "Global Change and Fire Regimes in Australia." In *Flammable Australia: Fire Regimes, Biodiversity and Ecosystems in a Changing World*, edited by Ross A. Bradstock, A. Malcolm Gill, and Richard J. Williams, 149–70. Collingwood: CSIRO Publishing, 2012.

- Cecil, K.L. "The Red Steer: Bushfires Along the Great Ocean Road (Volume 1)." Anglesea & District Historical Society, 1993.
- Chan, Gabrielle. "Cabinet Papers 1990-91: Hawke's Fight to Keep Mining out of Kakadu Helped Unseat Him." *The Guardian*, January 1, 2016.
- Chapman, H.H. "Is the Longleaf Type a Climax?" *Ecology* 13, no. 4 (1932): 328–34.
- Chase, Alston. *Playing God in Yellowstone: The Destruction of America's First National Park*. 1st ed. Boston: The Atlantic Monthly Press, 1986.
- Christensen, Norman L., Ann M. Bartuska, James H. Brown, Stephen Carpenter, Carla D'Antonio, Rober Francis, Jerry F. Franklin, et al. "The Report of the Ecological Society of America Committee on the Scientific Basis for Ecosystem Management." *Ecological Applications* 6, no. 3 (1996): 665.
- Christensen, P., and A. Annels. "Fire in Southern Tall Forests." In *Fire Ecology and Management of Western Australian Ecosystems: Proceedings of a Symposium Held in Perth on 10-11 May 1985*, edited by Julian R. Ford, WAIT Environmental Studies Group Report No. 14: 67–82. Perth: Western Australian Institute of Technology, 1985.
- Christensen, P.E., and P.C. Kimber. "Effect of Prescribed Burning on the Flora and Fauna of South West Australian Forests." In *Proceedings of the Ecological Society of Australia*, 9:85–106, 1975.
- Christianson, Amy. "Social Science Research on Indigenous Wildfire Management in the 21st Century and Future Research Needs." *International Journal of Wildland Fire* 24 (2015): 190–200.
- Clar, C. Raymond. *California Government and Forestry: Volume 1: From Spanish Days until the Creation of the Department of Natural Resources in 1927*. Sacramento: Division of Forestry, Department of Natural Resources, State of California, 1959.
- . *California Government and Forestry: Volume 2: During the Young and Rolph Administrations*. Sacramento: California Division of Forestry, 1969.
- Clark, Ian D., Sarah McMaster, Phillip Roberts, Fred Cahir, and Wendy Wright. "The Tourism Spectacle of Fire Making at Coranderrk Aboriginal Station, Victoria, Australia – a Case Study." *Journal of Heritage Tourism* 15, no. 3 (2020), 249-266.
- Clements, Frederic E. "Nature and Structure of the Climax." *Journal of Ecology* 24, no. 1 (1936): 252–84.
- Cohen, Jack. "The Wildland-Urban Interface Problem." *Forest History Today*, 2008.

Clode, Danielle, and Mark A. Elgar. "Fighting Fire with Fire: Does a Policy of Broad-Scale Prescribed Burning Improve Community Safety?" *Society & Natural Resources* 27, no. 11 (2014): 1192–99.

Cole, Lawson, Stephen Dovers, Martijn Gough, and Michael Eburn. "Can Major Post-Event Inquiries and Reviews Contribute to Lessons Management?" *Australian Journal of Emergency Management* 33, no. 2 (2018): 34–39.

Collard, Len, and Sandra Harben. "Nartj Katitj Bidi Ngulluckiny Koorl? (Which Knowledge Path Will We Travel?)." *Studies in Western Australian History* 26 (2010): 75–95.

Collard, Len, and Dave Palmer. "Noongar and Non-Aboriginal People Going along Together (Ngulla Wangkiny, Ni, Katitjin Noongar Nyidyung Koorliny, Kura, Yeye, Boorda)." In *Indigenous Intermediaries: New Perspectives on Exploration Archives*, edited by Shino Konishi, Maria Nugent, and Tiffany Shellam. ANU Press, 2015.

Collins, Paul. *Burn: The Epic History of Bushfire in Australia*. 1st ed. Crows Nest: Allen & Unwin, 2006.

———. *Burn: The Epic History of Bushfire in Australia*. 2nd ed. Carlton: Scribe, 2009.

Colloff, Matthew J. *Flooded Forest and Desert Creek: Ecology and History of the River Red Gum*. Collingwood: CSIRO Publishing, 2014.

Coman, Warren F. "Did the Indians Protect the Forest?" *Pacific Monthly*, 3 September, 1911.

Commonwealth. Parliamentary Debates. House of Representatives. Vol. 45. 26 February 2015.

Conservation Commission of the Northern Territory. "A Submission Concerning a Nomination of Kakadu National Park by the Australian Government for Inscription in the World Heritage List." Darwin: Conservation Commission of the Northern Territory, 1991.

Cook, S.F. *The Population of the California Indians, 1769-1970*. Berkeley: University of California Press, 1976.

Cooke, Peter. "A Long Walk Home to the Warddewardde." In *People on Country: Vital Landscapes, Indigenous Futures*, edited by Jon Altman and Seán Kerins, 146–61. Sydney: The Federation Press, 2012.

Cooke, Peter M. "Buffalo and Tin, Baki and Jesus: The Creation of a Modern Wilderness." In *Culture, Ecology and Economy of Fire Management in North Australian Savannas: Rekindling the Wurrk Tradition*, edited by Jeremy Russell-Smith, Peter J. Whitehead, and Peter M. Cooke, 85–99. Collingwood: CSIRO Publishing, 2009.

- Cooper, Neil. "Indigenous Fire Management." *Fire Australia*, 2016.
- Cordova, V.F. "EcoIndian: A Response to J. Baird Callicott." *Ayaangwaamizin: The International Journal of Indigenous Philosophy* 1, no. 1 (1997): 31–44.
- Cowlshaw, Gillian. "On 'getting It Wrong': Collateral Damage in the History Wars." *Australian Historical Studies* 37, no. 127 (2006): 181–202.
- Cronon, William. "A Place for Stories: Nature, History, and Narrative." *The Journal of American History* 78, no. 4 (1992): 1347–76.
- . "The Trouble with Wilderness." *The New York Times Magazine*, 13 August, 1995.
- . "The Trouble with Wilderness; Or, Getting Back to the Wrong Nature." *Environmental History* 1, no. 1 (1996): 7–28.
- Crosby, Alfred W. *Ecological Imperialism: The Biological Expansion of Europe, 900-1900*. 2nd ed. Cambridge: Cambridge University Press, 1993.
- Crosby, Alfred, W. "Virgin Soil Epidemics as a Factor in the Aboriginal Depopulation in America." *The William and Mary Quarterly* 33, no. 2 (1976): 289–99.
- Crosby, Alfred, W., and Donald Worster. "Ecological Imperialism: The Overseas Migration of Western Europeans as a Biological Phenomenon." In *The Ends of the Earth: Perspectives on Modern Environmental History*, 103–17. Melbourne: Cambridge University Press, 1988.
- Cruz, M.G., A.L. Sullivan, J.S. Gould, N.C. Sims, A.J. Bannister, J.J. Hollis, and R.J. Hurley. "Anatomy of a Catastrophic Wildfire: The Black Saturday Kilmore East Fire in Victoria, Australia." *Forest Ecology and Management* 284 (2012): 269–85.
- Curr, Edward M. *Recollections of Squatting in Victoria, Then Called the Port Phillip District (from 1841 to 1851)*. Melbourne: George Robertson, 1883.
- Cuthrell, Rob Q. "Archaeobotanical Evidence for Indigenous Burning Practices and Foodways at CA-SMA-113." *California Archaeology* 5, no. 2 (2013): 265–90.
- Dagget, D. *Gardeners of Eden: Rediscovering Our Importance to Nature*. Reno: University of Nevada Press, 2005.
- Dargavel, John. "Contested Forestries, Contested Educations: A Centenary Reflection." *Australian Forestry* 75, no. 1 (2012): 16–21.

- . *Fashioning Australia's Forests*. Melbourne: Oxford University Press, 1995.
- . *The Zealous Conservator: A Life of Charles Lane Poole*. Crawley, W.A.: University of Western Australia, 2008.
- . "Views and Perspectives: Why Does Australia Have 'Forest Wars'?" *International Review of Environmental History* 4, no. 1 (2018).
- Darrénougué, Nicolas, Patrick De Deckker, Kathryn E. Fitzsimmons, Marc D. Norman, Liz Reed, Sander van der Kaars, and Stewart Fallon. "A Late Pleistocene Record of Aeolian Sedimentation in Blanche Cave, Naracoorte, South Australia." *Quaternary Science Reviews* 28, no. 25–26 (2009): 2600–2615.
- David, Bruno, Simon G. Haberle, and Donald Walker. "Peopled Landscapes: The Impact of Peter Kershaw on Australian Quaternary Science." In *Peopled Landscapes: Archaeological and Biogeographic Approaches to Landscapes*, 3–26. Canberra: ANU Press, 2012.
- Davidson, Steve. "Cultural Burning Revives a Kakadu Wetland." *Ecos* 2005, no. 125 (2005): 14–16.
- Davis, Mike. *Ecology of Fear: Los Angeles and the Imagination of Disaster*. New York: Metropolitan, 1998.
- DellaSala, Dominic A., and Chad T. Hanson. *The Ecological Importance of Mixed-Severity Fires: Nature's Phoenix*. Elsevier, 2015.
- Deloria Jr., Vine. "The Speculations of Krech." *Worldviews* 4 (2000): 283–93.
- Deloria, Philip Joseph. *Playing Indian*. Yale University Press, 1998.
- Denevan, William M. "The 'Pristine Myth' Revisited." *Geographical Review* 101, no. 4 (2011): 576–91.
- Denevan, W.M. "The Pristine Myth: The Landscape of the Americas in 1492." *Annals of the Association of American Geographers* 82, no. 3 (1992): 369–85.
- Department of Agriculture. "Australia's Forests," 4 November, 2019.
<https://www.agriculture.gov.au/forestry/australias-forests>.
- Department of Environment and Energy and Commonwealth of Australia. "Australian National Greenhouse Accounts: National Inventory by Economic Sector 2017," 2019.

- Department of Environment, Land, Water & Planning Victoria. "Measuring Bushfire Risk in Victoria," 2015.
- Devine, Miranda. "Green Ideas Must Take Blame for Deaths." *The Sydney Morning Herald*, 12 February, 2009.
- Dixon, Kelly M., Geoffrey J. Cary, Graeme L. Worboys, and Philip Gibbons. "The Disproportionate Importance of Long-Unburned Forests and Woodlands for Reptiles." *Ecology and Evolution* 8, no. 22 (2018): 10952–63.
- Dodson, John, Freea Itzstein-Davy, Lynne Milne, and Annabel Morris. "Vegetation and Environmental History of Southern Western Australia." In *Country: Visions of Land and People in Western Australia*, edited by Andrea Gaynor, Matthew Trinca, and Anna Haebich, 147–67. Perth: Western Australian Museum, 2002.
- Dodson, J.R., and S.D. Mooney. "An Assessment of Historic Human Impact on South-Eastern Australian Environmental Systems, Using Late Holocene Rates of Environmental Change." *Australian Journal of Botany* 50 (2002): 455–64.
- Donovan, Geoffrey H, and Thomas C Brown. "Estimating the Avoided Fuel-Treatment Costs of Wildfire." *Western Journal of Applied Forestry* 23, no. 4 (2008): 197–201.
- Dortch, Joe. "Reconstructing Aboriginal Impacts on Australian Forests." In *Proceedings of the 6th National Conference of the Australian Forest History Society*, edited by M. Calver, 527–41. Rotterdam: Millpress, 2005.
- Dortch, Joe, Jane Balme, Jo McDonald, Kate Morse, Sue O'Connor, and Peter Veth. "Settling the West: 50 000 Years in a Changing Land." *Journal of the Royal Society of Western Australia* 102 (2019): 30–44.
- DuBois, Coert. *Systematic Fire Protection in California Forests*. Washington: Government Printing Office, 1914.
- Dunlap, Thomas R. "Ecology and Environmentalism in the Anglo Settler Colonies." In *Ecology & Empire; Environmental History of Settler Societies*, edited by Tom Griffiths and Libby Robin, 76–86. Edinburgh: Keele University Press, 1997.
- Eburn, Michael, Stephen Dovers, Ignatious Cha, and David Hudson. "Learning Lessons from Disasters: Alternatives to Royal Commissions and Other Quasi-Judicial Inquiries." *Australian Journal of Public Administration* 74, no. 4 (2015): 495–508.
- Ehrlich, Paul R. *The Population Bomb*. Sierra Club/Ballantine Books, 1968.
- Ellingson, Ter. *The Myth of the Noble Savage*. University of California Press, 2001.

- Ellis, P. F. M. "Firebrand Characteristics of the Stringy Bark of Messmate (*Eucalyptus Obliqua*) Investigated Using Non-Tethered Samples." *International Journal of Wildland Fire* 22, no. 5 (2013): 642–51.
- Ellis, P. F. M. "The Effect of the Aerodynamic Behaviour of Flakes of Jarrah and Karri Bark on Their Potential as Firebrands." *Journal of the Royal Society of Western Australia* 93 (2010): 21–27.
- Ellison, Autumn, Cassandra Moseley, and R. Patrick Bixler. "Drivers of Wildfire Suppression Costs: Literature Review and Annotated Bibliography." Ecosystem workforce program working paper no. 53. Oregon: Oregon State University, 2015.
- Enright, Neal J., and Joseph B. Fontaine. "Climate Change and the Management of Fire-Prone Vegetation in Southwest and Southeast Australia: Fire Management in SW Australia." *Geographical Research* 52, no. 1 (2014): 34–44.
- Environment Australia. "Australia's Kakadu: Protecting World Heritage. Response by the Government of Australia to the UNESCO World Heritage Committee Regarding Kakadu National Park." Commonwealth of Australia, 1999.
- Environmental Protection Authority (Western Australia). "Fire, for What Purpose? Review of the Fire Policies and Management Practices of the Department of Conservation and Land Management: A Discussion Paper." Perth: Environmental Protection Authority, 2004.
- Eriksen, Christine, and Don L. Hankins. "Colonisation and Fire: Gendered Dimensions of Indigenous Fire Knowledge Retention and Revival." In *The Routledge Handbook of Gender and Development*, edited by A. Coles, L. Gray, and J. Momsen, 129–37. New York: Routledge, 2015.
- Eriksen, Christine, and Don L. Hankins. "The Retention, Revival, and Subjugation of Indigenous Fire Knowledge through Agency Fire Fighting in Eastern Australia and California." *Society & Natural Resources* 27, no. 12 (2014): 1288–1303.
- Evans, Jay, and Jeremy Russell-Smith. "Delivering Effective Savanna Fire Management for Defined Biodiversity Conservation Outcomes: An Arnhem Land Case Study." *International Journal of Wildland Fire* 29, no. 5 (2020): 386-400.
- Evans, Peter. "Forest Fire and Funeral Pyre: Fire Tragedies of the Victorian Bush." Country Fire Authority, 1993.
- Evetts, Rand R., and Rob Q. Cuthrell. "Phytolith Evidence for a Grass-Dominated Prairie Landscape at Quiroste Valley on the Central Coast of California." *California Archaeology* 5, no. 2 (2013): 319–35.

