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Ethnos
Journal of Anthropology

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/retn20

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To cite this article: Mardi J. Reardon-Smith (2025) Forging Preferred Landscapes: Burning Regimes, Carbon Sequestration and 'Natural' Fire in Cape York, Far North Australia, Ethnos, 90:1, 50-72, DOI: 10.1080/00141844.2023.2210264

To link to this article: https://doi.org/10.1080/00141844.2023.2210264

Published online: 09 May 2023.

ETHNOS
2025, VOL. 90, NO. 1, 50–72
https://doi.org/10.1080/00141844.2023.2210264

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Forging Preferred Landscapes: Burning Regimes, Carbon Sequestration and 'Natural' Fire in Cape York, Far North Australia

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ABSTRACT

Fire management is a right and responsibility shared by all land managers in Cape York Peninsula, far north Australia, bringing together Aboriginal traditional owners, Queensland Parks and Wildlife Service rangers and settler-descended cattle graziers. The landscape of Northern Australia has been socialised by fire over millennia, resulting in a fire-adapted and fire-dependent landscape. While fire knowledge originated with Aboriginal traditional owners, decades of engagement in the multi-ethnic pastoral industry have resulted in contemporary burning practices that have been interculturally mediated. The Australian government's carbon sequestration scheme has further transformed local burning practices, precipitating new forms of burning and new forms of critique. Through examining the burning practices and perspectives of Aboriginal traditional owners, Park rangers, and – in particular – cattle graziers, the ideological underpinnings of different fire regimes emerge. These insights disrupt some of the accepted wisdom around fire management and cultural burning in Australia.

ARTICLE HISTORY Received 20 April 2022; Accepted 29 April 2023

KEYWORDS Fire-management; burning regimes; carbon sequestration; intercultural; Cape York Peninsula

Fire in various forms is central to life in Cape York. It is widely acknowledged in the scientific literature that the savanna landscapes of Northern Australia have been socialised by fire (Bowman 1998; Russell-Smith *et al.* 2013). Aboriginal people have implemented burning regimes in this region for millennia for economic and environmental reasons, resulting in a fire-adapted landscape that not only responds positively to fire, but is reliant on it (Head 1994; Langton 1998). Unlike landscapes further south in Australia, burning regimes in Cape York have continued from pre-European

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contact to the present day with only minor disruptions (Davis 2003). Historically, fire has also been an important management tool for graziers. The type of burning carried out on cattle stations shares aspects with Aboriginal traditional burning regimes, although the purposes diverge. Nowadays, fire remains one of the key land management tools employed by Aboriginal traditional owners, graziers and Queensland Parks and Wildlife Service (QPWS) rangers alike.

Based on 14 months of ethnographic fieldwork at multiple sites in south-east Cape York, this paper investigates how Aboriginal traditional owners, cattle graziers and Queensland Parks and Wildlife Service (QPWS) rangers understand and interact with different types of fire in order to understand what different land managers seek to achieve with their burning practices. This can bring insights into how different people understand the human role in caring for land; an activity underpinning their sense of belonging to this particular place. I discuss how different kinds of knowledge and practices around burning are employed in order to cultivate particular kinds of landscapes, that map roughly onto land tenure types (pastoral lease, joint managed National Parks, and Aboriginal freehold). While, for the purposes of analysis, I describe these three land managing groups as separate, there are important overlaps and commonalities between them, and together they constitute something of an uneasy coalition of land managing parties in the region. The Aboriginal traditional owners with which I worked were mostly employed in ranger organisations working with the QPWS under the formal structure of joint management. As such, these rangers work closely with QPWS rangers, some of whom are settler-descended and some of whom are Indigenous and Traditional Owners in Cape York. The cattle graziers with whom I worked are generally fourth-generation settler-descended cattle graziers whose pastoral leases border Aboriginal land and National Parks. The majority of National Parks in Cape York (including the two Parks upon which this research is based) are former cattle stations, with Lama Lama National Park being gazetted in 2008 and Rinyirru National Park (formerly known as Lakefield National Park) gazetted in 1979. Drawing on Merlan's (1998; 2005) and Ottosson's (2010) work on the 'intercultural' approach, I set out to analyse how the priorities and purposes of different fire-management regimes interact, overlap and intersect in ways that create collaborations, as well as tensions, among Cape York land managers. Fire functions as a non-human force that mediates and shapes human social relations.

While I explore the perspectives, positions, and practices of QPWS burning and burning by Aboriginal traditional owners, I am most interested in investigating grazier burning. The reasons for this are twofold. Firstly, while there is a rich existing and emerging literature on both Aboriginal cultural burning (see, for example, Anderson 1985; Head 1994; Bowman 1998; Yibarbuk *et al* 2001; Davis 2003; Ritchie 2009) and the uptake of fire regimes by land managing institutions in Australia (see, for example, Cook *et al*. 2012; Petty *et al*. 2015; Perry *et al.* 2018), grazier burning remains comparatively underexplored and undertheorised. Secondly, the co-production of environmental knowledge that grazier burning emerges from disrupts the accepted wisdom about fire management – and cultural burning – in Australia. As I will show, due to shared histories of burning, the context of intercultural fire management in Cape York differs substantially from that in Australia's south, where, as recent scholarship has shown (see

Freeman *et al.* 2021; Smith *et al.* 2021), the re-emergence of Indigenous cultural burning is both politically charged and constrained by a complicated confluence of government policy, altered ecosystems and the ongoing impacts of colonial dispossession.

Situated in the far north of Australia, Cape York has a tropical or monsoonal climate that is characterised by a dry mid-year (the Austral winter), followed by the 'build-up', which is hotter but still predominantly dry, and then the 'wet' season in which the monsoon comes. The inland of Cape York is savanna country with rocky ridges and plateaus forested with towering stands of Cooktown Ironwoods, as well as smaller scrubby plants. Further towards the coast, the landscape flattens and is comprised of more densely forested river systems, salt-pans, swamps and estuaries. Fire is used and managed throughout these different landscapes and at different times of the year for particular reasons.

To understand the basis of contemporary fire regimes in Cape York, I turn to Merlan's (1998) 'intercultural' approach to contemporary Aboriginal lives. This 'intercultural' approach has emerged as a way to theorise the situation of 'difference-yet-relatedness' that is reproduced in settler-colonial states like Australia (Hinkson & Smith 2005: 157). Rather than assuming that Aboriginal people and non-Aboriginal people come to encounters as already pre-formed, culturally different and bounded entities, the intercultural approach understands socio-cultural difference and forms of identifying as fundamentally relational; as emerging in social relations, iterations and practice (Ottosson 2010). To borrow Haraway's (2008: 25) phrase, it is through 'the dance of relating' that cultural ideas, norms and practices are reproduced or transformed. As Ottosson writes, 'articulations of difference are relational at the outset, instead of existing before they come into an interaction or relationship' (2010: 293). Merlan suggests that everyday social interactions can operate as a zone of reproduction and change, and it is in this zone that culture – and, as I will show in this paper, environmental knowledge and practice – is worked over, reproduced and transformed (2005: 169–170).

As well as focussing on everyday face-to-face interactions between people in Cape York, I understand relationships between land managers to be shaped by broader meta-human and non-human forces. Cape York is a rich site of interaction, with people pulled – at times forced – into engagement through the historically multi-ethnic pastoral industry, contemporary land tenure changes, management agreements and region-wide pest control and fire-management agendas. In these spaces of sometimes uncomfortable modes of relating, environmental knowledges and values have been and continue to be co-produced, but in ways constrained and shaped by unequal power relationships. Relationships in Cape York are shaped and impacted by interactions between people and human-generated entities, such as institutions like National Parks, legal instruments, land tenures, policies and management plans. Relationships between people are also shaped by water, seasons, climate, plants and animal species, and, as I will discuss in detail in this paper, fire. Each of these elements and entities 'do things' (Galvin 2018) in my analysis. Fire is a tool that is used variously to manage cattle, for hazard reduction, and to cultivate preferred landscapes. In relating to and with fire, different ideas about the human role in transforming and preserving landscapes emerge, producing insights into how different people see their role in land management and their relationship to the land itself.

