Title

Into the Firing Line: Civilian Ingress during the 2013 'Red October' Bushfires, Australia

Running Head

Bushfires and civilian ingress

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This manuscript has not been published or simultaneously submitted for publication elsewhere.

Abstract

A major issue for bushfire management arises when residents decide to leave a safe area and enter the fire zone to rescue or defend their property, pets, loved ones or other assets. Here we use statistical and narrative analyses of data from an online survey and semi-structured interviews with residents affected by the 2013 'Red October' bushfires in New South Wales, Australia. The survey results revealed that of the 58% of respondents who were not at home at the time the threat became apparent, 65% indicated that they attempted to get home prior to

the arrival of the fire front. In doing so, many endangered themselves, their family, friends and emergency services personnel. This paper discusses the shortcomings of bushfire survival plans and official risk communication, which do not cater well for household units that are divided or unattended when a bushfire starts. Findings suggest that to enhance bushfire safety and preparedness, emergency managers should acknowledge and speak more directly to the specific constraints to action for particular social groups at the wildland-urban interface, including families with school age children, commuters and absentee landholders.

Key words

bushfire, ingress/egress, interface communities, risk communication, household preparedness

Acknowledgements

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1 Introduction

Bushfires (wildfires) are an integral and defining part of the history, ecology and culture of Australia. Residents in at-risk communities have historically been encouraged to be well-prepared in recognition that there are situations where fire authorities will be unable to provide timely and sufficient firefighting support to prevent losses to life and property (Whittaker *et al.*, 2013; AFAC, 2012; Handmer and Tibbits, 2005). Disastrous bushfires are predicted to increase in frequency and intensity in the future (Liu *et al.*, 2010; Bradstock *et al.*, 2009; Lucas *et al.*, 2007).

There is growing concern about the increasing numbers of dwellings in the wildland-urban interface (WUI) (McCaffrey *et al.*, 2014; Mutch *et al.*, 2010; Chen and McAneney, 2005). Communities at the WUI typically comprise a mix of residents attracted by favourable real estate prices, geographical location, infrastructure and high amenity values, which make it possible for city careers to be combined with 'rural' lifestyles (Wilkins *et al.*, 2009). However, their lifestyles and environmental values can conflict with bushfire management. The daily commute to work in the city, for example, prevents many residents from being at home during the day should a bushfire start. It also reduces the time available to carry out property maintenance (Eriksen and Gill, 2010).

The expansion of the WUI and, with it, greater proportions of absentee landholders, isolated properties, and a commuting culture reliant on cars, presents both emergency managers and residents with a wicked problem[1]: what are the implications for individuals, households and emergency services when residents are not at home when a fire starts? This paper combines the results of an online survey and in-depth interviews with homeowners affected by the 2013 'Red October' bushfires in New South Wales (NSW), Australia, to better understand residents' decisions and actions when they, or other members of their household, were away from home when the fire threat became apparent. Specifically, this paper is concerned with a post-fire analysis of the factors participants indicated determined and influenced their decision to leave a safe area and enter the fire zone, and the outcomes of such actions.

2 Bushfire safety: managing intentions and actions

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[1] In public policy terms, a "wicked problem" is a problem that cannot clearly be defined or solved (APPC, 2007). Trying to manage this problem may inadvertently create other problems.

2.1 The policy context

Residents in high fire danger areas of Australia have historically been encouraged to make a considered choice to either prepare to stay and defend their property or else prepare to leave early. This longstanding community safety policy position, known (until 2010) as the 'Prepare, Stay and Defend, or Leave Early' policy (PSDLE), drew credence from research into bushfire fatalities and house loss, which show that the likelihood of successfully defending a house is significantly greater when houses are well prepared and residents are able-bodied and mentally prepared (Handmer and Tibbits, 2005; Lazarus and Elley, 1984; Wilson and Ferguson, 1984). There is abundant evidence that evacuating late is dangerous (Krusel and Petris, 1999; Miller *et al.*, 1984; McArthur and Cheney, 1967). Nearly one-third (32%) of bushfire-related fatalities between 1901 and 2008 occurred as residents fled the fire, making it the most common activity at time of death (Haynes *et al.,* 2010).

The PSDLE policy was subject to critical review following the 2009 'Black Saturday' bushfires in Victoria where 113 people perished in their homes (AAP, 2009a, 2009b). The ensuing Victorian Bushfires Royal Commission concluded that, with the exception of 'catastrophic fire events' where no property is considered defendable, the central tenets of PSDLE were theoretically sound but difficult to enforce in practice (Handmer *et al.*, 2010; Teague *et al.,* 2010). Notably, the Commission asserted that the PSDLE approach rested on an unrealistic assumption that all people would either immediately, and exclusively, 'stay and defend' or 'leave' the area early. The policy did not address the reality, supported by research prior to and following 'Black Saturday', that many people wait to see what will happen when a fire threatens before fully committing to a course of action (McLennan *et al*., 2013; Whittaker and Handmer, 2010; Reinholdt *et al.*, 1999). Furthermore, whilst contingency planning was an element of the policy position, it did not translate well into official advice (McLennan and Handmer, 2012; Teague *et al.,* 2010). The Commission's recommendations led to a revised approach – 'Prepare. Act. Survive.' (PAS) – with similar core principles to the PSDLE policy but with greater emphasis on the importance of both physical *and* mental preparedness, and that leaving early is always the safest option (AFAC, 2012).