- Fache, Elodie, and Bernard Moizo. "Do Burning Practices Contribute to Caring for Country? Contemporary Uses of Fire for Conservation Purposes in Indigenous Australia." *Journal of Ethnobiology* 35, no. 1 (2015): 163–82.
- Fairbank, Maslin, Maullin and Associates (FMMA), Public Opinion Strategies (POS), David Metz, and Lori Weigel. "Key Public Opinion Research Findings on the Ecological Role of Fire and the Benefits of Fire Management." Partners in Fire Education, 30 April, 2008.
- Fairbanks, H.W. "Shall We Use Fire as an Aid to Forestry?" *The Overland Monthly* 57, no. 3 (1911): 304–12.
- Falconer, Scott. "The Return of Cultural Burning." The Lord Mayor's Bushfire Appeal Churchill Fellowship Report, 2017.
- Federation of Victorian Traditional Owner Corporations, Parks Victoria, Department of Environment, Land, Water & Planning Victoria, and Country Fire Authority. "The Victorian Traditional Owner Cultural Fire Strategy," 2019.
- Fensham, R.J. "Aboriginal Fire Regimes in Queensland, Australia: Analysis of the Explorers' Record." *Journal of Biogeography* 24, no. 1 (1997): 11–22.
- Ferguson, Ian. "Fires, Forests and Futures: The ANU Westoby Lecture." *Australian Forestry* 72, no. 4 (2009): 195–205.
- Fernandes, Paulo M. "Empirical Support for the Use of Prescribed Burning as a Fuel Treatment." *Current Forestry Reports* 1, no. 2 (2015): 118–27.
- Fernandes, Paulo M., and Hermínio S. Botelho. "A Review of Prescribed Burning Effectiveness in Fire Hazard Reduction." *International Journal of Wildland Fire* 12, no. 2 (2003): 117–28.
- Fifer, Nichole, and Shannon K. Orr. "The Influence of Problem Definitions on Environmental Policy Change: A Comparative Study of the Yellowstone Wildfires: The Influence of Problem Definitions on Environmental Policy Change." *Policy Studies Journal* 41, no. 4 (2013): 636–53.
- Finzsch, Norbert. "'The Intrusion Therefore of Cattle Is by Itself Sufficient to Produce the Extirpation of the Native Race': Social Ecological Systems and Ecocide in Conflicts between Hunter–Gatherers and Commercial Stock Farmers in Australia." *Settler Colonial Studies* 7, no. 2 (2017): 164–91.
- Fisher, M.J. "The Role of Fire in the Management of National Parks in the Northern Territory." In *Proceedings of the Tropical and Arid Fire Symposium*. Darwin: Bush Fires Council of the Northern Territory, 1971.

- Fisher, W.J. "Kakadu National Park World Heritage Status—Fact or Fiction?" In *Environmental Planning in Multiple Land Use Areas*. Darwin: Department of Mines and Energy, 1989.
- Fixico, Donald L. "Ethics and Responsibilities in Writing American Indian History." *American Indian Quarterly* 20, no. 1 (1996): 29–39.
- Flannery, Tim. "Pleistocene Faunal Loss: Implications of the Aftershock for Australia's Past and Future." *Archaeology in Oceania* 25, no. 2 (1990): 45–55.
- . *The Future Eaters: An Ecological History of the Australasian Lands and People*. Sydney: Reed New Holland, 1994.
- . "Gross Ignorance in Kakadu Claim [Letter]." *The Australian Financial Review*, 10 February, 1998.
- Fleck, Richard F. "John Muir's Evolving Attitudes toward Native American Cultures." *American Indian Quarterly* 4, no. 1 (1978): 19–31.
- Foreman, Dave. "All Kinds of Wilderness Foes." *Wild Earth* 6, no. 4 (1997): i, 2–4.
- . "The Myth of the Humanized Pre-Columbian Landscape." In *Keeping the Wild: Against the Domestication of the Earth*, edited by George Wuerthner, Eileen Crist, and Tom Butler, 114–25. Washington: Island Press, 2014.
- . "Wilderness Areas for Real." In *The Great New Wilderness Debate*, edited by J. Baird Callicott and Michael P. Nelson, 395–407. Athens, Georgia: University of Georgia Press, 1998.
- Foreman, Paul W. "A Framework for Testing the Influence of Aboriginal Burning on Grassy Ecosystems in Lowland, Mesic South–Eastern Australia." *Australian Journal of Botany* 64, no. 8 (2016): 626.
- Foster, Holly, Briony Towers, Joshua Whittaker, John Handmer, and Tom Lowe. "Peri-Urban Melbourne in 2021: Changes and Implications for the Victorian Emergency Management Sector." *The Australian Journal of Emergency Management* 28, no. 3 (2013): 6–11.
- Fox, Allan. "Kakadu Is Aboriginal Land." *Ambio* 12, no. 3/4 (1983): 161–66.
- Fox, R.E. "Summary of Published Work." In *Report on the Use of Fire in National Parks and Reserves*, 1–11. Darwin: Department of the Northern Territory, Forestry, Fisheries, Wildlife, Environment and National Parks Branch, 1974.
- Franklin, Roger. *Inferno: The Day Victoria Burned*. Slattery Media Group, 2010.

- Furphy, Sam. *Edward M. Curr and the Tide of History*. ANU E Press, 2015.
- Gamble, Clive. "The Artificial Wilderness." *New Scientist* 1503 (10 April, 1986): 50–53.
- Gammage, Bill. "Fire in 1788: The Closest Ally." *Australian Historical Studies* 42, no. 2 (2011): 277–88.
- . *The Biggest Estate On Earth: How Aborigines Made Australia*. Crows Nest: Allen & Unwin, 2011.
- . "Victorian Landscapes in 1788." *Studies in the History of Gardens & Designed Landscapes* 31, no. 2 (2011): 83–87.
- Garde, M. "The Language of Fire: Seasonality, Resources and Landscape Burning on the Arnhem Land Plateau." In *Culture, Ecology and Economy of Fire Management in North Australian Savannas: Rekindling the Wurrk Tradition*, edited by Jeremy Russell-Smith, Peter J. Whitehead, and Peter M. Cooke, 102–94. Collingwood: CSIRO Publishing, 2009.
- Gell, Peter A., Iain-Malcom Stuart, and J. David Smith. "The Response of Vegetation to Changing Fire Regimes and Human Activity in East Gippsland, Victoria, Australia." *The Holocene* 3, no. 2 (1993): 150–60.
- Gill, A. Malcolm. "A Review of Fire Regimes of the Forested Region of South-Western Australia with Selected Examples of Their Effects on Native Biota." In *Australian Fire Regimes: Contemporary Patterns (April 1998–March 2000) and Changes since European Settlement*, edited by Jeremy Russell-Smith, R. Craig, A. M. Gill, R. Smith, and J. Williams, 1–19. . . Australia State of the Environment Second Technical Paper Series (Biodiversity). Canberra: Department of the Environment and Heritage, 2002.
- . "Fire and the Australian Flora: A Review." *Australian Forestry* 38, no. 1 (1975): 4–25.
- . "Fire Regimes, Biodiversity Conservation and Prescribed-Burning Programs." *Proceedings of the Royal Society of Victoria* 124, no. 1 (2012): 1–6.
- . "Fire, Science and Society at the Urban-Rural Interface." In *Proceedings of the Royal Society of Queensland*, 115: 153–60. Royal Society of Queensland, 2009.
- . "Post-Settlement Fire History in Victorian Landscapes." In *Fire and the Australian Biota*, edited by A. M. Gill, R. H. Groves, and I. R. Noble, 77–98. Canberra: Australian Academy of Science, 1981.
- Gill, A Malcolm, and G. J. Cary. "Socially Disastrous Landscape Fires in South-Eastern Australia: Impacts, Responses, Implications." In *Wildfire and Community: Facilitating Preparedness and*

- Resilience*, edited by Douglas Paton and Fantina Tedim, 14–32. Springfield: Charles C Thomas, 2012.
- Gill, A Malcolm, P. G. Ryan, P. H. R. Moore, and M. Gibson. "Fire Regimes of World Heritage Kakadu National Park., Australia." *Austral Ecology* 25, no. 6 (2000): 616–625.
- Gill, A Malcolm, and Scott L Stephens. "Scientific and Social Challenges for the Management of Fire-Prone Wildland-Urban Interfaces." *Environmental Research Letters* 4, no. 3 (2009): 1–10.
- Gill, A. Malcolm, Scott L. Stephens, and Geoffrey J. Cary. "The Worldwide 'Wildfire' Problem." *Ecological Applications* 23, no. 2 (2013): 438–454.
- Godfrey, Anthony. *The Ever-Changing View: A History of the National Forests in California, 1891-1987*. Vallejo, CA: USDA Forest Service, 2005.
- Goforth, Brett R., and Richard A. Minnich. "Evidence, Exaggeration and Error in Historical Accounts of Chaparral Wildfires in Southern California." *Ecological Applications* 17, no. 3 (2007): 779–90.
- Gómez-González, S., C. Torres-Díaz, C. Bustos-Schindler, and E. Gianoli. "Anthropogenic Fire Drives the Evolution of Seed Traits." *Proceedings of the National Academy of Sciences* 108, no. 46 (2011): 18743–47.
- Gómez-Pompa, Arturo, and Andrea Kaus. "Taming the Wilderness Myth." *BioScience* 42, no. 4 (1992): 271–79.
- Good, R.B. "The Planned Use of Fire on Conservation Lands - Lessons from the Eastern States." In *Fire Ecology and Management of Western Australian Ecosystems: Proceedings of a Symposium Held in Perth on 10-11 May 1985*, edited by Julian R. Ford, WAIT Environmental Studies Group Report No. 14: 147–52. Perth: Western Australian Institute of Technology, 1985.
- Goodell, Jeff. "Ryan Zinke Blames Radical Enviros for California Fires." *Rolling Stone*, 21 November, 2018.
- Goodman, David. *Gold Seeking: Victoria and California in the 1850s*. Stanford University Press, 1994.
- Gosper, Carl R., Suzanne M. Prober, and Colin J. Yates. "Continental-Scale Syntheses of Australian Pyromes - Misclassification of South-Western Eucalypt Woodlands Misinforms Management." *Journal of Biogeography* 43, no. 4 (2016): 858–61.
- Gott, Beth. "Aboriginal Fire Management in South-Eastern Australia: Aims and Frequency." *Journal of Biogeography* 32, no. 7 (2005): 1203–8.

- . “Murnong—*Microseris Scapigera*: A Study of a Staple Food of Victorian Aborigines.” *Australian Aboriginal Studies* 2 (1983): 2–18.
- Gould, J. S., W. L. McCaw, N. P. Cheney, P. F. Ellis, I. K. Knight, and A. L. Sullivan. *Project Vesta: Fire in Dry Eucalypt Forest: Fuel Structure, Fuel Dynamics and Fire Behaviour*. Perth: CSIRO Publishing and Department of Environment and Conservation, 2007.
- Graves, Henry. “The Torch in the Timber.” *Sunset* 44, no. 4 (1920): 37–40, 80–82, 84, 86, 88, 90.
- Graves, Henry S. “Protection of Forests From Fire.” US Department of Agriculture Forest Service Bulletin 82. Washington: Government Printing Office, 1910.
- Grayson, Donald K., and David J. Meltzer. “A Requiem for North American Overkill.” *Journal of Archaeological Science* 30, no. 5 (2003): 585–93.
- Greeley, William. “Piute Forestry or the Fallacy of Light Burning.” *The Timberman* 21, no. 5 (1920): 38–39.
- Greeley, William B. *Forests and Men*. New York: Country Life Press, 1951.
- Green, Neville. “Aboriginal Sentencing in Western Australia in the Late 19th Century with Reference to Rottnest Island Prison.” In *“Fire and Hearth” Forty Years On: Essays in Honour of Sylvia Hallam*, edited by Caroline Bird and R. Esmee Webb, 77–85. Records of the Western Australian Museum, Supplement 79. Western Australian Museum, 2011.
- Greene, S.W. “Relation between Winter Grass Fires and Cattle Grazing in the Longleaf Pine Belt.” *Journal of Forestry* 33, no. 3 (1935): 338–41.
- . “The Forest That Fire Made.” *American Forestry* 37, no. 10 (1931): 583–84, 618.
- Grey, Anthony J. *Jabiluka: The Battle to Mine Australia’s Uranium*. Melbourne: Text Publishing, 1994.
- Griffiths, Billy. “Caring for Country: The Place Where the Dreaming Changed Shape.” *Griffith Review*, 2017.
- . *Deep Time Dreaming: Uncovering Ancient Australia*. Black Inc., 2018.
- . “[Personal Communication with Author],” 9 October, 2019.
- Griffiths, Billy, and Lynette Russell. “What We Were Told: Responses to 65,000 Years of Aboriginal History.” *Aboriginal History* 42 (2018).

- Griffiths, Billy, Lynette Russell, and Richard 'Bert' Roberts. "Friday Essay: When Did Australia's Human History Begin?" *The Conversation*, 17 November 2017. <https://theconversation.com/friday-essay-when-did-australias-human-history-begin-87251>
- Griffiths, Tom. "'An Unnatural Disaster'? Remembering and Forgetting Bushfire." *History Australia* 6, no. 2 (2009): 35.1-35.7.
- . "Ecology and Empire: Towards an Australian History of the World." In *Ecology and Empire: Environmental History of Settler Societies*, edited by Tom Griffiths and Libby Robin, 1–18. Seattle: University of Washington Press, 1997.
- . "Environmental History, Australian Style." *Australian Historical Studies* 46, no. 2 (2015): 157–73.
- . "From the Ashes." *Inside Story*, 12 October, 2011. <http://insidestory.org.au/from-the-ashes>.
- . *Forests of Ash*. New York: Cambridge University Press, 2001.
- . "How Many Trees Make a Forest? Cultural Debates about Vegetation Change in Australia." *Australian Journal of Botany* 50 (2002): 375–89.
- . *Hunters and Collectors: The Antiquarian Imagination in Australia*. Melbourne: Cambridge University Press, 1996.
- . "Judge Stretton's Fires of Conscience." *Gippsland Heritage Journal* 26 (2002): 9–18.
- . "Pyromaniac Nation [Review of Paul Collins, *Burn: The Epic Story of Bushfire in Australia*]." *Australian Book Review* 287 (2006): 32–33.
- . "Reading Bruce Pascoe." *Inside Story*, 26 November, 2019. <https://insidestory.org.au/reading-bruce-pascoe/>.
- . "Savage Summer." *Inside Story*, 8 January 8, 2020. <https://insidestory.org.au/savage-summer/>.
- . "Season of Reckoning." *Australian Book Review*, March 2020.
- . "Stretton, Leonard Edward (Len) (1893–1967)." In *Australian Dictionary of Biography*, Vol. 16, 2002.
- . "The Language of Conflict." In *Frontier Conflict: The Australian Experience*, edited by Bain Attwood and S.G. Foster, 135–49. Canberra: National Museum of Australia, 2003.

