

## The Regime: Fire and Human-Landscape Involvement

Jon Rasmus Nyquist

Department of Social Anthropology, Norwegian University of Science and Technology, Trondheim, Norway

### ABSTRACT

In the southwest of Western Australia, the state Parks and Wildlife Service carry out prescribed burns with the goal of reducing ‘fuel loads’ and creating landscape patterns that they hope will slow down the spread of bushfires. These practices can contribute to establishing ‘a fire regime’, a tenuous state, which must be continually upheld, in which the forest tends to burn in certain ways. The regime is a model for human-environment involvement that highlights attempts to be favourably involved with landscapes that are sometimes dangerous and often unpredictable. This shows one example of a complicated pattern of involvement in today’s world. Often thought of as a time of distance and forceful disconnection, the Anthropocene also contains numerous examples of complicated attempts to maintain close ties with landscapes. This article develops ‘involvements’ as a lens for understanding cases like these, where people deliberately attempt to shape landscapes but do not have complete control over or insight into the paths from intention to effect. Involvements can shed light on how people live in the uncertain space between intention, action and effect; how they stretch themselves out across time, how they open themselves to being affected and how they create for themselves certain forms of knowledge and understanding. For fire managers, practices of burning, planning, patrolling and making themselves familiar with the forest all contribute to creating an interface with the fiery and dangerous landscape.


### ARTICLE HISTORY

Received 6 December 2022  
Accepted 2 August 2023

### KEYWORDS

Landscape; fire; the Anthropocene; Australia; environmental management

The southwest forest region in Western Australia sees a lot of fire. It is a place of forests, heath and woodlands; a Mediterranean climate region dominated by the grey-green furrow-stemmed jarrah trees (*Eucalyptus marginata*) and the charismatic, multi-coloured, towering karris (*Eucalyptus diversicolor*). Beneath the trees, shrubs and a carpet of leaves that fall from the evergreen eucalypts burn readily and eagerly in both wildfires and planned burns over large parts of the year. The southwest has long been shaped by fire and most people in the region know it to be a place where fire is a regular occurrence. Many also know it to be a place filled with plants and animals that are fire-adapted in various ways, and some know of its long history of Aboriginal

**CONTACT** Jon Rasmus Nyquist  [jonrnyquist@gmail.com](mailto:jonrnyquist@gmail.com)

© 2023 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group  
This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.

burning, going back as far as 60,000 years. In comparison with the Australian east coast, the southwest is sometimes thought of as a place where fire is gentler, where it is, as fire historian Stephen Pyne has put it, 'endemic, not demonic' (1991, 49). But in the last few decades, changes are starting to be felt in the southwest. More and more people live close to forested areas where they come into contact with fire. A century of logging and forestry practices has affected forest structure and hydrology, likely leading to drier forests with younger trees that burn more readily. And since the 1970s, this forested corner of the island continent has seen substantial declines in rainfall and a marked trend towards warm and dry weather extending further into the autumn and winter months. These factors together produce new situations for fire, and the last two decades have been characterized by a pattern of more frequent large and damaging bushfires in the region, so far culminating in the Waroona fire of 2016, a fire that became so intense that it created its own weather system with fire-driven storm clouds and dry lightning, that easily jumped fire breaks, casting embers many miles ahead of the fire front, ultimately covering some 70,000 hectares, and in some places burning unstopably until it reached the ocean. Nowadays, these forests that burn seem to show themselves more often as a violent and indifferent kind of nature. This article is about how people confront landscapes<sup>1</sup> like these, landscapes that have always been or have more recently become dangerous to humans and difficult to understand.

In the southwest of Western Australia fire managers in the state Parks and Wildlife Service are making a concerted effort to involve themselves more closely with these forests that burn. Most of the forests and woodlands of the southwest are publicly owned and managed by the state Parks and Wildlife Service, the largest section of the Western Australian Department of Biodiversity, Conservation and Attractions. Among Parks and Wildlife's activities, fire management is the one that involves the most people, most time and the most direct interventions in the landscape. This includes both the work that goes into containing and controlling wildfires as well as the work that is geared towards shaping landscapes to make them less likely to burn in damaging and catastrophic ways. By carrying out numerous planned, so-called 'prescribed' burns across the forest, they aim to create patterns of recently burned areas in the landscape, areas where wildfires would have less 'fuel' to burn and where fires, when they happen, would hopefully burn less fiercely.

I draw on participant observation among fire managers in the southwest of Western Australia. Between 2015 and 2017, I did 14 months of fieldwork in the southwest, which among other things consisted of spending a large part of a fire season (2016–2017) as part of a fire crew, fighting fires, carrying out prescribed burns and planning the fire management strategy for coming years. Here, I build on my understanding of the fire managers' ways of seeing and experiencing landscapes as well as my understanding of the landscape, gained through interaction with fire managers and through my own embodied involvement with fire and the landscape itself, to explore this pattern of practice as a model of human-landscape involvement. The regime is a landscape practice of the Anthropocene that also in many ways stands out from what are usually thought of as the Anthropocene's most central logics and typical forms, such as the plantation (Haraway 2016; Wolford 2021) and ruins (Bennett 2021). In short, a fire regime points to:

A specific way of being involved with a landscape, which entails ongoing practical interventions – in the form of burning – not to master or transform the landscape, but to keep the landscape suspended in a condition where it tends to behave in tolerable ways.

To explore *the regime* as an example of human-landscape involvement can contribute to a broader understanding of the different patterns by which people can be connected to a landscape, but it is also an attempt to understand something of the present time. In many ways, we live in an age of distance and disconnection. If modernity disconnects itself through universal imaginaries and management at a distance (Scott 1998), and capitalism and colonialism cut off people's ties to local landscapes in processes of accumulation by dispossession (Harvey 2003; West 2016), if indeed the central logic of the Anthropocene is a severing of relations between people and place (Davis and Todd 2017), and if we now live in the ambiguous ruins (Tsing 2015) of these historical processes of distance and forceful disconnection, then it seems critical to understand the various ways people try to maintain involvements.

Anthropologists have highlighted how interventions can, in certain ways, be positive, and that landscape shaping can have beneficial effects for both humans and non-humans. Fairhead and Leach, for instance, describe 'integrated vegetation management strategies' in West African forests (1995, 1028), practices that form a 'diverse resource management constellation' that can bring about 'landscape enrichment-through-use' (ibid.). Tsing describes a similar enrichment-through-use in Japanese satoyama forests, where cultivation and disturbance are key elements of creating diverse forest patches (Tsing 2014). And Lyons (2016) describes how soil care can be done even in the most difficult of circumstances, as farmers in Colombia practice modest interventions that work with the propensities of plants and soil and in partnership with processes of decomposition to create soil that can act as good conditions for growing food in the future.

