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Geographical fire research in Australia: Review and prospects

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Publication Details

Eriksen, C. & Head, L. (2014). Geographical fire research in Australia: Review and prospects. *Geographical Research*, 52 (1), 1-5.

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Geographical fire research in Australia: Review and prospects

Abstract

'You live in the bush. You live by the rules of the bush, and that's it.' These were the reflective words of Mrs Dunlop upon seeing the blackened rubble of her home, which made headline news the morning after the first, and most destructive, fire front tore through the Blue Mountains in New South Wales on 17 October 2013 (Partridge and Levy, 2013). While seemingly a simple statement, it goes right to the heart of heated public and political debates - past and present - over who belongs where and why in the fire-prone landscapes that surround Australia's cities. Bushfire is a constant and ongoing part of Australian history, ecology and culture. The love of a sunburnt country, the beauty and terror of fire, and the filmy veil of post-fire greenness described in the century-old poem 'Core of My Heart' (Mackellar, 1908) are still apt depictions of Australian identity today. Yet longer fire seasons and an increase in extreme fire weather days with climate change add both uncertainty and urgency to Australia's ability to coexist with fire in the future (Head et al., 2013).

Keywords

review, australia, prospects, research, geographical, fire

Disciplines

Education | Social and Behavioral Sciences

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Guest Editorial: Special Issue on Fire

Geographical Fire Research in Australia – Review and Prospects

“You live in the bush. You live by the rules of the bush, and that’s it.” These were the reflective words of Mrs Dunlop upon seeing the blackened rubble of her home, which made headline news the morning after the first, and most destructive, fire front tore through the Blue Mountains in New South Wales on 17 October 2013 (Partridge and Levy 2013). While seemingly a simple statement, it goes right to the heart of heated public and political debates – past and present – over who belongs where and why in the fire-prone landscapes that surround Australia’s cities. Bushfire is a constant and ongoing part of Australian history, ecology and culture. The love of a sunburnt country, the beauty and terror of fire, and the filmy veil of post-fire greenness described in the century-old poem *Core of my Heart* (Mackellar 1908) are still apt depictions of Australian identity today. Yet, longer fire seasons and an increase in extreme fire weather days with climate change add both uncertainty and urgency to Australia’s ability to coexist with fire in the future (Head *et al.* 2013).

As we write this editorial, the smoke still lingers from New South Wales’ October bushfires of 2013 – more than 200 homes have been lost, most of them in the Blue Mountains. In the aftermath of this recent bushfire disaster, we are struck by the enduring timeliness of the contributions in this *Geographical Research* special issue on fire. The papers seem prescient, which is attributable not to an incredible foresight by the authors but to the longstanding tradition of geographical research on which they are building, and a repetitive rhythm in its findings. We explore this repetitive rhythm through a brief overview of all bushfire research published in the two main Australian geography journals, *Geographical Research* and *Australian Geographer* since their inception (a total of 32 articles all listed in the bibliography).¹ This snapshot of Australian geographical fire research is entwined with short introductions to the specific contributions in this special issue.

The myriad ways in which bushfire impacts – directly or indirectly – on everyday life in Australia are reflected in the diverse topics discussed by the papers in this special issue – from insidious bushfire smoke, planning regulations as mitigation strategies, gendered dimensions of bushfire resilience, the scale politics of knowledge, to management of fire-prone vegetation. The current contributions all recognise the complexity of bushfires – the interwoven causes, the lasting effects. Changes in land use and population growth in fire-prone landscapes (particularly in peri-urban areas) combine with warming climates to increase the risk and impact of bushfires. Co-existing with fire over the coming decades will involve increasingly complex trade-offs.

Acknowledging that there is a vigorous debate about whether restricted subdivision, if not planned retreat, from fire-prone peri-urban areas will be necessary (Mercer 2012), the article by Bond and Mercer in this issue highlights the thousands of undeveloped lots already subdivided. They pragmatically discuss the neglected issue of subdivision design in these settings, arguing particularly for greater attention to quality of road access for evacuating residents and incoming fire crews. Such rebuilding of communities after fires provides an important opportunity to make improvements.