- . “We Have Still Not Lived Long Enough.” *Inside Story*, 16 February, 2009. <http://insidestory.org.au/we-have-still-not-lived-long-enough/>.
- Guha, Ramachandra. “Radical Environmentalism and Wilderness Preservation: A Third World Critique.” In *The Great New Wilderness Debate*, edited by J. Baird Callicott and Michael P. Nelson, 271–80. Athens, Georgia: University of Georgia Press, 1998.
- Hackett, Thomas. “A Reporter At Large: Fire.” *New Yorker*, 2 October 1989.
- Haebich, Anna. *For Their Own Good: Aborigines and Government in the South West of Western Australia, 1900-1940*. 2nd ed. Nedlands, W.A.: University of Western Australia Press, 1992.
- . “Neoliberalism, Settler Colonialism and the History of Indigenous Child Removal in Australia.” *Australian Indigenous Law Review* 19, no. 1 (2016): 20–31.
- Hajer, Maarten, and Wytske Versteeg. “A Decade of Discourse Analysis of Environmental Politics: Achievements, Challenges, Perspectives.” *Journal of Environmental Policy & Planning* 7, no. 3 (2005): 175–84.
- Hall, R. “Artefact Density Patterns in Areas of High Relief: A Case Study from Far East Gippsland.” In *Cultural Heritage of the Australian Alps. Proceedings of the Symposium Held at Jindabyne, New South Wales, 16-18 October 1991*, edited by B. Scougall, 125–40. Canberra: Australian Alps Liaison Committee, 1992.
- Hallam, Sylvia J. *Fire and Hearth*. Canberra: Australian Institute of Aboriginal Studies, 1975.
- . “Peopled Landscapes in Southwestern Australia in the Early 1800s: Aboriginal Burning off in the Light of Western Australian Historical Documents.” *Early Days: Journal of the Royal Western Australian Historical Society* 12, no. 2 (2002): 177–91.
- . “The Biggest Estate on Earth: How Aborigines Made Australia [Review].” *Australian Aboriginal Studies* 2 (2011): 123–26.
- . “The History of Aboriginal Firing.” In *Fire Ecology and Management of Western Australian Ecosystems: Proceedings of a Symposium Held in Perth on 10-11 May 1985*, edited by Julian R. Ford, WAIT Environmental Studies Group Report No. 14: 7–20. Perth: Western Australian Institute of Technology, 1985.
- Hallam, Sylvia J., and Lois Tilbrook, eds. *Aborigines of the South West Region 1829-1840*. The Bicentennial Dictionary of Western Australians, Volume VIII. Nedlands, W.A.: University of Western Australia, 1990.

- Hames, Raymond. "The Ecologically Noble Savage Debate." *Annual Review of Anthropology* 36, no. 1 (2007): 177–90.
- Hamilton, Clive. *Defiant Earth: The Fate of Humans in the Anthropocene*. Sydney: Allen & Unwin, 2017.
- Hamm, Giles, Peter Mitchell, Lee J. Arnold, Gavin J. Prideaux, Daniele Questiaux, Nigel A. Spooner, Vladimir A. Levchenko, et al. "Cultural Innovation and Megafauna Interaction in the Early Settlement of Arid Australia." *Nature* 539, no. 7628 (2016): 280–83.
- Hammer, Roger B., Volker C. Radeloff, Jeremy S. Fried, and Susan I. Stewart. "Wildland–Urban Interface Housing Growth during the 1990s in California, Oregon, and Washington." *International Journal of Wildland Fire* 16, no. 3 (2007): 255–65.
- Hancock, W.K. *Discovering Monaro: A Study of Man's Impact on His Environment*. Cambridge: Cambridge University Press, 1972.
- Hankins, Don L. "Review of *The Biggest Estate on Earth: How Aborigines Made Australia*. By Bill Gammage." *Environmental History* 17, no. 3 (2012): 653–55.
- . "The Effects of Indigenous Prescribed Fire on Riparian Vegetation in Central California." *Ecological Processes* 2, no. 24 (2013).
- Hannam, Peter. "'Smoke Money' Offers an Unexpected Way Forward for Indigenous Communities." *Sydney Morning Herald*, 5 November, 2017.
- Hansen, Christine. "Deep Time and Disaster." *Environmental Humanities* 10, no. 1 (2018): 226–40.
- Hansen, Christine, and Tom Griffiths. *Living with Fire: People, Nature and History in Steels Creek*. CSIRO, 2012.
- Hanstrum, B. "Fire Weather in Relation to Tropical Cyclones over South-West Western Australia." In *Proceedings of the Third Australian Fire Weather Conference, 18-20 May 1989, Hobart*, 79–84. Melbourne: Bureau of Meteorology, 1990.
- Hardin, Garrett. "The Tragedy of the Commons." *Science* 162, no. 3859 (1968): 1243–48.
- Harkin, Michael E. "Swallowing Wealth: Northwest Coast Beliefs and Ecological Practices." In *Native Americans and the Environment: Perspectives on the Ecological Indian*, edited by Michael Eugene Harkin and David Rich Lewis, 211–32. Lincoln: University of Nebraska Press, 2007.

- Harkin, Michael Eugene, and David Rich Lewis. "Introduction." In *Native Americans and the Environment: Perspectives on the Ecological Indian*, edited by Michael Eugene Harkin and David Rich Lewis, xix–xxxiv. Lincoln: University of Nebraska Press, 2007.
- , eds. *Native Americans and the Environment: Perspectives on the Ecological Indian*. Lincoln: University of Nebraska Press, 2007.
- Harris, James A., Richard J. Hobbs, Eric Higgs, and James Aronson. "Ecological Restoration and Global Climate Change." *Restoration Ecology* 14, no. 2 (2006): 170–176.
- Harris, John. "Hiding the Bodies: The Myth of the Humane Colonisation of Aboriginal Australia." *Aboriginal History* 27 (2003): 79–104.
- Harris, Sarah, and Chris Lucas. "Understanding the Variability of Australian Fire Weather between 1973 and 2017." *PLOS ONE* 14, no. 9 (2019): e0222328.
- Hartcher, Peter. "Barbed Wire Fence Tangle for PM." *The Sydney Morning Herald*, 26 October, 2013.
- Hateley, Ron. *The Victorian Bush: Its "Original and Natural" Condition*. Melbourne: Polybractea Press, 2010.
- Haugo, Ryan D., Bryce S. Kellogg, C. Alina Cansler, Crystal A. Kolden, Kerry B. Kemp, James C. Robertson, Kerry L. Metlen, Nicole M. Vaillant, and Christina M. Restaino. "The Missing Fire: Quantifying Human Exclusion of Wildfire in Pacific Northwest Forests, USA." *Ecosphere* 10, no. 4 (2019): e02702.
- Haynes, C.D. "Land, Trees and Man (Gunret, Gundulk, Dja Bining)." *Commonwealth Forestry Review* 57 (1978): 99–106.
- . "Man's Firestick and God's Lightning: Bushfire in Arnhemland." Paper presented to the ANZAAS 52nd Congress, Sydney, 1982.
- . "Problems in Fire Management at Kakadu." In *Towards an Expert System for Fire Management at Kakadu National Park*, 7–10. Technical Memorandum 85/2. Canberra: CSIRO Institute of Biological Resources, Division of Water and Land Resources, 1985.
- . "Realities, Simulacra and the Appropriation of Aboriginality in Kakadu's Tourism." In *Indigenous Participation in Australian Economies: Historical and Anthropological Perspectives*, edited by I. Keen, 165–85. Canberra: ANU E Press, 2010.
- . "Seeking Control: Disentangling the Difficult Sociality of Kakadu National Park's Joint Management." *Journal of Sociology* 49, no. 2–3 (2013): 194–209.

- . “The Pattern and Ecology of Munwag: Traditional Aboriginal Fire Regimes in North-Central Arnhemland.” *Proceedings of the Ecological Society of Australia* 13 (1985): 203–14.
- . “Use and Impact of Fire.” In *Monsoonal Australia: Landscape, Ecology and Man in the Northern Lowlands*, edited by C.D. Haynes, M.G. Ridpath, and M.A.J. Williams. The Netherlands: Balkema, 1991.
- Haynes, Chris. “The Value of Work and ‘Common Discourse’ in the Joint Management of Kakadu National Park.” *The Australian Journal of Anthropology* 28, no. 1 (2017): 72–87.
- Hays, Samuel P. *Conservation And The Gospel Of Efficiency: The Progressive Conservation Movement, 1890–1920*. Pittsburgh: University of Pittsburgh Press, 1959.
- Hayward-Ryan, Tony. *Kakadu Burning: The Incineration of North Australia*. Winnellie: Tony Hayward-Ryan, 1996.
- Head, Lesley. “Prehistoric Aboriginal Impacts on Australian Vegetation; An Assessment of the Evidence.” *Australian Geographer* 20, no. 1 (1989): 37–46.
- Helms, J. D. “Walter Lowdermilk’s Journey: Forester to Land Conservationist.” *Environmental History Review* 8, no. 2 (1984): 132–45.
- Higuera, Philip E. “Taking Time to Consider the Causes and Consequences of Large Wildfires.” *Proceedings of the National Academy of Sciences* 112, no. 43 (2015): 13137–38.
- Higuera, Philip E., Daniel G. Gavin, Patrick J. Bartlein, and Douglas J. Hallett. “Peak Detection in Sediment - Charcoal Records: Impacts of Alternative Data Analysis Methods on Fire-History Interpretations.” *International Journal of Wildland Fire* 19, no. 8 (2010): 996–1014.
- Hill, Michael. “Kakadu National Park and the Aboriginals: Partners in Protection.” *Ambio* 12, no. 3/4 (1983): 158–67.
- Hillier, Jean. “Can’t See the Trees for the Wood? Visions and Re-Visions of Old-Growth Forests in Western Australia.” In *Country: Visions of Land and People in Western Australia*, edited by Andrea Gaynor, Matthew Trinca, and Anna Haebich, 57–81. Perth: Western Australian Museum, 2002.
- Hingston, F.J. “Fire in the Northern Jarrah Forest.” In *Fire Ecology and Management of Western Australian Ecosystems: Proceedings of a Symposium Held in Perth on 10-11 May 1985*, edited by Julian R. Ford, WAIT Environmental Studies Group Report No. 14: 61–65. Perth: Western Australian Institute of Technology, 1985.
- Hiscock, Peter. “Creators or Destroyers? The Burning Questions of Human Impact in Ancient Aboriginal Australia.” *Humanities Australia* 5 (2014): 40–52.

Hixson, Walter L. *American Settler Colonialism: A History*. Palgrave MacMillan, 2013.

Hoare, J., R.J. Hooper, N.P. Cheney, and K.L.S. Jacobsen. "A Report on the Effects of Fire in Tall Open Forest and Woodland with Particular Reference to Fire Management in Kakadu National Park in the Northern Territory." Nightcliff: Australian National Parks and Wildlife Service, 1980.

Holbrook, Stewart H. *Burning An Empire: The Story of American Forest Fires*. New York: MacMillan, 1943.

Holmes, Katie, Andrea Gaynor, and Ruth Morgan. "Doing environmental history in urgent times." *History Australia* 17, no. 2 (2020): 230-251.

Horton, David. "The Burning Question: Aborigines, Fire, and Australian Ecosystems." *Mankind* 13, no. 3 (1982): 237-52.

———. *The Pure State of Nature*. Sydney: Allen & Unwin, 2000.

Horwitz, Pierre, and Martin Brueckner. "The Use of Science in Environmental Policy: A Case Study of the Regional Forest Agreement Process in Western Australia." *Sustainability: Science, Practice, & Policy* 1, no. 2 (2005): 14-24.

House of Representatives, Select Committee Into The Recent Bushfires. "A Nation Charred: Report on the Inquiry into Bushfires." Canberra: Australian Government Publishing Service, 2003.

Howitt, A.W. "The Eucalypts of Gippsland." *Transactions of the Royal Society of Victoria* 2 (1890): 81-120.

Hoxie, George L. "How Fire Helps Forestry." *Sunset*, 1910.

Huffman, Mary R. "The Many Elements of Traditional Fire Knowledge: Synthesis, Classification, and Aids to Cross-Cultural Problem Solving in Fire-Dependent Systems Around the World." *Ecology and Society* 18, no. 4 (2013).

Hutchins, D.E. *A Discussion of Australian Forestry, with Special References to Forestry in Western Australia*. Perth: Forests Department of Western Australia, 1916.

Hutton, Drew, and Libby Connors. *A History of the Australian Environmental Movement*. Melbourne: Cambridge University Press, 1999.

"Indian Forestry [Editorial]." *San Francisco Call*, 23 September, 1902.

- Ingalsbee, Timothy. "Whither the Paradigm Shift? Large Wildland Fires and the Wildfire Paradox Offer Opportunities for a New Paradigm of Ecological Fire Management." *International Journal of Wildland Fire* 26, no. 7 (2017): 557–61.
- Ingalsbee, Timothy, and Urooj Raja. "The Rising Costs of Wildfire Suppression and the Case for Ecological Fire Use." In *The Ecological Importance of Mixed-Severity Fires: Nature's Phoenix*, edited by Dominic A. DellaSala and Chad T. Hanson, 348–71. Elsevier, 2015.
- Ingalsbee, Timothy, and George Wuerthner. "The War on Wildfire: Firefighting and the Militarisation of Forest Fire Management." In *Wildfire: A Century of Failed Forest Policy*. Sausalito, California: Foundation for Deep Ecology, by arrangement with Island Press, 2006.
- Inspector-General for Emergency Management, and State of Victoria. "Annual Report: Implementation of Recommendations on Bushfire Fuel Management." Department of Justice and Regulation, 2017.
- . "Review of Performance Targets for Bushfire Fuel Management on Public Land." Department of Justice and Regulation, 2015.
- International Savanna Fire Management Initiative. "The Global Potential of Indigenous Fire Management: Findings of the Regional Feasibility Assessments." United Nations University, 2015.
- Ireland, Judith. "UN Official 'talking through Her Hat' on Bushfires and Climate Change, Says Tony Abbott." *The Sydney Morning Herald*, 23 October, 2013.
- Jacklyn, P., and Jeremy Russell-Smith, eds. *Proceedings from the North Australia Fire Management Workshop, Darwin, 24-25 March 1998*. Darwin: Tropical Savannas CRC, 1998.
- Johnson, A Sydney, and Philip E Hale. "The Historical Foundations of Prescribed Burning for Wildlife: A Southeastern Perspective." In *Proceedings: The Role of Fire for Nongame Wildlife Management and Community Restoration: Traditional Uses and New Directions*, edited by W. Ford, Kevin R. Russell, and Christopher E. Moorman, 11–23. Gen. Tech. Rep. NE-288. Newtown Square, PA: U.S. Dept. of Agriculture, Forest Service, Northeastern Research Station, 2002.
- Johnson, Brent E., Rand R. Everett, Kent G. Lightfoot, and Charles J. Stiplen. "Exploring the Traditional Use of Fire in the Coastal Mountains of Central California." *JFSP Research Project Reports* 74 (2010).
- Johnson, Christopher N. "Fire, People and Ecosystem Change in Pleistocene Australia." *Australian Journal of Botany* 64, no. 8 (2016): 643–51.