2.2 Survival plans and official advice

Fire authorities across Australia have devised Bushfire Survival Plan booklets and planning templates to assist residents in physically and mentally preparing themselves and their properties for a bushfire threat (Eriksen *et al.*, Accepted). Their design embodies the precepts of PAS and, as such, readers are prompted to prepare for either defending a well prepared property, or for leaving early. Although there are prompts for contingency planning these documents are essentially based on the assumption that all residents will be at home when a fire starts. This 'complete household' as focus for risk communication was criticised following the 'Black Saturday' bushfires:

> Much attention and effort has been focused on developing policies and procedures to assist people who are in their homes in the event of a bushfire. However, less attention has been given to the needs of those who are not at home when bushfires threaten, including travellers, visitors and tourists, and those located at work, in hospitals or other health facilities, or in schools, kindergartens or child care centres. (Teague *et al.,* 2009, p.206.)

Official crisis communication during bushfires (alerts, television and radio reportage, etc.) is explicit in instructing against "unnecessary travel" during bushfires. Yet, when exactly is travel "unnecessary" given that acceptable levels of "risk" differs between households, individuals and emergency services? Outside of advice concerning evacuation, only four references to advice against "travel" during bushfires were found in official preparedness literature. The NSW Rural Fire Service (RFS) (NSW RFS, 2013 p.4) advises developing a habit of paying attention to local radio and TV on hot, dry, windy days, to assist with daily planning to avoid areas with an increased risk of a bushfire. The South Australia (SA) Country Fire Service (CFS) (SA CFS, 2014b) advises that on severe (Total Fire Ban) days, people should, if possible, avoid travelling into bushfire prone areas. The Queensland (QLD) Fire and Emergency Service (FES), and West Australia (WA) Department of Fire and Emergency Services (DFES) provide the most contextual advice on travelling home during a bushfire. The QLD FES (2015 p.11), for example, prompts readers who plan on leaving early to consider and write down, what they will do if they have sent their children to school that day: "Think about whether or not you will have to travel from work into the fire zone". In advising against travelling near a bushfire, the document also states "You should never take a journey into areas where the fire danger is catastrophic or extreme. You should consider postponing or finding alternative routes if necessary. If you can smell or see smoke in the distance, it is best to U-turn and drive away from the danger" (QLD FES, 2015 p.8). The WA DFES (2014a) informs readers that

they may not be able to get home if away when a fire starts because of road closures. In the context of planning to stay and defend, readers are also prompted to consider and write down what they will do if "you cannot return to your home to actively defend your house (roads blocked)?" (WA DFES, 2014a p.38).

In contrast to most official agency planning advice, Towers' (2013) template for involving children in planning and preparation of family survival plans, is built on the assumption that a household will most likely be divided when a bushfire threat eventuates due to education and employment commitments. This is an important addition, as the limited identified travel-specific advice points to a dearth of official material to assist residents who are regularly absent from their properties, such as commuters, households with school age children, and 'weekenders'. The detailed material available to assist residents devise a plan to either 'stay and defend' or 'leave early', means that residents who may be well-prepared for defending their property or for leaving early if at home when a fire breaks out, may be ill-prepared for the dangers of travelling towards the fire front to get home and implement these plans under intense stress and time-pressure. Only in the most recent round of updates by the SA CFS (2014a p.7), NSW RFS (2013 pp.16-17) and Australian Capital Territory (ACT) Emergency Services Agency (ESA) (2013 pp.16-17) does official advice incorporate prompts to readers to consider school policies for emergency situations, such as bushfires, or if children are home alone. These revisions, however, do not advise against travel during a bushfire or provide advice on how to plan for these scenarios.

2.3 Survival intentions and associated movement

Civilian ingress during bushfires is a surprisingly under-researched topic. Though a large body of scholarship is concerned with better understanding residents' survival related decisions under threat from an imminent, or potential, bushfire, research has mainly focused on the factors likely to determine at-home residents' decisions to 'stay and defend', 'leave early' or 'wait and see' (McNeill *et al.*, 2014; McLennan *et al.*, 2013; Whittaker *et al.*, 2010). This is despite evidence from studies of residents' responses to an actual fire threat, which provide noteworthy exceptions to this general trend. For example, post-fire analyses of residents' preparedness and actions during two bushfires in 2011 at the WUI of Perth, WA, found that a number of residents were not at home when the fires were initially reported (most were at work) and that the majority sought to return home once informed of the threat (Heath *et al.*, 2011; McLennan *et al.*, 2011). Similarly, a majority (83%) of study

participants who were not at home when the fire threat became apparent in North Warrandyte, Victoria (VIC) in 1991 attempted to return home (success rate of 62%) (Beringer, 2000). Data collected from multiple fire events by Reinholdt *et al.* (1999), similarly revealed that 'return to rescue' and 'unsuccessful attempt to return' were two of the main ways people responded to knowledge of a fire threat.

Part of the problems is that questions relating to civilian ingress generally form only a small part of broader post-fire studies with analysis rarely going beyond reporting of simple statistics and trends. A few notable exceptions provide important insights to the motivating factors and implications of civilian ingress during bushfires.

Focussing on the 2005 Wangary Bushfire, SA, Proudley (2010) explored what factors influenced decision-making under threat within families. Interviews identified that the roles that people have within a family unit play a major part in what they do, how they behave and respond during a crisis. A significant number of women were found to be at home alone with infants on the day of the fire, and their heavy reliance on husbands and partners for preparedness, planning and decision-making became a family burden. It not only placed pressure on the partner at home to make survival related decisions, but it also put pressure on the absent partner to return home to rescue or protect their family.

