NEW SOUTH WALES FIRE BRIGADES

COMMUNITY FIRE UNIT APPROACH: A REPORT ON THE BACKGROUND, KEY ISSUES AND FUTURE DIRECTIONS

Tom Lowe 2008

bushfire CRC

RMIT University

Centre for Risk & Community Safety

NEW SOUTH WALES FIRE BRIGADES 'COMMUNITY FIRE UNIT' APPROACH: A REPORT ON THE BACKGROUND, KEY ISSUES AND FUTURE DIRECTIONS

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June - 2008

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Acknowledgements

The research described in this report was carried with the sole financial support of the Bushfire Cooperative Research Council's Project C6; "The 'prepare, stay and defend or leave early' policy: validation and implementation". The author would like to thank NSW Fire Brigades for their assistance in carrying out the research, in particular Commissioner Greg Mullins, Gerry Byrne, Terry Munsey, Karl Deusing and Rachel Scott. The data, views and information could not have been gathered without the help and support of those Community Fire Unit members that took part in the on-line survey and follow-up focus groups. I would also like to acknowledge Professor John Handmer as Director of Program C and leader of this particular research and Dr Katharine Haynes for her invaluable support and advice throughout the project.

New South Wales Fire Brigades Commissioner's Introduction

The NSW Fire Brigades established the Community Fire Unit Program following on from the devastating bushfires that affected so many bushland urban interface areas in the summer of 1994. From its early inception the program has grown steadily over the past 14 years to 370 units with 6,400 volunteers and has proved very popular with residents in these high risk locations.

The primary aim of the program is to empower local residents to protect their own properties and that of their immediate neighbours from the impact of bushfires. The program achieves this through supporting local residents through the provision of basic firefighting equipment, personal protective equipment and training. This process is undertaken by NSW Fire Brigade personnel at station level, assisted by Community Fire Unit Coordinators from the Bushfire Natural Hazards Section.

As the Community Fire Unit program has evolved so have the challenges facing the NSW Fire Brigades in managing this successful program. There have been many changes and improvements in the program over the past fourteen years, for example, the development of the CFU Internet Portal for access by volunteers, the development of I-Zone plans for each unit, improved training including Team Leader Training, improved data collection and new designs for mobile trailers and uniform.

The NSW Fire Brigades will continue to review the effectiveness of the program in consultation with volunteers. This research paper by Tom Lowe is the first substantiative research and review of the program ever undertaken. I commend Tom and the CRC on the excellent work undertaken to produce this document. It enables the NSW Fire Brigades to better plan for the future growth of the program and assists us in identifying any outstanding issues and strategies to mitigate. The report importantly confirms the value of the program and the benefit to the volunteers and the broader community.

Greg Mullins AFSM
Commissioner
NSW Fire Brigades

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Executive Summary

Community Fire Unit (CFU) initiatives in New South Wales and the Australian Capital Territory are increasing in popularity and cost. This report measures the effectiveness of the scheme in achieving key community bushfire safety goals. It also identifies likely challenges facing the movement as numbers grow and new issues arise.

An assessment was carried out utilising a range of qualitative and quantitative research techniques, including: 10 agency interviews; 670 Community Fire Unit member questionnaires; 50 public questionnaires and 4 focus groups.

The research identified many positive aspects including a sense of empowerment, increased capability to live with fire and improved social interactions among individuals involved in the CFU program. Bonding and bridging ties are both potentially strengthened through involvement with CFUs.

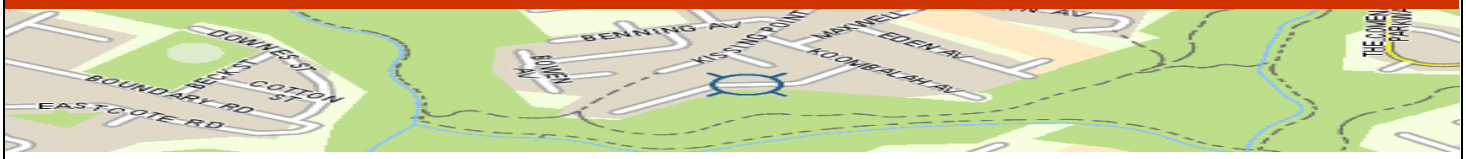
The training and equipment were particularly valued as they boosted confidence and created more of an active and cooperative role for groups intending to stay and defend their homes from bushfire.

However, it was also found that some CFU members focussed too sharply on their operational role, leaving gaps in their wider preparation and planning. A strong reliance upon equipment and guidance from commanding officers could make some communities more vulnerable to bushfire. 10% of survey respondents stated that their families would stay at home as long as possible then evacuate in the event of a bushfire in their area.