Previous articles authored by Mercer and colleagues (2004, 2009, 2011) in *Geographical Research* and *Australian Geographer* were also concerned with debates over land use and fire management, analysing different social constructions and understandings of nature and environmental discourse. These social constructions, Mercer argued, have implications for the success of bushfire adaptation and mitigation strategies. In conducting this research Mercer aimed to inform policy, particularly in regards to land use, and his work reflects the growing emphasis in human geography scholarship more broadly since the 1990s on the indivisibility of nature and culture.

This 'cultural turn' in geography (Gill 2006) coincided with a change in the weighting of physical and human geography articles on fire in the two Australian journals over time. While physical geography was dominant in earlier decades (see Fleeton (1980) and Adrian (1984) for exceptions), contributions from human geography became more frequent from the 1990s onwards.^{2,3,4} Studies by Gill (1994), Cubit (1996), Crowley and Garnett (2000), Hill *et al.* (2000), Whittaker and Mercer (2004), Harte Childs and Hastings (2009), Eriksen *et al.* (2011) argued for the importance of engaging local communities, local knowledge and oral histories in developing sustainable contemporary land management and bushfire mitigation strategies. The study of debates surrounding fire management on public land (Gill 1994; Whittaker and Mercer 2004), as well as the impact of changing land use and ownership types on bushfire vulnerability, were consistent features of human geography scholarship on fire (Cochrane *et al.* 1962; Solomon and Dell 1967; Fleeton 1980; Bardsley *et al.* 1983; Hughes and Mercer 2009; Buxton *et al.* 2011).

As such, the work of Australian human geographers has been cutting edge in geographical research internationally in their focus on the effect of social change on societal perceptions of bushfire risk in an everyday context. This is despite a long-standing international critique of both the dominant biophysical focus of natural hazards research (Kates 1971; Handmer and Dovers 2008) and the problematic tendency in behavioural models to separate knowledge and action (Torry 1979; Watts 1983; Burton *et al.* 1993; Barr 2008). The power of knowledge continues to be a recurrent fire research theme today, including in the commentaries in this special issue. The notion of knowing is explored in Howitt's meditation on what it means to live *with* fire, in pointedly asking what knowledge of adaptation failure looks like before disaster strikes. This question is particularly important in the context of Williams and Gorman-Murray's respective emphases on how knowledge is produced, valued and used by different actors – the powerful as well as those marginalised in contemporary society.

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Engaging the broader community (the powerful and the marginalised) with both the tangible and intangible threats of bushfire is the focus of Eriksen's paper, which builds on her broader work on gendered dimensions of bushfire resilience (Eriksen 2013). In this issue she concentrates on social norms and embedded power relations to highlight a necessary shift away from the 'boys club' engagement culture of rural fire services in order to reduce gendered patterns of vulnerability to bushfire. The benefits of hands-on experience and practice, the strength of networks and the imperative of supportive learning environments are shown as being particularly fruitful ways of engaging women with bushfire safety issues.

Enright and Fontaine discuss another aspect of risk management in this special issue, namely the complex trade-offs involved in Fuel Reduction Burning (FRB) that are exacerbated in a warming climate. Providing a useful review of the literature, they remind us that FRB provides a poor return on investment at a broad scale. Instead it needs to be delivered strategically, for example, by concentrating on areas near human infrastructure. From an ecological point of view, however, increased frequency of FRBs and shorter fire return times tend to have negative outcomes for biodiversity in southwest Australia, particularly if followed by drought.