Similarly, research with fire-affected households in both Australia and the USA revealed how egress "only portrays one side of the evacuation coin" (Eriksen, 2014 p.42). For many, getting home by travelling into the line of fire was an equally pressing issue, despite official orders to evacuate. Eriksen (2014) highlights how the need to care for children, elderly relatives, disabled people and other loved ones, including animals, instinctively guides the intended and actual actions of residents absent from home in the face of a bushfire threat. In attempting to get home during a fire, many people take risks, not only via daily commuting routes along narrow winding roads through forests or on mountain slopes but also by diverting to little-known back roads to reduce distance or dodge police blocks. Late evacuations are typically triggered by the appearance of flames or heavy smoke nearby (Whittaker *et al.*, 2013), which heightens the risk of encountering dangers associated with a fire front, such as flames, ember attack, thick smoke, falling trees and rushing traffic (Haynes *et al.*, 2010). However, the very same environmental cues can trigger instinctive urges to "get home". The anxieties associated with a divided household and the dangers of travelling towards, or through, the fire front to collect

children from school or home is explicitly highlighted in Towers' (2013) focus on the wellbeing of children during bushfires. She highlights the possibility that schools will be closed on days of catastrophic fire danger and advises that if people are unable to take time off work, it is important to make advance care preparations for children.

The experiences and decision-making of non-resident horse agistors[2] during the 2003 Canberra bushfires, ACT, reveal that the, then current, PSDLE policy also did not cater for the needs of non-resident agistors (Main, 2010). Many agistors left their residences in the comparably safer confines of Canberra's urban areas and intentionally travelled towards (and through) the fire front to rescue their horses on properties at the WUI. Many agistors "rushed out to the paddocks too late and were stopped by roadblocks" (*ibid*, p.16). Main (2010 p.20) asserts bushfire safety information for horse owners "assumes horse owners are also property owners". This is significant in the context of our study, as bushfire safety information more broadly assumes that the resident will be at home at the time the fire threat eventuates (discussed above).

Although situated in broader discussions of bushfire vulnerability and resilience, the above studies' critical engagement with civilian ingress illustrate that perceptions of 'tolerable' hazard and risk are complex, and influenced by socio-demographic, economic and lifestyle factors alike. In the context of risk and crisis communication, acknowledgement of this is crucial to inform and overcome disparity in perceived risk and consequent actions between, and within, various divisions of the emergency services and individual household members.

2.4 Fatality statistics

It is difficult to discern with certainty if recorded bushfire fatalities are the direct result of attempts to travel through the danger zone to get home. It is equally difficult to discern whether anyone has died whilst defending, leaving or sheltering after successfully entering the fire zone from a safe place. Few studies had specifically examined the circumstances surrounding fatalities, outside of formal coronial inquiry. Notable exceptions are Chambers and Bettingham (1967) and McArthur and Cheney (1967) who assessed civilian deaths during the 1967 Hobart bushfires (see also Haynes *et al.*, 2008), and Krusel and Petris (1999) who examined the

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[2] An 'agistor' is a person who pays to keep their horse on someone else's land (Main, 2010 p.2).

circumstances of civilian fatalities during the 1983 Ash Wednesday Bushfire. More recently, studies of bushfire fatalities have drawn on longitudinal data sets, encompassing data from multiple fire events (Blanchi *et al.*, 2014; Haynes *et al.*, 2010).

Haynes *et al.* (2010) is the only study to explicitly identify fatalities caused by civilians attempting to 'get home'. In analyzing the relationship between gender, age and activity at time of death, they distinguished when a "victim left a safe area and deliberately entered fire zone in order to defend or rescue property or loved ones" (p.187). Across the time period 1900 – 2008, 25 out of a total of 552 civilians were killed whilst "*en route* to defend or rescue" (18 male, 3 female, 4 <18 years of age) (p.190). They highlight that the higher number of fatalities "*en route* to defend or rescue" in the time period 1955 – 2008 (8 male, 3 female, 4 < 18 years of age), compared to ten casualties (all male) in 1900 – 1954, may be explained by the higher prevalence and use of cars since the 1950s.

2.5 Vehicle Safety

It is well documented that cars do not provide as good protection as houses do from radiant heat during bushfires (Auditor General Victoria, 2003). Cars are the most likely mode of transport to be used by residents seeking to outrun a fire front. Twenty-six of the 53 people killed in the 1967 Hobart bushfires died in or near vehicles (Leonard, 2010). Sixteen of the thirty-two civilian fatalities in the 1983 Ash Wednesday fires were vehicle-related (Krusel and Petris, 1999). Eight of the nine fatalities in the 2005 Wangary Bushfire (aka the 2005 Eyre Peninsula fire) perished in their vehicles (AFAC, 2008).

Despite this historical evidence, there are discrepancies in the official discourse on vehicle safety during bushfires. The scholarship on vehicle tenability in bushfire burnover is concerned more with the tenability of firefighting appliances and crew safety, than with civilians (Knight *et al.*, 2003; Mangan, 1997). Research conducted in 2006 dispelled the myth that sheltering in cars is the "second best option" in providing a buffer between people and radiant heat during a bushfire (Leonard, 2010 p.3). The Australasian Fire Authorities Council (AFAC, 2008) accordingly updated its *Guidance for people in cars during bushfires* to highlight that sheltering passively in vehicles can be extremely dangerous and needs to be avoided wherever possible. However, Handmer *et al.* (2010) concluded in their review of fatalities in the 2009 'Black Saturday' bushfires,

that the question of evacuation in cars warranted re-examination given that few people (7) died in cars during the fire.

