# *HOUSEHOLDER PREPAREDNESS AND RESPONSE IN THE EYRE PENINSULA BUSHFIRE*

*Alan Rhodes* [A,B]
[A] CFA, Victoria, Australia
[B] Collaborative Institute for Research, Consulting and Learning in Evaluation, RMIT University, Australia

## Abstract
There is an increasing recognition by emergency services that the safety of the community during major bushfires depends on people having the capacity to protect themselves and their assets. Householder self-reliance and capacity underpin the advice that people plan whether they will stay and defend or leave early. A post-fire survey of people affected by the January 2005 bushfire on the Eyre Peninsula highlighted many issues related to developing greater self-reliance. The descriptive study identified that the level of understanding of the risk, the preparation and how people responded were variable and often inadequate resulting in different configurations of vulnerability across sub-groups. The paper contends that vulnerability reflects people's reasoning and the choices they make in responding to the risk both prior to, and during the fire. This reasoning is shaped by a complex array of factors operating at both the macro level of social and community structures and the micro level of individual psychology and experience that either enable or constrain particular choices. Efforts to develop greater self-reliance must be directed towards understanding the particular nature of the vulnerability and enabling different reasoning processes that lead people to make more appropriate decisions in response to risk.

Keywords: wildfire, community safety, warnings, vulnerability, self-reliance

## Introduction
In recent years major fires have taken a heavy toll on communities around Australia. Recent inquires into major fires and reviews of fire prevention have addressed a common set of themes relating to community preparedness and response (Auditor General Victoria, 2003; Ellis, Kanowski, & Whelan, 2004; Esplin, Gill, & Enright, 2003; Mcleod, 2003). Prominent amongst these issues has been the capacity of people to respond effectively, their actions during a fire and the role of warnings. However, there are relatively few studies of communities affected by major bushfires that have described people's preparedness and response to the fire. The January 2005 bushfire on the Lower Eyre Peninsula of South Australia was one of the most destructive bushfires in South Australian history and it provided an opportunity to investigate community preparedness and response during a major fire. The objectives of the research were to provide a description of people's preparedness and response and to identify factors that may influence the development of self-reliance. The study was one of several Bushfire Cooperative Research Centre projects undertaken to provide input to the inquiry by the South Australian State Coroner. This paper presents a summary of findings detailed in the report provided to the coroner (Rhodes, 2005).

## Key Issues in Community Preparedness and Response
There is a great deal people can do to improve their bushfire safety. It is increasingly recognised that the safety of the community in major fires, in large part depends on the preparedness of householders and the community, and the capacity of people to respond appropriately during the fire. The focus on community safety and risk management in Australian fire services over recent years reflects the growing emphasis on partnerships between agencies and communities and the importance of developing community capacity and householder self-reliance in order to deal with the threat of bushfires (Smith, Nicholson, & Collett, 1996).

Given that in major bushfires, the fire service is unlikely to be able to provide adequate protection to every property, the safety of people and the protection of property depend largely on people's decisions and actions, both prior to and during the event. In relation to bushfires, the likelihood that people will have to fend for themselves for at least part of the time is reflected in advice to the community about how to deal with the bushfire risk. Extensive research demonstrates that well prepared and defended houses have a much greater chance of surviving a bushfire (Handmer & Tibbits, 2005). Further, the most effective way to protect life is for people to either leave the area well before a fire arrives or to stay and defend a well-prepared house and shelter from radiant heat during the passage of the fire front (Krusel & Petris, 1992). This research underpins Australian fire services' advice to the public about what to do during a bushfire (AFAC, 2005). Another major issue consistently identified in inquiries and highlighted again in reports on recent major fires, is the role and effectiveness of warnings. The effectiveness of warnings is in part related to the level of preparedness of those receiving the warning in that better prepared households tend to be less reliant on official warnings (Boxelaar & Reinholtd, 2000; Drabek, 1999; Mileti & Peek, 2000). Although emergency services endeavour to provide information to the community, the reality of major fires

is that this is difficult and often people experience bushfires with limited information to guide their response. Fire services stress the need for people to be aware of their local environment and to be proactive in obtaining information during a fire, again reflecting the importance of self-reliance.