- Jolly, W. Matt, Mark A. Cochrane, Patrick H. Freeborn, Zachary A. Holden, Timothy J. Brown, Grant J. Williamson, and David M. J. S. Bowman. "Climate-Induced Variations in Global Wildfire Danger from 1979 to 2013." *Nature Communications* 6, no. 7537 (2015).
- Jones, Rhys. "Fire-Stick Farming." *Australian Natural History* 16 (1969): 224–29.
- . "Hunters in the Australian Coastal Savanna." In *Human Ecology in Savanna Environments*, 107–46. New York: Academic Press, 1980.
- . "Mindjongork: Legacy of the Firestick." In *Country in Flames: Proceedings of the 1994 Symposium on Biodiversity and Fire in North Australia*, edited by Deborah Bird Rose, Biodiversity Series Paper No. 3: 11–18. Darwin: Jointly published by the Biodiversity Unit (Department of the Environment, Sport and Territories) and the North Australia Research Unit (The Australian National University), 1994.
- . "Ordering the Landscape." In *Seeing the First Australians*, edited by Ian Donaldson and Tamsin Donaldson, 181–209. Sydney: Allen & Unwin, 1985.
- Jurskis, Vic, Bob Bridges, Paul de Mar, and others. "Fire Management in Australia: The Lessons of 200 Years." In *Proceedings of the Joint Australia and New Zealand Institute of Forestry Conference, 27 April–1 May 2003*, 353–368. Wellington, New Zealand: Ministry of Agriculture and Forestry, 2003.
- Kanowski, P. J., R. J. Whelan, and S. Ellis. "Inquiries Following the 2002–2003 Australian Bushfires: Common Themes and Future Directions for Australian Bushfire Mitigation and Management." *Australian Forestry* 68, no. 2 (2005): 76–86.
- Karskens, Grace. "Fire in the Forests? Exploring the Human-Ecological History of Australia's First Frontier." *Environment and History* 25, no. 3 (2019): 391–419.
- Kay, C.E., and R.T. Simmons. "Preface." In *Wilderness and Political Ecology: Aboriginal Influences and the Original State of Nature*, edited by C.E. Kay and R.T. Simmons, xi–xix. Salt Lake City: University of Utah Press, 2002.
- Keeley, Jon E. "Fire Management Impacts on Invasive Plants in the Western United States." *Conservation Biology* 20, no. 2 (2006): 375–84.
- . "Native American Impacts on Fire Regimes of the California Coastal Ranges." *Journal of Biogeography* 29, no. 3 (2002): 303–320.
- Keeley, Jon E., Juli G. Pausas, Philip W. Rundel, William J. Bond, and Ross A. Bradstock. "Fire as an Evolutionary Pressure Shaping Plant Traits." *Trends in Plant Science* 16, no. 8 (2011): 406–11.

- Keen, I., and Francesca Merlan. "The Significance of the Conservation Zone to Aboriginal People." Resource Assessment Commission Kakadu Conservation Zone Inquiry Consultancy Series. Canberra: Australian Government Publishing Service, 1990.
- Kelly, G. "Karla Wongi: Fire Talk." *Landscape* 14, no. 2 (1999): 48–53.
- Kelly, Luke, Katherine Giljohann, and Michael A. McCarthy. "Percentage Targets for Planned Burning Are Blunt Tools That Don't Work." *The Conversation*, 30 March, 2015. <http://theconversation.com/percentage-targets-for-planned-burning-are-blunt-tools-that-dont-work-39254>.
- Kelly, Robert L., and Mary M. Prasciunas. "Did the Ancestors of Native Americans Cause Animal Extinctions in Late-Pleistocene North America? And Does It Matter If They Did?" In *Native Americans and the Environment: Perspectives on the Ecological Indian*, edited by Michael Eugene Harkin and David Rich Lewis, 95–122. Lincoln: University of Nebraska Press, 2007.
- Kenny, Robert. *Gardens of Fire: An Investigative Memoir*. UWA Publishing, 2013.
- Kerins, Seán. "Caring for Country to Working on Country." In *People on Country: Vital Landscapes, Indigenous Futures*, edited by Jon Altman and Seán Kerins, 26–44. Sydney: The Federation Press, 2012.
- Kershaw, A. Peter, Sophie C. Bretherton, and Sander van der Kaars. "A Complete Pollen Record of the Last 230 Ka from Lynch's Crater, North-Eastern Australia." *Palaeogeography, Palaeoclimatology, Palaeoecology* 251, no. 1 (2007): 23–45.
- Kessell, S. L. "The Damage Caused by Creeping Fires in the Forest." Bulletin No. 33. Perth: Western Australia Forests Department, 1924.
- Kimber, Richard. "Black Lightning: Aborigines and Fire in Central Australia and the Western Desert." *Archaeology in Oceania* 18, no. 1 (1983): 38–45.
- Kimmerer, Robin Wall, and Frank K. Lake. "The Role of Indigenous Burning in Land Management." *Journal of Forestry* 99, no. 11 (2001): 36–41.
- Kitts, Joseph A. "California Divided on Light Burning." *The Timberman*, 1920.
- Knapman, Gareth. *Race and British Colonialism in South-East Asia, 1770–1870: John Crawfurd and the Politics of Equality*. New York: Routledge, 2017.
- Knaus, Christopher. "Bots and Trolls Spread False Arson Claims in Australian Fires 'Disinformation Campaign.'" *The Guardian*, 8 January, 2020. <https://www.theguardian.com/australia->

news/2020/jan/08/twitter-bots-trolls-australian-bushfires-social-media-disinformation-campaign-false-claims.

Komarek, E.V. "History of Prescribed Fire and Controlled Burning in Wildlife Management in the South." In *Prescribed Fire and Wildlife in Southern Forests*, edited by Gene W. Wood, 1–12. Georgetown, South Carolina: The Belle W. Baruch Forest Science Institute of Clemson University, 1981.

Konishi, Shino. "First Nations Scholars, Settler Colonial Studies, and Indigenous History." *Australian Historical Studies* 50, no. 3 (2019): 285-304.

Kosek, Jake. "Smokey the Bear Is a White Racist Pig." In *Understories: The Political Life of Forests in Northern New Mexico*. Durham: Duke University Press, 2006.

Kost, Fiona. "Burning the Bush: The Development of Australia's South-West Botanical Province." In *Humans and the Environment: New Archaeological Perspectives for the Twenty-First Century*, edited by Matthew I. J. Davies and Freda Nkirote M'Mbogori, 117–31. Oxford: Oxford University Press, 2013.

Krech III, Shepard. "Beyond the Ecological Indian." In *Native Americans and the Environment: Perspectives on the Ecological Indian*, edited by Michael Eugene Harkin and David Rich Lewis, 3–31. Lincoln: University of Nebraska Press, 2007.

———. *The Ecological Indian: Myth and History*. New York: Norton, 1999.

Lake, Frank K., Vita Wright, Penelope Morgan, Mary McFadzen, Dave McWethy, and Camille Stevens-Rumann. "Returning Fire to the Land: Celebrating Traditional Knowledge and Fire." *Journal of Forestry* 115, no. 5 (2017): 343–53.

Langston, Nancy. *Forest Dreams, Forest Nightmares: The Paradox of Old Growth in the Inland West*. Seattle: University of Washington Press, 1995.

Langton, M. *Burning Questions: Emerging Environmental Issues for Indigenous Peoples in Northern Australia*. Darwin: Centre for Indigenous Natural and Cultural Resources Management, Northern Territory University, 1998.

Lawrence, David. *Kakadu: The Making of a National Park*. Melbourne: Melbourne University Press, 2000.

Lear, Linda. *Rachel Carson: Witness for Nature*. New York: Henry Holt, 1997.

- Leaver, Bruce, Arturo Izurieta, Nancy Williams, Bill Phillips, Jeremy Russell-Smith, John Woinarski, Keith Ferdinands, Peter Baylis, and Robyn Bushell. "Kakadu National Park Management Plan 2007-2014 Technical Audit: Summary Report." Director of National Parks Australia, 2012.
- Leavesley, Adam. "[Review] 'The Biggest Estate on Earth - How Aborigines Made Australia.'" *Ecological Management & Restoration* 13, no. 2 (2012): e4–5.
- Legg, Stephen. "Political Agitation for Forest Conservation Victoria, 1860-1960." *International Review of Environmental History* 2 (2016): 7–33.
- Lehman, Greg. "Turning Back the Clock: Fire, Biodiversity, and Indigenous Community Development in Tasmania." In *Working on Country: Contemporary Indigenous Management of Australia's Lands and Coastal Regions*, edited by Richard Baker, Jocelyn Davies, and Elspeth Young, 308–19. South Melbourne: Oxford University Press, 2001.
- Leopold, A. Starker. "Wildlife Management in the National Parks (or, The Leopold Report)." In *The Great New Wilderness Debate*, edited by J. Baird Callicott and Michael P. Nelson, 103–20. Athens, Georgia: University of Georgia Press, 1998.
- Levitus, R. "Change and Catastrophe: Adaptation, Re-Adaptation and Fire in the Alligator Rivers Region." In *Culture, Ecology and Economy of Fire Management in North Australian Savannas: Rekindling the Wurrk Tradition*, edited by Jeremy Russell-Smith, Peter J. Whitehead, and Peter Cooke, 58–79. Collingwood: CSIRO Publishing, 2009.
- . "Management and the Model: Burning Kakadu." In *Sustainable Environments, Sustainable Communities: Potential Dialogues between Anthropologists, Scientists and Managers: Proceedings of a Symposium Hosted by the School of Anthropology, Geography and Environmental Studies, the University of Melbourne, 2 October 2004*, edited by Monica Minnegal. Research Paper (University of Melbourne. School of Anthropology, Geography and Environmental Studies); No. 21. Melbourne: School of Anthropology, Geography and Environmental Studies, The University of Melbourne, 2005.
- Lewis, Daniel. "Experts Take Corners as Argument Reignites." *Sydney Morning Herald*, 13 February, 2009.
- Lewis, Darrell. *Slower than the Eye Can See: Environmental Change in North Australia's Cattlelands - a Case Study from the Victoria Rivers District, Northern Territory*. Darwin: Tropical Savannas CRC, 2002.
- Lewis, David Rich. "American Indian Environmental Relations." In *A Companion to American Environmental History*, edited by Douglas Cazaux Sackman. Blackwell Companions to American History. Malden, MA: Wiley-Blackwell, 2010.

- Lewis, Henry T. "An Anthropological Critique." In *Forgotten Fires: Native Americans and the Transient Wilderness*, edited by Henry T. Lewis and M. Kat Anderson, 17–36. Norman: University of Oklahoma Press, 2002.
- . "Burning the 'Top End': Kangaroos and Cattle." In *Fire Ecology and Management of Western Australian Ecosystems: Proceedings of a Symposium Held in Perth on 10-11 May 1985*, edited by Julian R. Ford, WAIT Environmental Studies Group Report No. 14: 21–31. Perth: Western Australian Institute of Technology, 1985.
- . "Ecological and Technical Knowledge of Fire: Aborigines Versus Park Rangers in Northern Australia." *American Anthropologist* 91, no. 4 (1989): 940–61.
- . "Fire Technology and Resource Management in Aboriginal North America and Australia." In *Resource Managers: North American and Australian Hunter-Gatherers*, edited by Nancy M. Williams and Eugene S. Hunn, 45–68. Boulder, Colorado: Westlaw Press Inc., 1982.
- . "In Retrospect." In *Before the Wilderness: Environmental Management by Native Californians*, edited by Thomas Blackburn and Kat Anderson, 389–400. Menlo Park, California: Ballena Press, 1993.
- . "Management Fires vs. Corrective Fires in Northern Australia: An Analogue for Environmental Change." *Chemosphere* 29, no. 5 (1994): 949–63.
- . "Patterns of Indian Burning in California: Ecology and Ethnohistory." In *Before the Wilderness: Environmental Management by Native Californians*, edited by Thomas Blackburn and Kat Anderson, 55–116. Menlo Park, California: Ballena Press, 1993.
- Lewis, Henry T., and M. Kat Anderson. "Introduction." In *Forgotten Fires: Native Americans and the Transient Wilderness*, edited by Henry T. Lewis and M. Kat Anderson, 3–16. Norman: University of Oklahoma Press, 2002.
- Lewis, James G. *The Forest Service and the Greatest Good: A Centennial History*. Durham, NC: Forest History Society, 2006.
- Lewis, Michael, Amy Christianson, and Marsha Spinks. "Return to Flame: Reasons for Burning in Lytton First Nation, British Columbia." *Journal of Forestry* 116, no. 2 (2018): 143–50.
- Lightfoot, Kent G., and Rob Q. Cuthrell. "Anthropogenic Burning and the Anthropocene in Late Holocene California." *The Holocene* 25, no. 10 (2015): 1581–87.
- Lightfoot, Kent G., and Otis Parrish. *California Indians and Their Environment: An Introduction*. University of California Press, 2009.

- Lindenmayer, David, David Blair, Lachlan McBurney, and Sam Banks, eds. *Mountain Ash: Fire, Logging and the Future of Victoria's Giant Forests*. Acton: CSIRO Publishing, 2015.
- Lindsay, Brendan C. *Murder State: California's Native American Genocide, 1846–1873*. Lincoln: University of Nebraska Press, 2012.
- Loehle, Craig. "Applying Landscape Principles to Fire Hazard Reduction." *Forest Ecology and Management* 198, no. 1–3 (2004): 261–67.
- Lonnberg, Allan. "The Digger Indian Stereotype in California." *Journal of California and Great Basin Anthropology* 3, no. 2 (1981): 215–23.
- Louis, Renee Pualani. "Can You Hear Us Now? Voices from the Margin: Using Indigenous Methodologies in Geographic Research." *Geographical Research* 45, no. 2 (2007): 130–39.
- Lourandos, Harry, and Anne Ross. "The Great 'Intensification Debate': Its History And Place In Australian Archaeology." *Australian Archaeology* 39, no. 1 (1994): 54–63.
- Lullfitz, Alison, Joe Dortch, Stephen D. Hopper, Carol Pettersen, Ron (Doc) Reynolds, and David Guilfoyle. "Human Niche Construction: Noongar Evidence in Pre-Colonial Southwestern Australia." *Conservation and Society* 15, no. 2 (2017): 201–16.
- Lunn, Stephen. "Greenies Blamed for Fires' Scale." *The Australian*, 12 February, 2009.
- Lunt, I. "Grazed, Burnt and Cleared: How Ecologists Have Studied Century-Scale Vegetation Changes in Australia." *Australian Journal of Botany* 50 (2002): 391–407.
- Lutz, J.A., Jan W. Wagtendonk, and J.F. Franklin. "Twentieth-Century Decline of Large-Diameter Trees in Yosemite National Park, California, USA." *Forest Ecology and Management* 257, no. 11 (2009): 2296–2307.
- MacDaniels, E.H. "National Forest Jungles: The Theory of 'Light Burning' in Yellow Pine Is Disproved." *The Timberman* 25, no. 3 (1924): 50–51.
- Macintyre, Stuart, and Anna Clark. *The History Wars*. 2nd ed. Carlton: Melbourne University Press, 2004.
- Maclean, Norman. *Young Men and Fire*. Chicago: University Of Chicago Press, 1992.
- MacQueen, Andy. "The Biggest Estate on Earth: How Aborigines Made Australia" by Bill Gammage, 2011 A Blue Mountains Critique." *Heritage (Newsletter of the Blue Mountains Association of Cultural Heritage Organisations Inc.)*, August 2013.