Burning on Aboriginal Land

It is a pleasantly warm day in June 2018. I am walking along the boundary fence between the jointly managed[1] Lama Lama National Park and a cattle-grazing property named Tidewater Station.[2] The air is still and calm. Around me, Aboriginal Lama Lama rangers are positioning themselves, in pairs, at intervals along the fence line. Some rangers have drip torches, but most are retrieving cigarette lighters or boxes of matches from their pockets. I am walking with Mabel, a Lama Lama ranger in her late thirties. Mabel bends down and snaps a branch off a shrubby tree she calls 'bark tree'. I have also heard people refer to this tree as 'soap bush'. It is a type of acacia, with long grey green and silky leaves. Mabel hands me the branch and explains that I should use this branch to fan the fire if it is in danger of going out, or to extinguish any spot fires that may jump the road on the Tidewater side of the fence.

We are spread out along the fence line and, before long, I can see tell-tale spirals of smoke from small fires nearby. Mabel hands me some matches and shows me how to light the dead grass near the fence. 'Like this,' she says, bundling the grass and lighting it at the base of the clump. She tells me that this grass is called kerosene grass, presumably because it dries out, or cures, earlier in the season than other grasses and ignites easily. The fires that Mabel and I light start trickling away from us, moving into the National Park. There is a satisfying crackling sound, and the smell of smoke. The fire creeps through the grass, licking at the bases of trees but leaving much intact. Where the grass is still green, the fire goes out. Mabel keeps an eye on me throughout the burning, reminding me intermittently to watch the fire. As we walk along, observing the progress of the fire and monitoring for spot fires, Mabel tells me that she first learnt to burn from her grandparents while they worked on cattle stations. Birds are wheeling around in the smoke above us, waiting for the easy prey of panicked small animals fleeing the fire. We watch as the fire moves away. Once it has travelled around ten metres from the fence line, we pack up and return to camp (Figure 1).

Burning is widely conceptualised by Aboriginal people in Cape York, and across all of Australia, as a way to clean up or look after the country (Yibarbuk *et al* 2001). This idea that burning is a tool for caring for country is well established in the literature on Aboriginal land management practices (Anderson 1985; Head 1994; Yibarbuk *et al* 2001; Davis 2003; Ritchie 2009). Burning is often discussed as a key way for Aboriginal to people fulfil their obligations of custodianship and an area that has not been burnt for a period of years is often perceived as neglected (Anderson 1985: 81; Head 1994). In regions where Aboriginal burning regimes have been significantly interrupted, fire-responsive and reliant vegetation has experienced a 'dramatic decline' (Head 1994: 176; Bowman 1998). Such findings have added weight to a powerful argument that Aboriginal burning regimes have been an effective land management tool, rather than being responsible for biodiversity loss (Langton 1998: 11).

Burning is also one of the more recognisable forms of Aboriginal land management to Western science. Evidence of historical and ongoing fire-regimes has become a common way for Aboriginal groups to prove their ongoing usage of land in land claims, and the right to burn has become a key concern when land rights or native

Figure 1. Burning in Lama Lama National Park.

title are recognised (Ritchie 2009: 48–49). Indeed, fire-management tends to be the most straightforward way for Queensland Parks and Wildlife Service (QPWS) to conceptualise incorporating Aboriginal environmental knowledge into managing Parks. In Cape York, the responsibility to burn is shared by Aboriginal traditional owners, graziers and QPWS and, as noted by Davis (2003), each of these groups exercises their right to burn.

Controlled burns are used to achieve a variety of outcomes: as a cattle management tool to encourage the growth of pasture, in order to reduce the risk of damaging wildfires, and to maintain fire-adapted ecosystems. For Aboriginal people in Cape York, burning has an additional use in asserting cultural knowledge around land management and operating as a cultural marker. What people are referring to when they speak about burning in a traditional or cultural way is somewhat ambiguous and situational. For some Aboriginal people, like a Lama Lama woman named Karen, burning with traditional methods means having a senior person present while burning is carried out. While burning 'traditionally' mostly seems to mean burning from the ground, some Aboriginal people in Cape York also see aerial burning in which a traditional owner is in the helicopter as equally traditional. In this sense, traditional burning can be used to refer to any kind of fire-management that has input and involvement with traditional owners. Burning, then, is as much a cultural activity as it is an important aspect of land management. In suggesting that fire-management is 'traditional' when traditional owners are involved, Aboriginal people are asserting that burning is a cultural activity that, when done in certain ways, is something distinctly Aboriginal.

Many Cape York Aboriginal people refer to the way that the 'old people' would burn country, highlighting both the economic purposes of burning and the long history of fire management in Aboriginal communities in Cape York. Reflecting similar sentiments, Bradley has suggested that for the Yanyuwa people in the Gulf of Carpentaria that he has worked with, burning is a deeply cultural activity that allows people to 'demonstrat[e] a continuity with the people who have died, their ancestors' (1995: 28). Yet, in Cape York, the transmission of knowledge has not been a linear trajectory from older, experienced Aboriginal people to younger.

While several Aboriginal rangers spoke to me about learning fire management skills from their parents and grandparents, every ranger nowadays must complete a formal nationally recognised certificate in fire safety and management. Many of these courses are facilitated by Cape York Natural Resource Management (CYNRM), a not-for-profit organisation that works with landholders, land managers and ranger groups to assist in land management and conservation projects across Cape York. For those Aboriginal rangers who attribute their fire-management knowledge to their parents or grandparents, it is important to note that these parents and grandparents worked on cattle stations. It is here that they engaged in fire-management, and, in many cases, here that they learnt how to manage fire. The intercultural context of the grazing industry and mutually beneficial outcomes of cool burns for Aboriginal people and graziers means that the boundaries between Aboriginal fire management and grazing fire management are murky.

Burning on Cattle Stations

The way that graziers burn is similar to the way that Aboriginal traditional owners burn. While I did not observe this, several graziers told me that they light fires by riding along slowly on a quad bike, holding a lit drip torch in the grass and leaving a trickle of fire in their wake. Instead of leaving fires to burn mostly unmonitored, graziers tend to keep track of fires using an online resource called Northern Australia Fire Information (NAFI) and by checking the horizon for visible smoke.

In general, graziers have the view that burning from the ground is the most appropriate way to burn. While aerial burning can be fast and effective for burning large swathes of country, it is a method that relies on proper firebreaks having already been put in place. One grazier, Martha, pointed out that it is more difficult to keep track of which sections you have burnt when you burn from the sky. The prevailing logic with burning is that each section of country should be burnt every three or so years. Aerial burning means that it can be more difficult to achieve the kind of mosaic burns, where discrete patches of land are burnt and nearby patches are left to 'rest', that are desired. Another grazier, Bev, echoed Martha's sentiments. Bev told me that she thinks that the way QPWS burn – frequently from helicopters – is wrong, as it often results in fires meeting each other and leaving nowhere for the animals and insects who live in those areas to move to safety. Bev and her husband Alan prefer to burn from the ground, believing that this style of burning provides animals a chance to get away.

Several graziers spoke about mosaic burns as being important to allow the country to rest in between being burnt. This kind of mosaic burning that graziers carry out has substantial overlap with the kind of burning that Aboriginal traditional owners do. The key difference is the involvement of Aboriginal traditional owners, although up until a handful of decades ago, grazier burning consistently did involve Aboriginal people, as they were the bulk of the workforce on cattle stations. An employee of CYNRM pointed out this convergence in burning regimes, saying that the way graziers burn is 'very similar to what we think was happening 200 years ago. You know, like talking to people and stuff, you sort of see … talking to the old people, Aboriginal people were always walking around with a firestick. So, they were burning'. When asked, graziers invariably spoke of learning how to use and manage fire from their parents. However, it is well documented that pastoralists in parts of the Northern Territory incorporated Aboriginal burning regimes into their own land management practices (Ritchie 2009: 46). It seems likely, then, that even if graziers learnt about fire from their parents, their parents' knowledge originated with Aboriginal land managers in the past.

