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Knowing wildfire risk: Scientific interactions with risk mitigation policy and practice in Victoria, Australia

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ABSTRACT

Over the past decade, major landscape wildfires (or 'bushfires' in Australia) in fire-prone countries have illustrated the seriousness of this global environmental problem. This natural hazard presents a complex mesh of dynamic factors for those seeking to reduce or manage its costs, as ignitions, hazard behaviour, and the reactions of different human and ecological communities during and after hazard events are all extremely uncertain. But while those at risk of wildfire have been subject to significant research, the social dimensions of its management, including the role of science, have received little attention. This paper reports on a case study of the Barwon-Otway area of Victoria in Australia, a high wildfire risk area that has recently been a pilot site for a new risk mitigation strategy utilising the wildfire simulation model PHOENIX RapidFire. Against simple equations between 'more science' and 'less uncertainty,' this paper presents results from interviews and a workshop with practitioners to investigate how scientific research interacts with and informs both wildfire policy and practice. We suggest that attending to cultural and social specificities of the application of any technical innovation—such as next generation modelling—raises questions for future research about the roles of narrative, performance, and other knowledges in the sedimentation of science.

1. Introduction

Over the past decade, major landscape wildfires in the United States, Chile, Canada and Australia have illustrated the seriousness of the global 'wildfire problem' (Gill et al., 2013). Such wildfires inflict much of their significant socioeconomic and socionatural costs through immediate fire damage and the dispersion of toxic ash and smoke. These costs are likely to rise as wildfires become both more severe and more frequent in fire-prone regions due to climate change (Handmer et al., 2012). At the same time, wildfires present a complex mesh of dynamic factors for those seeking to reduce or manage them, in that ignitions, wildfire behaviour, and the reactions of different human and nonhuman communities during and after wildfires are all highly uncertain (Neale and Weir, 2015). This complexity is indicated in the official Australian definition of natural hazard risk as 'the likelihood of harmful consequences arising from the interaction of hazards, communities and the environment' (COAG, 2011: 22). Such interactional definitions suggest that the pressing task of managing natural hazards, such as wildfire, includes investigating and knowing the interplay of social and scientific dimensions of both hazards and places.

As in natural hazards research more generally, most social research on wildfire has focused upon either the politics of its management or identifying the causes and cures of vulnerabilities in at-risk communities (see Eriksen and Head, 2014; McCaffrey, 2015). Alternately, there has been little research into those professionally engaged in management, a group often called decision-makers and practitioners but that we simply label, following Morss et al. (2005), 'practitioners'. This deficit in present social research is not something we seek to explain but rather to begin to ameliorate, driven by two contentions. First, it does not stand to reason that the social world of hazard governance, however bureaucratic and professionalised, would not also offer complexities and contradictions that parallel those found in at-risk communities. Without their empirics, we cannot begin to understand how different values and forms of knowledge are routinely ordered and prioritised within such anticipatory regimes (Anderson, 2010). Second, though hazard governance is pervasively political and social, it is also driven in diverse ways by physical scientific research. If we hope

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to understand how this research interacts with and informs both public policy and practice we must remain attentive to cultural and social specificities, including the institutions, individuals, and discourses involved. In this paper, we address these aspects of wildfire management through an exemplary case study of the Barwon-Otway region of Victoria, Australia (see Neale et al., 2016).

Though the interface between scientific research, policy and practice has been subject to extensive inquiry, their actual relationships are frequently hard to discern. As Jasanoff states (2003: 227–228), the diffusion of scientific research into practical application is typically imagined to be both linear and unproblematic. As such, responses to difficult environmental problems can be shaped by the fallacies that, for example, scientific uncertainty is the cause of political inaction and that scientific research necessarily reduces uncertainty. However, the global history of climate change science shows that any linear formulations between 'more science,' 'less uncertainty' and 'political action' are inherently flawed (Sarewitz, 2004: 392–393). This is not only because scientific research is a potent topic for political dispute (see Collins and Pinch, 1998), but also because cultural, economic and institutional factors also vitiate the integration of scientific research into other domains (Hulme, 2009). In the translations from the hazardous world to 'the laboratory' – and back again – the contingent events, agents, other forms of knowledge, and concerns driving research and its application are often omitted (Hacking, 1983; Latour, 1987).[1] The many critiques of the linear model of the research-policy nexus suggest that 'science led' or 'science dependent' policy and practice are not simply scientific or technical matters (Briggle, 2014; Hunt and Shackley, 1999); to pretend as such is to ignore the social causes of our successes and failures in addressing environmental issues such as wildfire. In focusing upon science and its innovations we may elide other significant knowledges, and, more acutely, how what counts as authoritatively 'scientific' or 'unscientific' is being naturalised or reordered in a given context.