- Mactaggart, Barbara, Johannes Bauer, and David Goldney. "When History May Lead Us Astray: Using Historical Documents to Reconstruct Swampy Meadows/Chains of Ponds in the New South Wales Central Tablelands, Australia." *Australian Geographer* 38, no. 2 (2007): 233–52.
- Maddison, Sarah. "Indigenous Identity, 'Authenticity' and the Structural Violence of Settler Colonialism." *Identities: Global Studies in Culture and Power* 20, no. 3 (2013): 288–303.
- Madley, Benjamin. *An American Genocide: The United States and the California Indian Catastrophe, 1846-1873*. New Haven: Yale University Press, 2016.
- Mann, Charles. *1491: New Revelations of the Americas Before Columbus*. Knopf, 2005.
- Mann, Charles C. "1491." *The Atlantic*, March 2002.
- Manson, Marsden. "Preserving the Forests by Fire." In *Should the Forests Be Preserved?*, 37–38. California Water and Forest Association, 1903.
- . "The Effect of Partial Suppression of Annual Forest Fires in the Sierra Nevada Mountain." *Sierra Club Bulletin*, 1906.
- Marks, Russell. "Taking Sides over 'Dark Emu': How the History Wars Avoid Debate and Reason." *The Monthly*, 5 February, 2020.
- Marks-Block, Tony, Frank K. Lake, and Lisa M. Curran. "Effects of Understory Fire Management Treatments on California Hazelnut, an Ecocultural Resource of the Karuk and Yurok Indians in the Pacific Northwest." *Forest Ecology and Management* 450 (2019): 117517.
- Marshall Sahlins. "Goodbye to Tristes Tropes: Ethnography in the Context of Modern World History." *The Journal of Modern History* 65, no. 1 (1993): 1–25.
- Martin, Calvin. "An Introduction Aboard the *Fidèle*." In *The American Indian and the Problem of History*, edited by Martin, Calvin, 3–26. New York: Oxford University Press, 1987.
- Martin, P.S. "40,000 Years of Extinctions on the 'Planet of Doom.'" *Palaeogeography, Palaeoclimatology, Palaeoecology* 82 (1990): 187–201.
- . "Prehistoric Overkill." In *Pleistocene Extinctions: The Search for a Cause*, edited by P.S. Martin and H.E. Wright Jr., 75–120. New Haven: Yale University Press, 1967.
- . "The Discovery of America." *Science* 179, no. 4077 (1973): 969–74.
- Martin, Richard J. "Sometime a Fire: Re-Imagining Elemental Conflict in Northern Australia's Gulf Country." *Australian Humanities Review* 55 (2013): 67–91.

- Martin, Robert E., and David B. Sapsis. "Fires as Agents of Biodiversity: Pyrodiversity Promotes Biodiversity." In *Proceedings of the Symposium on Biodiversity of Northwestern California*, edited by R.R. Harris, D.C. Erman, and H.M. Kerner, 150–57. Wildland Resources Center, Report 29. Berkeley: University of California Press, 1992.
- Massey, Doreen. *Space, Place, and Gender*. University of Minnesota Press, 1994.
- Mathews, Freya. "Scientists Warned Us This Would Happen." *The Sydney Morning Herald*, 10 February, 2009.
- Matlock, Teenie, Chelsea Coe, and A. Leroy Westerling. "Monster Wildfires and Metaphor in Risk Communication." *Metaphor and Symbol* 32, no. 4 (2017): 250–61.
- May, Daniel. "'Fanning the Flames of Debate': The Relationship between Concepts of Aboriginal Fire Regimes and Post-Bushfire Discussion in Australia." Honours Thesis, University of New South Wales, Australia, 2014.
- . "Shallow Fire Literacy Hinders Robust Fire Policy: Black Saturday and Prescribed Burning Debates." In *Disasters in Australia and New Zealand: Historical Approaches to Understanding Catastrophe*, edited by Scott McKinnon and Margaret Cook. Palgrave MacMillan, 2020.
- McArthur, A.G. "Control Burning in Eucalypt Forests." Canberra: Forestry and Timber Bureau, 1962.
- McArthur, Alan. "Plotting Ecological Change." In *Historians At Work: Investigating and Recreating the Past*, edited by Keith Swan, David Dufty, and G. S. Harman, 27–48. Sydney: Hicks Smith & Sons, 1973.
- McCarthy, Michael A., Georgia Garrad, and Libby Rumpff. "The Alpine Grazing Debate Was Never about Science." *The Conversation*, 16 April, 2015. <http://theconversation.com/the-alpine-grazing-debate-was-never-about-science-40219>.
- McCaw, Lachlan, T. Hamilton, and C. Rumley. "Application of Fire History Records to Contemporary Management Issues in South-West Australian Forests." In *A Forest Consciousness: Proceedings of the 6th National Conference of the Australian Forest History Society Inc, 12 - 17 September 2004, Augusta, Western Australia*, 555–64. Rotterdam: Millpress, 2005.
- McCaw, Lachlan, and Barry Hanstrum. "Fire Environment of Mediterranean South-West Western Australia." In *Fire in Ecosystems of South West Western Australia: Impacts and Management*, edited by I Abbott and N. Burrows, 87–106. Leiden: Backhuys, 2003.
- McCaw, W.L., N.D. Burrows, B. Dell, J.J. Havel, and N. Malajczuk. "Fire Management." In *The Jarrah Forest: A Complex Mediterranean Ecosystem*, 317–34. Dordrecht: Kluwer Academic Publishers, 1989.

- McConchie, Peter, Tommy George, Victor Steffensen, David Claudie, Robert Nelson, George Musgrave, Dale Musgrave, et al. *Fire: And the Story of Burning Country*. Avalon: Cyclops Press, 2013.
- McGrath, Ann. *Born in the Cattle: Aborigines in Cattle Country*. Allen & Unwin, 1987.
- McGregor, Russell. "Another Nation: Aboriginal Activism in the Late 1960s and Early 1970s." *Australian Historical Studies* 40, no. 3 (2009): 343–60.
- . *Environment, Race, and Nationhood in Australia: Revisiting the Empty North*. Palgrave Macmillan, 2016.
- McGregor, Sandra, Violet Lawson, Peter Christophersen, Rod Kennett, James Boyden, Peter Baylis, Adam Liedloff, Barbie McKaige, and Alan N. Andersen. "Indigenous Wetland Burning: Conserving Natural and Cultural Resources in Australia's World Heritage-Listed Kakadu National Park." *Human Ecology* 38, no. 6 (2010): 721–29.
- McGuffog, Tim, and Tom Starr. "Fire Management in Northern Australia: The Top End Trifecta." In *Bushfire '97 Proceedings*, 234–38. Plaza Hotel, Darwin: CSIRO Tropical Ecosystems Research Centre, 1997.
- McKenzie-Murray, Martin. "Bushfire prevention strategy questioned after Lancefield." *The Saturday Paper*, 18 March, 2016.
- McNeill, J. R. "Observations on the Nature and Culture of Environmental History." *History and Theory* Theme Issue 42 (2003): 5–43.
- McLennan, James (Jim). "70 Years before Black Saturday, the Birth of the Victorian CFA Was a Sad Tale of Politics as Usual." *The Conversation*, 7 February, 2019. <http://theconversation.com/70-years-before-black-saturday-the-birth-of-the-victorian-cfa-was-a-sad-tale-of-politics-as-usual-111080>.
- Megarrity, Lyndon. *Northern Dreams: The Politics of Northern Development in Australia*. Australian Scholarly Publishing, 2018.
- Mellanby, K. "Politics and Wildlife in Australia." *Nature* 325 (1987): 112.
- Merchant, Carolyn. "Reinventing Eden: Western Culture as a Recovery Narrative." In *Uncommon Ground: Rethinking the Human Place in Nature*, edited by William Cronon, 132–70. New York: Norton, 1996.

- . “Shades of Darkness: Race and Environmental History.” *Environmental History* 8, no. 3 (2003): 380–94.
- . *The Columbia Guide to American Environmental History*. Columbia University Press, 2002.
- Merlan, Francesca. “Indigeneity: Global and Local.” *Current Anthropology* 50, no. 3 (2009): 303–33.
- Merrilees, D. “Man the Destroyer: Late Quaternary Changes in the Australian Marsupial Fauna.” *Journal of The Royal Society of Western Australia* 51, no. 1 (1968): 1–24.
- Meyer, Grant A. “Yellowstone Fires and the Physical Landscape.” In *After the Fires: The Ecology of Change in Yellowstone National Park*, edited by Linda L. Wallace, 29–54. New Haven: Yale University Press, 2004.
- Mieder, Wolfgang. “‘The Only Good Indian Is a Dead Indian’: History and Meaning of a Proverbial Stereotype.” *The Journal of American Folklore* 106, no. 419 (1993): 38–60.
- Miles, Greg. “Is Early Dry Season Burning an ‘Ecological Trojan Horse’?” Unpublished manuscript, September 2016.
- Miller, B. P., T. Walshe, N. J. Enright, and B. B. Lamont. “Grasstree Stem Analysis Reveals Insufficient Data for Inference of Fire History.” *Journal of the Royal Society of Western Australia* 95, no. 2 (2012): 95–102.
- Miller, Ben P., Terry Walshe, Neal J. Enright, and Byron B. Lamont. “Error in the Inference of Fire History from Grasstrees.” *Austral Ecology* 32, no. 8 (2007): 908–16.
- Miller, Char. “Essential Landscape: An Environmental History of Chaparral Ecosystems in California.” In *Valuing Chaparral*, edited by E. Underwood, H. Safford, and J. Keeley, 123–40. Springer, 2018.
- Miller, Jay D., and Hugh D. Safford. “Corroborating Evidence of a Pre-Euro-American Low- to Moderate-Severity Fire Regime in Yellow Pine–Mixed Conifer Forests of the Sierra Nevada, California, USA.” *Fire Ecology* 13, no. 1 (2017): 58–90.
- Mills, Jenny. “The Impact of Man on the Northern Jarrah Forest from Settlement in 1829 to the Forests Act 1918.” In *The Jarrah Forest: A Complex Mediterranean Ecosystem*, edited by B. Dell, J.J. Havel, and N. Malajczuk, 229–79. Dordrecht: Kluwer Academic Publishers, 1989.
- Minister for Energy, Environment and Climate Change, and Minister for Water. “Government Responds To Lancefield And Sets Out Future Of Planned Burning.” Premier of Victoria, 19 November, 2015. <http://www.premier.vic.gov.au/government-responds-to-lancefield-and-sets-out-future-of-planned-burning/>.

- Minor, Jesse, and Geoffrey A. Boyce. "Smokey Bear and the Pyropolitics of United States Forest Governance." *Political Geography* 62 (2018): 79–93.
- Mistry, Jayalaxshmi, Bibiana A. Bilbao, and Andrea Berardi. "Community Owned Solutions for Fire Management in Tropical Ecosystems: Case Studies from Indigenous Communities of South America." *Philosophical Transactions of the Royal Society B: Biological Sciences* 371, no. 1696 (2016).
- Mooney, S.D., S.P. Harrison, P.J. Bartlein, A.-L. Daniau, J. Stevenson, K.C. Brownlie, S. Buckman, et al. "Late Quaternary Fire Regimes of Australasia." *Quaternary Science Reviews* 30, no. 1–2 (2011): 28–46.
- Moore, Grace. "'Raising High Its Thousand Forked Tongues': Campfires, Bushfires, and Portable Domesticity in Nineteenth-Century Australia." *Interdisciplinary Studies in the Long Nineteenth Century* 26 (2018).
- Morgan, Ruth. "Running out? An Environmental History of Climate and Water in the Southwest of Western Australia, 1829 to 2006." PhD thesis, University of Western Australia, 2012.
- Morgan, Ruth A. *Running Out? Water in Western Australia*. Perth: UWA Publishing, 2015.
- Morton, Adam. "Grazing Adviser Rebuffs Baillieu." *The Age*, 6 April, 2011.
- Muir, John. *My First Summer in the Sierra*. Boston: Houghton Mifflin, 1916.
- . "The American Forests." *Atlantic Monthly*, 1897.
- Muller, Chris. "Review of Fire Operations in Forest Regions Managed by the Department of Conservation and Land Management: Report to the Executive Director of the Department of Conservation and Land Management." Perth: Department of Conservation and Land Management WA, 2001.
- Murphy, Brett P., Ross A. Bradstock, Matthias M. Boer, John Carter, Geoffrey J. Cary, Mark A. Cochrane, Roderick J. Fensham, Jeremy Russell-Smith, Grant J. Williamson, and David M. J. S. Bowman. "Fire Regimes of Australia: A Pyrogeographic Model System." Edited by Pauline Ladiges. *Journal of Biogeography* 40, no. 6 (2013): 1048–58.
- Myers, Norman, Russell A. Mittermeier, Cristina G. Mittermeier, Gustavo A.B. Da Fonseca, and Jennifer Kent. "Biodiversity Hotspots for Conservation Priorities." *Nature* 403, no. 6772 (2000): 853–858.

- Nadasdy, P. "Transcending the Debate over the Ecologically Noble Indian: Indigenous Peoples and Environmentalism." *Ethnohistory* 52, no. 2 (2005): 291–331.
- Nadasdy, Paul. "The Anti-Politics of TEK: The Institutionalisation of Co-Management Discourse and Practice." *Anthropologica* 47, no. 2 (2005): 215–32.
- Nagaoka, Lisa, Torben Rick, and Steve Wolverton. "The Overkill Model and Its Impact on Environmental Research." *Ecology and Evolution* 8, no. 19 (2018): 9683–96.
- Nash, Roderick. "Sorry, Bambi, But Man Must Enter The Forest: Perspectives on the Old Wilderness and the New." In *Fire's Effects on Wildlife Habitat: Symposium Proceedings, Missoula, MT, March 21, 1984*, edited by James E. Lotan, 264–68. General Technical Report INT-182. Ogden, Utah: US Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station, 1985.
- . *Wilderness and the American Mind*. Yale University Press, 1967.
- National Academy of Sciences. "Report of the Committee Appointed by the National Academy of Sciences Upon the Inauguration of a Forest Policy for the Forested Lands of the United States to the Secretary of the Interior." Washington: Government Printing Office, 1897.
- Neale, Timothy. "'Are We Wasting Our Time?': Bushfire Practitioners and Flammable Futures in Northern Australia." *Social & Cultural Geography* 19, no. 4 (2018): 1–23.
- . "Digging for Fire: Finding Control on the Australian Continent." *Journal of Contemporary Archaeology* 5, no. 1 (2018): 79–90.
- . "Review of 'The Biggest Estate on Earth.'" *Arena Magazine*, February 2012.
- Neale, Timothy, Rodney Carter, Trent Nelson, and Mick Bourke. "Walking Together: A Decolonising Experiment in Bushfire Management on Dja Dja Wurrung Country." *Cultural Geographies* 26, no. 3 (2019): 341–59.
- Neale, Timothy, and Daniel May. "Bushfire Simulators and Analysis in Australia: Insights into an Emerging Sociotechnical Practice." *Environmental Hazards* 17, no. 3 (2018): 200–218.
- Neale, Timothy, Jessica K. Weir, and Tara K. McGee. "Knowing Wildfire Risk: Scientific Interactions with Risk Mitigation Policy and Practice in Victoria, Australia." *Geoforum* 72 (2016): 16–25.
- Nelson, Michael P., and J. Baird Callicott. "Introduction: The Growth of Wilderness Seeds." In *The Wilderness Debate Rages on: Continuing the Great New Wilderness Debate*, edited by Michael P. Nelson and J. Baird Callicott, 1–20. Athens, Georgia: University of Georgia Press, 2008.