Regardless of such discrepancies, it is clear that driving even short distances during a bushfire can be extremely dangerous, as noted by Krusel and Petris (1999, p.7):

> Surviving witnesses mentioned the confusion, poor visibility, loss of orientation and conditions hazardous to driving that were present prior to the arrival of the fire. Evacuation was made even more difficult by the fact that people did not know where the fire was, and which roads provided access to safety.

Such conditions are equally applicable to residents attempting to 'get home' by racing the fire front in their vehicles. Routes of ingress and egress easily become bottlenecks when the threat of bushfire looms, or when the movements of fast bushfires are difficult to track. In 1969 seventeen people perished on the highway between Geelong and Melbourne, VIC, under such conditions. However, it is important to note that whereas those who perished in 1969 were not attempting to get home before the fire arrival (rather they were taken by surprise by the fast moving grass fire), those attempting to get home intentionally create a vulnerable situation where they can block or be trapped in traffic, or are unable to outrun flames encountered *en route*.

3 Study Context and Methods

In October 2013, approximately 100 bushfires burnt across eastern NSW, intensified by high temperatures and strong winds. The most damaging fire activity occurred on Thursday 17 October but the severe weather conditions meant the fires continued to threaten communities until Wednesday 23 October. The 'Red October' fires, as they came to be known, destroyed over 200 houses, with hundreds more damaged, in the Blue Mountains, Southern Highlands, Central Coast and Port Stephens areas. This paper reports on the results of a post-fire analysis of resident preparedness and decision-making in communities affected by the 'Red October' bushfires.
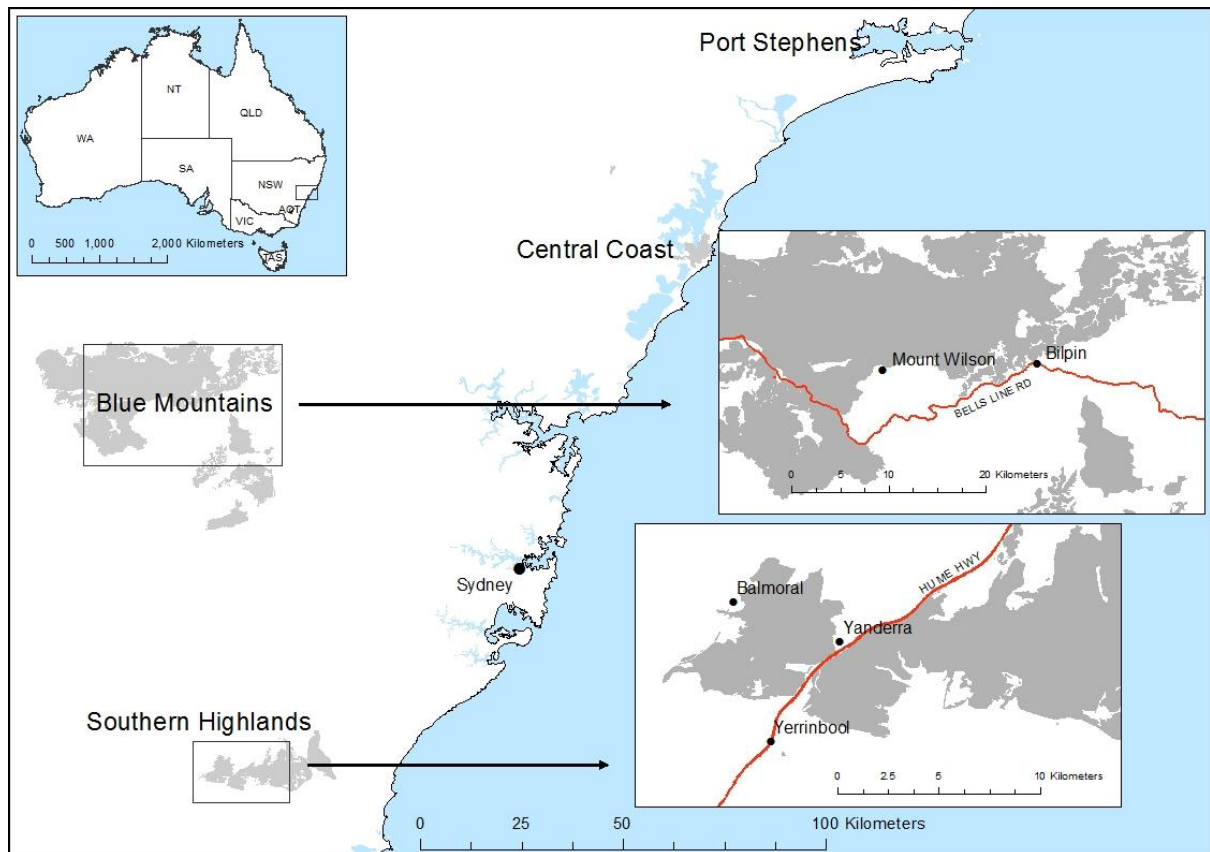
Fig. 1. Map of study areas (black dots with names) and proximity to the footprint of the 2013 'Red October' bushfires (areas shaded grey), NSW, Australia (map drawn by B. Horsey, 2014).

