



Examining bushfire policy in action: Preparedness and behaviour in the 2009 Black Saturday fires



John Handmer^{a,*}, Saffron O'Neill^b

^a Centre for Risk and Community Safety, Mathematical & Geospatial Sciences, RMIT University, GPO Box 2476, Melbourne, Victoria 3001, Australia

^b Geography, College of Life & Environmental Sciences, University of Exeter, Amory Building, Rennes Drive, EX4 4RJ, UK,

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ABSTRACT

An important part of reducing the risk of disaster is the preparedness of the people at risk. Australian bushfire authorities have policies and publicity about what households should do to be prepared – which include knowledge about fire risk, awareness of one's own risk, taking specific steps to reduce risk including having an emergency plan. Yet, there is sparse empirical evidence about the link between preparedness and actual behaviour in the face of a major disaster.

The authors had an opportunity to examine the circumstances surrounding the 172 civilian fatalities which occurred in the 2009 Victorian 'Black Saturday' bushfires, through the examination of a detailed fatality dataset compiled by the Victorian Bushfires Royal Commission. This dataset allows detailed examination of Victorian bushfire safety policy ('Stay or go') in action on a day of extreme fire danger: from preparedness (both before and on the day of the fire) to behaviour on the day of the fire itself.

This analysis presents three overarching findings. First, some aspects of 'Stay or go' appear to be supported: being well-prepared to evacuate remains the safest option in a bushfire; sheltering passively is very dangerous. Second, successful implementation of 'Stay or go' depends on a multitude of factors, which can challenge even the most capable householders. Third, events like Black Saturday challenge the 'Stay or go' approach, and indicate the need for a different approach on extreme fire danger days. We conclude by reflecting on the findings from this research in terms of the most recent changes to bushfire policy in Victoria.

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1. Introduction

It is orthodoxy amongst Australian and international emergency service agencies that those at risk need to be well prepared in order to undertake risk mitigation behaviour. Much effort is thus expended in communicating the nature of the risk, the need to plan for local circumstances (including having a household plan) and the need for an emergency kit. For bushfire, specific behaviours may be advocated including the need to modify buildings and gardens to improve safety; or the need to leave an area in order to avoid danger on high-risk days (e.g. CFA, 2013). Survey data shows that some (up to half in some areas) of the households in wildfire (or bushfire) prone areas have acted on such advice, and have taken wildfire related preparedness measures, including having a household plan (Whittaker et al., 2013; McLennan et al., 2015).

Problems can arise however in the quality or appropriateness of plans, how effective the preparedness approaches are, or how thoroughly people are able to implement their plans. Much published research on householder preparedness emphasises awareness, perception and knowledge of fire risk; and on measuring specific preparatory behaviours, such as having an emergency kit or a water pump for firefighting (McLennan et al., 2014). In effect, this research typically assesses preparedness on the basis of self-assessment of plans and intentions; whereas research examining preparedness against outcomes in the event of a fire is rare.

One study that has examined the relationship between preparedness and outcomes is Haynes et al. (2010) (see also Bianchi et al. 2014). This Australian research drew on coronial reports of bushfire fatalities between 1900 and 2008, and showed that the majority of fatalities occurred as people were carrying out a planned action. This highlights that it is problematic to assume a direct link between preparedness (especially as measured by the proxy of having a fire plan) and effective risk-mitigation behaviour when confronted by bushfire. However, the Haynes et al. (2010)

* Corresponding author.

E-mail addresses: John.handmer@rmit.edu.au (J. Handmer), s.o'neill@exeter.ac.uk (S. O'Neill).

paper did not examine the most recent, and catastrophic, Australian fire. The 2009 Black Saturday bushfires killed 172 civilians, had associated costs of over \$3.5 billion, and was proclaimed as Australia's worst bushfire disaster. Scholarly work has yet to examine how the relationship between preparedness and behaviour plays out in situations of extreme fire danger. Understanding this relationship is especially important as anthropogenic climate change will impact on people's ability to manage fire risk through both extended fire seasons and more severe fire weather (Clarke et al., 2011), and increased heat wave frequency and duration (Alexander and Arblaster, 2009).

Here, we examine bushfire policy in action, through an exploration of preparedness and behaviour among those who died in the 2009 Black Saturday fires. This paper arose from the authors' involvement in the 2009 Victorian Bushfires Royal Commission, a public enquiry established after the fires. The authors were asked to review the fatality data collected by the Commission immediately following the fires, and to examine 'the implications of the fatality dataset for the "Stay or go" policy and for broader community safety action and communications' (Handmer et al., 2010: 9). To do so, the Commission provided access to a fatality dataset with details for each of the 172 civilian fatalities. In this paper, we analyse the dataset using criteria for preparedness and behaviour developed from both bushfire safety policy documents and the research literature. This allowed us to examine bushfire policy in action on a day of extreme fire danger: from preparedness (both before and on the day of the fire) to actual behaviour on the day of the fire itself.