- Nicholson, P. H. "Fire and the Australian Aborigine-An Enigma." In *Fire and the Australian Biota*, edited by A. Malcolm Gill, R. H. Groves, and I. R. Noble, 55–76. Canberra: Australian Academy of Science, 1981.
- Noble, W. S. *Ordeal by Fire: The Week a State Burned Up*. Melbourne: The Hawthorn Press, 1977.
- Norgaard, Kari Marie. "The Politics of Fire and the Social Impacts of Fire Exclusion on the Klamath." *Humboldt Journal of Social Relations* 36, no. 1 (2014): 73–97.
- Norman, Heidi. *"What Do We Want?" A Political History of Aboriginal Land Rights in New South Wales*. Canberra: Aboriginal Studies Press, 2015.
- Northern Research Station. "Who Owns America's Forests? Forest Ownership Patterns and Family Forest Highlights from the National Woodland Owner Survey." NRS-INF-06-08. US Department of Agriculture, Forest Service, 2008.
- Nugent, Maria. *Botany Bay: Where Histories Meet*. Crows Nest: Allen & Unwin, 2005.
- Olmstead, F.E. "Fire and the Forest: The Theory of Light Burning." *Sierra Club Bulletin*, January 1911.
- Ostrander, H.J. "How to Save the Forests by Use of Fire [Letter to Editor]." *San Francisco Call*, 23 September, 1902.
- Ovington, Derrick. "Kakadu - Park Plus." *UNESCO Review*, 1979.
- Palmer, Lisa. "Bushwalking in Kakadu: A Study of Cultural Borderlands." *Social & Cultural Geography* 5, no. 1 (2004): 109–27.
- . "Interpreting 'nature': The Politics of Engaging with Kakadu as an Aboriginal Place." *Cultural Geographies* 14, no. 2 (2007): 255–73.
- Parker, Albert J. "Fire in Sierra Nevada Forests: Evaluating the Ecological Impact of Burning by Native Americans." In *Fire, Native Peoples and the Natural Landscape*, edited by Thomas R. Vale, 233–68. Washington: Island Press, 2002.
- Pascoe, Bruce. *Dark Emu: Black Seeds: Agriculture or Accident?* Broome, Western Australia: Magabala Books, 2014.
- Paterson, Andrew Barton. "Buffalo Country." In *The Animals Noah Forgot*. Sydney: The Endeavour Press, 1933.

- Paveglio, Travis, Todd Norton, and Matthew S. Carroll. "Fanning the Flames? Media Coverage during Wildfire Events and Its Relation to Broader Societal Understandings of the Hazard." *Human Ecology Review* 18, no. 1 (2011): 41–52.
- Pawson, Eric, and Stephen Dovers. "Environmental History and the Challenges of Interdisciplinarity: An Antipodean Perspective." *Environment and History* 9 (2003).
- Pearce, D., A. Jackson, and Richard W. Braithwaite. "Aboriginal People of the Tropical Savannas: Resource Utilization and Conflict Resolution." In *The Future of Tropical Savannas: An Australian Perspective*, edited by A. Ash, 88–103. Melbourne: CSIRO Publishing, 1996.
- Pearce, Lilian M. "Affective Ecological Restoration, Bodies of Emotional Practice." *International Review of Environmental History* 4, no. 1 (2018): 167–89.
- Pearse, Guy Pearse. *High and Dry: John Howard, Climate Change and the Selling of Australia's Future*. Viking, 2007.
- Peet, G.B., and A.J. Williamson. "An Assessment of Forest Damage from the Dwellingup Fires in Western Australia." Perth: Institute of Foresters of Australia, 1968.
- Pegg, Dick. "Fuel Management Programs a 'Must' ...before It's Too Late [Letter to the Editor]." *Timber & Forestry E News*, 2014.
- Penman, Trent. "Saving Homes, Saving Wildlife: Victoria Ditches Burnoff Targets." *The Conversation*, 25 November, 2015. <http://theconversation.com/saving-homes-saving-wildlife-victoria-ditches-burnoff-targets-51114>.
- Perry, Justin J., Melissa Sinclair, Horace Wikmunea, Sidney Wolmby, David Martin, and Bruce Martin. "The Divergence of Traditional Aboriginal and Contemporary Fire Management Practices on Wik Traditional Lands, Cape York Peninsula, Northern Australia." *Ecological Management & Restoration* 19, no. 1 (2018): 24–31.
- Petty, Aaron M., Vanessa deKoninck, and Ben Orlove. "Cleaning, Protecting, or Abating? Making Indigenous Fire Management 'Work' in Northern Australia." *Journal of Ethnobiology* 35, no. 1 (2015): 140–62.
- Petty, Aaron M., Patricia A. Werner, Caroline ER Lehmann, Jan E. Riley, Daniel S. Banfai, and Louis P. Elliott. "Savanna Responses to Feral Buffalo in Kakadu National Park, Australia." *Ecological Monographs* 77, no. 3 (2007): 441–463.
- Phillips, Anne. "What's Wrong with Essentialism?" *Distinktion: Scandinavian Journal of Social Theory* 11, no. 1 (2010): 47–60.

- Pinchot, Gifford. "The Relation of Forests and Forest Fires." *National Geographic* 10 (1899): 399–403.
- Plumwood, Val. "Wilderness Skepticism and Wilderness Dualism." In *The Great New Wilderness Debate*, edited by J. Baird Callicott and Michael P. Nelson, 652–90. Athens, Georgia: University of Georgia Press, 1998.
- Pooley, Simon. "Fire, Smoke, and Expertise in South Africa's Grasslands." *Environmental History* 23, no. 1 (2018): 28–55.
- Popper, Karl. *Conjectures and Refutations*. London: Routledge, 1963.
- Portenga, Eric W., Dylan H. Rood, Paul Bishop, and Paul R. Bierman. "A Late Holocene Onset of Aboriginal Burning in Southeastern Australia." *Geology* 44, no. 2 (2016): 131–34.
- Powell, Michael, and Rex Hesline. "Making Tribes? Constructing Aboriginal Tribal Entities in Sydney and Coastal NSW from the Early Colonial Period to the Present." *Journal of the Royal Australian Historical Society* 96, no. 2 (2010): 115–48.
- Pratt, M.L. *Imperial Eyes: Travel Writing and Transculturation*. New York: Routledge, 1992.
- Preece, Noel. "Aboriginal Fires in Monsoonal Australia from Historical Accounts." *Journal of Biogeography* 29, no. 3 (2002): 321–336.
- Presland, Gary. *Understanding Our Natural World: The Field Naturalists Club of Victoria, 1880–2015*. Blackburn: Field Naturalists Club of Victoria, 2016.
- Press, A.J. "Fire Management in Kakadu National Park: The Ecological Basis for the Active Use of Fire." *Search* 18 (1987): 244–48.
- Press, Tony. "Fire, People, Landscapes and Wilderness: Some Thoughts of North Australia." In *Country in Flames: Proceedings of the 1994 Symposium on Biodiversity and Fire in North Australia*, edited by Deborah Bird Rose, Biodiversity Series Paper No. 3: 19–24. Darwin: Jointly published by the Biodiversity Unit (Department of the Environment, Sport and Territories) and the North Australia Research Unit (The Australian National University), 1994.
- Preston, W. L. "Portents of Plague from California's Protohistoric Period." *Ethnohistory* 49, no. 1 (2002): 69–121.
- Price, Owen F., Ross A. Bradstock, Jon E. Keeley, and Alexandra D. Syphard. "The Impact of Antecedent Fire Area on Burned Area in Southern California Coastal Ecosystems." *Journal of Environmental Management* 113 (2012): 301–7.

- Price, Owen F., Juli G. Pausas, Navashni Govender, Mike Flannigan, Paulo M. Fernandes, Mathew L. Brooks, and Rebecca Bliege Bird. "Global Patterns in Fire Leverage: The Response of Annual Area Burnt to Previous Fire." *International Journal of Wildland Fire* 24, no. 3 (2015): 297–306.
- Prober, Suzanne M., Emma Yuen, Michael H. O'Connor, and Les Schultz. "Ngadju Kala: Australian Aboriginal Fire Knowledge in the Great Western Woodlands." *Austral Ecology* 41, no. 7 (2016): 716–32.
- . "Ngadju Kala: Ngadju Fire Knowledge and Contemporary Fire Management in the Great Western Woodlands." Floreat, Western Australia: Ngadju Nation and CSIRO, 2013.
- Pulaski, E.C. "Surrounded by Forest Fires: My Most Exciting Experience as a Forest Ranger." *American Forestry* 29, no. 356 (1923): 485–86.
- Pyne, Stephen J. "2012 Words on Fire Symposium: Keynote." OSU MediaSpace. Accessed 2 May, 2017. https://media.oregonstate.edu/media/t/0_uo5e6hbq.
- . "Big Fire; or, Introducing the Pyrocene." *Fire* 1, no. 1 (2017): 1.
- . *Between Two Fires: A Fire History of Contemporary America*. Tucson: University of Arizona Press, 2015.
- . *Burning Bush: A Fire History of Australia*. New York: Henry Holt and Company, 1991.
- . *California: A Fire Survey*. University of Arizona Press, 2016.
- . "Fire." In *A Companion to American Environmental History*, edited by Douglas Cazaux Sackman. Blackwell Companions to American History. Malden, MA: Wiley-Blackwell, 2010.
- . *Fire in America: A Cultural History of Wildland and Rural Fire*. Princeton: Princeton University Press, 1982.
- . "'Fire, Native Peoples, and the Natural Landscape', Thomas R. Vale, Editor, 2002. Island Press, Washington D.C., 315 Pages, \$25.00, ISBN 1-55963-888-5 (Paper) [Book Review]." *Restoration Ecology* 11, no. 2 (2003): 257–59.
- . "Firestick History." *The Journal of American History* 76, no. 4 (1990): 1132–41.
- . "Frontiers of Fire." In *Ecology & Empire; Environmental History of Settler Societies*, edited by Tom Griffiths and Libby Robin, 19–34. Edinburgh: Keele University Press, 1997.

- . “Introduction - Fire’s Lucky Country.” In *Fire in Ecosystems of South West Western Australia: Impacts and Management*, edited by I Abbott and N. Burrows, 1–8. Leiden: Backhuys, 2003.
- . “Making History from Fighting Fire.” Furniss lecture, Colorado State University, 25 March, 2009.
- . “[Personal Communication],” 8 July, 2018.
- . “(Personal Communication),” 14 April, 2020.
- . “Problems, Paradoxes, Paradigms: Triangulating Fire Research.” *International Journal of Wildland Fire* 16, no. 3 (2007): 271–76.
- . *Slopovers: Fire Surveys of the Mid-American Oak Woodlands, Pacific Northwest, and Alaska*. Tucson: University of Arizona Press, 2019.
- . *Tending Fire: Coping with America’s Wildland Fires*. Washington, D.C.: Island Press, 2004.
- . “The Planet Is Burning.” *Aeon*, 20 November, 2019. <https://aeon.co/essays/the-planet-is-burning-around-us-is-it-time-to-declare-the-pyrocene>.
- . “The Source.” Presented at the Joint Conference of the American Society for Environmental History and the Forest History Society, Durham, NC, 29 March, 2001. <http://www.foresthistory.org/Events/lecture2001%20text.html>.
- . *The Still-Burning Bush*. Melbourne: Scribe Short Books, 2006.
- . *To The Last Smoke: An Anthology*. University of Arizona Press, 2020.
- . *Vestal Fire: An Environmental History, Told through Fire, of Europe and Europe’s Encounter with the World*. University of Washington Press, 1997.
- . “Vignettes of Primitive America: The Leopold Report and Fire History.” *Forest History Today*, no. Spring (2017): 12–18.
- . *Year of the Fires: The Story of the Great Fires of 1910*. New York: Viking, 2001.
- Ramage, B. S., K. L. O’Hara, and B. T. Caldwell. “The Role of Fire in the Competitive Dynamics of Coast Redwood Forests.” *Ecosphere* 1, no. 6 (2010).

- Ranco, Darren J. "Critiquing The Ecological Indian in the Age of Ecocide." In *Native Americans and the Environment: Perspectives on the Ecological Indian*, edited by Michael Eugene Harkin and David Rich Lewis, 32–51. Lincoln: University of Nebraska Press, 2007.
- "Random Talk on Forest Fires (Editorial)." *American Forestry* 16, no. 11 (1910): 667–69.
- Redford, K.H. "The Ecologically Noble Savage." *Cultural Survival Quarterly* 15 (1991): 46–48.
- Rice, James D. "Beyond 'The Ecological Indian' and 'Virgin Soil Epidemics': New Perspectives on Native Americans and the Environment." *History Compass* 12, no. 9 (2014): 745–57.
- Rickards, Lauren. "Goodbye Gondwana? Questioning Disaster Triage and Fire Resilience in Australia." *Australian Geographer* 47, no. 2 (2016): 127–37.
- Rijke, Kim de, Richard J. Martin, and David S. Trigger. "Cultural Domains and the Theory of Customary Environmentalism in Indigenous Australia." In *Engaging Indigenous Economy: Debating Diverse Approaches*, edited by Will Sanders, 43–53. Research Monograph (Australian National University. Centre for Aboriginal Economic Policy Research); No. 35. Acton, ACT: ANU Press, 2016.
- Ritchie, David. "Things Fall Apart: The End of an Era of Systematic Indigenous Fire Management." In *Culture, Ecology and Economy of Fire Management in North Australian Savannas: Rekindling the Wurrk Tradition*, edited by Jeremy Russell-Smith, Peter J. Whitehead, and Peter Cooke, 23–40. Collingwood: CSIRO Publishing, 2009.
- Robin, Libby. "Histories for Changing Times: Entering the Anthropocene?" *Australian Historical Studies* 44, no. 3 (2013): 329–40.
- . *How A Continent Created A Nation*. Sydney: University of New South Wales Press, 2007.
- . "Radical Ecology and Conservation Science: An Australian Perspective." *Environment and History* 4 (1998): 191–208.
- Robin, Libby, Leo Joseph, and Robert Heinsohn, eds. *Boom and Bust: Bird Stories for a Dry Country*. CSIRO Publishing, 2009.
- Robinson, Catherine J., Dermot Smyth, and Peter J. Whitehead. "Bush Tucker, Bush Pets, and Bush Threats: Cooperative Management of Feral Animals in Australia's Kakadu National Park." *Conservation Biology* 19, no. 5 (2005): 1385–91.
- Rodgers III, Andrew Denny. *Bernhard Eduard Fernow: A Story of North American Forestry*. 2nd ed. New York: Hafner Publishing Company, 1968.

- Rogers, Thomas James. *The Civilisation of Port Phillip: Settler Ideology, Violence, and Rhetorical Possession*. Melbourne University Press, 2018.
- Rolls, Eric. *A Million Wild Acres: 200 Years of Man and an Australian Forest*. Melbourne: Nelson, 1981.
- Romme, William H., and Monica G. Turner. "Ten Years After the 1988 Yellowstone Fires: Is Restoration Needed?" In *After the Fires: The Ecology of Change in Yellowstone National Park*, edited by Linda L. Wallace, 318–61. New Haven: Yale University Press, 2004.
- Roos, Christopher I., Andrew C. Scott, Claire M. Belcher, William G. Chaloner, Jonathan Aylen, Rebecca Bliege Bird, Michael R. Coughlan, et al. "Living on a Flammable Planet: Interdisciplinary, Cross-Scalar and Varied Cultural Lessons, Prospects and Challenges." *Philosophical Transactions of the Royal Society B: Biological Sciences* 371, no. 1696 (2016).
- Roos, Christopher I., Grant J. Williamson, and David M. J. S. Bowman. "Is Anthropogenic Pyrodiversity Invisible in Paleofire Records?" *Fire* 2, no. 3 (2019).
- Rose, Deborah Bird. *Nourishing Terrains: Australian Aboriginal Views of Landscape and Wilderness*. Canberra: Australian Heritage Commission, 1996.
- Rossiter, Natalie A., Samantha A. Setterfield, M.M. Douglas, and L.B. Hutley. "Testing the Grass-Fire Cycle: Alien Grass Invasion in the Tropical Savannas of Northern Australia." *Diversity and Distributions* 9 (2003): 169–76.
- Rothenberg, D. "Review of *Uncommon Ground: Toward Reinventing Nature*, Edited by W. Cronon." *Amicus Journal* 18, no. 2 (1996): 41–44.
- Rothman, Hal K. *Blazing Heritage: A History of Wildland Fire in the National Parks*. Oxford: Oxford University Press, 2007.
- Rothwell, Nicolas. "Indigenous Policy: Academic Jon Altman and His 'Hybrid Economy.'" *The Australian*, 4 June, 2016.
- Rowse, Tim. "Indigenous Heterogeneity." *Australian Historical Studies* 45, no. 3 (2014): 297–310.
- Rowse, Tim. *After Mabo: Interpreting Indigenous Traditions*. Melbourne: Melbourne University Press, 1993.
- Ruane, Simone. "Using a Worldview Lens to Examine Complex Policy Issues: A Historical Review of Bushfire Management in the South West of Australia." *Local Environment* 23, no. 8 (2018): 777–95.