While graziers generally concede that cool season burns are necessary to protect pasture and infrastructure, to encourage the growth of fire-adaptive plants and as a cattle-management tool, land managers have a range of perspectives on the potentially detrimental impact of exclusively lighting cool fires. One grazier, Bill, told me about the transformation of the landscape on the station where he was raised once it became a National Park and the fire-regime shifted. He recalled a visit to the area to do some contract mustering, having not seen the station for 27 years. He recounted his impressions to me:

> I drove into [the station] and there's a ridge, probably about two kilometres from [the] house, there's a big ridge there. And that used to be our paddock where our stallion and mares, our breed mares were, for breeding workhorses … And you could ride up on that big sand-ridge there and look, and there's a horse three or four hundred yards, and you could see it. But that ridge today, it's – it's got a lot of white currant out there which usually grows in at the river, and that's gone right out there. Even when I was there that day, it was nearly dark and there was little cold fire trickling through this stuff, and I'm thinking, well that's going to be more and more. That open savanna country, as they call, well that's going to be no more. And … yeah, that's … I don't know. I just think this whole fire thing is wrong. Totally wrong.

Like other graziers, Bill implements cool burns. However, he asserts that cool burns alone do not constitute an effective fire-regime. This is because these fires are not hot enough to properly 'clean up' the country. Moreover, cool burns are understood by land managers to result in thickening of the country by encouraging the growth of melaleuca scrub, referred to as woody suckers. Melaleuca encroachment is considered to be undesirable because it transforms landscapes from open savanna grasslands to dense forest. This is an issue from both a conservation standpoint and grazing point of view, as it impacts on groundcover, habitat for small animals, grasses and makes it more difficult to run cattle.

This perspective is shared by most people, even as they engage in lighting fires of this nature and sometimes, through the Australian government's carbon sequestration

scheme, profiting from them. Only one grazier revealed to me quietly that he did not believe cool burns were as bad as people claimed. He told me that he is not so sure about the kind of burning they carry out on his own station. He said that everyone is always talking about the problems with cool fires, but he has seen cool fires burning along 'slow and steady, doing good work'. With a chuckle, he admitted that the 'experts' – in this context, his wife – do not agree with him. This particular grazier had lived on his station his entire life and told me that he has seen woody thickening happen in areas that have never been burnt and never had cattle. He suspects that woody thickening is perhaps just a natural tendency of the landscape, and less connected to cool burns than most would argue.

Despite the reservations that some graziers hold about the impacts of implementing cool burns, it is a form of land management undertaken across the region. As I have described, the type of burning undertaken on pastoral leases bears similarities with the types of burning carried out by Aboriginal traditional owners. I contend that it is unlikely that this has occurred as a linear transmitting of Aboriginal knowledge to settler-descended graziers. Aboriginal burning regimes, while continuing from pre-colonisation until the present day, have undergone shifts, adaptations and changes in both purposes and practices both before and after non-Aboriginal settlers arrived. This is nowadays compounded by the introduction of aerial burning and the formalising of fire-related training.

I conceive of the historical grazing industry as a site of productive yet uncomfortable relating. The collaborations between Aboriginal people and White graziers resulted in graziers gaining important knowledge in managing their land, while allowing Aboriginal traditional owners to maintain a physical relationship to their ancestral lands – albeit in a highly restricted fashion and reliant upon their continued employment for little or no wages. Through this space of intercultural interaction, graziers gained knowledge that enabled them to care for land in ways that have some commonality with Aboriginal forms of land management, and Aboriginal people were able to continue to work on, live on and fire their areas of traditional connection.

Importantly, within this space, environmental knowledge and practices did not remain static and unchanging. Despite the violence towards Aboriginal people and inequality historically wrought by the grazing industry many Aboriginal people in Cape York and elsewhere in Australia strongly identify with cattle work (see McGrath 1987; Cowlishaw 1988; May 1994; Smith 2003; Redmond 2005; Gill & Paterson 2007; Ottosson 2012; Simone 2016). The grazing industry, then, can be understood as what Merlan would call a 'zone' of reproduction and change (1998; 2005). As Merlan has argued, in spaces of everyday interaction, cultures are worked over, reproduced and transformed (2005: 169–170). The environmental knowledge that underpins the contemporary burning practices of Aboriginal traditional owners, graziers and, as I will discuss, even QPWS rangers has emerged out of a process of co-production and continues to develop in new ways as a result of new entanglements.

As such, it is problematic to conceive of 'Aboriginal burning' and 'grazier burning' as two separate domains. Everyone implements cool burns, whether to reduce fuel loads, participate in carbon sequestration, or encourage the fresh growth of 'green

pick' and draw cattle to particular areas. Through ongoing processes of interaction between people, plant and animal species, technologies, and government-led initiatives, burning knowledge continues to be co-produced over time. The formal fire training workshops reflect this confluence of different genealogies of knowledge, drawing on the rhetoric of cultural burning alongside the language of hazard reduction. Though some of the intended uses of fire differ from land-tenure type to land-tenure type, accepted knowledge and wisdom about how fire operates and should be managed in Cape York is held in common.

Burning in National Parks

In Rinyirru National Park, burning occurs a little later in the year. I was in the Park in July when some aerial burning was carried out, involving rangers Ray, Sammy and Mitch. Ray is the Ranger in Charge (RIC) for the Park, Sammy is a conservation officer for QPWS whose role involves a lot of fire-management, and Mitch is a helicopter pilot. Sometimes QPWS involve Aboriginal traditional owners in their aerial burning, but on this occasion no traditional owner was present. Sammy explained to me how aerial burning works. He told me that in the helicopter, the bombardier sits beside a machine which injects small balls called Dragon Eggs with a flammable gas and drops the balls into the scrub. The Dragon Eggs take about fifteen seconds to ignite and burn for around 20 s, just long enough to start a small fire. Normally, the machine is set to drop the gas-filled balls every 20 or 50 metres as the helicopter flies along.

Ray explains to me that he thinks of cool burns as protection burns and is concerned mostly about establishing adequate firebreaks along the boundary fences in order to protect neighbouring properties and QPWS infrastructure in the event of a wildfire spreading through the Park. As part of QPWS fire-management, a fire plan is created each year and approved by QPWS management structure and the board of Rinyirru Aboriginal Corporation. Before any fires are lit, QPWS management are required to give an 'all clear', and neighbours must be notified. Throughout this process, though, the RIC remains the decision maker, a situation which sometimes draws the ire of individual Aboriginal traditional owners.

On this day, Ray announces happily that the neighbouring grazier has given him the go-ahead to 'burn the shit out of it' by helicopter. Ray tells me that while July is generally the latest they are able to burn in the dry-season due to the risk of fires later in the year spreading uncontrollably, this year they would need to carry out additional burns later on, as everything was still a little too green to burn effectively, owing to a later than usual wet season in the preceding months. After the fires are lit, Ray and Sammy sit monitoring a laptop screen. They have loaded the same NAFI website that graziers use to keep track of fires. NAFI displays information about the location, intensity and duration of fires, and is colour-coded to show where fires have burnt in previous weeks, months and years. Sammy is monitoring the website to see whether their fires are showing up and still burning. He explains that he is concerned that the vegetation is not cured enough for an effective burn.