It is the contention of this paper that the logic of the fire service position is sound and well supported by research, but in reality large numbers of people living in bushfire prone areas are highly vulnerable and have limited capacity to deal effectively with a major bushfire. A community of self-reliant and prepared households is a desirable but as yet unrealised goal. The study of preparedness and response in the Eyre Peninsula bushfire dramatically illustrates the challenges faced by those who seek to promote greater community responsibility. Further, the paper contends that vulnerability reflects the choices people make in responding to the risk both prior to, and during the fire. This reasoning is shaped by a complex array of factors operating at both the macro level of social and community structures and the micro level of individual psychology and experience that either enable or constrain particular choices. Efforts to develop greater self-reliance must be directed towards enabling different reasoning processes that lead people to make decisions that reduce vulnerability and enhance safety.

## 10th and 11th January Bushfire on the Eyre Peninsula

The Lower Eyre Peninsula is a relatively isolated and sparsely populated coastal region located at the southern section of the Eyre Peninsula. The area is mostly flat or gently undulating with extensive agricultural activities of cereal cropping and grazing. The area consists largely of grassland, crops with scattered areas of native scrub and forest, particularly on the hills. Port Lincoln is a town of 14,000 people and provides a service and business centre for the region as well as being the centre for a large fishing and tourist industry. There are several small townships along the coast and several small settlements and towns scattered through the farming district. ABS 2001 Census data indicates that there are 300 dwellings in the fire-affected area with a population of 650 people, 448 aged 20 years or older, with 52% male. The bushfire on the Lower Eyre Peninsula was a severe fire event. The peak grassland fire danger index was over 350 and the fire had an average rate of spread of 17 km/hr before the westerly wind change (Gould, 2005). The fire burnt over 77,000ha. of grassland, stubble, shrubby woodland and forest fuels. Nine people died and 93 homes were destroyed, numerous other buildings, vehicles and equipment and over 46,000 stock were destroyed (Smith, 2005).

## Methodology

The focus of the research was people's preparedness and response to the fire, and the role of warnings and information. The issues were investigated using a questionnaire administered by telephone to residents and owners of property in the fire-affected area over several weeks in May 2005. The contact details were obtained from a database of households that had registered for assistance or were identified as being affected by the fire by various recovery agencies. An attempt was made to contact all those on the database. Of the 547 people on the database, 336 households were successfully contacted and 288 completed the questionnaire (88% response). The survey sought to obtain a response from one person per household. The questionnaire was developed specifically for the study of the Eyre Peninsula bushfire, based on a number of post incident surveys of major bushfires by the author and colleagues (CFA, 2003; Odgers & Rhodes, 2002). The questionnaire sought to investigate people's response to the fire as well as perceptions, attitudes and actions prior to the fire. The questionnaire consisted of a structured interview schedule of questions with defined responses and a number of open-ended questions to which interviewers recorded summary statements. These statements were coded for analysis.

## Key Findings

The Protective Action Decision Model (Lindell & Perry, 1992) describes the decision making process in response to risk and a range of factors; situational, social context and individual characteristics, that influence the decision making process. Although developed as a model of response to warning, a similar decision making process applies when people consider how to respond to risks in the environment. This decision making involves risk identification, 'does the threat exist?'; risk assessment, 'is protection needed?; and risk reduction, 'is protection feasible?'. This model provides a useful framework through which to examine the preparedness and response of people affected by the Eyre Peninsula fire. The following sections present key findings, firstly in relation to preparedness, followed by an examination of people's response to the fire and the role of warnings.

### *Recognition of the bushfire risk*

Approximately 34% of respondents indicated that they thought a bushfire was unlikely or very unlikely to occur in the area and over 51% reported that they thought the threat to life and property was low or very low. Critical awareness of the risk reflects the level of concern about the risk as represented by the self-reported salience of the

issue of bushfires in people's thoughts or conversations with others (Paton, 2003). It might be expected that if people's perception of the risk is high, they are likely to be concerned about the risk and hence report 'thinking about' or 'talking with others' about the issue. However, about one in three who believed that the threat to life and property was high or very high, were still low in terms of their critical awareness of bushfire. There was a strong tendency for people living in coastal areas, compared with those living in more rural and farming areas to believe a fire was unlikely, that it posed a less significant threat and to be less concerned generally about the risk of fire.