When we look at involvements in today's world, however, we will find that they are often complicated and ambiguous, neither clearly good nor bad. Landscape involvements today often embody troubled histories, complicated contemporary connections and uncertain futures. We can see such complicated involvements in things like geo-engineering projects where people involve themselves with landscapes in efforts to turn troublesome elements into useful tools they can harness (Zee 2020); in restoration projects that deindustrialize a landscape in one place while indirectly being enabled by exploitation elsewhere (Swanson 2015); or in 'exclosures' that carefully modify remaining patches of a landscape to keep certain things out and others in with the hope of allowing species on the brink of extinction to cling on a little longer (Van Dooren 2022). The fire regime of the Australian Southwest is one more such complicated pattern of involvement. At the same time as today's fire regime in the southwest rests on a history of dispossession, and its prospects under the drier and warmer conditions of the future are uncertain, the regime is also an attempt at being involved with a landscape in order to make it safer for humans to live with. The aim of this paper is to contribute to the understanding of such ambiguous and complicated involvements.

By involvements I mean something else than a one-way shaping. More so than domination and control, involvements points to efforts to *take part in* the landscape's processes. Like 'involution' (Hustak and Meyers 2012), involvement points to some kind or degree of mutual sway. Like 'entanglements' (Haraway 2008) involvement rests on

the idea that being, thinking and action all emerge out of relations. *Unlike* entanglements, involvement highlights conscious deliberate effort. Even as they arise out of involvement, intention and effort are present and important things to pay attention to in people's efforts to shape the changing and unpredictable landscapes of the Anthropocene. Moreover, I intend involvement to evoke both the sense of complication of something *being involved* and the sense of closeness of *being involved with*. A key aspect of involvements is that they can be both deliberate and partly unclear to those involved.

I suggest involvement as a lens for understanding ambiguous human-environment relations in the Anthropocene. As an analytical approach involvement is a way to place a magnifying glass on the uncertain space between intention, action, and effect in people's relations with landscapes and non-humans. It can let us look more closely at situations where people act with purpose and intention, but are not entirely sure what the effects will be or how exactly they can achieve them; where people seek to shape or affect their surroundings, but do not have complete insight into the path from action to effect. This is something that may have always characterised human-non-human relations (see for instance Swanson, Lien, and Ween 2018 on unruliness in domestication), but situations characterized by this uncertain gap, as well as with the sense that it may be widening, are an especially important part of understanding the current historical moment, in which climate change and many other disturbances combine to create situations where landscapes more often behave in ways people are not used to.

In the following sections, I present the fire regime in the literature, on the ground, in the planning process, in meeting rooms and in conversations. Together it will form an image of a particular mode of involvement, one that highlights ongoingness of practice, an inclination towards a future that lies always a few years ahead, and a setting up of conditions for this near future through the effects that can be made to emerge from spatial patterns. Running through these sections are also a few more general aspects that involvement as an analytical lens can bring out – aspects we can look more closely at in this uncertain space between intention, action and effect.

The first of these is that involvement is something that sits in people, their views, their practices and the environment at the same time. It is not just a one-directional movement – from views to practices to a shaped landscape – but one going both ways, and one where patterns and complications may be suspended across or in between. Involvement highlights how attempting to shape something like a landscape is also to subject oneself to being shaped. The second aspect is how this uncertain space between intention, action and effects can extend over time, as well as how people can actively stretch or spread their involvement out in time. Involvements can have characteristic temporal orientations and strategies for maintaining ties over time. The third aspect I will emphasize is how people's coming to terms with creating or affecting something that they do not fully grasp manifests in particular ways of having knowledge and understanding. Involvement directs attention to partial knowing and understanding, and it can let us highlight what forms knowledge and understanding take when they are sought and acted on but never fully achieved.

### **Fire Regime as Policy, Practice and Pattern of Fire**

In the Australian southwest, in contrast to many other comparable places (be it as settler states, Mediterranean climate regions, Western nations or fire prone landscapes), where

fire *exclusion* and *suppression* have been the dominant doctrines for most of the last century, forest managers have approached fire as a tool to make the landscape less likely to burn in dangerous ways. The state Parks and Wildlife Service and their predecessors<sup>2</sup> have been engaged in this form of landscape intervention for many decades. Beginning in the 1930s, and more systematically from the 1950s and 1960s, the WA Forests Department developed a program of widespread prescribed burning, which at its peak in the 1970s involved burning around 15% of the region's forests every year. The year I did the majority of my fieldwork, Parks and Wildlife burned nearly 250,000 hectares (close to 10% of the region's forests) in around 50 different burns of widely varying sizes and shapes. I took part in igniting my first burn early in the spring burning season of 2016, just as the vegetation was getting dry enough, and spent the next year following as much as I could of Parks and Wildlife's fire management activities. Sometimes I was part of a fire crew, doing the hands-on work of lighting burns and fighting fires, and sometimes I accompanied fire officers as they planned and organized the burns.<sup>3</sup> I was also invited to sit in on meetings and I made myself a regular fixture in any and all seminars, talks and events that had anything to do with fire. 'Fire regimes' were regularly a subject of conversation in many of these situations, and as I gradually came to understand, most of the practices I participated in were part of shaping the fire regime in the region.

In the literature, the concept of a fire regime is often used in order to name a pattern. When Pyne writes that 'industrial fire is reshaping every fire regime on the planet' (Pyne 2001, 11) the regimes are the actual patterns by which fires occur, whereas when Bird et al. (2012) write about an 'Aboriginal fire regime' consisting of frequent small hunting fires in the Western Dessert of Australia, or when Fache and Moizo (2015) discuss the problems that arise in attempts to align 'traditional fire regimes' with conservation-oriented non-indigenous fire knowledge in Northern Australia, regimes are patterns of practice and knowledge in addition to patterns of fire. And when Zahara (2020) describes a 'Let it Burn' approach in Saskatchewan fire management as a 'settler fire regime' the regime points, additionally, to assumptions, values and a way of thinking. Countless other examples could show the same thing: 'Fire regime' can describe policy and knowledge, it can describe a pattern of fire-oriented practice, and it can describe the patterns in which fires actually occur in the landscape. The concept has a capacity to encompass all these aspect at the same time.

The concept was also used in a similarly capacious way by many of my interlocutors in the southwest of Western Australia. One way it was often invoked was to insist on the importance of a systematic approach to fire management. At the same time as wildfires have been getting more frequent in the last couple of decades, there has also been a tendency towards less prescribed burning, caused among other things by stricter regulations for burning that were put in place after one of Parks and Wildlife's prescribed burns escaped and caused significant property damages near the town of Margaret River in 2011. When I met Tom,<sup>4</sup> a Parks and Wildlife regional manager with many years of experience in burn planning, he spoke with fervour about the need to properly 'reinstate' the regime in the region. What was needed, he said, was a 'low-fuel regime', to avoid falling into 'a high intensity regime'. The latter would be the pattern of fires they might get if they stopped burning or only burned to protect townsites, he asserted, and the former the pattern of fires that would result, he said as he drew shapes to

illustrate on a piece of paper, from burning most of the forested areas ‘on rotation’, so that every part of the forest would be burned every 6–8 years with ‘patchy’ and ‘mild’ burns that together can form ‘mosaics’ in the landscape. While Tom revealed ideas about fire inherited from a time when fire management was driven by the desire to protect the state’s timber stock, he also revealed something about what a regime encompasses more generally. The regime referred to both burning practice and fire pattern, and to reinstate the regime meant to both reinstate the burning practice properly and, through burning, to reinstate in the landscape a certain pattern of fire.