Despite these efforts to burn, Ray instigates a further attempt to burn in August. This time, QPWS rangers will burn from the ground. August is widely considered to be too late to burn in Cape York, but Ray explains that he is eager to put a firebreak in place to protect the main ranger base from wildfires. At the fence line, some of the rangers walk into the scrub carrying drip torches and begin lighting up the grass. Others are in vehicles equipped with firehoses and large water tanks, colloquially called mop-up units. These vehicles are stationed at intervals along the fence line, ready to intervene if the wind changes direction. From my vantage point in a ranger vehicle, I watch as the fire begins. At first, tendrils of smoke rise above the trees. Before long, enormous clouds of smoke envelope me. Two rangers are stationed with a mop-up unit beside the fence, only a few hundred metres away. At points, the smoke is so thick that they are difficult to make out. Once the fire has spread through much of the western side of the patch of scrub, Ray's voice crackles through the two-way radio. 'That's good, we'll pack up,' he says. We regroup on the main road that runs on one side of the burnt section of land and spend the next few hours monitoring the fire. While some of the Aboriginal rangers present were vocally critical of the decision to burn so late in the season, this hazard reduction burn was ultimately conceded as necessary when intense wildfires swept through the Park in December (Figure 2).

QPWS fire-management regimes intersect with genealogies of fire knowledge that constitute burning regimes elsewhere in Cape York. For instance, Rinyirru National Park's fire-regime is an adaptation of the types of burning that their grazier neighbours employ. I spoke with the former RIC for Rinyirru National Park, Michael. He

Figure 2. A QPWS ranger monitors the fire.

explained that when he first came to work at the Park, he based his burning regime on what was being implemented across the boundary fence at a neighbouring cattle station. As well as learning from the neighbouring graziers, Michael sought the advice of several Aboriginal traditional owners who were senior knowledge-holders. These men had worked alongside the aforementioned neighbouring grazier in the mustering camp, passing on knowledge to him that he still holds today.

As should be clear from my descriptions of fire-management, while Aboriginal people, graziers and QPWS diverge in aspects of their burning practices, there are also significant overlaps and mutual influences. Indeed, Ockwell and Rydin have argued that these different groups in Cape York constitute something of a 'pro-burning coalition' with 'inter-connected storylines' (2006: 394). In some sense, the different kinds of burning regimes in Cape York stem from a common origin: pre-colonisation Aboriginal burning regimes. However, forms of fire management have been adapted by various people to suit different purposes and priorities, incorporating aspects of Aboriginal burning knowledge, grazing burning practices and Western scientific approaches towards the use of fire in landscape management.

The uptake of burning regimes in National Parks demonstrates how the project of joint management has, to some extent, functioned to incorporate Aboriginal fire management – a form of what has been referred to in the literature as traditional ecological knowledge (Berkes 1993; Nadasdy 1999). Elsewhere in the world, the reintroduction of indigenous fire regimes remains contentious. In the management of the Gran Sabana in Venezuela, for example, Sletto (2008) has demonstrated how indigenous burning practices have been historically denigrated by state agencies as irrational and destructive. Such a position is based on an imagined past of the Gran Sabana as a forest that has been negatively impacted by indigenous burning and is at risk of becoming a desert in the future (Sletto 2008; 2011). As Sletto points out, such discourses are less about what is true, and more about whose knowledge gets to count (2008: 1944). Throughout the nineteenth and twentieth centuries, fire regimes were similarly suppressed in various parts of Africa, including Madagascar (Kull 2002), Zambia (Eriksen 2007), Mali (Laris 2002) and Mozambique (Shaffer 2010). While Shaffer (2010) speaks to the sidelining of Indigenous peoples' traditional ecological knowledge in state-led fire management, Kull (2002), Eriksen (2007) and Laris (2002) variously describe how state conservation agencies built on earlier colonial policies to prohibit and criminalise the use of fire, positioning indigenous fire regimes as disruptive, dangerous, and antithetical to conservation. Since the late 2000s, conservation discourse, strategies and policies in various sub-Saharan African and South American states have begun to shift towards an acceptance of fire management rather than suppression (Eloy *et al.* 2019; Moura *et al.* 2019; Schmidt & Eloy 2020). However, it is important to note that there remains a diversity of opinion among conservation and land management actors about the benefits or risks of fire management (Rodríguez *et al.* 2018; Eloy *et al.* 2019: 16) and, furthermore, many fire management projects are reliant upon international development funding (Moura *et al.* 2019: 602).

While a similar diversity of opinion regarding the reintroduction of fire regimes may exist among scientists and policy makers in Australia, the incorporation of fire

regimes into QPWS' management plans is not particularly contentious today, even if there are tensions which emerge in how fire regimes are carried out. This is the result of several factors: decades of social science and ecological scholarship supporting burning regimes in Northern Australia (Bradley 1995; Bowman 1998; Yibarbuk *et al.* 2001; Petty *et al.* 2015); the continuity of fire regimes from pre-colonisation to the present day (albeit with some disruption) resulting in a landscape which still responds positively to fire (Head 1994; Langton 1998; Davis 2003); the use of similar fire regimes on neighbouring properties; the introduction of fire regimes in the Park before the era of joint-management; and the formal structure of joint management itself which, however imperfectly, seeks to take Indigenous environmental knowledge claims seriously. In Cape York, joint management (though still in its 'teething' phase) works against the fortress conservation model, as it incorporates the perspectives, practices, knowledges, and values (albeit in a constrained fashion) of Indigenous peoples who are Traditional Owners for protected areas. While the ontological 'building blocks' of management (Howitt & Suchet-Pearson 2006) may remain consistent with pre-joint management conservation, the use of fire regimes based on pre-colonisation burning represents perhaps the most successful and visible incorporation of Aboriginal knowledges into Park management.

Both the grazing industry and the project of joint management are sites of collaboration which have been simultaneously enabling and constraining for Aboriginal people. While QPWS burning was initially modelled on this already interculturally mediated fire-management undertaken on nearby pastoral stations, it is now legislatively mandated to involve the engagement of Aboriginal traditional owners. In turn, QPWS now provides resources and training for Aboriginal rangers to carry out burning. The uptake of burning regimes and delivery of fire-training by QPWS reflects this deeply entangled intercultural dynamic. Yet, despite the involvement of Aboriginal traditional owners, it is QPWS management staff who formulate a fire management plan and the Ranger in Charge who makes the decision of when to implement burning regimes. Such a situation results in some Aboriginal traditional owners articulating a sense that their knowledge and perspectives have been sidelined by QPWS management.

Fire-management and burning regimes are not simply a local concern with regionalised impacts in Cape York. The introduction of the carbon sequestration programme has drawn Aboriginal traditional owners and graziers into engagement with the international carbon trading market, although the carbon sequestration programme tends to be understood in a deeply localised way in Cape York. With carbon credits considered to be both lucrative and problematic by many land managers, further tensions emerge.

Carbon Sequestration

This sharing and co-creation of fire-knowledge between Aboriginal traditional owners, graziers and QPWS rangers is complicated by the existence of the carbon sequestration programme. The carbon sequestration programme was first established in Arnhem

Land in 2005, and since then has been implemented across northern Australia (Russell-Smith *et al.* 2013). Engagement in the carbon credits scheme requires burning to occur each year between the 1st of January and the 31st of July. Any fires that occur after this timeframe, whether deliberate or accidental, threaten the payment that the land manager will receive for burning. The payments that land managers receive do not come directly from the government, but through a third party with whom the land manager has a contract.

The logic behind the carbon credits scheme is based on reducing carbon emissions. Because of the higher fuel load later in the year, as more grasses cure and other vegetation dries out, late-season fires burn hotter, potentially burning larger trees and spreading into the canopy, and release about twice as much carbon dioxide into the atmosphere as an early-season cool burn. Late-season fires also tend to be significantly larger. The carbon credits programme is intended to encourage early-season burns which establish fire-breaks and reduce the fuel load, thus avoiding out of control wildfires later in the season. The financial rewards for carbon credits can be substantial, leading to criticism from various Cape York locals that certain people are damaging the landscape with excessive fire for profit. The carbon credits scheme in Cape York, but even more broadly across all of northern Australia, can be read as an attempt to remunerate Aboriginal people for caring for country and employing traditional land management practices. For Cape York locals, though, this interpretation was rarely considered – probably because settler-descended graziers are equally entitled to engage in the carbon credits programme.