*Assessment of the risk prior to the fire*

In assessing whether people felt the need to take action, respondents were asked about perceived responsibility for dealing with the threat of fire at their property and their expectations of assistance from the fire service. The majority (71%) felt they were 'totally' or 'mostly responsible' for dealing with the threat to their property. However, when assessing agency responsibility, 36% felt that the fire service or government was 'totally' or 'mostly responsible' while 41% felt that the fire service or government were 'somewhat responsible'. Respondents were also asked whether, prior to the bushfire, they expected to receive assistance from the fire service to protect their house and property. Nearly three-quarters of respondents (74%) strongly agreed or agreed that they expected such assistance. Of those who were at their property, a smaller proportion (48%) expected to receive assistance during the fire. Renters were much less likely to feel responsible for dealing with the threat of fire compared with those who owned the property and respondents in the 18-34 age groups also were more inclined to feel 'not responsible at all' or 'only slightly responsible' compared with older age groups. People living on large farms and members of CFS were more likely to feel responsible for dealing with the threat.

A significant minority of people in the area did not recognise the risk of bushfires in the area. Even amongst those familiar with fire through their experience of using it as part of farm practice or from fighting fires, many appear to have underestimated the risk. Those living in the more residential coastal areas in particular appeared to regard the risk of fire as low. There was also a high level of expectation of assistance from the fire service if the fire occurred and amongst some sub-groups, there was a perception that the fire services and government had the greatest responsibility for dealing with the bushfire risk. Such attitudes are likely to reduce the incentive to undertake preparation action. Further, while the majority appear to have been concerned about the risk, in many cases this concern failed to translate to significant action to plan and prepare for the occurrence of a fire.

*Risk reduction prior to the fire*

If people recognise the risk and identify a need to take action, it is important to understand what actions they intend to take. Approximately 60% of respondents indicated that they had made a firm decision or plan about what they would do if a fire occurred. The responses are shown in table 1.

**Table 1: Intended protective action if a bushfire occurred**

| **Intended protective action (N=170)** | **%** |
|---|---|
| Stay and try to protect property throughout the fire | 51 |
| Do as much as possible to protect the property but leave if threatened by the fire | 24 |
| Leave as soon as I know there is a fire and before it reaches the immediate area | 16 |
| Wait and see what happens but leave if feel threatened by the fire | 8 |
| Wait for emergency services to tell me what to do | 1 |
| I would not be at home as I intend to leave on days of total fire ban | <1 |

While just over half those who had made a decision intended to stay, a large minority indicated that they intended to take action that is contrary to the advice of the fire services, including those who intended to leave as soon as they knew of a fire in the area (16%), who would be likely to face significant danger if there was no warning.

In terms of the actions people had taken to prepare their properties, most reported taking actions that were either relatively simple (e.g. clear gutters of leaves) or are commonly done for reasons other than fire protection.(have buckets and ladders available, or mow grass around house). Measures that were more complex or specific to fire protection (e.g. cover gaps and vents, prepared protective clothing, have fire fighting hoses and pump) were less likely to be implemented and with a significant proportion (10-30%) of residents indicating that they would be unlikely to take such actions. Although over half the respondents indicated they had made a firm decision or plan about what they would do if a bushfire occurred, very few had undertaken actions that might underpin such a plan, such as discussing it with all members of the household, considering how it might need to change in different situations, or having communicated the plan to others.

There were significant differences between respondents on large farms and those on small properties and in the coastal residential areas. Those on farming properties were more likely to intend to stay and defend their property and were more likely to have taken more preparation measures, including those specific to bushfire protection. However there were no significant differences in the extent of planning about what to do.