The study was conducted across a number of study sites (Figure 1), using data collected through an online survey (Horsey and Penman, 2014) as well as semi-structured interviews (McLennan *et al.,* 2014; Wilkinson *et al.,* 2014). Basic characteristics of the survey and interview participants are outlined in Table 1. The online survey was created via Survey Monkey© and advertised through the email lists and social media of the NSW RFS, as well as social media of the authors and their institutional affiliations. Due to the infinite number of potential viewers of social media, it is not possible to determine a total response rate for the online survey. The online survey consisted of 108 questions that covered a range of topics, including previous bushfire experiences, household preparedness, actions before and during the fire, and information sourcing. This paper specifically draws on the survey questions that identify whether respondents were at home at the time the fire threat first became apparent, and their consequent actions, including whether they attempted to get home and if they were successful in their attempt (see Tables 2 and 3).

Table 1: Characteristics of the survey and interview participants

	Online Survey	Southern Highlands Post-Fire Interviews	Blue Mountains Post-Fire Interviews
Localities	Blue Mountains, Southern Highlands, Central Coast, Port Stephens	Yanderra, Yerrinbool and Balmoral ('Hall Road Fire')	Bilpin and Mount Wilson ('State Mine Fire')
Number of interviews	-	25	18
Number of research participants	589 (212 male, 377 female)	30 (14 male, 16 female)	23 (14 male, 9 female)
Number not at home	287	11	10
Number who attempted to returned home	185	9	9

The long duration of the 'Red October' bushfires, and the fact that some communities were on alert for several weeks before they were affected, meant that many residents 'came and went', for work and lifestyle reasons, a number of times before the fire posed a threat to their properties. The design of the online survey made it difficult to capture respondents' movements across the multiple days of the event. To give greater validity to the conclusions drawn from the online survey, we triangulated the survey results with narratives documented in semi-structured interviews with residents affected by the bushfires in the Southern Highlands (McLennan *et al.,* 2014) and Blue Mountains regions (Wilkinson *et al.,* 2014).

A total of 589 complete surveys were returned between December 2013 and February 2014. The majority of these came from residents affected by the Links View (n = 254), Hall Road (n = 154), Mount York (n = 60) and State Mine (n = 51) fires in the Blue Mountains and Southern Highlands regions. Fewer surveys were completed by residents affected by fires on the Central and North Coasts (n = 70 total). Pearson's Chi-Squared test of contingencies was used to evaluate the statistical significance of survey components. All analyses were conducted using the 'R' statistical package software. Women more commonly responded to the survey (64%) and the majority of all respondents were between 35 and 54 years of age (52%).

The semi-structured interviews aimed to elicit in-depth narratives of residents' direct experience of the bushfires. In December 2013, residents of five communities were interviewed on their properties. The study areas were chosen due to their proximity to the recent bushfires: Yanderra, Yerrinbool and Balmoral in the Southern Highlands, affected by the Hall Road Fire, and Mt Wilson and Bilpin in the Blue Mountains, affected by the State Mine Fire (Figure 1). In the communities of Yanderra, Yerrinbool and Balmoral interviewees were selected via door knocking along streets delineating the WUI located in closest proximity to the fire. Participation was voluntary as well as dependent on residents being at home at the time of the door knock. In the

communities of Mt Wilson and Bilpin, interviewees were purposefully selected based on their participation in research that had been conducted with residents in both locales during May-June 2013 as part of a broader project examining risk and amenity (Gill *et al.*, 2015). No further attempts were made to recruit further participants in any of the study areas due to budgetary and time constraints. With the participants' permission, all of the interviews were audio-recorded and later transcribed verbatim.

Given the survey advertising and interview recruitment methods, both samples are potentially biased towards people with direct personal bushfire experience and/or already interested in fire management to some extent. Therefore, the data does not represent a completely randomised sample, and represents a more optimistic scenario for the extent of planning. The qualitative interview data were subjected to systematic coding and analysis in QSR NVivo 10.0, a computer-assisted qualitative data analysis software program. An iterative process of identifying appropriate codes was followed to capture *a priori* and emergent themes. The interview quotes used in this paper are verbatim and have been chosen because they reflect attitudes, beliefs and concerns shared by the participants in this study.

4 Research Findings and Discussion

4.1 Racing the fire front

More than half (58%) of survey respondents were not at home at the time the fire threat became apparent (Table 2). This corresponds with broader societal trends, with a growing number of Australians choosing to combine city careers with rural lifestyles at the WUI since the 1960s (Wilkins *et al.,* 2009). Improvement in road systems has furthermore contributed to Australia becoming a nation reliant on cars (ABS, 2013). Employees are now commuting for longer, in traffic that is more congested, to reach their place of work (Flood and Barabato, 2005). More women (46%) than men (35%) were at home when the fire threat eventuated[3] (see also Haynes *et al.,* 2010), which is consistent with Flood and Barabato's (2005) observation that, on average, men spend more time travelling to and from work each week than women.

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[3] X-squared = 5.5359, df = 1, p-value = 0.01863

Table 2: Comparison of civilian ingress during the 'Red October' bushfires, by gender[4]

	Were you at home when the fire threat became apparent?			Did you try and get home?			Were you successful in getting home?		
	Yes (%)	No (%)	Total (n)	Yes (%)	No (%)	Total (n)	Yes (%)	No (%)	Total (n)
Men	35%	65%	172	58%	42%	112	89%	11%	64
Women	46%	54%	324	69%	31%	173	75%	25%	118
Total	42%	58%	496	65%	35%	285	80%	20%	184

Of the 58% (n = 288) of survey respondents who stated that they were not at home at the time the threat became apparent, 64% (n = 185) indicated that they attempted to get home prior to the arrival of the fire front. Almost eighty percent (n = 147) of these attempts were successful[5]. As reflected in the interview quote below, landholders expressed an array of expectations of the ease with which they would be able to get home in time:

> I was in Melbourne when you had the really bad weather here and things took off, but I had a couple of days. And then I had a day to prepare once I got back just to make sure everything was right… [My wife] didn't do anything, because, well first of all it's my job, and secondly it wasn't about to, you know, consume her and the house. It was some distance away; you could see it over there on the ridge so we knew we had some time. (Works locally, male, Bilpin, State Mine Fire)

Fires can ignite, move and impact upon property rapidly leaving residents with little or no time for adequate preparation (Penman *et al.*, 2013). Many study participants did not appear to question the distance from which they, or other members of their household, worked or studied, and the time it would take them to cover this distance to get home in the event of a fire. Indeed, there was an *expectation* expressed by many interview participants that they would be able to get home before the fire affected property:

> I just didn't anticipate the roads to be blocked so early. I thought I'd have a reasonable opportunity to get back and help her [my wife] with things. But yeah, the fire moved in so quickly that [it] sort of took everyone by surprise a bit… The expectation was that I would get back in time. That I could help her

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[4] More women than men were home at the time (p-value = 0.01863); women were marginally more likely to try and get home compared with men (p-value = 0.06723); men were more successful at getting home than women were (p-value = 0.04436).

[5] The discrepancy between reported n values in the text vs. Table 2 is due to some respondents not answering all survey questions.

move everything out and yes, we're probably cutting it fine but the fire just beat us, it moved in too quick. It was pretty hopeless. (Commuter, male, Yanderra, Hall Road Fire)

I work over at North Sydney so I was just buried in traffic for hours, I wasn't getting back any time soon…. It takes me an hour and a half even if the roads are good to get back. And by the time I'd gotten to Campbelltown, the traffic was already starting to bank up. (Commuter, male, Yanderra, Hall Road Fire)

The majority of interviewees reported being "surprised" by the speed of the fast moving fire. Several were also "surprised" by the extent and seemingly early set up of road blocks preventing access to threatened areas. Table 3 examines the relationship between the time taken to get home, and the time between first learning of the fire and actual impact.

Table 3: Comparison of time between first knowledge of the fire, actual impact, and travel time to return home.

(n = 177)[6]	How long after you first learnt of the fire did it threaten your home or the area close to your home?				
How long did it take you to get home?	**< 15 mins**	**15 – 30 mins**	**30 – 60 mins**	**1 – 2 hours**	**> 2 hours**
Unsuccessful	35%	38%	28%	17%	10%
< 15 mins	18%	24%	11%	8%	9%
15 – 30 mins	12%	5%	11%	17%	18%
30 – 60 mins	12%	19%	25%	17%	21%
1 – 2 hours	12%	9%	14%	21%	21%
> 2 hours	12%	5%	11%	21%	21%
Total (n)	**17**	**21**	**28**	**24**	**87**

Analysis of survey respondents who reported that the fire threatened their homes within one hour of first learning of the threat (n = 66), reveals that several travelled through potentially dangerous environments. Forty-six percent (n = 30) successfully returned home within that first hour. Most then had less than 60 minutes to activate their survival plan. As indicated in the interviews, for some residents this involved rescuing loved ones and assets and leaving the area under threat (see Sections 4.2 – 4.5).

4.2 Roadblocks and rationales for travel

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[6] Eight responses (of the 185 respondents who indicated that they attempted to get home once they found out about the fire) were removed from this analysis, as they did not answer both follow up questions.

Twenty percent of survey respondents reported that they were unsuccessful in their attempts to get home after learning of the bushfire threat. The interviews provide greater insight into these difficulties with several participants encountering roadblocks on route, which they described as adding an additional level of anxiety and distress. The roadblocks (more so than the fire) were (in their opinion) what separated them from their family and prevented them from assisting with last minute preparations, rescuing pets or livestock, or actively defending their home. In attempts to bypass the road-blocks many interviewees described travelling on unofficial back roads to get home. These roadblocks had been put in place by authorities to keep people out of the fire zone – an area considered dangerous because of the active and unpredictable movement of the fire front:

> [Female participant]: We've got a business in Lithgow, where the fire started, which was interesting. On that day [our daughter] was also working and we were both in Lithgow. The fire had started there the day before, so we knew about it but we wouldn't have gone to Lithgow that day if we'd realised how quickly that was going to change everything. I tried to get out the back way and couldn't get through, couldn't get out of Lithgow. Because I had to get back to get [our daughter from work]… So then I had to go the long way around and I drove through Winmalee, only about ten minutes before the fire started there. [My husband] rang me and said he got through Little Hartley.
> [Male participant]: We've being going up and down there for 22 years. I know all the little hidey holes so we got through. (Commuters, Bilpin, State Mine Fire)

The heightened anxiety felt when separated from their family and pets prompted many to drive into the fire zone, despite official advice to the contrary. Such narratives provide insight into rationales for travel during the heat of the moment when what would ordinarily be perceived as an unacceptably hazardous action is outweighed by the urge to protect others:

> My wife and the two boys were all here apart from me, I was still at work… My wife was here because she was crook and it was just dumb luck she was actually at home because the boys normally come home and unlock the house themselves, so there's nobody here until about five o'clock at least. It was just luck that there was somebody here, that [my wife] could pack up some stuff and organise the kids and liaise with the police and so on to get things done. Otherwise I'm concerned about how it would

have unfolded. Because they blocked off the roads very, very early so we didn't have a chance to get back and no matter how much you spoke to the police about the fact that, "Look, I need to get back there, I don't intend on staying, I just need to get back because the kids are here." (Commuter, male, Yanderra, Hall Road Fire)

[My wife] didn't want to go at all… over the whole 8 days she left and came back probably three times. So three separate nights, and yeah, so we pushed it to the limit. So the kids were here too, but on those three days they had to go, so they all went… We just judged the risk on the day. (Stay-at-home dad, Bilpin, State Mine Fire)

Although the resident in the latter quote was at home when the fire threat became apparent, his narrative is representative of a number of interview participants, particularly those with young children or pets, who reported multiple accounts of ingress and egress prior to the dissipation of the fire threat. In this particular case, the anxiety of family separation resulted in multiple accounts of the wife and children evacuating and returning to the house. This again demonstrates the crucial role children play in the decision-making of households members separated during bushfires (Towers, 2013).