There are varying opinions among Cape York locals about the value and efficacy of the carbon credits programme. It is widely conceded that the carbon credits scheme does deliver some benefits in that it encourages and creates capacity for regular burning that may not have been happening previously. During a discussion between a grazing couple, Bill and Diane, Diane pointed out that since the introduction of carbon credits, hot, out-of-control bushfires have become less frequent. She recalled the regularity of such wildfires when she and Bill first acquired their station, some thirty years earlier, saying:

> (W)e would've burnt when the storms were coming. Like, when we first came here we got burnt out, black, because we didn't have any roads, we didn't have anything. We got burnt black every second year. Just the whole place just burnt, you know, before we did that. But now it seems to be a bit more, not so much … I think that's what they were trying to stop was the out of control late season fires.

Similarly, the Landcare officer for CYNRM, Michael, pointed to the positive impact on the landscape that carbon credits have had. He told me that the impact is perhaps more notable on the western side of Cape York, which historically has often burnt later than the east. Michael explained that, 'that's where the prevailing winds go, and if a fire starts anywhere on the Peninsula Development Road [main highway in Cape York] late in the year it used to keep going until the west coast'. Michael also pointed out that substantial tracts of land in that region of the Cape are Aboriginal land. Importantly, the carbon credits scheme has provided both the financial incentive and the

capacity for traditional owners in that region to burn their country early enough to create fire-breaks to reduce the spread of wildfires.

Carbon credits is often referred to by graziers as 'fairy dust money' because it is considered to be 'money for nothing'. When I initially heard this term, I assumed the grazier in question was denigrating the carbon credits scheme as another pointless government-directed initiative, dreamt up down south and awkwardly applied to Cape York. In conversation with Michael, though, I understood that referring to carbon credits as 'fairy dust money' is related more to graziers' bemusement that they could be financially rewarded for something they have always done, rather than a criticism of the programme. The majority of graziers I worked with in Cape York engaged in the carbon credits programme. Those that did not were unable to do so because of complex limitations around their particular lease agreements rather than because of an ideological position. This gestures towards the radical economic contingency of the region (Neale 2017; Reardon-Smith 2022). Even those graziers who do engage with the programme are critical of what carbon credits is actually achieving.

There has been compelling scholarship on how carbon sequestration projects, particularly in the Global South, have transformed local lives and livelihoods (see Blok 2011; Dalsgaard 2013; Yocum 2016; Valderama 2020). Much of this scholarship details how these projects, precipitated by multinational actors or NGOs, seek to change local practices with a goal to both addressing climate change and contributing to local development, with varying levels of success on both counts (Yocum 2016). As Blok (2011) points out, these kinds of projects then shift the responsibility of carbon emissions and mitigation onto some of the people who have contributed the least to anthropogenic climate change. The situation in Cape York is both different and the same. In some ways, carbon sequestration in Cape York (and across northern Australia) has emerged as a novel way to pay people for the labour that they already do – or at least have been aspiring to do, which is the case for some Aboriginal traditional owner groups who previously lacked the resources to implement wide scale early season burning. Indeed, as noted by Neale (2022), Indigenous carbon credits are understood by carbon trading companies as a kind of 'premium' product due 'their ostensible alignment of Indigenous empowerment and climate change mitigation and, thereby, their virtuousness' (11). In this sense, carbon sequestration is less a transformation of local practices and more a facilitation or recognition of the good work that, in particular, Aboriginal traditional owners (but also cattle graziers) have already been doing. Unlike the carbon sequestration projects in the Global South, in northern Australia these schemes do not seek to transform local relations to land or livelihoods as such. However, in a smaller but nonetheless significant way, carbon credits do transform local burning practices to an extent, and it is these changes that are particularly contentious among land managers.

There was a general sense among graziers that carbon credits encourages the wrong type of fire-management by providing payment for cool burns which may lead to melaleuca encroachment, otherwise called woody thickening. Carbon credits can also provide incentives for land managers to burn substantial swathes of their country each year, instead of engaging in mosaic burns which allow each section of country

to rest in between burns. Many graziers neighbour parcels of Aboriginal freehold land which do not operate as active cattle stations. According to these graziers, their Aboriginal Land Trust neighbours get the vast majority of their income from the carbon credits scheme and tend to over-burn, with ramifications for woody thickening.

The same critique was put forward by several QPWS rangers at Rinyirru NP. They told me that a neighbouring Land Trust had burnt far too much land over a short period of time, rushing to get their burning completed before the carbon credits cut-off date at the end of July. The QPWS rangers I spoke to characterised such burning as unnecessary and irresponsible, motivated purely by financial incentives rather than a desire to care for or clean up the country.

The narrative that carbon credits allows traditional owners to be financially rewarded for caring for country is complicated by the reality on the ground. Not only does the carbon credits scheme encourage a different and less beneficial type of fire regime than might have existed previously, but the burning itself is frequently carried out by a Landcare or CYNRM employee in a helicopter. Thus, in some ways the carbon credits scheme can be understood as precipitating a new type of burning regime rather than paying people for the work they already do; and this is not only the case for Aboriginal traditional owners. Graziers, too, admit to such a tendency. Such a sentiment was summed up succinctly by one grazier who, when asked if he believed carbon credits has changed the way people burn, replied, 'Oh shit, big time! I even know people who know better, will say, oh well I need that money.'

Despite the carbon sequestration programme being premised on mitigating carbon emissions because of a changing climate, the concept of climate change rarely came into conversations about fire. In Cape York, controlled burning and wildfires have always been a reality for people living on the land. The impacts of a longer, less predictable and more catastrophic fire season are not being felt in Cape York the way that they are being felt in the southern part of the Australian continent. For many graziers in Cape York, who tend to characterise shifts in weather patterns as 'natural cycles' (Connor & Higginbotham 2013; Connor 2016), the concept of climate change represents an ideology or belief system, rather than a reality. Thus, the purpose of the carbon sequestration programme – ostensibly to reduce carbon emissions – is obscured or ignored by many of the people who engage in the programme. Instead, the programme is discussed by graziers and QPWS rangers, in particular, to criticise some Aboriginal groups' burning regimes which are perceived as being detrimental to the country.

However, as is evident in the way that graziers simultaneously critique and take part in carbon credits, it is difficult for financially marginal people to reject the offer of these payments. The same is evidently true of Aboriginal land trusts that are criticised by their neighbours for burning too much land for profit. The coercive power that financial reward holds encourages land managers to engage in the programme, even as they continue to harbour concerns. The carbon credits scheme provides a route to maintaining fire-regimes as it remunerates land managers for their work, but it is constraining in that it encourages only one kind of burning. Furthermore, in this

reification of what constitutes an appropriate burning regime for northern Australia, the various inconvenient impacts of exclusively implementing cool burns are glossed over.

Engagement in the carbon credits system is ubiquitous among eligible Cape York land managers, because, as grazier Bill pointed out, people 'need that money'. Despite the claims of Cape York land managers that carbon credits is 'fairy dust money', or, money-for-nothing, at least some people would contend that carbon credits has transformed the way that people burn and has shifted people's priorities for burning. Instead of burning to cultivate a particular kind of preferred landscape, some graziers and Aboriginal groups are compelled to burn more than they normally would to ensure that they receive payment. Using fire to maintain particular landscapes for particular purposes, though, remains a concern – particularly for graziers. Many graziers implement storm burning to lessen some of the effects of cool fires despite the risk this poses to their receiving carbon credits. This is a type of burning that is considered by some people to be vital in maintaining the landscape, providing insights into what constitutes different kinds of preferred landscapes for different people.

Storm Burning

I am driving through a forested section of Lama Lama National Park with graziers Alan and Bev who lease Tidewater Station, situated between Rinyirru NP and Lama Lama NP. It has been a while since they have driven on this road, as bogginess had rendered it impassable until late in the dry season. As we drive through the forest, Alan and Bev observe that 'the country has thickened up a bit' since this section of land was excised from their station some 10 years prior. Alan and Bev explain to me that the woody thickening here would have been much worse, had they not been able to continue implementing storm burns for some years after the land transfer.