There were quite widespread misconceptions about the value of staying to defend a house during a fire. Nearly half (48%) of the respondents reported that 'there is not much people can do to protect their property in a major fire', and 42% believed that 'staying during a fire puts life at risk'. However 86% believed 'staying could increase the chance of house survival' and 87% recognised that 'houses can provide protection during a fire'. Some of these expectations about the outcomes of various actions appear contradictory, highlighting the complexity of people's decision making. The differences in these attitudes between sub-groups were not significant, although there was a tendency for people living in residential settings to be less inclined to recognise that staying was a safe option.

*Recognition of the heightened bushfire risk – 10/11 January, 2005*

Most people (87%) reported that they knew there had been a fire in the general area on 10 January. Of those who knew of the fire (N=240), the majority (39%) had seen smoke, 27% knew about the fire from friends, family or neighbours, 19% had heard a media announcement, and 13% knew about the fire through the local brigade. Despite the widespread knowledge of the fire the level of concern was varied. A small number (6%) reported they 'didn't think about the fire' whereas 21% 'thought it might spread but would not affect them', while the largest group (48%) thought 'the fire was under control or would not spread'. Only a quarter (25%) thought' the fire could spread and affect their property'. Most people (78%) were also aware that 11 January was a total fire ban day (TFB). By mid morning the fire had started to spread rapidly. More than half the respondents (54%) were away from their house and property. Of these only 18% had left because of concern about the fire while another 13% were involved in fighting the fire. Nearly half the respondents (45%) reported that they were away because they had gone to work or had other things to do on the day, and a further 9% were away for other reasons. Despite the fire the previous day, the declaration of the TFB and the extreme weather conditions, a large proportion of respondents did not recognise that there was an increased risk and continued with their normal activities.

*Assessing the risk*

The failure of many people to anticipate the heightened risk and the lack of official warnings during the fire meant that many people did not become aware of the danger until the fire was very close. Of those who were present at their property when the fire approached, 69% found out about the fire less than 30 minutes before it reached their property. The most common means of seeking information were listening to the radio and using mobile phones to contact family, neighbours and friends. However, only a minority 10-15% reported information during the fire, such as advice about what to do, where to go or road closures.

The lack of recognition of the general bushfire risk meant that many were poorly attuned to the increased risk on 11 January, and when the fire began to spread many people were going about their normal routines, unconcerned about or unaware of the danger. The severity of the fire and the lack of warnings compounded the risk, with many people caught unawares or who found themselves in situations they had not anticipated resulting in many trying to flee from the fire, putting themselves at greater risk. The lack of warning and information prevented any re-assessment of the risk and what was required, forcing people to rely on inadequate preparation and planning. Even many of those who had taken preparation measures and decided to stay to protect their property found their preparations inadequate to protect their assets.

*Response to the bushfire threat*

More than half (58%) of those away from their property attempted to return, but most were unsuccessful, being stopped at roadblocks or because of the severity of the fire. A significant minority (42%) of those who intended to stay and protect their property were away from their property at the time of the fire and most were unable to return to enact their plan. Similarly, the lack of warning of the fire meant that many people were unable to implement their intention to leave early. Of those who left their property 81% estimated they left less than 30 minutes before the fire reached their property.

Just under half (49%) of those who were at their property at the time of the fire stayed throughout the fire and another 12% stayed either because the fire did not reach the house or they were unable to leave. Overall, 83% of those who indicated they intended to stay actually did stay throughout the fire. People on larger farms were much more likely to stay than those on smaller acreage or residential blocks and those who had taken more preparation

measures were also more likely to stay and defend their property. The amount of warning of the fire's approach was strongly associated with staying; 91% of those who had more than 1 hour warning stayed, whereas only 53% of those who had less than 30 minutes stayed. Many people who did stay experienced significant problems trying to protect their property, with nearly a quarter indicating that the lack of water supply significantly hindered their efforts. However the severity of the fire, wind, smoke and ash and the danger posed by the fire were considered the main difficulty faced in trying to protect property. Despite the difficulties there was a clear relationship between someone being present during the fire and the likelihood of the house surviving as shown in table 2.