This discussion of the ecological role and place of fire links to a strong palaeoecological tradition in Australian physical geography. This research analyses pollen, charcoal and other remains in sedimentary cores to reconstruct vegetation and fire regimes over long time periods. It has often compared erosion, productivity, fire regimes and vegetation changes. The prehistoric timeframe of the published work in *Geographical Research* and *Australian Geographer* stretches back to 6000BP. This large body of scholarship sought to establish the extent of human impacts on landscape - both 200 years of European occupation and the much longer period of Aboriginal occupation and land-use. For Holland (1986), Head (1989), Prosser (1990), Boon and Dodson (1992), Liangzhong and Whelan (1993), Bowman and Panton (1994), Dodson *et al.* (1994a), Dodson *et al.* (1994b), Shakeby *et al.* (2003), Black

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and Mooney (2007), and Wittenberg and Inbar (2009), research centred on establishing pre-colonisation fire regimes and assessing the impacts of fire on soil and vegetation.

These contributions in the two Australian journals are part of international debates about environmental changes associated with Aboriginal arrival and ongoing impacts. Australian palaeoecological research of this kind was world leading from the 1970s, because Australia was one of the few places where a long-term hunter-gatherer prehistory was preserved (e.g. Jones 1969, Hallam 1975, Kershaw *et al.* 2007, Lynch *et al.* 2007, Rule *et al.* 2012). The work has always been controversial, and the debates around human impacts are still not resolved.

The article by Johnston and Bowman in this issue reminds us also that the social licence for planned burning is not well established, and that the smoke from both FRB and wildfires has significant but under-acknowledged health impacts. As the residents of the greater Sydney region experienced during October 2013, the impact of smoke extends far beyond the areas actually burning, as a drifting potent mix of toxic gases and particulate matter. Few of these residents will be aware that mortality rates may have increased by up to 5% on those smoke haze days, as is argued by Johnston and Bowman.

The cutting-edge research presented in this special issue and the lessons learnt from a strong tradition of geographical research on bushfire provide much food for thought in times of uncertainty and urgency. We still have much to learn. Yet, geographical fire research in Australia has greatly informed the choices we face as individuals and as a nation in terms of mitigating and adapting to a changing climate.

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#With sincere thanks to Carrie Wilkinson for assistance with the historical literature analysis.

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¹ We compiled an annotated bibliography of all papers relating to bushfire published in *Geographical Research* (formerly known as *Australian Geographical Studies*) and *Australian Geographer* since their inceptions. Our literature review examined key themes, arguments, research methods and paradigms, identifiable changes over time, and links to major bushfires, to create a representative sample of the types of geographical research being undertaken on fire in Australia over the last fifty years or so.

² Neither journal distinguished between or favoured the publishing of articles from human or physical geography. A number of studies combined methods from both human and physical geography to

compare traditional, 'pre-historic' Aboriginal with 'historic' non-Aboriginal cultural approaches to strategic burning. This comparison was based on assessment of the physical impacts of these practices (their continuation and cessation) on vegetation regimes (see, for example, Clark and McLoughlin 1986; Head 1989; Crowley and Garnett 2000; Hill *et al.* 2000; Vigilante 2001).

³ Broadly speaking, the body of scholarship in the two journals dealt with long-term issues rather than focusing on particular events. The scope of the research published has only recently broadened to encompass studies of fire on an international scale – and even then only in *Geographical Research* (Pyne 2001 (international review); Harte Childs and Hastings 2009 (South Africa); Wittenberg and Inbar 2009 (northern-Israel); Galiana-Martin and Karlsson 2012 (Spanish Mediterranean coast)). This arguably reflects the online presence of the journal and its increasing international audience, and is in contrast to the significant contributions by Australian geographers on regional or local studies published in international journals.

⁴ While many of the early studies contributed to methodological development and innovation along the way, the past few years have seen a number of explicitly methodological papers. Muller (2007) proposed a method of constructing chronological fire histories using flowering "scars" on Austral Grasstrees. Mooney *et al.* (2007) argued for the value of palaeoecology in providing practical information for the contemporary management of fire-prone landscapes. Eriksen *et al.* (2011) advocated a mixed-methods approach to provide insight into complex factors that influence bushfire preparedness that have both tangible policy relevance and analytical depth. Galiana-Martin and Karlsson (2012) proposed a methodology for assessing vulnerability of a landscape to bushfire using a synthetic index of vulnerability with cartographical representations and multi-criteria evaluation.