In order to counter the issue of woody thickening or melaleuca encroachment which most people understand as related to cool burns, most land managers also engage in another type of controlled burning called storm burning. Storm burns can occur only within a tight window, after the first rain has come, but before the wet season sets in properly. Some years there are only a handful of days in which it is appropriate to storm burn. Storm burns are understood by land managers to be essential to counteract the woody thickening that cool burns encourage, as these fires are hot enough to burn 'suckers' (melaleuca saplings) and are effective for cleaning up the country and maintaining open grasslands. Pam, an experienced grazier, explained to me why she does storm burning:

> You need a hot fire to control the regrowth or thickening – whatever you want to call it … To reduce the thickening. Our problem is we've got too many trees. We shouldn't have this many trees. It should be a lot open-er. And we've got to keep it open. The only way you can keep it open is to have really hot fires in the dry weather. And not in the proper dry, just before the storms. It's got to be big humidity.

Storm burning is an attempt to counteract some of the consequences of the widespread implementation of cool burns. While many land managers engage in both types of burning, several graziers expressed to me their belief in the primacy of a pre-human 'natural' fire regime. One experienced grazier, Bill, who actively implements a burning regime involving both cool burns to establish firebreaks, and storm burns to maintain open savanna landscapes, discussed his belief that Aboriginal burning regimes, grazier burning regimes and, now, the carbon sequestration programme have disturbed a 'natural' and preferable type of burning. Early on in our interactions, Bill voiced his belief to me that before either European settlers or Aboriginal people were in Australia, the only way the country would burn was from lightning strikes – that is, late in the dry season, immediately before the wet, when dry electrical storms sweep across the region as the monsoon builds. Later, when I conducted an interview with Bill, he elaborated on his perspective:

> I just think we're going dead opposite to nature. Nature, before anybody interfered as far as I'm concerned, was hot fires, storm time, when lightning struck. You know, that was before white-fella or blackfella, anyone interfered. And that's my argument. Why are we going dead opposite to nature with the burning? Why are we burning now? Because no way in the world [would] nature have burnt this time in the year. It couldn't. It only burnt come November … October, November, December, when lighting come around. And I just think this is really wrong, this early burning. That's what's thickening the country up.

These ideas of a 'natural' fire regime are shared by a variety of graziers. Another grazier, Martha, told me that she believes 'nature' intends for fires to occur in the late season and burn hot, and this is what the country relies on to maintain open savanna landscapes. 'I reckon nature's been around a lot longer than any people', Martha reasoned to me. Yet another grazier shared this belief in a natural fire regime, and suggested that Aboriginal people likely 'messed up' the natural way of things with their burning, whereas hot, lightning-strike fires would have kept the country open.

Graziers here are drawing a distinction between 'nature' and 'culture', which goes back to the key ontological and epistemological assumption in Western thought that nature and culture are separate. Today, it is more or less accepted in the social sciences that both 'nature' and 'culture' and the relation between them are constructed in particular ways to serve particular ends (Descola & Pálsson 1996; Pálsson 1996; Escobar 2008; Descola 2013). Descola and Pálsson (1996) argue that the ontological category of 'nature', as separate from culture, is unique to Western societies. They argue that despite notions of 'wildness' existing in some form in many societies, what is significant to a Western ontology and epistemology is the reliance on a binary framework: nature in opposition to culture. These ontological assumptions underpinned the preservationist model that National Parks are based on.

Many anthropologists have criticised the assumptions that such a preservationist model rests upon, pointing out that the landscapes which governments may wish to protect from people are already socialised and culturalised landscapes (Cronon 1996; Head 2000; Balée 2013). That is, they have already been altered, transformed, exploited and nurtured by people over long periods of time, resulting in contemporary

landscapes that may appear 'natural' but are in fact the result of human effort, labour and care. As Langton writes,

> The Aboriginal objections to the term 'wilderness' do not, of course, constitute an objection to the protection of natural values, but rather a demand for recognition of the cultural content of biophysical landscapes and the extent of the interdependence of cultural and natural values, at least in those landscapes where there has been almost uninterrupted Aboriginal management for millennia. (1998: 10)

This is very much the case for Cape York, particularly in relation to the importance of continuing fire regimes in managing vegetation and landscapes. While graziers are not disputing that Aboriginal people have socialised the landscapes of Cape York through burning regimes, they are suggesting that such burning regimes are 'going dead opposite to nature'. Graziers position both historical and contemporary fire management to be a human intervention that has caused unwanted changes to the landscape. Yet, graziers continue to fire the landscape.

The notion that storm burning is necessary hinges upon two related ideas underpinned by particular sets of knowledge and ontologies: that Cape York ought to be comprised of open savanna grasslands, and that the only pre-human (and thus natural) fire would have occurred from lightning strikes during storms. What mostly goes unsaid is that open savanna grasslands are preferable for grazing cattle. The fact that graziers understand a cattle-appropriate landscape to be a more 'natural' landscape is related to how graziers frame the landscape of Cape York and their role in it in general. The notion that cattle and the landscape in Cape York are a natural fit emerges from the value that graziers see in labouring on and with the land, and the centrality of cattle to their ability to live and work in Cape York.

Graziers' sense of belonging to the region is deeply entwined with their physical labouring on the land, and this labour is mediated by their relationship to cattle. For graziers, their way of life – as graziers, as people from the bush – is related to how they understand their cultural place in the world. Graziers' existence in the world is entwined with cattle on multiple levels. Of particular importance is how graziers come to experience landscapes as mediated by cattle, in a similar vein to how both Dominy (2001) and Gray (1999) describe sheep as shaping pastoralists' relationships to land. Graziers tend to talk about landscapes, weather conditions and vegetation in terms of how they may impact on cattle. Similarly, what they perceive to be a 'good' landscape is one that is conducive to grazing cattle – a landscape free of melaleuca encroachment. As I have discussed elsewhere (Reardon-Smith 2021), graziers' relationships to cattle and cattle-appropriate landscapes are not purely economic but is instead about a particular valued way of being in the world. By suggesting that such a preferable landscape is the result of a 'natural' fire regime, graziers dismiss the changes caused to ecosystems by extensive and long-term burning regimes. Yet, despite this belief in a 'natural' fire regime, many graziers both engage in burning and understand the disruption to 'natural' fire as achieved by human activity. Only the sole grazier in this study who disputed the dominant narrative around cool

burns and woody thickening seems to perceive human fire regimes as somewhat irrelevant.

Storm burns were not discussed with me in detail by either Aboriginal traditional owners or QPWS rangers. While some QPWS rangers who were concerned about the impacts of melaleuca encroachment did position storm burning as necessary, though tricky to implement because of the risk-averse nature of QPWS management, in general storm burning seemed to be a preoccupation for graziers. This is because even though QPWS, Aboriginal and grazier fire-regimes look similar and result in similar outcomes, the ontological basis and purpose for each fire-regime differs. Fire-regimes on grazier's properties are ultimately intended to preserve pasture. They implement cool burns and mosaic burns to encourage the growth of grass and to establish firebreaks that will save their pasture from being destroyed in out-of-control hot fires late in the season. Because these cool burns are understood to encourage melaleuca thickening, graziers also implement storm burns to try and allow the landscape to remain open. While they position this as an attempt to maintain the 'natural' savanna landscape of Cape York, this is evidently preferable to woody thickening because it allows for more pasture to grow and for graziers to more easily and economically grow cattle. Graziers' practices are related to what they understand a 'natural' fire regime to be, albeit in a controlled fashion in order to produce a particular outcome. In their storm burning, they seek to mimic what they believe was happening 'before whitefella or blackfella, anyone, interfered'. Thus, there is a tension here between the hierarchical relationship they construct between 'natural' and 'cultural' fire. However, in practicing storm burning, the binary between 'natural' and 'cultural' fire – and between 'nature' and 'culture' in general – that graziers have constructed becomes unstuck.