In addition to the fire managers’ ‘low fuel’ regime of prescribed burning, an Aboriginal fire regime also has a large role to play in how fire professionals think about fire in the forests of the region. While Aboriginal people in some parts of Australia do practice traditional burning (see for instance Ansell et al. 2020; Bird et al. 2012), in the southwest, very few Indigenous Australians are practically involved in fire management. For most of the twentieth century, the region’s forests have been managed mostly by state foresters. According to Burrows, Ward, and Robinson (1995), 1855 can be thought of as the point when the Aboriginal fire regime ended in most of southwest forests. This estimate makes sense for them according to their study of stem sections and fire scars, but it also follows shortly after the 1847 Bushfire Ordinance which made it an offence for Aboriginal people to light fires. For the more southerly parts of the region, Crawford and Crawford estimate that Aboriginal burning ‘may have continued comparatively undisturbed until about the 1860s, when the pastoralists to the north began to establish homesteads and to take out leases for grazing on the coast’ (Crawford and Crawford 2003, 71). Others say Aboriginal burning persisted after this as well (Kelly 2000; Lloyd and Krasnostein 2005), even that it continued in some parts of the region into the early twentieth century when agriculture and the timber industry tightened their grip on the region and the state tightened their grip of governance on the Aboriginal population. In the course of the twentieth century nearly all of the southwest forests were formally brought under state management and it is only very recently that Indigenous Noongar people in the region have been granted repossession of some of their land through a Native Title settlement. It seems too soon, however, to say if the settlement will involve a larger role for Aboriginal people in fire management in the region.<sup>5</sup>

Meanwhile, a *figure* of an Aboriginal fire regime of pre-settlement times is often used by people involved in fire management as an imaginative resource to make sense of the role of fire in the region. Open a planning document, a policy statement, or a research paper about the southwest, and you are likely to be introduced to fire as both ancient and Indigenous. In the Department’s Fire Management Strategy 2017–2021, for instance, the pyric proclivities of the region are established with reference to both natural and Aboriginal fire: ‘Fire has been present in the Australian bush for millions of years’, they write, and continuing, ‘Aboriginal people managed fire for millennia, creating a mosaic of burnt and unburnt vegetation that prevented vast bushfires from forming’ (Department of Parks and Wildlife 2017, 2). Similarly, in a fairly recent Forest Management Plan it is stated that: ‘Noongar people have long used fire as a key tool in forest management’ (Conservation Commission 2013, 48), and that ‘burning by Noongar people with a fire regime appropriate to seasons and forest type was used to lower the risk of bushfire, encourage the growth of bush tucker and bush medicine, and provide forage for native fauna’ (ibid.). Here, a vocabulary of ‘tools’, ‘risk’, and ‘management’ meshes the desires of contemporary fire managers with

Aboriginal burning practices, making the Aboriginal regime a resource for them to imagine and communicate what might be conceivable with the right kind of practice. For fire managers, the figure of an Aboriginal regime is one of the things that allows them to imagine the southwest as a fire-prone yet manageable place. At the same time as it keeps Aboriginal people in the region today at a distance, the figure of the Aboriginal fire regime is one of the things many fire managers draw on to make sense of close practical involvement with the forest as a positive thing.

The fire regime, in these instances, is a concept that points at the same time to a pattern of thought and practice and the state the landscape is in. This is a crucial aspect of the way I use the concept. As a pattern of involvement, the regime lies in people's views, their practices, and in the environment at the same time. And it is important to emphasise the latter, namely what the forest can be *swayed to become*. Views and practices are part of a striving for the landscape to be suspended in a condition. The regime, in this sense, points to an emergent state arising out of the involvement between people and landscapes. The regime involves ties between people and landscapes and a temporary condition that is emergent from these ties. This condition is a state where fire managers burn continually to create patterns across the landscape and where the landscape itself comes to be composed in such a way that it lends itself more easily to mild and small fires than to large and intense ones. It is, however, far from a permanent state, rather it needs to be constantly upheld, and for this policies and established practices play a crucial role. Fire managers try to attain patterns in the landscape and to maintain them always in a state of continual attainment. The effects of the regime can show themselves to fire managers in fires and burns, but for the most part the regime exists for them as a kind of latent landscape proclivity that lies in the combination of patterns throughout the forest formed by burning.

### Patterns in the Forest

On a Friday in spring, I saw the Australian southwest from the sky. In Barry's two-seat, single-propeller Super Cub we climbed steadily above the trees. At first, there seemed to be vast expanses of forest in every direction. But pretty soon, with more altitude, I could see gravel pits down to my left, and a few small paddocks and farms, interspersed between the green expanses. The forest itself was laced with thin lines, straight and curved, made by logging tracks, fire roads and other dirt roads. There was smoke in the air, but it was white and thin, barely more than a subtle tinge. Spotter pilots like Barry weren't supposed to be flying if they had less than 8 km of visibility, he explained, and it was just on the right side of that today. The smoke was coming mostly from a prescribed burn called the Leach burn, which I had taken part in igniting the day before. We circled over. For the most part Barry was looking for any sign of smoke coming from outside the burn boundaries. If he had seen any, he would have radioed in a smoke report to the Parks and Wildlife office in the nearby town of Collie. Barry showed me how to tell, from this point of view, what had been burned and what hadn't. He told me to look for signs of scorch on the trees, since it was easier to see the patterns of scorch than it was to see the colour of the ground beneath the canopies. He also pointed out short thin lines here and there along the forest floor, and told me they were trees that had gone down during the burn. We circled around the whole burn

area and as we were flying over the boundary to the north-east, he pointed to creek lines that hadn't been burned. We could see that the vegetation was denser, with fewer trees and more green shrubbery, no sign of scorch. Outside the burn boundaries, the forest stretched out with only slight changes in the colour scheme. Had we climbed even a little bit higher the patches would have merged to continuity.

The forests of the Australia southwest are patchworks of areas that have recently been burned and areas burned more long ago; areas planned to be burned soon, and areas from which fire managers hope to keep fire out for the time being. On one level, fire management entails trying to make sure the right places burn at the preferred time, and airplanes and keen-eyed pilots are frequently mobilized to help. What makes a place the right place to burn depends on larger patterns by which burnt and unburnt areas are distributed across time and space. Management involves working with the forest to try to attain those landscape patterns that fire managers' hope will act as a kind of infrastructure for small and mild, rather than big and ferocious, fires.

Often forest managers look at the southwest forests and see an area composed of units that differ along one particular dimension: the amount of 'fuel', mostly leaf litter and scrub, present in the forest. What they most of all would like to see is a forest that exhibits a specific kind of heterogeneous pattern of variation: what we might call *a whole-of-forest mosaic* of fuel ages. The amount of fuel is often expressed indirectly, through 'fuel age', or 'time since last burn', and a forest with a whole-of-forest mosaic is a forest which has a more or less even spread of patches with different times since they were last burned, but with a strong bias towards low fuel ages. There may be a six-year-old area next to a two-year-old one, next to one that was burned 10 years earlier, next to an area burned just this season, and so on; ideally, in fire managers' eyes, most from 0 to about 8 or 10 years since last burn. Some kind of mosaic pattern would always exist across the forest. No fire burns uniformly, and whatever fire managers do, parts of the forest would inevitably burn each year resulting in some kind of heterogeneous patterns of various times-since-last-burn. But fire managers seek to affect this mosaic, to make it more biased towards low fuel ages, and to create an ongoing state that would require of them a more or less even amount of burning every year to maintain. In a whole-of-forest mosaic areas are arranged in relation to one another. They are meaningful for fire managers as part of a larger pattern they all compose together, a mosaic where all pieces alternate, each one of them either growing 'older' or being burned, and together making a landscape with an even distribution in time and space of different, but mostly low, fuel ages. These patches with different fuel ages all together form a larger pattern with its own emergent characteristics, its own tendencies and proclivities to burn. This is a phenomenon that all burns contribute to, but that no one of them alone can significantly affect.