This paper proceeds by first surveying the intersection between scientific research and public policy, before then outlining the governance of wildfire risk in Victoria, presenting the method and results of the empirical study of mitigation practitioners, and discussing the implications of this case study to our understandings of hazard management. Southwest of the metropolis of Melbourne, the Barwon-Otway area is a high wildfire risk site in Victoria, with large stands of contiguous forest and an extensive wildland-urban interface (see Fig. 1). The area's established but comparatively modest record of fatalities and house losses from wildfires belies its high media and political profile. Since 2009, the area has been used by government agencies as the pilot site for a new approach to the calculation and mitigation of wildfire risk utilising a novel scientific tool: the wildfire simulation model PHOENIX RapidFire ('PHOENIX'). This pilot has been devised with the explicit aim of replacing the existing policy approach, criticised by many researchers, which was endorsed and expanded by the state government in the aftermath of the disastrous 2009 Black Saturday wildfires. The practitioners engaged in this pilot were therefore uniquely positioned to comment on the values and forms of knowledge prioritised in this transition, and provide insight into the cultural and social specificities of an avowedly science-led policy transition.

2. Research, policy and practice

The relation between scientific research and public policy is often imagined as a linear 'pipeline': research gives answers to practical policy questions. However, as political scientist Brian Head argues (2008: 1), policy decisions 'emerge from politics, judgment and debate, rather than being deduced from empirical analysis'. Reviewing the movement towards 'evidence-based' policy from the 1990s onwards, Head suggests that any successful implementation requires systematic research ('science'), program management experience ('practice'), and political judgment. Hunt and Shackley (1999) also suggest that a wealth of research does not simply cause policy change. Diverse capacities and institutions are necessary, though their cumulative and individual effectiveness is 'a quality determined within the interactions of the various players, rather than being essential or exogenous' (Hunt and Shackley, 1999: 162). In short, the 'success' of empirical findings, regulatory instruments and regulatory agencies are interdependent (see also Jacobs et al., 2005; Bosomworth, 2015).

Discussing climate change as an archetype, Head (2014) states that achieving sustainable policy change informed by research hinges on two factors. First, governments must seek to foster innovative research in line with policy goals and, second, they must build broad stakeholder support or legitimation for the resulting policy strategies. This aligns with both empirical studies (e.g. Hickey et al., 2013) that indicate policymakers want research that is socially robust and 'policy relevant' (see McNie, 2007), and the significant literature on co-production and deliberative policy analysis which links sustainable policies to stakeholder involvement in research and design (see Hajer, 2009; Zinn and Fitzsimons, 2014). But while the latter addresses how, as van Kerkhoff and Lebel note (2006: 454), scientific knowledge is 'permeable, changeable, and contestable,' it has focused more on those alienated from policy processes rather than its 'insiders'. As such, though these 'insiders' are often presented in analyses as influential agents, their cultures and ideologies are themselves relatively obscure (see Shackley, 2001; Mørk et al., 2008; Millington et al., 2012). Without a robust account of this layer of practice we will likely remain at a loss to explain the paradoxical paths through which science does and does not enter into natural hazards management. Why, for example, is government-commissioned research about natural hazards often not publicly available in Australia, despite there being no legal impediments (Eburn and Handmer, 2012)?

Two studies illustrate the factors that often vitiate the integration of scientific research into policy and practice. Interviewing over 120 practitioners, Rayner et al. (2005) sought to understand the limited uptake of advanced weather research by water managers in the United States. Overall, they discovered a regime of institutional incentives that encouraged invisibility and conservatism; across the national sector, new tools or information were not sought out because there was little or no reward (and much professional risk) in innovation. What was rewarded, and thereby encouraged, was to cling to standard practice and avoid public scrutiny (Rayner et al., 2005: 209–211). Another study, focusing on the role of research for Colorado's flood risk management practitioners, found similar conservative institutional dynamics, underwritten by the different values and ideals motivating different agents (Morss et al., 2005). These were summarised in the contrast between 'scientists' (those primarily engaged in research) and 'practitioners' (those primarily engaged in management). Whereas the former, for example, are invested in the analysis and reduction of uncertainties and probabilities, the latter are motivated towards justifiable outcomes. What is imprecise to one may be cost effective standard practice to the other. Following Funtowicz and Ravetz (1993), Morss et al. suggest that facts and values are often inverted or intermixed in such 'high stakes' contexts, meaning the availability and use of scientific knowledge are just two factors amongst many in a network of decisions (see Fothergill, 2000; Marincioni, 2007).

[1] Of course, while little research in the physical and social sciences occurs solely in laboratories, 'the laboratory' is a useful placeholder for the experimental context of research.