Conclusion

Fire in its various forms structures land management and involves different values around land and how people understand the human role in managing landscapes. Despite fire management regimes looking quite similar from land manager to land manager, these burning practices emphasise different things. For Aboriginal traditional owners, fire management is a cultural activity, whereas for graziers burning is about preserving pasture and mimicking what they understand to be a 'natural' or pre-human burning regime. These relationships to fire differ from those of QPWS rangers, who base their fire-management on Western science and hazard reduction. As I have described, Aboriginal burning has been adapted and transformed through the intercultural spaces that existed on cattle stations. In Cape York, it is now difficult and, indeed, counter-productive, to demarcate Aboriginal fire-management from cattle station fire-management. The kind of burning regime employed today on Aboriginal land, pastoral leases and National Parks is modelled on the burning that was carried out by Aboriginal stock workers and graziers on cattle stations. In this 'zone' of interaction (Merlan 2005), such burning likely underwent adaptation and change, and served multiple uses for different people simultaneously. Shared

contemporary burning practices, then, are the result of the intercultural co-creation of environmental knowledge.

In this analysis, fire-management can be understood as a site of tension and interaction in which the interacting of different groups of people, different types of fire-knowledge and the government-initiated carbon sequestration programme give rise to new types of burning and new forms of critique. Graziers critique the tendency of QPWS and some Aboriginal groups in Cape York to exclusively implement cool burns, suggesting that storm burns are needed in order to emulate a 'natural' (pre-human) fire regime. This is related to the idea among graziers that savanna landscapes should be open. Entwined with this notion is the reality that an open savanna landscape is more advantageous for running cattle. Grazier burning is, then, largely concerned with protecting and preserving pasture, reflecting the value they place in their own labour and a workable landscape.

It is through historical and contemporary forms of everyday interaction that contemporary burning regimes in Cape York emerged and persist. Such intercultural interactions allowed for the sharing and co-creation of fire-related knowledge. However, the divergent purposes that seemingly similar burning regimes are geared towards gives rise to tensions between groups of land managers. The interaction between different groups of people, different fire-ontologies and a government-led response to climate change through the carbon sequestration programme precipitate both new types of burning, and new forms of critique.

Notes

1. Joint management is the formal power sharing system whereby National Parks are managed in equal parts by the Queensland Parks and Wildlife Service (QPWS) and an Aboriginal corporation representing the Aboriginal Traditional Owners of the region.
2. While I have retained the actual names of the National Parks, the names of cattle stations and some individuals have been changed to protect anonymity.

Acknowledgements

This paper has benefited from generous comments and suggestions from Ase Ottosson, Linda Connor, Luis Angosto-Ferrandez and the anonymous reviewers.

Disclosure Statement

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

Funding

This research was supported by an Australian Government Research Training Programme (RTP) Scholarship 2017–2020 and the Carlyle Greenwell Research Fund from the Department of Anthropology, University of Sydney 2017–2019.

Ethics Approval

The research project was approved by the University of Sydney Human Research Ethics Committee and it adheres to the relevant protocols and guidelines for research with Aboriginal and Torres Strait Islander people and other human participants (project number 2017/972).

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References

Anderson, Jon C. 1985. *The Political and Economic Basis of Kuku-Yulanji Social History* (PhD thesis). The University of Queensland, Brisbane, Australia.

Balée, William. 2013. *Cultural Forests of the Amazon: A Historical Ecology of People and Their Landscapes*. Tuscaloosa, AL: University of Alabama Press.

Berkes, Fikret. 1993. Traditional Ecological Knowledge in Perspective. In *Traditional Ecological Knowledge: Concepts and Cases*, edited by Julian T. Inglis, 1–10. Ottawa: International Development Research Centre.

Blok, Anders. 2011. Clash of the Eco-Sciences: Carbon Marketization, Environmental NGOs and Performativity as Politics. *Economy and Society*, 40(3):451–476.

Bowman, David M. J. S. 1998. Tansley Review No. 101. The Impact of Aboriginal Landscape Burning on the Australian Biota. *New Phytologist*, 140(3):385–410.

Bradley, John. 1995. Fire: Emotion and Politics: A Yanyuwa Case Study. In *Country in Flames: Proceedings of the 1994 Symposium on Biodiversity and Fire in North Australia*, edited by Deborah Bird Rose, 25–32. Biodiversity Series, Paper No. 3. Canberra: Biodiversity Unit, Department of Environment, Sport and Territories.

Connor, Linda H. 2016. *Climate Change and Anthropos: Planet, People and Places*. New York: Routledge.

Connor, Linda H. & Nick Higginbotham. 2013. 'Natural Cycles' in Lay Understandings of Climate Change. *Global Environmental Change*, 23(6):1852–1861.

Cook, Gary D., Sue Jackson & Richard J. Williams. 2012. A Revolution in Northern Australian Fire Management: Recognition of Indigenous Knowledge, Practice and Management. In *Flammable Australia: Fire Regimes, Biodiversity and Ecosystems in a Changing World*, edited by Richard J. Williams, A. Malcolm Gill & Ross A. Bradstock, 293–306. Collingwood, VIC: CSIRO Publishing.

Cowlishaw, Gillian. 1988. *Black, White or Brindle: Race in Rural Australia*. Cambridge: Cambridge University Press.

Cronon, William. 1996. The Trouble with Wilderness: Or, Getting Back to the Wrong Nature. *Environmental History*, 1(1):7–28.

Dalsgaard, Steffan. 2013. The Commensurability of Carbon: Making Value and Money of Climate Change. *HAU: Journal of Ethnographic Theory*, 3(1):80–98.

Davis, Jim. 2003. Indigenous Land Management. In *Australia Burning: Fire, Ecology, Policy and Management Issues*, edited by G. Cary, D. Lindenmayer & S. Dovers, 219–223. Collingwood, VIC: CSIRO Publishing.

Descola, Philippe. 2013. *Beyond Nature and Culture*. Chicago; London: University of Chicago Press.

Descola, Philippe & Gisli Pálsson. 1996. *Nature and Society: Anthropological Perspectives*. London: Routledge.

Dominy, Michelle. 2001. *Calling the Station Home: Place and Identity in New Zealand's High Country*. Oxford: Rowman & Littlefield Publishers, Inc.

Eloy, Ludivine, Bibiana A. Bilbao, Jayalaxshmi Mistry & Isabel B. Schmidt. 2019. From Fire Suppression to Fire Management: Advances and Resistances to Changes in Fire Policy in the Savannas of Brazil and Venezuela. *The Geographical Journal*, 185:10–22.

Eriksen, Christine. 2007. Why Do They Burn the 'Bush'? Fire, Rural Livelihoods, and Conservation in Zambia. *The Geographical Journal*, 173(3):242–256.