There is also a second spatial pattern that fire managers seek to attain in the forest. I call this pattern *favourable adjacency*. To attain favourable adjacency areas are arranged according to their relation to certain constants of the region – wind and settlements – and according to patterns that can be created by placing areas next to each other; patterns such as 'buffers', 'zones' and 'corridors'. Favourable adjacency lies for instance in stacking newly burnt areas next to each other, and in making larger buffers against dangerous winds to protect townsites. Fire managers are familiar with fire among other things through persistent patterns of wind. They know northerlies to be dangerous – and especially north-westerlies – as such winds are often associated with trough movements,



that is, weather occurrences where low-pressure atmospheric troughs move in from the west bringing high winds, atmospheric instability, sometimes dry lightning and the risk of sudden shifts in wind direction. Therefore, when planning to burn, fire managers seek to stack burns in such a way that they will usually choose to burn a southerly area before an adjacent northerly one so that the first one can make the second one safer. Onto a very recently burned southerly area, they can then stack the next burn, and then the next after that. Several burns together can then form larger buffers against wildfires fanned by northerly winds and low-fuel corridors positioned in such a way that they may stand in between towns and settlements and possible wildfires coming from the north.

Through a combination of these patterns a landscape itself may become less prone to certain kinds of fire. When the forest manifests a low-fuel mosaic and patterns of favourable adjacency it can be a forest that will tend to have fewer large and damaging wildfires and more small ones that fire fighters are more likely to be able to contain. This is not an attempt at dominating the forest to make it act in definitively predictable ways, but rather of inscribing onto it temporary patterns that may nudge it towards a state where the forest itself *tends towards* certain kinds of fires rather than others. These are patterns that exist across imaginaries, practices, and the forest itself. The regime is not characterized by correspondence between the landscape and the imagined spatial patterns, rather, the regime is what is suspended across intention, action and effect. The regime is a process of shaping going several directions, where all parts are in motion – where fire managers’ burn and the forests grow and reaccumulate fuel – mutually affected in not-quite-controlled ways. These patterns and the practices of realizing them can also affect fire managers themselves. An awareness of favourable adjacency grants the forest an affective pull on people who know it in this way. It means that they can stand somewhere in the region they know and feel apprehensive or at ease, their thoughts and actions pulled by an awareness of the landscape’s variable propensity to burn. The ties that fire managers attempt to maintain with the landscape are systematic, but they are also bodily and affective. Fire managers seek to inscribe their own desired patterns onto the forest, but they also let themselves be shaped. The regime describes the landscape in a certain state as well as people in a certain state.

### **Becoming Aware of Pyro-Variability**

On the ground, any one of the burnt and unburnt patches is itself patchy, uneven and complex. Even as forest patches have been swayed by fire managers’ deliberate burning, they still need to be made known over and over again. This remaking of familiarity reveals something about the form that understanding takes for fire managers as they involve themselves with the forest. In February, I accompanied Sarah, a fire manager, out to another part of the southwest on three different occasions to get acquainted with an area planned for an upcoming burn. In the months prior, I had participated in the spring burning season with fire crews on the ground, and now a suitable time had opened up for me to take part in the planning process. It was some 4000 hectares of a forest block called Mullalyup forest block which was to be burned, and Sarah and I were the ones tasked with writing the so-called ‘prescription’.

Our first trip was for reconnaissance. Driving along rough dirt tracks in a white 4wd Toyota we found what Sarah deemed to be a complicated boundary, steep in some

sections, narrow in others, and with several twists and turns; tracks that looked like they could become slippery in wet conditions. Sarah, I noticed, was trying to get a sense of what it would be like to conduct a burn in this area. We found several potential complications: a powerline that cut across a part of the burn area, a Water Corporation tank just outside the northern boundary, and part of a disused railway line on the very edge of the burn site. She also made note of some sections that could cause trouble if they were to get a hopover there, and she noted that there seemed to be a lot of ground fuel in the part of the burn that bordered a pine plantation, which could be a good thing because it meant that it would be easier to establish a good edge on the burn. In principle, many of the things we were looking for in the field could be found on maps. But fire managers' work with various kinds of maps consists of a constant making and remaking. Their maps are treated as a process that require periodic interaction with the landscape.

Our second trip out to the burn site a few weeks later was for the purpose of taking fuel measurements. We did measurements in seven lines, in places that covered different vegetation types in the burn area. For each line, we walked about 25 meters in from the road, then we took measurements at 10 spots, one every 10 meters. For every spot, we measured the depth of leaf litter using a small wooden instrument which required us to place a rectangular part in between the leaves on the ground which would push up another part of the instrument to show the difference in height between the top of the leaf litter and the ground. Later, we would look up a table in Parks and Wildlife's Forest Fire Behaviour Tables (a small red booklet they refer to as 'the red book') to convert litter depth in millimetres into litter weight in tonnes per hectare.

Our survey form also prompted us to assess the scrub for density, with an S, M or D, for sparse, medium or dense, and at each site we took note of what we reckoned was the average tree height and the average scrub height, as well as other features of the site such as slope, aspect, and dominant tree species. Our seven sites were quite varied. Most were relatively open with a grassy understorey dotted with spiky short zamia palms, and grass-trees with their halo-like spread of grass on top of their black stems. Other sites were fairly dense. At one spot, we practically fought our way in through a tall thicket of parrot bush, a prickly shrub with long branches which we had to duck under, step over, and push out of our way.

The routines and apparatuses for preparing a burn prescription direct the way we look at the forest and they are part of the particular kind of understanding that arises in this mode of involvement. They prompt us to look for things that contribute to the 'rate of spread', to parse observations and measurements into 'available fuel', to look at bushes and scrub, little trees, flowers and plants, and see something that can approximate one of the 'scrub types', which can then allow us to estimate how much certain parts of the landscape can be expected to contribute to a fire's growth. The fire behaviour tables also allow us to emphasize small variations in moisture and dryness and to see in which parts of the landscape such variations could make a big difference in a fire. These are variabilities that are subtle from most people's points of view, but magnified when observed with a view to how the forest will burn. If a fire can magnify these variations, fire managers must also try to do so for themselves.