4.3 "Preparation" vs. "Response"

The adaptive capacity of households relies heavily upon residents having an appreciation of the potential risks embedded within extreme weather warnings, as well as the foresight and ability to act upon such warnings in the days, weeks and months prior to a bushfire. The 2009 Victorian Bushfires Royal Commission (Teague *et al.,* 2010) found that despite widespread public warning that high temperatures and winds would likely create catastrophic fire conditions on 7 February 2009, many people living in bushfire prone areas had no grasp of the implications such severe weather conditions could have on the fire threat. Prior to the events of October 2013, many of the residents we surveyed and interviewed had taken considerable measures to actively prepare themselves and their property for bushfire but in the majority of cases, pivotal preventative action was not taken until the fire threat was imminent. This is consistent with research more broadly, which shows that even when residents have several days warning of a potential fire threat, many wait until there is an actual and immediate threat before taking action (Tibbits and Whittaker, 2007). By then, time is insufficient to adequately prepare the

property and oneself physically and mentally for the task at hand (Penman *et al.*, 2013).

> I just started to prepare the house as best I could. Got up, cleaned the gutters, and put some water in the gutters and stuff like that. Luckily, the power had come back on momentarily, which allowed me to get the hose going and water and stuff. (Works locally, male, Balmoral, Hall Road Fire)

> By the time the fires came I had about four inches of water in the bottom of our dam, it was completely empty. (Works locally, male, Bilpin, State Mine Fire)

> We'd been overseas and had been here very little in the previous three months and so all of the winter leaves left over from autumn, all the kindling that had fallen around the shed and around the water tanks. I mean, there's mess still here that I never got down to clean up. So I had a mad day just working so hard to try to get all of the stuff ready. (Retiree, male, Mt Wilson, State Mine Fire)

Several interview participants on town water had not envisaged or planned for power outages and did not have a generator or back-up water supply. Others with independent water supplies did not have sufficient reserves (in their opinion) to defend their property. Furthermore, whilst it was important for many study respondents to get home - especially those who had pre-arranged firefighting mechanisms in place to protect their homes - some explicitly expressed that they felt it was essential they be there to make 'last-minute-tune-ups' to the property. It was envisaged that these "preparations" would precede active defence:

> The thing that I'd say that was fortunate was the coincidence that I happened to be here and was able to implement all of those correction methods, prevention methods. (Retiree, male, Mt Wilson, State Mine Fire)

> I think we were pretty well set up. I did have to clean out a wasps nest out of my tickers, you know, the sprinklers? I've got two boom sprays towards half the backyard. There were wasps' nests in them. And I had to make sure the pumps all worked. (Commuter, male, Bilpin, State Mine Fire)

Even those who planned on leaving early did not adequately prepare to do so. Many had not considered what they would pack or what they would do if they were not at home at the time of the fire to grab packed belongings:

> We both got the notification on our phones when we were at work. I rushed home. My first instincts were to take care of the animals and put them in the car, and then pack up all our important things like our certificates and passports and things that we couldn't replace that well. By that time I had been packing up for about an hour. (Commuter, female, Balmoral, Hall Road Fire)

The consistent reference by interview participants to the importance of being able to get home to implement modifications to the house and grounds (including packing to leave again) reflects the practical aspects of preparedness emphasised in risk communication (such as checklists). However, it is important to note that these actions were actually responses triggered by the immanency of the fire threat. This confusion over what being "well prepared" for bushfire means on paper and in practice has become a recognized public policy issue. In the wake of the 2009 'Black Saturday' bushfires, for example, Handmer *et al.* (2010) found that many of the people killed were undertaking "response" actions rather than "preparations" prior to impact of the fire. To reduce the number of lives and houses lost during bushfires Eriksen and Prior (2013) and Penman *et al.* (2013) emphasise the need for risk communication to clearly define and explain *why* practical household preparation tasks need to be completed on a regular basis.

4.4 Leaving work: the consent of employers

Several interview participants described seeking permission from their employers before leaving work on the day of the fire. For some, the pressure of ensuring their manager was informed of their decision to leave work, and that this action was justified, caused delays:

> I was at work and basically had to go up to my boss and say, "Look, I've got a message, there's fires in our area so I've got to go", and lucky enough what I was working on at work wasn't critical to be done that day. So that was my first instinct, "Oh, can I leave my work? Are other people dependent on what I'm doing?" (Commuter, female, Balmoral, Hall Road Fire)

Such incidences amongst commuters who worked in the city raises the question: what role should employers play in preparing their employees for bushfire? Whilst the SA Country Fire Service (SA CFS, n.d.) and VIC Country Fire Authority (VIC CFA, 2014) distribute detailed information kits pertaining to bushfire safety and preparedness for businesses, for the most part, these documents do not look at preparing employees for bushfire beyond the workplace. Employers could play an active role in promoting bushfire safety education specific to the needs of commuting employees. This would also ensure that a conversation has taken place between the employer and employee with regards to the company's policy on leaving work to attend to a bushfire and employees knowing their rights to do so (or not).