**Table 2: House survival by someone being present**

| | No one present (No. of houses) | Someone present (No. of houses) |
|---|---|---|
| Destroyed | 21 | 8 |
| Survived | 35 | 74 |
| Total | 56 | 82 |

Calculating the odds ratio from table 2 indicates that there was 5.6 fold greater chance of the house being destroyed if no-one was present. There was also significantly less damage to houses where someone was present during the fire; however this pattern was not evident in relation to other buildings on the property. Finally the importance of active defence was supported by residents' own assessment of their efforts. Sixty percent felt that their efforts and that of others prevented the house being destroyed and a further 14% felt someone being present reduced damage to the house. Despite the severity of the fire and the widespread lack of preparedness, many people showed great courage and resilience to protect both life and property and did make a difference through their efforts. However if there had been greater recognition and understanding of the risk, more extensive household planning and preparation, and more effective warnings, it is likely that the losses from the fire would have been significantly less.

## Discussion

It is precisely in such severe events such as the Eyre Peninsula fire, when agency capacity and resources are overwhelmed, that the community needs to be self reliant. Although the geophysical and social context of each fire is different, Eyre Peninsula is similar to many other rural areas where the risk of fire is present. Different groups and individuals experience the bushfire risk differently because of the particular combination of macro and micro level factors that shape their reasoning in response to the risk. Identification of these factors potentially provides an explanation of the patterns of response identified above. One such pattern was that some farmers appeared to be better prepared and were more likely to stay and defend their property. A consideration of the processes which may lead to this greater self-reliance provides an example of how macro and micro factors may operate to shape people's reasoning and choices.

(McGee & Russell, 2003) in a study of bushfire preparedness in rural Victoria noted that farmers and those who were longer term residents of the area were better informed about fire, better prepared and more integrated with the local fire brigade. The present study supports such observations. Farmers have good local knowledge of the environment and are experienced with fire through its use in their farming practice or in fighting frequent small outbreaks leading to a greater familiarity with fire. Further, involvement in networks of fellow farmers and the local brigades creates a context where consideration of bushfires is more salient and may help to establish norms about how to deal with the bushfire risk. Social capital may be an important factor influencing the choices people in this sub-group make. A farm is also a family's livelihood and often embodies a strong attachment to the local area, and as such provides both financial and emotional incentive to address the fire risk, reflecting both economic and cultural factors that may influence decisions. At the individual level a person's psychological make-up and their life history further shape their choices through mechanisms such as understanding the outcomes of particular actions and confidence in their ability to cope. Such a set of contingent conditions predisposes a person to follow a particular reasoning pathway in response to the risk, but it is neither the only set of such conditions, nor guaranteed to bring about particular choices. Other factors operate in a countervailing manner to maintain vulnerability. The heaviest losses were experienced in the more rural areas where people not only lost houses but also other assets. Indeed for many their livelihood was destroyed. People in these situations are more vulnerable simply because of the extent of the assets exposed to the fire. Similarly, a lack of financial resources may prevent the implementation of protection measures, or because of household circumstances, there may be too few people available during the fire to adequately protect assets. An analysis of the patterns of vulnerability and resilience of other social groupings would identify different macro and micro level factors and assist in explaining their response to the risk.

The reasoning pathway through identification of the risk, assessing options and deciding how to respond, both prior to and during a fire is influenced by a wide range of factors at both the macro level of social and community structures and the micro level of individual psychology, experience and circumstances. The differing vulnerability of particular social groupings reflects how social structures create the conditions for particular reasoning and choices. Other social structures, psychological processes and experiences further influence choices at the household and individual level. Understanding how the complex array of factors operates for different groups and individuals to generate particular configurations of vulnerability also provides the key to identifying countervailing mechanisms that can generate alternative reasoning pathways that lead to greater self reliance and capacity to deal effectively with the bushfire risk.

**Acknowledgements**
I would like to acknowledge the assistance of Gerald Elsworth, CIRCLE, RMIT University, Strahan Research, and the support of the Country Fire Service, South Australia, the Bushfire CRC and CFA.

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