Our tables and forms echo methods from field ecology – such as the transect – but they also reveal a history of approaches myopically interested in how vegetation will burn. Through the Fire Behaviour Tables the forest is opened up for us as a place that is governed

by a small number of processes: the daily and seasonal drying and moistening of leaves, soil and understorey; the rate of spread of a fire and the rate at which litter accumulates on the ground after a fire or burn. At this stage in the planning process variability is both contained and magnified. Variety is turned into averages, singular sites into types, representative spots flatten diversity. But through these ordering techniques another kind of variability is magnified, and this is what we might call *pyro-variability* – the kind of variability relevant for how the forest will burn. This kind of variability is brought out, a figure against a ground. Fire managers engage with the landscape through a particular mode of discrimination, one that distinguishes between more and less flammable and different ways that elements may burn. As we look at the forests, we actively imagine possible kinds of fire. Just like a ‘fluvial imagination’ looks at a landscape ‘with a sense for how water flows over land’ (Hoag 2022, 5), an awareness of pyro-variability sees the landscape with a sense for how it may burn. Field trips like these contribute to new wholes, as an image of our burn site as a pyro-landscape is formed. This is, among other things, where leaves and scrub become ‘fuel’, a potentiality for fire, a proclivity to burn. Here, fire managers form images of what has been and what is to be shaped. The same landscape tendencies that their burns are affecting are now in small parts made known to themselves.

Fire managers form in these involvements with the forest a certain image of spatial variability – a spatial *pyro-variability* – of places to be aware of, certain spots that are more flammable than others, spots and patches that stand out for how they might burn. This is a heterogeneity which is invisible to most who encounter the forest, but here it is a quality of a site that is magnified. Our burn site was flammable throughout, but not uniformly so. Our field trips helped us specify what kind of days with what kind of weather would be suitable for our burn, but even more importantly, field trips and fuel assessments were exercises in creating awareness of pyro-variability, of getting to know a site as a variably flammable landscape. Asking of the forest: ‘how will you burn here?’ and ‘how will you burn here?’ creates for fire managers a kind of variability that is foregrounded at the expense of other kinds of diversity. And this is a kind of questioning that lies not just in the measurements themselves but in walking through the forest, in touching leaves and manoeuvring through the understorey.

In addition to creating landscape-wide patterns, as we saw in the previous section, maintaining the regime also involves working with landscapes left from previous burns, imagining and anticipating how an area may burn in the next instance. The regime relies on rehearsing experiential ways of being in the forest. Getting to know an area in its pyro-variability is a bodily and affective kind of tie to the landscape. Similar ties are rehearsed through the practices of burning themselves. These are practices through which the fire managers are changing themselves, becoming worn into a fire-oriented way of being in the landscape and making themselves flexible in the encounter with an inhuman (cf. Clark 2011) other. Over and over, fire managers practice attuning to, and creating in their minds and plans, the landscape as a place with a variable propensity to burn. These practices produce people that are pyro-aware, who, with their bodies and practical routines, know and understand the forest in a certain way. Creating new figures of landscape variability to make forest patches familiar again and actively imagining and anticipating how an area may burn in the future are key parts of what characterizes the kind of understanding that arises within the regime as a mode of involvement.

## Ongoing Attainment

A few weeks later, our Mullalyup burn was briefly brought up in Blackwood district's annual burn planning meeting. It didn't play a major role that day. Mostly, it was one among several planned burns that the district felt they needed to deal with at roughly the same time. Many here felt like they had fallen severely behind schedule in the last few years and this season had only made it worse. As the 10 or so people attending the meeting got settled around a large oval table in a meeting room there was talk of how well Perth Hills, another district, had done this year, and how difficult it had been for Blackwood. Perth Hills, someone said hyperbolically, must have almost 'nothing left to burn', whereas for Blackwood district, it had been mostly 'sour grapes', a comment that referred to tensions between Parks and Wildlife and wine growers in the region who were worried about smoke taint on their grapes and had been lobbying the state government to get Parks and Wildlife to hold their burning until after the end of the harvest. Needless to say, there wasn't much to talk about for the first part we had on the agenda, 'autumn achievements', and we quickly moved on to discussing which burns could be postponed and for how long. The main task for the day was to distribute the burns that were planned over the next few years in the best possible way, meaning a way that at any one point in time would give the best possible spatial distribution of recently burned areas.

We all had in front of us a long list of burns. A burn called Beaton was the first one. Beaton had access issues, they said. It had 30–40-year-old fuel right next to 'a shitty old karri belt'. But the prescription has been approved on the corporate level, so they concluded to roll it over to next year. Andy was in charge of the maps we had projected onto a large screen, but otherwise people chimed in with the knowledge they had. The prescriptions for each of the burns had been written by different people in the room and here was one of the instances where knowledge about burns was spread through the department and where an awareness of a district-wide pyro-variability was being formed.

We continued on to two different burns in Bramley forest block. 'We're not gonna touch that until we get the other ones done', Jay said, referring to a couple of adjacent areas that were also coming up. There's a pine plantation up against the Bramley burns too. And Jay knew about two big karri stags that they had convinced Main Roads to keep as habitat trees. Immediately, I was seeing the fire managers thinking about burns through visions of favourable landscape patterns. Bramley was involved in what they hoped would be a sequence of adjacent burns, and it was involved in strategic adjacency in relation to a pine plantation. Meanwhile, the pine plantation and the adjacent areas coming up contributed to building a sense of landscape pyro-variability. Here were adjacent areas with older fuels – a dangerous situation – and at the same time, we could see in them the potential to create a low-fuel buffer. The forest enters our meeting through experiences and recollections, expectations of what could happen in similar circumstances – of knowing how it might be to find yourself in situations with a steep section next to old fuels, of struggling with boggy tracks, or recollections of having seen certain trees in certain places. The forest is present through the practices each of us have done to become pyro-aware and to construct images of pyro-variable landscapes. What it means to burn next to a pine plantation, or to avoid burning too

intensely around large old habitat trees, involve forest proclivities that fire managers know from embodied experience.

Burns came in rapid succession now. Jalbarragup was next. They got close with this one this season. There was some 'local angst' about roosting sites for cockatoos, someone said, conjuring unspecified members of the community. A complicated shape; a 'high risk burn'. Another roll over. A third Bramley burn. An 'easy picking' that was missed this season, someone mentioned. 'What's the landowners like?' The volunteer brigades were keen to get it done, but there was also some talk of ringtail possums, a critically endangered species. Barrabup is next. There's a complication with people who use the river for recreation. What if we have a big smouldering marri down by the river's edge? Yalingup now. We ought to take away the expectation that we'll be doing the area of the burn that is heath. The local contact person in the shire is okay with not doing the heath, he 'can think of nothing worse than looking at a black hill every time he's driving into town'. There's also some interest 'from Canberra' – the unspecified Canberra that stands for a faraway federal government – about 'some bird in there'. Decisions about Yalingup might have to be made at a higher level of the organization. Upper Capel, the next one – a carry over. A portion of the burn has been completed. It was '... well treated', a euphemism for a burn that might have been a bit too hot. Boranup is next. A carry over, but it has to be a spring burn. There's a particular population of frogs in there, so the burn will be separated into several little cells that should be done at different times – so as to not put too much strain on the whole frog population. Then comes Mullalyup, our burn. I chime in to mention some steep sections and that the fuel loads were not dramatically high for a 12-year-old area. It's deemed an easy burn; they keep it on the plans.

By chance or by the long barrage of constraints and complications the room, for a moment, exhales in a brief pause. The path from intention to effect is difficult not just because fire is fickle and landscapes are lively but also due to political complications, local people's preferences, agency priorities, and the complicated leftovers from past forest interventions. 'This should be called issues district, not Blackwood', Mitch, the district manager, says with a resignedly frustrated smile.