- Rundel, Philip W., Mary T. K. Arroyo, Richard M. Cowling, Jon E. Keeley, Byron B. Lamont, Juli G. Pausas, and Pablo Vargas. "Fire and Plant Diversification in Mediterranean-Climate Regions." *Frontiers in Plant Science* 9 (2018).
- Russell, Lynette. "Living in the Indigenous Space." *Australian Book Review*, August 2019.
- Russell-Smith, Jeremy. "Fire Management Business in Australia's Tropical Savannas: Lighting the Way for a New Ecosystem Services Model for the North?" *Ecological Management & Restoration* 17, no. 1 (2016): 4–7.
- Russell-Smith, Jeremy, Garry D Cook, Peter M Cooke, Andrew C Edwards, Mitchell Lendrum, CP (Mick) Meyer, and Peter J Whitehead. "Managing Fire Regimes in North Australian Savannas: Applying Aboriginal Approaches to Contemporary Global Problems." *Frontiers in Ecology and the Environment* 11, no. s1 (2013): e55–63.
- Russell-Smith, Jeremy, Andrew C. Edwards, John C. Z. Woinarski, John McCartney, Sarah Kerin, Steve Winderlich, Brett P. Murphy, and Felicity A. Watt. "Fire and Biodiversity Monitoring for Conservation Managers: A 10-Year Assessment of the 'Three Parks' (Kakadu, Litchfield and Nitmiluk) Program." In *Culture, Ecology and Economy of Fire Management in North Australian Savannas: Rekindling the Wurrk Tradition*, edited by Jeremy Russell-Smith, Peter J. Whitehead, and Peter M. Cooke, 294–324. Collingwood: CSIRO Publishing, 2009.
- Russell-Smith, Jeremy, Jay Evans, Andrew C. Edwards, and Anthony Simms. "Assessing Ecological Performance Thresholds in Fire-Prone Kakadu National Park, Northern Australia." *Ecosphere* 8, no. 7 (2017): e01856.
- Russell-Smith, Jeremy, David Lindenmayer, Ida Kubiszewski, Peter Green, Robert Costanza, and Andrew Campbell. "Moving beyond Evidence-Free Environmental Policy." *Frontiers in Ecology and the Environment* 13, no. 8 (2015): 441–48.
- Russell-Smith, Jeremy, Diane Lucas, Minnie Gapindi, Billy Gunbunuka, Nipper Kapririgi, George Namingum, Kate Lucas, Pina Guiliani, and George Chaloupka. "Aboriginal Resource Utilization and Fire Management Practice in Western Arnhem Land, Monsoonal Northern Australia: Notes for Prehistory, Lessons for the Future." *Human Ecology* 25, no. 2 (1997): 159–95.
- Ryan, D. G., J. E. Ryan, and B. J. Starr. "The Australian Landscape-Observations of Explorers and Early Settlers." Sponsored by the NSW Farmer's Association, Wagga Wagga: Murrumbidgee Catchment Management Committee, 1995.
- Ryan, Michael. "Victorian Fires: Retrospective and Prospective." *Australian Forestry* 72, no. 2 (2009): 59–60.

- Sangha, Kamaljit K., and Jeremy Russell-Smith. "Ecosystems Based Enterprise Opportunities for Indigenous People in Northern Australian Savannas." Darwin: Darwin Centre for Bushfire Research, 2015.
- Sauer, Carl O. "A Geographic Sketch of Early Man in America." *Geographical Review* 34, no. 4 (1944): 529–73.
- Sauer, C.O. "The Agency of Man on the Earth." In *Man's Role in Changing the Face of the Earth*, edited by W.L.J. Thomas, C.O. Sauer, Marston Bates, and Lewis Mumford, 49–69. Chicago: University of Chicago Press, 1955.
- Sayre, Nathan F. *The Politics of Scale: A History of Rangeland Science*. London: University Of Chicago Press, 2017.
- Schauble, John. "'Where Are the Others?' Victoria's Forgotten 1926 Bushfires." *Victorian Historical Journal* 90, no. 2 (2019): 301–17.
- Schiff, A.L. *Fire and Water: Scientific Heresy in the Forest Service*. Cambridge: Harvard University Press, 1962.
- Scholl, Andrew E., and Alan H. Taylor. "Fire Regimes, Forest Change, and Self-Organization in an Old-Growth Mixed-Conifer Forest, Yosemite National Park, USA." *Ecological Applications* 20, no. 2 (2010): 362–380.
- Schullery, Paul. "The Fires and Fire Policy." *BioScience* 39, no. 10 (1989): 686–94.
- Schulz, Dennis, ed. *Fire on the Savannas: Voices from the Landscape*. Darwin: Tropical Savannas CRC, 1998.
- Schwilk, Dylan W., and David D. Ackerly. "Flammability and Serotiny as Strategies: Correlated Evolution in Pines." *Oikos* 94, no. 2 (2001): 326–36.
- Sharples, Jason J., Geoffrey J. Cary, Paul Fox-Hughes, Scott Mooney, Jason P. Evans, Michael-Shawn Fletcher, Mike Fromm, Pauline F. Grierson, Rick McRae, and Patrick Baker. "Natural Hazards in Australia: Extreme Bushfire." *Climatic Change* 139 (2016): 85–99.
- Shedley, Phil. "Willow Springs." In *Firefighters: Stories from Australian Foresters*, edited by Oliver Raymond and Roger Underwood, 36–40. Palmyra, Western Australia: York Gum Publishing, 2014.
- Sheehan, Paul. "The Flannery Eaters." *The Sydney Morning Herald*, 5 June, 2004, sec. Spectrum.

- Sheridan, Greg. "Crisis Survived, We Must Quickly Apply the Lessons." *The Australian*, 12 February, 2009.
- Show, S.B., and E.I. Kotok. *The Role of Fire in the California Pine Forests*. US Department of Agriculture Bulletin 1294. Washington: Government Printing Office, 1924.
- Silcox, Ferdinand. "How the Fires Were Fought." *American Forestry* 16, no. 11 (1910): 631–39.
- Sinclair, Steve J. "[Review] 'The Biggest Estate on Earth - How Aborigines Made Australia.'" *Ecological Management & Restoration* 13, no. 2 (2012): e6–e6.
- Smith, Conrad. *Media and Apocalypse: News Coverage of the Yellowstone Forest Fires, the Exxon Valdez Oil Spill, and the Loma Prieta Earthquake*. Westport, Conn: Greenwood, 1992.
- Smith, Linda Tuhiwai. *Decolonizing Methodologies: Research and Indigenous Peoples*. Otago: Otago University Press, 1999.
- Smith, Will, Timothy Neale, Jessica K. Weir, Adam Leavesley, Rodney Carter, Simone Blair, Brian Cook, et al. "Intercultural Collaboration on Aboriginal Country." *Bushfire & Natural Hazards CRC*, 2018.
- Smithers, Gregory D. "Beyond the 'Ecological Indian': Environmental Politics and Traditional Ecological Knowledge in Modern North America." *Environmental History* 20, no. 1 (2015): 83–111.
- Sneeuwjagt, Rick, and Nigel Higgs. "Managing a Fiery Change (Reprint)." *Landscape*, 2009.
- Sniderman, J. M. K., J. Hellstrom, J. D. Woodhead, R. N. Drysdale, P. Bajo, M. Archer, and L. Hatcher. "Vegetation and Climate Change in Southwestern Australia During the Last Glacial Maximum." *Geophysical Research Letters* 46, no. 3 (2019): 1709–20.
- Snyder, Gary. "Is Nature Real?" In *The Wilderness Debate Rages on : Continuing the Great New Wilderness Debate*, edited by Michael P. Nelson and J. Baird Callicott, 351–54. Athens, Georgia: University of Georgia Press, 2008.
- Social Ventures Australia. "Warddeken Indigenous Protected Areas (IPA) Social Return on Investment Analysis." Department of the Prime Minister and Cabinet, 2015.
- Soeterboek, Chris. "'Folk-Ecology' in the Australian Alps: Forest Cattlemen and the Royal Commissions of 1939 and 1946." *Environment and History* 14, no. 2 (2008): 241–63.
- Southard, Lewis F. "The History of Cooperative Forest Fire Control and the Weeks Act." *Forest History Today* Spring/Fall 2011 (2011): 17–20.

- Spence, Mark David. *Dispossessing the Wilderness: Indian Removal and the Making of the National Parks*. New York: Oxford University Press, 1999.
- Spriggs, Matthew. "Future Eaters in Australia, Future Eaters in the Pacific? Early Human Environmental Impacts." *Australian Archaeology* 52, no. 1 (2001): 53–59.
- Stanley, Peter. *Black Saturday at Steels Creek*. Scribe, 2013.
- State Government of Victoria. *Report of the Inquiry into the 2002-2003 Victorian Bushfires*. Melbourne: State Government of Victoria, 2003.
- . "Traditional Burning Practices of Aboriginal People and the Prescribed Burning Debate in Victoria." In *Report of the Inquiry into the 2002-2003 Victorian Bushfires*, 117–23. Melbourne: State Government of Victoria, 2003.
- Steen-Adams, Michelle M., Susan Charnley, and Mark D. Adams. "Historical Perspective on the Influence of Wildfire Policy, Law, and Informal Institutions on Management and Forest Resilience in a Multiownership, Frequent-Fire, Coupled Human and Natural System in Oregon, USA." *Ecology and Society* 22, no. 3 (2017).
- Steffensen, Victor. *Fire Country: How Indigenous Fire Management Could Help Save Australia*. Hardie Grant Travel, 2020.
- Stephens, Scott L., Robert E. Martin, and Nicholas E. Clinton. "Prehistoric Fire Area and Emissions from California's Forests, Woodlands, Shrublands, and Grasslands." *Forest Ecology and Management* 251, no. 3 (2007): 205–16.
- Stephens, Scott L., and Neil. G. Sugihara. "Fire Management and Policy since European Settlement." In *Fire in California's Ecosystems*, edited by Jan W. Wagtendonk, Neil. G. Sugihara, Scott L. Stephens, Andrea E. Thode, Kevin E. Shaffer, and Jo Ann Fites-Kaufman, 2nd ed., 399–410. University of California Press, 2018.
- Stewart, Omer C. "Burning and Natural Vegetation in the United States." *Geographical Review* 41, no. 2 (1951): 317–20.
- . "Fire as the First Great Force Employed by Man." In *Man's Role in Changing the Face of the Earth*, edited by W.L.J. Thomas, Carl O. Sauer, Marston Bates, and Lewis Mumford, 115–33. Chicago: University of Chicago Press, 1955.
- . *Forgotten Fires: Native Americans and the Transient Wilderness*. Edited by Henry T. Lewis and M. Kat Anderson. Norman: University of Oklahoma Press, 2002.

- Stoddard, Herbert L. *Bobwhite Quail: Its Habits, Preservation, and Increase*. Scribner's, 1931.
- Strong, Samantha. "How the Sense-Making of Myths Can Help Us Understand Bushfire." Paper presented at *Bushfire Management: Balancing the Risks*, Canberra, 21 July 2017. Canberra: National Parks Association of the ACT, 2017.
- Struzik, Edward. *Firestorm: How Wildfire Will Shape Our Future*. Washington: Island Press, 2017.
- Study Advisory Group. "Kakadu Region Social Impact Study: Community Action Plan." Canberra: Supervising Scientist, 1997.
- Sugihara, Neil G., Todd Keeler-Wolf, and Michael G. Barbour. "Introduction." In *Fire in California's Ecosystems*, edited by Jan W. Wagtendonk, Neil G. Sugihara, Scott L. Stephens, Andrea E. Thode, Kevin E. Shaffer, and Jo Ann Fites-Kaufman, 2nd ed., 1–11. University of California Press, 2018.
- Sutter, Paul S. "Putting the Intellectual Back in Environmental History." *Modern Intellectual History*, preprint, 17 February, 2020, 1–10. <https://doi.org/10.1017/S1479244320000050>.
- Swain, E. H. F., and Queensland Department of Public Lands. *An Australian Study of American Forestry*. Brisbane: Government Printer, 1918.
- TallBear, Kimberly. "Shepard Krech's The Ecological Indian: One Indian's Perspective." International Institute for Indigenous Resource Management Publications, 2000.
- Thomassin, Annick, Timothy Neale, and Jessica K. Weir. "The Natural Hazard Sector's Engagement with Indigenous Peoples: A Critical Review of CANZUS Countries." *Geographical Research* 57, no. 2 (2019): 164–77.
- Tiffen, Rodney. "Our Thirty Year Culture Wars." *Inside Story*, 12 March, 2020. <https://insidestory.org.au/our-thirty-year-culture-wars/>.
- Tingay, A., R.J. Sneeuwjagt, and H.G. Styles. "Contemporary Views of the Voluntary Conservation Movement on the Use of Fuel Reduction Burns as a Land Management Technique." In *Fire Ecology and Management of Western Australian Ecosystems: Proceedings of a Symposium Held in Perth on 10-11 May 1985*, edited by Julian R. Ford, WAIT Environmental Studies Group Report No. 14: 215–18. Perth: Western Australian Institute of Technology, 1985.
- Tolhurst, Kevin G. "Report on the Physical Nature of the Victorian Fire Occurring on 7th February 2009," 15 May, 2009.
- Tolhurst, Kevin. "Fuel for the Tinderbox [Review of Paul Collins: Burn]." *The Australian*, 6 December, 2006.