4.5 Caring for pets via neighbourhood networks

Several interview participants described anxieties relating to pets as a motivating factor for getting home. In their absence, many friends and neighbours attempted to rescue and defend pets and livestock, some by leaving a safe area:

> The neighbours were actually the ones that got my horses out. You know, I was stuck trying to get home. And they got the horses out to another friend's property. (Commuter, female, Yanderra, Hall Road Fire)

> We rushed back. Everyone was gathered outside the fire station. There were fireys [sic. firefighters] everywhere. I was in a panic 'cause the neighbours were crying because they said, "We tried to get [your dog] but you were out". And I said, "Yes, but I always leave the door open just in case". I do. On a day like that, I would leave the door open, but they didn't know and they hadn't tried the door so that's when the neighbours said, "Come on, we'll go and get him". I said, "No, I'm going to run down and get him. I don't want you going in your car." She said, "You can't run down". Anyway, we came to the top of the road… and the fireys let us through. I was quite surprised. I just said, "My dog's down there". He said, "Go straight there, get him, come straight back." That's what I did and then we all sat or stood and watched the fire go through. (Retiree, female, Balmoral, Hall Road Fire)

These narratives bring to light the benefits of communicating with neighbours prior to a fire breaking out. Although no physical harm came to the people and pets involved in the above example, had neighbours known that the back door was left open in the event of extreme fire weather, they may have been able to rescue her dog as they evacuated the area, averting the need to return to the fire threat. This provides another example as to why risk communication needs to clearly explain the importance of preparing a bushfire survival plan that involves and has been discussed with family, friends, and neighbours alike in case of contingency planning.

5 Conclusion

Though official advice is explicit in instructing against "unnecessary travel" during bushfires, to date there has been no consistent advice on how to adequately prepare for and cope with the known issue of residents, who are not at home when a bushfire starts, leaving a safe area and entering the fire zone to rescue or defend property, pets and loved ones. What constitutes a "tolerable" hazard and risk, and to whom, is a grey area of bushfire resilience literature. While it is widely agreed that physically and mentally prepared people can defend well-prepared houses in less than catastrophic conditions if they are at home to implement their survival plan, much less focus has been placed on the matter of residents placing themselves and others in danger in order to return to their property upon learning of an imminent threat.

One reason for prompting debate on this matter is the emphasis in this paper on the infeasibility of travelling under threat through the vegetated terrain that often defines WUI landscapes. This problem is exacerbated with the high level of residents who commute on a daily basis to the city, thus attempting to return via limited and congested routes, which are simultaneously relied upon by emergency vehicles and evacuating residents travelling at speed. Fast-moving bushfires furthermore decrease the likelihood of anyone having sufficient time to return home or find a structure suitable for shelter *en route*. History has shown that most bushfire fatalities are the result of people being caught out while travelling either on foot or in vehicles (Haynes *et al.,* 2010). Several studies have documented the dangers associated with late evacuation (as referenced in Sections 2.3 and 2.4), reinforcing the importance of clearly communicating about how to plan for timely evacuation. Far less emphasis has been placed on the similar dangers involved in "getting home" during a bushfire, in part because official advice against entering a fire zone leaves little room for debate about the alternatives that residents resort to. Yet, as this study and other research have repeatedly shown, a significant proportion of WUI residents attempt

to return home upon learning of a bushfire threatening their home and/or family. To simply ban residents from returning home during a bushfire with roadblocks or mandatory evacuation orders is therefore a simplistic and short-sighted solution to an overtly complex and ongoing issue. It highlights the need for further research that compares different types of communities, residents' planned action with their actual movements during a bushfire threat, and their rationales for or against travel in or out of a fire zone.

Effectively translating the 'Prepare. Act. Survive.' policy into practice therefore remains a challenging work in progress. There is room for improvement in terms of official documents and planning templates accommodating the increasingly common occurrence of residents being away from home when the fire threat eventuates. Bushfire safety advice needs to be more detailed and flexible to assist residents with diverse backgrounds and lifestyles, including parents, commuters, and absentee landholders, to make informed decisions of the likely benefits and costs associated with attempting to get home in uncertain and dangerous conditions. The wicked problem of civilian ingress during bushfires requires innovative solutions that can be successfully worked across agencies and residents if the risk of people entering the fire zone unprepared is to be avoided. For example, packing a box with vital belongings (documents, photos, medication, clothes) and taking it to work on catastrophic and extreme fire danger days could be a standard part of commuting through bushfire-prone landscapes. Employers could play an active role in promoting bushfire safety education specific to the needs of commuting employees. Creating contingency plans for children, the elderly, people with disabilities, and pets that involves neighbours, schools, employers, family or friends, could ensure that alternatives to travelling towards, or through a fire front, have been considered and agreed upon before the threat eventuates.

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Title:
Into the firing line: civilian ingress during the 2013 "Red October" bushfires, Australia

Date:
2016-01

Citation:
Wilkinson, C., Eriksen, C. & Penman, T. (2016). Into the firing line: civilian ingress during the 2013 "Red October" bushfires, Australia. NATURAL HAZARDS, 80 (1), pp.521-538. https://doi.org/10.1007/s11069-015-1982-5.

Persistent Link:
http://hdl.handle.net/11343/282955