Escobar, Arturo. 2008. *Territories of Difference: Place, Movements, Life, Redes*. Durham/London: Duke University Press.
Freeman, Dean, Bhiamie Williamson & Jessica Weir. 2021. Cultural Burning and Public Sector Practice in the Australian Capital Territory. *Australian Geographer*, 52(2):111–129.
Galvin, Shaila S. 2018. Interspecies Relations and Agrarian Worlds. *Annual Review of Anthropology*, 47:233–249.
Gill, Nicholas & Alistair Paterson. 2007. A Work in Progress: Aboriginal People and Pastoral Cultural Heritage in Australia. In *Geographies of Australian Heritages: Loving a Sunburnt Country?*, edited by Brian J. Shaw & Roy Jones, 113–131. Farnham: Ashgate Publishing.
Gray, John. 1999. Open Spaces and Dwelling Places: Being at Home on Hill Farms in the Scottish Borders. *American Ethnologist*, 26(2):440–460.
Haraway, Donna. 2008. *When Species Meet.* Minneapolis: University of Minnesota Press.
Head, Lesley. 1994. Landscapes Socialised by Fire: Post-Contact Changes in Aboriginal Fire Use in Northern Australia, and Implications for Prehistory. *Archaeology in Oceania*, 29(3):172–181.
———. 2000. *Second Nature: The History and Implications of Australia as Aboriginal Landscape*. Syracuse, NY: Syracuse University Press.
Hinkson, Melinda & Ben Smith. 2005. Introduction: Conceptual Moves Towards an Intercultural Analysis. *Oceania*, 75(3):157–166.
Howitt, Richard & Sandra Suchet-Pearson. 2006. Rethinking the Building Blocks: Ontological Pluralism and the Idea of 'Management'. *Geografiska Annaler*, 88B(3):323–335.
Kull, Christian A. 2002. Madagascar Aflame: Landscape Burning as Peasant Protest, Resistance or a Resource Management Tool? *Political Geography*, 21:927–953.
Langton, Marcia. 1998. *Burning Questions: Emerging Environmental Issues for Indigenous Peoples in Northern Australia*. Darwin: Centre for Indigenous Natural and Cultural Resource Management, Northern Territory University.
Laris, Paul. 2002. Burning the Seasonal Mosaic: Preventative Burning Strategies in the Wooded Savanna of Southern Mali. *Human Ecology*, 30(2):155–186.
May, Dawn. 1994. *Aboriginal Labour and the Cattle Industry: Queensland from White Settlement to the Present*. Cambridge: Cambridge University Press.
McGrath, Anne. 1987. *Born in the Cattle: Aborigines in Cattle Country*. Sydney: Allen & Unwin Australia.
Merlan, Francesca. 1998. *Caging the Rainbow: Places, Politics and Aborigines in a North Australian Town*. Honolulu: University of Hawaii Press.
———. 2005. Explorations Towards Intercultural Accounts of Socio-Cultural Reproduction and Change. *Oceania*, 75(3):167–182.
Moura, Livia C., Aldicir O. Scariot, Isabel B. Schmidt, Robin Beatty & Jeremy Russell-Smith. 2019. The Legacy of Colonial Fire Management Policies on Traditional Livelihoods and Ecological Sustainability in Savannas: Impacts, Consequences, New Directions. *Journal of Environmental Management*, 232:600–606.
Nadasdy, Paul. 1999. The Politics of TEK: Power and the 'Integration' of Knowledge. *Arctic Anthropology*, 36(1/2):1–18.
Neale, Timothy. 2017. *Wild Articulations: Environmentalism and Indigeneity in Northern Australia*. Honolulu: University of Hawai'i Press.
———. 2022. Interscalar Maintenance: Configuring an Indigenous 'Premium Carbon Product' in Northern Australia (and Beyond). *Journal of the Royal Anthropological Institute*.
Ockwell, David & Yvonne Rydin. 2006. Conflicting Discourses of Knowledge: Understanding the Policy Adoption of Pro-Burning Knowledge Claims in Cape York Peninsula, Australia. *Environmental Politics*, 15(3):379–398.
Ottosson, Ase. 2010. Aboriginal Music and Passion: Interculturality and Difference in Australian Desert Towns. *Ethnos*, 75(3):275–300.
———. 2012. The Intercultural Crafting of *Real* Aboriginal Country and Manhood in Central Australia. *The Australian Journal of Anthropology*, 12:179–196.

Pálsson, Gisli. 1996. Human-Environment Relations: Orientalism, Paternalism and Communalism. In *Nature and Society: Anthropological Perspectives*, edited by Philppe Descola & Gisli Pálsson, 63–81. London: Routledge.

Perry, Justin J., Melissa Sinclair, Horace Wikmunea, Sidney Wolmby, David Martin & Bruce Martin. 2018. The Divergence of Traditional Aboriginal and Contemporary Fire Management Practices on Traditional Lands, Cape York Peninsula, Northern Australia. *Ecological Management & Restoration*, 19(1):24–31.

Petty, Aaron M., Vanessa de Koninck & Ben Orlove. 2015. Cleaning, Protecting, or Abating? Making Indigenous Fire Management 'Work' in Northern Australia. *Journal of Ethnobiology*, 35(1):140–162.

Reardon-Smith, Mardi J. 2021. 'We are the Ones Who Know the Intimacies of the Soil': Grazier Claims to Belonging and Changing Land Relations in Cape York Peninsula, Queensland. *The Australian Journal of Anthropology*, 33(2):340–355.

———. 2022. Grappling with Weeds: Invasive Species and Hybrid Landscapes in Cape York Peninsula, Far Northeast Australia. *Environmental Values*. doi:10.3197/096327122X16491521047044.

Redmond, Anthony. 2005. Strange Relatives: Mutualities and Dependencies Between Aborigines and Pastoralists in the Northern Kimberley. *Oceania*, 75(3):234–246.

Ritchie, David. 2009. 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 Jeremey Russell-Smith, Peter Whitehead & Peter Cooke, 23–40. Collingwood: CSIRO Publishing.

Rodríguez, Iokiñe, Bjørn Sletto, Bibiana Bilbao, Isabelle Sánchez-Rose & Alejandra Leal. 2018. Speaking of Fire: Reflexive Governance in Landscape of Social Change and Shifting Local Identities. *Journal of Environmental Policy & Planning*, 20(6):689–703. doi:10.1080/1523908X.2013.766579.

Russell-Smith, Jeremy, Gary D. Cook, Peter M. Cooke, Andrew C. Edwards, Mitchel Lendrum, C. P. Meyer & Peter J. Whitehead. 2013. Managing Fire Regimes in Northern Australian Savannas: Applying Aboriginal Approaches to Contemporary Global Problems. *Frontiers in Ecology and the Environment*, 11(Special Issue 1):55–63.

Schmidt, Isabel B. & Ludivine Eloy. 2020. Fire Regime in the Brazilian Savanna: Recent Changes, Policy and Management. *Flora*, 268:151163.

Shaffer, L. Jen. 2010. Indigenous Fire Use to Manage Savanna Landscapes in Southern Mozambique. *Fire Ecology*, 6:43–59. doi:10.4996/fireecology.0602043.

Simone, Tauri. 2016. *Aboriginal Stockwomen: Their Legacy in the Australian Pastoral Industry* (PhD thesis). Deakin University, Geelong.

Sletto, Bjørn. 2008. The Knowledge That Counts: Institutional Identities, Policy Science, and the Conflict over Fire Management in the Gran Sabana, Venezuela. *World Development*, 36(10):1938–1955.

———. 2011. Conservation Planning, Boundary-Making and Border Terrains: The Desire for Forest and Order in the Gran Sabana, Venezuela. *Geoforum*, 42:197–210.

Smith, Benjamin R. 2003. Pastoralism, Local Knowledge and Australian Aboriginal Development in Northern Queensland. *The Asia Pacific Journal of Anthropology*, 4(1–2):88–104.

Smith, Will, Timothy Neale & Jessica K. Weir. 2021. Persuasion Without Policies: The Work of Reviving Indigenous Peoples' Fire Management in Southern Australia. *Geoforum*, 120:82–92.

Valderama, Sara P. 2020. Disappearing Waste and Wasting Time: From Productive Fallows to Carbon Offset Production in Madagascar's Forests. *Ethnos*. doi:10.1080/00141844.2020.1796737.

Yibarbuk, Dean, Peter J. Whitehead, Jeremy Russell-Smith, Donna Jackson, Charles Godjuwa, Alaric Fisher, Peter Cooke, David Choquenot & David M. J. S. Bowman. 2001. Fire Ecology and Aboriginal Land Management in Central Arnhem Land, Northern Australia: A Tradition of Ecosystem Management. *Journal of Biogeography*, 28(3):325–343.

Yocum, Heather M. 2016. 'It *Becomes* Scientific …': Carbon Accounting for REDD+ in Malawi. *Human Ecology*, 44:677–685. doi:10.1007/s10745-016-9869-y.