In addition, strong community links within the CFUs were identified as having a potentially negative influence on wider community relations, preparedness and communications.

Respondents identified that the growth of the CFU movement has not been accompanied by adequate increases in support and administration, with some feeling that the more personal ‘bottom-up’ focus has now been lost as communications with the NSW Fire Brigades have become more difficult.

The evidence points towards the need for a more focused and capable support network to adequately manage the CFU movement. Nevertheless, the program continues to develop and improve systems as more resources are allocated and greater emphasis is placed on it by government. Undoubtedly the CFU Program systems will be significantly improved in years to come.



1.0 Introduction, background and research questions

Section summary:

- The CFU concept is briefly discussed and the context in which the research has been carried out is described.

- The community self-sufficiency for bushfires approach is introduced with particular relevance to the individual, psychological and social requirements of such a stance.

- The CFU scheme is introduced as a unique approach that warrants further investigation due to its growing volunteer base and methods of promoting community bushfire safety.

- The research approach is described. This acknowledges the need for an understanding of *individual psychology and experience* in order to 1) assess implementation of the 'prepare, stay and defend or leave early' policy, and a knowledge of *social and community structures* in order to 2) assess the scheme's influence upon community resilience. However, a third requisite is introduced as fundamental to the process of developing community safety. This is the contextual environment that exists between peoples' perception of bushfire risk and the social / cultural / economic conditions which dictate the extent to which risk judgements are able to be turned into action.

- The research questions that this project aims to address are contextualised and introduced.

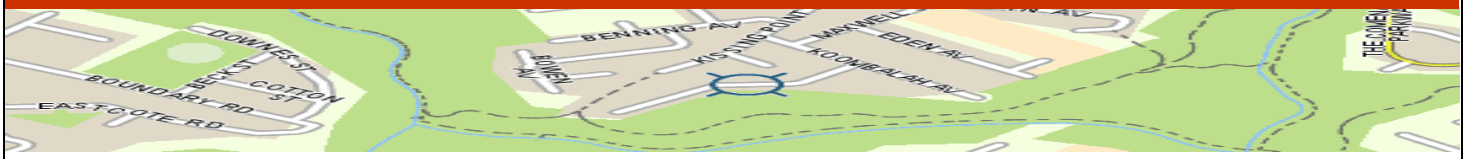
- This research contributes to an existing body of community engagement and education research. A number of such research projects are described.

1.1 Introduction

The NSWFB-CFU approach was initiated in 1994 following serious fires in Sydney's urban interface areas. As a result, calls were made by the public for greater control over their own lives and property, with many homeowners expressing willingness to stay and defend. This was supported by a realisation among the emergency services that, in the event of extensive or multiple bushfires, the volume of structures and lives at risk cannot be successfully defended alone. The response has been a commitment by the NSWFB to prepare vulnerable communities at a street level to carry out this task in predominantly urban interface areas.

Given the scheme's growth in size and popularity it is deemed important that any future development should be carried out with a good idea of the advantages that are on offer and the problems that may be experienced. Thus, using data gathered using a wide range of social research techniques, this report aims to discuss the ways in which this brand of community empowerment acts to promote bushfire awareness, preparedness, positive behaviour change and ultimately resilience in urban interface areas.

1.0 Introduction, Background and Research Questions



This report aims to provide social research information that will benefit the NSWFB in running CFUs and hopes to offer suggestions as to where this kind of scheme may fit into wider bushfire management in the future. It will be of interest to those working in community outreach and education roles principally within fire organisations, but may have a wider appeal to researchers working in this field.

The report encompasses the following chapters:

Section 2 – THE URBAN INTERFACE: DEFINING A DEVELOPING HAZARD

Suburban growth around Australian cities is set to push housing development further into a fire-suppressed bush environment which is likely to experience longer and more frequent periods of high fire danger in the future due to the effects of climate change.

This chapter describes the complex nature of the 'urban interface', both in terms of its physical make-up and the demographic, social, economic and cultural attributes of the people that live there. It explores some of the unique challenges that face fire agencies in this dynamic and developing environment.

Section 3 – COMMUNITY FIRE UNITS: BACKGROUND AND CONTEXT

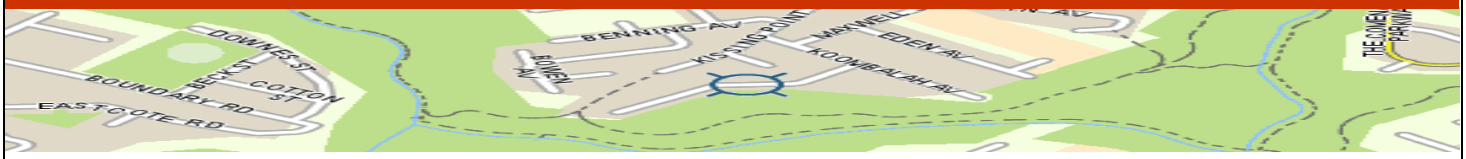
This section provides the background to the formation of CFUs, their aims and modes of function. This is followed by details of CFU directives, duties and responsibilities, membership and other practical aspects.