But we were far from done. After having pushed some burns to later seasons, we now had 70 burns and a total of 182,000 hectares for the coming year. This was still so clearly too much that it provoked anxious laughter. They quickly started looking for burns that could be pushed even further into the future, and gradually they began assembling a good distribution in time, one that seemed feasible in any one of the seasons, but also one that at any one point gave a landscape that projected good future landscapes. Which burns would be safest to postpone? we asked ourselves. A burn called Happy Valley is postponed a few years, tentatively. Mullalyup, in passing, is pushed back two years. A burn called Treton is pushed further back as well. One called Hamelin gets pushed way out, someone wonders if they will ever be able to get it done. A few burns are switched around to 'stack them properly'. From south to north, because of the winds. Gradually the plans are starting to look better.

In the meeting balances are sought between what seems feasible, what is ideal, and what they can tolerate. As we near the end, Andy tweaks the map on the projector and zooms out so we can see the entire district and get an overview. It's a pretty good mix, they all agree, a much better balance than when we started out this morning.

Burns have been spread out over the coming years, and distributed in space as well. They think aloud about the townsites. 'Kirup's alright', someone says, in the present tense, almost as if the burns had already been carried out and not just placed on maps and plans. The other towns look fairly good too. 'Nannup's gonna be just about the best protected town in the southwest!' Now, the plans are looking good, even if nothing has changed in the landscape itself. They have thought and discussed, and mobilized visions of adjacency, pyro-variability, stacking and buffers, and a wide patchwork across the entire district. Now, on paper and on maps, the district exhibits the right kinds of heterogeneity.

Real and practical connections were established in our meeting. The map anticipates a landscape that embodies potentials for future forests and future conditions for management. A good kind of heterogeneity in the district has been given a certain kind of existence. It is more than an imagined, virtual existence, but of course not yet a feature of the landscape itself. It is anticipated on maps and plans, and made more real by the existence of practical arrangements – routines for prescription writing, burning, and patrolling – that are continually maintained and continually performed. But the good kinds of heterogeneity can also never be *only* a feature of the landscape – the regime can never stop being practiced and planned for, it can never not *also* reside in meeting rooms and on maps.

An anticipatory map may be the closest fire managers get to having a sense of seeing 'the regime' as such. The map anticipates a landscape that projects futures – it is a preparation for a landscape that can ease certain kinds of fire and inhibit others. The maps and lists, just like the formulas, indexes, lists and pacts that Ballestero describes among water experts and activists in Brazil and Costa Rica, are ways that people 'touch the future' (Ballestero 2019, 5) with their devices, 'narrowing down certain options and opening the possibility of creating different and, maybe better, worlds' (ibid.). To inhibit some possibilities and open more easily for others, bushfire risk management combines different kinds of spatial heterogeneity: a whole-of-forest mosaic of different fuel ages, a clustering of areas based on adjacency and relation to wind and built-up areas, and an awareness of local pyro-variability. Burn planning is a way of mediating the patterns of thought and patterns in the forest – intention and effect – ultimately in order for the right kinds of heterogeneity not to be attained once and for all, but to be kept always in the process of continual attainment. Here, then, fire managers stretch their involvement out in time, inserting themselves so that they are always *in* the space between intention and effect, never at a beginning or an end.

Indeed, a burn never reaches the end of the planning process. A burn is never really complete. Even after it has gone through the prescription writing process, after having been established as a pyro-variable place through field visits, and after having its position in relation to other burn patches, wind and settlements negotiated in meetings – even then, the short respite when the forest is actually burning both embodies and propels an ongoing cycle. The brief moment of burning, the few hours when flames consume leaf litter and shrubs, both anticipates and echoes, it is inhabited by future and past fires and burns. Any burn has a place in larger relational and never-completed patterns. Any burn is always envisioned within several forms of heterogeneity that must be continually maintained.

The best situation for fire managers is to be always in the midst of attainment, always keeping up an emergent state. Through planning, burning, patrolling and prescribing

something larger can emerge. More than just a collection of recently burned areas, the regime lies in the patterns of thought and practice associated with planning and creating pyro-awareness and the practices of burning to maintain mosaics of different times-since-fire and patterns of favourable adjacency. But it doesn't lie in any of these things alone. Rather it lies in the emergent temporary condition that a combination of both patterns of fire and practices of attainment can produce. As a concept the regime points to a set of connections through which people are *systematically* intertwined as well as *bodily* intertwined, and it points to an emergent state that grows from these attachments. Fire managers are systematically intertwined through patterned practices; routines of mapping, measuring, observing, planning, burning, patrolling, flying and so on. They are bodily intertwined through close interactions with forests that burn, through practices of becoming used to fire's heat, rhythm and intensity; and practices of getting to know landscapes in their variable propensity to burn. And they are intertwined with landscapes that become more than something out there for them to involve themselves with. They are intertwined with the landscape in a state that has come about partly through their involvement. The regime is a state where landscape patterns are always in the process of being attained and at any one moment balanced in a good way. In both its ongoingness and its quality of being emergent, the regime has similarities with Deleuze and Guattari's notion of a 'plateau': 'a continuous, self-vibrating region of intensities' (1980, 22) which never comes to a climax.

But if the regime is like a plateau, it is also important to emphasize that it does not hold itself in that state. The West Australian fire managers' regime is not *self-vibrating*. The regime is completely reliant on fire managers' ongoing involvement, and even while the regime involves systematic and bodily ties, it has little enduring solidity or momentum on its own. What different kinds of regimes have in common, according to Hartog, who writes about 'regimes of historicity', is that they point to 'mixtures and composites and an always *provisional* or *unstable* equilibrium' (Hartog 2015, xv, my emphasis). The regime has little inertia or resilience. The regime is like a balloon you can never stop inflating. If people stop burning, the advantageous combination of heterogeneous forms in the landscape disappears fairly quickly.

The regime, then, also highlights *ongoingness*. It is something that must be continually upheld and maintained. The regime is a suspended state, an ongoingness of practice, aspirations and the features of the landscape. And it lies above all in the futures it projects. The regime is stretched out in time, always oriented towards a fairly near future. The regime lies not so much in the way a landscape exists in the present as in the kinds of futures it enables and constrains. It is a kaleidoscope through which fire managers see possible futures and a pattern of practical interaction through which they can shape and sway the landscape so that the forest itself eases and inhibits future fires of certain kinds. The fire managers' ideal regime also lies in a situation where practices and elements are aligned such that this kind of state can be kept going. It lies in producing an emergent state in the forest and in being able to maintain that state. The combination of several sought-for forms of heterogeneity makes the forest what I think of as a 'projective landscape', a landscape whose material composition itself projects future possibilities.

## The Regime as a Mode of Involvement

Fire management – a task without completion, the never-ending work of burning the same patches over and over again, of labouring with landscapes that can reset one's efforts in as little as 5–6 years – might seem to require a rather peculiar frame of mind. One colleague suggested to me that this kind of burning seems almost Sisyphean, because of its seemingly very ephemeral outcomes that appear to erase themselves much like a boulder rolls down a hill. And one of my early hypotheses when I started this project was that a paradox of fire management lay in the fact of working incredibly hard to produce an absence, namely, the absence of large and damaging bushfires. I gradually came to realize, however, that the outcomes of prescribed burning are also strongly felt, affectively as well as in their effects, and that fire management involves not just avoiding something, but creating real projective forms in the landscape and real conditions that make it possible to keep the processes of the regime going. What is produced in the practices of planning, burning, assessing and patrolling *is* the regime, which fire managers feel and see in its effects and in their practices of anticipation and future-making.