1.1. The evolution of the 'Stay or go' policy

Householders staying and protecting their property during bushfires has a very long history, especially in rural Australia. Lived experience of those at risk of bushfire was that a building protected people from the radiant heat, smoke and embers of a bushfire as the firefront passed through the area; and that active defence of the property (for example, putting out spot fires in the roof eaves before and after the firefront passed over) ensured the viability of the building as a protective structure. This approach formed the basis of the policy 'Prepare, stay and defend, or leave early'; known colloquially as 'Stay or go': being prepared to stay and defend a well prepared property, or having pre-defined triggers to leave well before the fire arrived. This policy was formally adopted by all Australian fire agencies in 2005, although it had long been the unofficial position in some southern states.

To be effective, the stay and defend part of 'Stay or go' makes a number of major assumptions regarding the nature of fire risk including: that there is a single fire front which passes over the building within ~20 min (during which people need protection from radiant heat) and that the property itself, and its location, result in a defensible structure (Lazarus and Elley, 1984). Academic work has shown that 'Stay or go' was a well-founded policy from historic data, in terms of protecting householders and property from fire risk (Handmer and Tibbits, 2005; Handmer and Haynes, 2008).

1.2. Householder preparedness and 'Stay or go'

The UN-ISDR (United Nations Office for Disaster Risk Reduction) defines preparedness as the 'knowledge and capacities [of people and institutions] to effectively anticipate, respond to, and recover from, the impacts of likely, imminent or current hazard events or conditions' (UN-ISDR, 2007). As well as assumptions about property defendability, and number and duration of fire fronts, the 'Stay or go' policy assumed a level of householder preparedness

(e.g. CFA, 2003; Tibbits et al., 2008). In different forms these assumptions apply to most natural hazards (Wisner et al., 2004).

First, 'Stay or go' assumed an *awareness of the fire risk*. People are unlikely to prepare unless they appreciate that a risk has relevance for them or their household. People may be unaware of bushfire risk if they are unfamiliar with a location: for example, if they are holidaymakers or recent migrants to an area.

Second, the policy assumed some *knowledge to mitigate fire risk*. This knowledge is both in preparation for, and in the event of, a fire. Preparatory activities might include modifications to buildings (such as installing water tanks and pumps, or water sprinkler systems) and gardens (such as cutting down overhanging trees, or planting non-flammable species) to improve risk management in the event of a fire. Knowledge also includes that needed to deal with an impending fire risk, such as the need to patrol the property to put out spot fires and prevent ember ignition if defending a property, or carrying drinking water and a blanket in a vehicle in order to more safely evacuate a fire-threatened area. Note that experience from previous knowledge of fire may act to inhibit appropriate response instead of facilitate effective risk-reduction behaviour: peoples' circumstances may be very different for different fire events, for example they may be much older, with an (unrecognised) subsequent reduction in firefighting ability (Kates, 1962).

Third, 'Stay or go' assumed that people had the *capacity to actively defend their property* and that vulnerabilities would be managed (VBRC, 2010a). People needed to have the physical and mental capacity to undertake risk-reduction behaviours for their property before and during the fire event. If this was not the case (for an acute reason, such as consumption of alcohol; or for an ongoing reason, such as a long-term health issue or age), then it was assumed that they would evacuate rather than attempt to defend their property. The capacity to actively defend also depends on being able to defend a particular property during a bushfire. Property defence is impeded by the presence of heavy fuel loads close to the property (e.g. trees overhanging the house), a property on a slope of greater than 10° (uphill slopes cause fire acceleration), and by large or complex property structures (for example, it is more difficult to detect ember attacks in multi-pitch roofs).

Last, the policy assumed the presence of a *fire plan detailing clear, effective and appropriate behavioural intentions in the event of a fire*. Making a fire plan requires some assessment of the costs, risks and benefits of the available options, and a commitment from all involved to follow a particular strategy in the event of a fire. Effective fire plans take into account different likely scenarios, for example, how a fire event will be handled for both regular weekday and weekend household schedules; as well as for other events (such as the presence of visitors, or a sudden family illness or injury). A contingency plan should also be present (e.g. what to do if the household's original intention to stay and defend becomes untenable). A known clear and specific trigger is required to implement the plan.

The policy mandated two options to mitigate risk from bushfire, preparing to stay and protect the building from the fire ('stay and defend') or preparing to evacuate the area early on a day of predicted fire danger ('leave early'). Other options were possible, but were not endorsed and are much more risky: for example, waiting to see what might happen ('wait and see') – likely to lead to a dangerous last-minute evacuation in the face of a firefront (Whittaker et al., 2013); or sheltering from the fire without undertaking active defence ('sheltering passively') and risking the refuge building catching fire.

Arguments against the approach have concerned the reality of the above assumptions – i.e. that a significant proportion of those at risk would defer any decision until they were directly threatened by a nearby fire (Whittaker et al., 2013) – and the presumed

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