- Trauernicht, Clay, Barry W. Brook, Brett P. Murphy, Grant J. Williamson, and David M. J. S. Bowman. "Local and Global Pyrogeographic Evidence That Indigenous Fire Management Creates Pyrodiversity." *Ecology and Evolution* 5, no. 9 (2015): 1908–18.
- Trinca, Matthew, and Andrea Gaynor. "Visions of Land and People in Western Australia." In *Country: Visions of Land and People in Western Australia*, edited by Andrea Gaynor, Matthew Trinca, and Anna Haebich, 1–20. Perth: Western Australian Museum, 2002.
- Trosper, Ronald L. "Now That Pauite Forestry Is Respectable: Can Traditional Ecological Knowledge and Science Work Together?" Unpublished paper, 2007.
- Trueman, Clive N. G., Judith H. Field, Joe Dortch, Bethan Charles, and Stephen Wroe. "Prolonged Coexistence of Humans and Megafauna in Pleistocene Australia." *Proceedings of the National Academy of Sciences of the United States of America* 102, no. 23 (2005): 8381–8385.
- Turney, Chris S. M., Michael I. Bird, L. Keith Fifield, Richard G. Roberts, Mike Smith, Charles E. Dortch, Rainer Grün, et al. "Early Human Occupation at Devil's Lair, Southwestern Australia 50,000 Years Ago." *Quaternary Research* 55, no. 01 (2001): 3–13.
- Tyrrell, Ian. *True Gardens of the Gods: Californian-Australian Environmental Reform, 1860-1930*. Berkeley: University of California Press, 1999.
- Underwood, R.J., R.J. Sneeuwjagt, and H.G. Styles. "The Contribution of Prescribed Burning to Forest Fire Control in Western Australia: Case Studies." In *Fire Ecology and Management of Western Australian Ecosystems: Proceedings of a Symposium Held in Perth on 10-11 May 1985*, edited by Julian R. Ford, WAIT Environmental Studies Group Report No. 14: 153–70. Perth: Western Australian Institute of Technology, 1985.
- Underwood, Roger. *Cyclone Alby: Memories of the 1978 Western Australian Storm and Bushfire Crisis*. Palmyra, Western Australia: York Gum Publishing, 2018.
- . "Ferguson Report a Beauty, but Now the Fight Begins." *News Weekly*, no. 2976 (2016): 4–5.
- . *Fire from the Sky: A Personal Account of the Early Days of Aerial Burning in Western Australia*. Palmyra, Western Australia: York Gum Publishing, 2015.
- . *Foresters of the Raj: Stories from Indian and Australian Forests*. Palmyra, Western Australia: York Gum Publishing, 2013.
- . *Tempered by Fire: Stories from the Firefighters and Survivors of the 1961 Western Australian Bushfires*. Edited by Roger John Underwood. Subiaco: The Bushfire Front, 2011.

- Underwood, Roger, Stewart McArthur, and Stretton Group. "The Catastrophe Australia Had To Have Which Crippled Victoria." Presented at the Stretton Group Inaugural Oration, Melbourne, 18 March, 2009.
- Vale, Thomas R., ed. *Fire, Native Peoples and the Natural Landscape*. Washington: Island Press, 2002.
- . "Reflections." In *Fire, Native Peoples and the Natural Landscape*, edited by Thomas R. Vale, 295–302. Washington: Island Press, 2002.
- . "The Pre-European Landscape of the United States: Pristine or Humanised?" In *Fire, Native Peoples and the Natural Landscape*, edited by Thomas R. Vale, 1–40. Washington: Island Press, 2002.
- Verran, Helen. "A Postcolonial Moment in Science Studies: Alternative Firing Regimes of Environmental Scientists and Aboriginal Landowners." *Social Studies of Science* 32, no. 5–6 (2002): 729–762.
- Victoria. Standing Committee on the Environment and Planning. Inquiry into fire season preparedness. Hearing Transcripts 26 October 2016.
- Victoria, Parliament, Environment and Natural Resources Committee, and John Pandazopoulos. *Report of the Natural Resources Committee on the Inquiry into the Impact of Public Land Management Practices on Bushfires in Victoria*. Parliamentary Paper No. 116 Season 2006–2008. Melbourne: Government Printer, 2008.
- Vincent, Eve, and Timothy Neale, eds. *Unstable Relations: Indigenous People and Environmentalism in Contemporary Australia*. Perth: UWA Publishing, 2016.
- Wagtendonk, Jan van. "Dr Biswell's Influence on the Development of Prescribed Burning in California." In *The Biswell Symposium: Fire Issues and Solutions in Urban Interface and Wildland Ecosystems*, Vol. General Technical Report, PSW-GTR-159. USDA Forest Service, 1995.
- Walker, Peter A. "From 'Tragedy' to Commons: How Hardin's Mistake Might Save the World." *Journal of Natural Resources Policy Research* 1, no. 3 (2009): 283–86.
- Walker, T.B. "Forest Fires." In *Report of the National Conservation Commission*, 2: 424–25. Washington: Government Printing Office, 1909.
- Wallace, Linda L., Francis J. Singer, and Paul Schullery. "The Fires of 1988: A Chronology and Invitation to Research." In *After the Fires: The Ecology of Change in Yellowstone National Park*, edited by Linda L. Wallace, 3–9. New Haven: Yale University Press, 2004.

- Wallace, W.R. "Fire in the Jarrah Forest Environment." *Journal of the Royal Society of Western Australia* 49, no. 2 (1965): 33–44.
- Ward, Charlie. *A Handful of Sand: The Gurindji Struggle, After the Walk-Off*. Melbourne: Monash University Publishing, 2016.
- Ward, D. J. "Bushfire History from Grasstrees at Eneabba, Western Australia." *Journal of the Royal Society of Western Australia* 92, no. 3 (2009): 261–268.
- Warde, Paul, Libby Robin, and Sverker Sörlin. *The Environment: A History of the Idea*. Baltimore: Johns, 2018.
- Wardell-Johnson, Grant W., Michael Calver, Neil Burrows, and Giovanni Di Virgilio. "Integrating Rehabilitation, Restoration and Conservation for a Sustainable Jarrah Forest Future during Climate Disruption." *Pacific Conservation Biology* 21 (2015): 175–85.
- Watson, Simon J., Rick S. Taylor, Lisa Spence-Bailey, Dale G. Nimmo, Sally Kenny, Luke T. Kelly, Angie Haslem, et al. "The Mallee Fire and Biodiversity Project." *Proceedings of the Royal Society of Victoria* 124, no. 1 (2012): 38–46.
- Way, Albert G. *Conserving Southern Longleaf: Herbert Stoddard and the Rise of Ecological Land Management*. Athens: University of Georgia Press, 2011.
- Weaver, Harold. "Fire as an Ecological and Silvicultural Factor in the Ponderosa-Pine Region of the Pacific Slope." *Journal of Forestry* 41, no. 1 (1943): 7–15.
- Weaver, Sally M. "Progress Report: The Role of Aboriginals in the Management of Cobourg and Kakadu National Parks, Northern Territory, Australia." Presented at the North Australian Research Unit, Darwin, July 30, 1984.
- . "The Role of Aboriginals in the Management of Australia's Coburg (Gurig) and Kakadu National Parks." In *Resident Peoples and National Parks: Social Dilemmas and Strategies in International Conservation*, edited by Patrick C. West and Steven R. Brechin, 311–33. Tucson: The University of Arizona Press, 1991.
- Wegman, Imogen. "'A Truly Sublime Appearance': Using GIS to Find the Traces of Pre-Colonial Landscapes and Land Use." *History Australia* 17, no. 1 (2020): 59–86.
- Weiner, Douglas R. "A Death-Defying Attempt to Articulate a Coherent Definition of Environmental History." *Environmental History* 10, no. 3 (2005): 404–420.

- Weir, Jessica K., and Dean Freeman. "Fire in the South: A Cross-Continental Exchange." *Bushfire & Natural Hazards CRC*, 2019.
- Weir, Jessica K., Stephen Sutton, and Gareth Catt. "The Theory/Practice of Disaster Justice: Learning from Indigenous Peoples' Fire Management." In *Natural Hazards and Disaster Justice*, edited by Anna Lukaszewicz and Claudia Baldwin, 299–317. Singapore: Springer Singapore, 2020.
- Weisiger, Marsha. *Dreaming of Sheep in Navajo Country*. University of Washington Press, 2009.
- Wells, Grant, Stephen D. Hopper, and Kingsley W. Dixon. "Fire Regimes and Biodiversity Conservation: A Brief Review of Scientific Literature with Particular Emphasis on Southwest Australian Studies." *Consultant Report Commissioned as Part of the EPA's Review of CALM's Fire Policies and Management Practices*. Environmental Protection Authority, Perth, Western Australia, 2004.
- Westaway, Michael C., Jon Olley, and Rainer Grün. "At Least 17,000 Years of Coexistence: Modern Humans and Megafauna at the Willandra Lakes, South-Eastern Australia." *Quaternary Science Reviews* 157 (2017): 206–11.
- Westerling, A. L., H. G. Hidalgo, D. R. Cayan, and T. W. Swetnam. "Warming and Earlier Spring Increase Western U.S. Forest Wildfire Activity." *Science* 313, no. 5789 (2006): 940–43.
- Wettenhall, R. L. (Roger Llewellyn). *Bushfire Disaster: An Australian Community in Crisis*. Studies in Australian Society (Angus and Robertson). Sydney: Angus & Robertson, 1975.
- White, Richard. "'Are You an Environmentalist or Do You Work for a Living?' Work and Nature." In *Uncommon Ground: Rethinking the Human Place in Nature*, edited by William Cronon, 171–85. W. W. Norton & Company, 1995.
- White, Stewart Edward. "Woodsmen, Spare Those Trees!" *Sunset*, March 1920.
- Whitehead, Peter J., Paul Purdon, Peter M. Cooke, Jeremy Russell-Smith, and Stephen Sutton. "The West Arnhem Land Fire Abatement (WALFA) Project: The Institutional Environment and Its Implications." In *Culture, Ecology and Economy of Fire Management in North Australian Savannas: Rekindling the Wurrk Tradition*, edited by Jeremy Russell-Smith, Peter J. Whitehead, and Peter M. Cooke, 325–54. Collingwood: CSIRO Publishing, 2009.
- Whittaker, Josh, and David Mercer. "The Victorian Bushfires of 2002–03 and the Politics of Blame: A Discourse Analysis." *Australian Geographer* 35, no. 3 (2004): 259–87.
- Wilkie, Douglas. "Earth, Wind, Fire, Water—Gold: Bushfires and the Origins of the Victorian Gold Rush." *History Australia* 10, no. 2 (2013): 95–113.

- Williams, Michael. "Sauer and 'Man's Role in Changing the Face of the Earth.'" *Geographical Review* 77, no. 2 (1987): 218–31.
- Williams, Richard J., Damian Barrett, Garry D. Cook, A. Malcolm Gill, Lindsay Hutley, Adam Leidloff, Bronnwyn Myers, and John C. Z. Woinarski. "Landscape-Scale Fire Research in Northern Australia: Delivering Multiple Benefits in a Changing World." In *Culture, Ecology and Economy of Fire Management in North Australian Savannas*, edited by Jeremy Russell-Smith, P. J. Whitehead, and Peter M. Cooke, 212–34. Collingwood: CSIRO Publishing, 2009.
- Williamson, B., F. Markham, and J.K. Weir. "Aboriginal Peoples and the Response to the 2019-2020 Bushfires." CAEPR Working Paper No. 134/2020. Canberra: Centre for Aboriginal Economic Policy Research, Australian National University, 2020.
- Williamson, Bhamie. "Reigniting Cultural Burning in South-Eastern Australia: The ACT Aboriginal Cultural Fire Initiative." *Native Title Newsletter*, no. 2 (2017): 18–20.
- Williamson, Grant J., Brett P. Murphy, and David M. J. S. Bowman. "Cattle Grazing Does Not Reduce Fire Severity in Eucalypt Forests and Woodlands of the Australian Alps." *Austral Ecology* 39, no. 4 (2014): 462–68.
- Wilson, Katherine. "The Fire Cult: On Whistleblowers and Pyrowankers." *Overland*, Autumn 2019.
- Wilson, Nicholas, Geoffrey J. Cary, and Philip Gibbons. "Relationships between Mature Trees and Fire Fuel Hazard in Australian Forest." *International Journal of Wildland Fire* 27, no. 5 (2018): 353–62.
- Winderlich, S., S. Atkins, and Steve Winderlich. "Kakadu Traditional Owner and Stakeholder Views on Fire Management." In *Kakadu National Park Landscape Symposia Series 2007–2009. Symposium 3: Fire Management, 23–24 April 2008*, 4–13. Aurora Kakadu (South Alligator): Supervising Scientist, Department of the Environment, Water, Heritage and the Arts, 2010.
- Winter, W.H., and J. Williams. "Managing Resources and Resolving Conflicts: The Role of Science." In *The Future of Tropical Savannas: An Australian Perspective*, edited by A. Ash, 20–27. Melbourne: CSIRO, 1996.
- Woenne-Green, S., R. Johnston, A. Wallis, and Ros Sultan. *Competing Interests: Aboriginal Participation in National Parks and Conservation Reserves in Australia: A Review*. Fitzroy: The Australian Conservation Foundation, 1994.
- Woinarski, John C. Z., Sarah Legge, James A. Fitzsimons, Barry J. Traill, Andrew A. Burbidge, Alaric Fisher, Ron S. C. Firth, et al. "The Disappearing Mammal Fauna of Northern Australia: Context, Cause, and Response." *Conservation Letters* 4, no. 3 (2011): 192–201.
- Woinarski, John C. Z., Jeremy Russell-Smith, Alan N. Andersen, and Kym Brennan. "Fire Management and Biodiversity of the Western Arnhem Land Plateau." In *Culture, Ecology and Economy of*

Fire Management in North Australian Savannas: Rekindling the Wurrk Tradition, edited by Jeremy Russell-Smith, Peter J. Whitehead, and Peter M. Cooke, 234–63. Collingwood: CSIRO Publishing, 2009.

Woodward, Craig, and Heather Ann Haines. “Unprecedented Long-Distance Transport of Macroscopic Charcoal from a Large, Intense Forest Fire in Eastern Australia: Implications for Fire History Reconstruction.” *The Holocene* 30, no. 7 (2020): 947–952.

Woollacott, Angela. *Settler Society in the Australian Colonies: Self-Government and Imperial Culture*. Oxford University Press, 2015.

Worster, Donald. “Grass to Dust: The Great Plains in the 1930s.” *Environmental History Review* 1, no. 3 (1976): 2–11.

———. “The Ecology of Order and Chaos.” *Environmental History Review* 14, no. 1/2, 1989 Conference Papers, Part Two (1990).

Wroe, Stephen, and Judith Field. “A Review of the Evidence for a Human Role in the Extinction of Australian Megafauna and an Alternative Interpretation.” *Quaternary Science Reviews* 25, no. 21–22 (2006): 2692–2703.

Wroe, Stephen, Judith Field, and Donald K. Grayson. “Megafaunal Extinction: Climate, Humans and Assumptions.” *Trends in Ecology & Evolution* 21, no. 2 (2006): 61–62.

Wuerthner, George, ed. *Wildfire: A Century of Failed Forest Policy*. Sausalito, California: Foundation for Deep Ecology, by arrangement with Island Press, 2006.

———. *Yellowstone and the Fires of Change*. Dream Garden Press, 1988.

Yell, Susan. “‘Breakfast Is Now Tea, Toast and Tissues’: Affect and the Media Coverage of Bushfires.” *Media International Australia* 137, no. 1 (2010): 109–19.

Yibarbuk, D., Peter J. Whitehead, Jeremy Russell-Smith, D. Jackson, C. Godjuwa, A. Fisher, P. Cooke, D. Choquenot, and D. M. J. S. Bowman. “Fire Ecology and Aboriginal Land Management in Central Arnhem Land, Northern Australia: A Tradition of Ecosystem Management.” *Journal of Biogeography* 28, no. 3 (2001): 325–43.

Yibarbuk, Dean, Peter Cooke, and others. “Bininj Mak Balanda Kunwale Manwurrk-Ken.” *Ngoonjook: A Journal of Australian Aboriginal Issues* 20 (2001): 33–37.

Zylstra, P. “Fire History of the Australian Alps: Prehistory to 2003.” Canberra: Australian Alps National Parks Liaison Committee, 2006.

Zylstra, Philip, Ross A. Bradstock, Michael Bedward, Trent D. Penman, Michael D. Doherty, Rodney O. Weber, A. Malcolm Gill, and Geoffrey J. Cary. "Biophysical Mechanistic Modelling Quantifies the Effects of Plant Traits on Fire Severity: Species, Not Surface Fuel Loads, Determine Flame Dimensions in Eucalypt Forests." *PLOS ONE* 11, no. 8 (2016): e0160715.