In their encounters with the environment, people around the world step into the uncertain space between intention, action and effect. 'Involvement', with a focus on movements between imaginaries, practices and the environment; temporal extension of practices and their effects; and forms of knowledge and understanding, can capture what goes on in this uncertain space, and the regime is one concrete way it can play out. Fire managers step into the uncertain space by creating emergent forms that exist in imaginaries, practices and the environment at the same time; by stretching themselves and their practices out across time in such a way that they are always in the midst of involvement and the landscape is imbued with tendencies to project future fires of a certain kind; and by creating for themselves fire-oriented understandings of anticipation and possibilities and places known through a making and remaking of familiarity. Ultimately, they attempt to inscribe themselves and their actions onto the landscape to make it a place where it is less dangerous to encounter fire.

When the regime is being upheld, fire managers feel that they can more safely and more confidently encounter fire. The regime is significant for fire managers *only* insofar as it has effects that are real, felt and tangible for them – such as effects on the ways the region burns in wildfires, and effects on how dangerous it is for fire fighters to engage with the flames. Fire managers see the regime in its effects, and they feel it in the affective pull of adjacency – of feeling safe in the vicinity of two-year-old fuel and more worried when close to an area that hasn't burned in 40 years – and in the comfort of feeling that everything is within the plan. They see the regime every time they burn, never directly and completely, but rather as manifestations of the difference that it makes. While the regime is decidedly real – it projects possible futures, it elicits and inhibits – it cannot ever produce certainty and control. These are efforts among people who occupy a landscape they know to be beyond mastery.

Today's world is full of complicated patterns of human-landscape involvement. The regime is only one among many. To more sharply understand and describe one pattern can help us more clearly see the features of others. One of the distinguishing features of the regime as a mode of involvement lies in what it aims to create. Fire managers



attach themselves to landscapes to try to set up conditions for keeping the landscape suspended in a temporary state. This mode of attachment is a *setting up of conditions* for the landscape to act in certain ways, and it is a continual maintenance of those conditions. This kind of fire management is in many ways the opposite of keeping fire at a distance. The attainment of the regime is about producing, opening and expanding the interface between people and forests that burn. When fire managers create patterns in the landscape, when they make themselves pyro-aware, and when they project imagined landscapes into the future, and when they create conditions for further involvement – all this is establishing a place where people can encounter fire, and if it works as they hope it will, this means that when they meet the fiery and indifferent landscape, they also encounter something familiar; they encounter the regime, and in encountering the regime, they also encounter parts of themselves, or something they themselves are part of. While the regime cannot produce certainty and control, what it can produce is an interface or a meeting place – stretched out in time and suspended across intention, action and effect – for encounters with a fiery and sometimes dangerous place.

And so, on the day before my flight with Barry, when we descended on the Leach burn with a dozen fire trucks, some utes and a small airplane dropping incendiary capsules, the fire managers met a landscape that was willing to burn, but they also encountered parts of themselves – they saw the planning they had done and the futures they had envisioned, the patterns that this burn would contribute to and the patterns that might make an escape from this burn a little bit safer. They stood within the material forms of future projections they had previously made. They walked amongst the remnants of their past efforts – some could recall the last time they burned here, and many knew the burns they had recently done nearby – and they met the landscape with bodies that had flexed to become accustomed to the habits of fire. And at the same time, everyone knew that this was not control, and that it did not give predictability. They had inscribed themselves into the uncertain space between intention, action and effect; populated it with their routines, their ways of knowing, and the remnants of their actions, and created emergent forms there, but they had in no way eliminated the gap. That day, fire seemed for the most part a willing accomplice in their pattern-making and future-making efforts. Only occasionally did it remind us it was something wild and beyond control; like when an overgrown creek line they had struggled to ignite suddenly erupted in billows of black smoke and flames or when, late in the evening, as some of us were getting ready to head home and others were preparing to stay on and patrol through the night, the forest that had burned a few hours earlier seemed to have come alive again with countless bright pulsating reddish-yellow spots still smouldering on the ground, along branches and in every nook of every tree, as though a creature with a thousand eyes were looking back at us in the dark night, ready for a gust of wind to carry it along to somewhere unexpected.

## Notes

1. Even though 'landscape' is a problematic concept in some ways, for instance for its ties to a certain historically situated way of seeing and taking ownership of land (Cosgrove 1985), my view is that the concept is nevertheless useful in many ways. Recent environmental anthropology uses the landscape concept actively (Mathews 2023; Tsing, Mathews, and Bubandt

2019), taking it as a concept that invites a critical view on historically situated ways of seeing and acting at the same time as it opens for seeing complex human–non-human relations (Tsing 2015). Moreover, I find the concept especially useful for understanding the interplay between process and form (see also Mathews 2023).

2. It is meaningful to say that Parks and Wildlife is a descendant of the Western Australian Forests Department, which since the mid-eighties has gone through a number of organizational restructurings, partly in response to conflicts surrounding logging and forestry.
3. Many of the fire officers have a background in forestry or environmental science. Among the fire crews are local farmers, young people taking seasonal work, former tradesmen, and some that have come to Parks and Wildlife from recently closed coal mines or saw mills. Both fire officers and fire crews are male dominated groups, but among officers especially the trend in recent years has been towards a more even gender distribution.
4. All interlocutors have been anonymized. Approval for the project was granted by the Institutional Review Board at the University of California Santa Cruz.
5. Rodrigues et al. (2022) show that there is a desire among some Noongar elders to be more involved in fire management but also a reluctance to have their knowledge be drawn on as solutions to the problems caused by others. As Neale et al. (2019) show with a case of collaborative bushfire management in the southeast of Australia, revival of Indigenous fire practices can be open-ended and ambiguous experiments.

## Disclosure Statement

No potential conflict of interest was reported by the author(s).

## Funding

This work was supported by Social Science Research Council.

## References

- Ansell, Jennifer, Jay Evans, Adjumarllarl Rangers, Arafura Swamp Rangers, Djelk Rangers, Jawon Rangers, Mimal Rangers, et al. 2020. "Contemporary Aboriginal Savanna Burning Projects in Arnhem Land: A Regional Description and Analysis of the Fire Management Aspirations of Traditional Owners." *International Journal of Wildland Fire* 29 (5): 371–385. <https://doi.org/10.1071/WF18152>.
- Ballesterio, Andrea. 2019. *A Future History of Water*. Durham: Duke University Press.
- Bennett, Mia M. 2021. "Ruins of the Anthropocene: The Aesthetics of Arctic Climate Change." *Annals of the American Association of Geographers* 111 (3): 921–931. <https://doi.org/10.1080/24694452.2020.1835457>.
- Bird, Rebecca Bliege, Brian F. Coddling, Peter G. Kauhanen, and Douglas W. Bird. 2012. "Aboriginal Hunting Buffers Climate-Driven Fire-Size Variability in Australia's Spinifex Grasslands." *PNAS* 109 (26): 10287–10292. <https://doi.org/10.1073/pnas.1204585109>.
- Burrows, Neil, B. Ward, and A. D. Robinson. 1995. "Jarrah Forest Fire History from Stem Analysis and Anthropological Evidence." *Australian Forestry* 58 (1): 7–16. <https://doi.org/10.1080/00049158.1995.10674636>.
- Clark, Nigel. 2011. *Inhuman Nature: Social Life on a Dynamic Planet*. Los Angeles, CA: Sage.
- Conservation Commission of Western Australia. 2013. *Forest Management Plan 2014–2023*. Kensington.
- Cosgrove, Denis. 1985. "Prospect, Perspective, and the Evolution of the Landscape Idea." *Transactions of the Institute of British Geographers* 10 (1): 45–62. <https://doi.org/10.2307/622249>.

- Crawford, Patricia, and Ian Crawford. 2003. *Contested Country: A History of the Northcliffe Area, Western Australia*. Perth: University of Western Australia Press.
- Davis, Heather, and Zoe Todd. 2017. "On the Importance of a Date, or, Decolonizing the Anthropocene." *ACME: An International Journal for Critical Geographies* 16 (4): 761–780.
- Deleuze, Gilles, and Felix Guattari. 1980. *A Thousand Plateaus: Capitalism and Schizophrenia*. Minneapolis, MN: University of Minnesota Press.
- Department of Parks and Wildlife. 2017. *Fire Management Strategy 2017–2021*. Perth.
- Fache, Elodie, and Bernard Moizo. 2015. "Do Burning Practices Contribute to Caring for Country? Contemporary Uses of Fire for Conservation Purposes in Indigenous Australia." *Journal of Ethnobiology* 35 (1): 163–182. <https://doi.org/10.2993/0278-0771-35.1.163>.
- Fairhead, James, and Melissa Leach. 1995. "False Forest History, Complicit Social Analysis: Rethinking Some West African Environmental Narratives." *World Development* 23 (6): 1023–1035. [https://doi.org/10.1016/0305-750X\(95\)00026-9](https://doi.org/10.1016/0305-750X(95)00026-9).
- Haraway, Donna. 2008. *When Species Meet*. Minneapolis: University of Minnesota Press.
- Haraway, Donna. 2016. "Making Kin: Anthropocene, Capitalocene, Plantationocene, Chthulucene." In *Staying with the Trouble: Making Kin in the Chthulucene*, edited by Donna Haraway, 99–103. Durham, NC: Duke University Press.
- Hartog, Francis. 2015. *Regimes of Historicity: Presentism and Experiences of Time*. New York, NY: Columbia University Press.
- Harvey, David. 2003. *The New Imperialism*. Oxford: Oxford University Press.
- Hoag, Colin. 2022. *The Fluvial Imagination: On Lesotho's Water-Export Economy*. Oakland: University of California Press.
- Hustak, Carla, and Natasha Meyers. 2012. "Involutionary Momentum: Affective Ecologies and the Sciences of Plant/Insect Encounters." *Differences* 23 (3): 74–118. <https://doi.org/10.1215/10407391-1892907>.
- Kelly, Glen. 2000. 'Karla Wongi: Fire Talk.' *Landscape* 15. Perth: Department of Conservation and Land Management.
- Lloyd, Natalie, and Alisa Krasnostein. 2005. "Historical Perspectives on Mosaic Burning in Western Australia's Southwest Forests." In *Proceedings of 6th National Conference of the Australian Forest History Society Inc*, edited by Michael Calver, 439–450. Rotterdam: Millpress.
- Lyons, Kristina. 2016. "Decomposition as Life Politics: Soils, Selva, and Small Farmers under the Gun of the U.S.–Colombia War on Drugs." *Cultural Anthropology* 31 (1): 56–81. <https://doi.org/10.14506/ca31.1.04>.
- Mathews, Andrew. 2023. *Trees Are Shape Shifters: How Cultivation, Climate Change and Disasters Create Landscapes*. New Haven: Yale University Press.
- Neale, Timothy, Rodney Carter, Trent Nelson, and Mick Bourke. 2019. "Walking Together: A Decolonising Experiment in Bushfire Management on Dja Dja Wurrung Country." *Cultural Geographies* 26 (3): 341–359. <https://doi.org/10.1177/1474474018821419>.
- Pyne, Stephen. 1991. *Burning Bush: A Fire History of Australia*. Seattle: University of Washington Press.
- Pyne, Stephen. 2001. "An Exchange for all Things? An Inquiry into the Scholarship of Fire." *Australian Geographical Studies* 39 (1): 1–16. <https://doi.org/10.1111/1467-8470.00126>.
- Rodrigues, Ursula, Alison Lulfitz, Lester Coyne, Averil Dean, Aden Eades, Ezzard Flowers, Lynette Knapp, Carol Pettersen, Treasy Woods, and Stephen D. Hopper. 2022. "Indigenous Knowledge, Aspiration, and Potential Application in Contemporary Fire Mitigation in Southwest Australia." *Human Ecology* 50 (5): 963–980. <https://doi.org/10.1007/s10745-022-00359-9>.
- Scott, James. 1998. *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*. New Haven, CT: Yale University Press.
- Swanson, Heather. 2015. "Shadow Ecologies of Conservation: Co-Production of Salmon Landscapes in Hokkaido, Japan, and Southern Chile." *Geoforum* 61:101–110. <https://doi.org/10.1016/j.geoforum.2015.02.018>.
- Swanson, Heather, Marianne Lien, and Gro Ween. 2018. *Domestication Gone Wild: Politics and Practices of Multispecies Relations*. Durham: Duke University Press.
- Tsing, Anna. 2014. "More-Than-Human Sociality: A Call for Critical Description." In *Anthropology and Nature*, edited by Kirsten Hastrup, 27–42. Routledge.

- Tsing, Anna. 2015. *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*. Princeton, NJ: Princeton University Press.
- Tsing, Anna, Andrew Mathews, and Nils Bubandt. 2019. "Patchy Anthropocene: Landscape Structure, Multispecies History, and the Retooling of Anthropology." *Current Anthropology* 60 (S20): S186–S197. <https://doi.org/10.1086/703391>.
- Van Dooren, Thom. 2022. *A World in a Shell: Snail Stories for a Time of Extinction*. Cambridge, MA: The MIT Press.
- West, Paige. 2016. *Dispossession and the Environment: Rhetoric and Inequality in Papua New Guinea*. New York: Columbia University Press.
- Wolford, Wendy. 2021. "The Plantationocene: A Lusotropical Contribution to the Theory." *Annals of the American Association of Geographers* 111 (6): 1622–1639. <https://doi.org/10.1080/24694452.2020.1850231>.
- Zahara, Alex. 2020. "Breathing Fire into Landscapes That Burn: Wildfire Management in a Time of Alterlife." *Engaging Science, Technology, and Society* 6:555–585. <https://doi.org/10.17351/ests2020.429>.
- Zee, Jerry C. 2020. "Machine Sky: Social and Terrestrial Engineering in a Chinese Weather System." *American Anthropologist* 122 (1): 9–20. <https://doi.org/10.1111/aman.13360>.