Section 4 – OTHER COMMUNITY-BASED SCHEMES IN AUSTRALIA

This section summarises the backgrounds and modes of operation of a number of urban community-based schemes in Australia. By identifying key differences in approach the section assesses how these have reflected upon their outcomes in relation to the original objectives and motivation for initiation.

Section 5 – THEORETICAL BACKGROUND

This section explores some of the many theories which have evolved to increase our understanding of the human relationship with risk and natural hazards. In particular, contemporary thinking on the communication of risk, along with ideas that lie behind the promotion of community links and empowerment to produce more resilient communities.



Section 6 - RESEARCH METHODS

A detailed description is given of the various data gathering methods used within the project.

Section 7 – FINDINGS AND DISCUSSION

This section introduces the key findings of the study and discusses them in the context of wider research and evidence. The implications of the research findings are discussed and future directions suggested.

1.2 Background

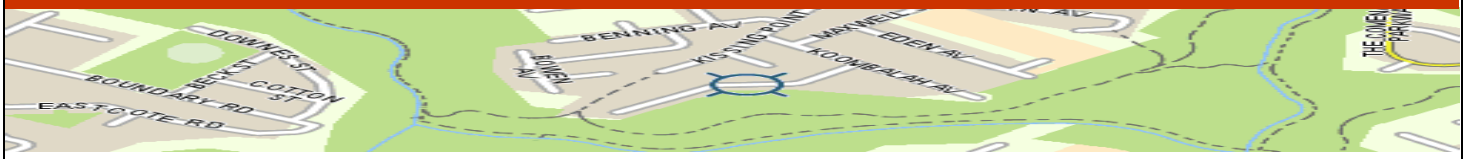
1.2.1 *The Australian position on bushfires and community safety:*

A great deal of the current Australian position on bushfires is now dependent upon individual self-sufficiency and community resilience. The Australian position, which is endorsed by the peak fire and emergency services industry body the Australian Fire Authorities Council (AFAC), states that residents should share the burden of responsibility by reducing bushfire risk to their own property and lives. This focus puts a greater emphasis on what people can do for themselves and how they can strengthen their capacities (Twigg, 2007). As the AFAC position paper on bushfires and community safety states:

> *"Householders need to be allowed and encouraged to take responsibility for their own preparedness and safety in bushfires. Fire agencies should support and assist the community to manage and prepare for bushfire, and encourage people to understand fire and to take actions necessary for their own protection and safety."*
>
> (AFAC, 2005:4)

The strategy has a number of goals which are being achieved through increasing operational interaction with the public and the development of collaborative relationships with at risk communities. In addition to the creation of a more holistic community preparedness and adaptation model, a key part of the strategy involves the encouragement of residents to decide, prior to the start of each fire season, whether they will prepare to stay and actively defend their property from bushfires or leave well before a fire arrives. The community self-sufficiency stance also creates secondary dividends for the emergency services, effectively allowing resources to be placed where they are most needed during times of intense fire activity.

As will be described within this report, the realisation of these goals requires a deep understanding of individuals and communities and the constantly evolving environment in which they interact and operate. Bushfire management in Australia is, by necessity, on the move; led by changing environments, populations, needs and expectations and driven, in response, by cultural, political and practical aspirations.



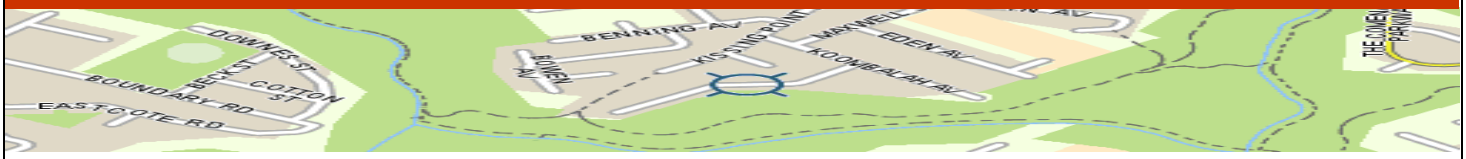
If the Australian bushfire position is to deliver, it must identify patterns of change and modify its policies to suit existing and future conditions. It is hoped that this research will help to inform the development of the bushfire policy.

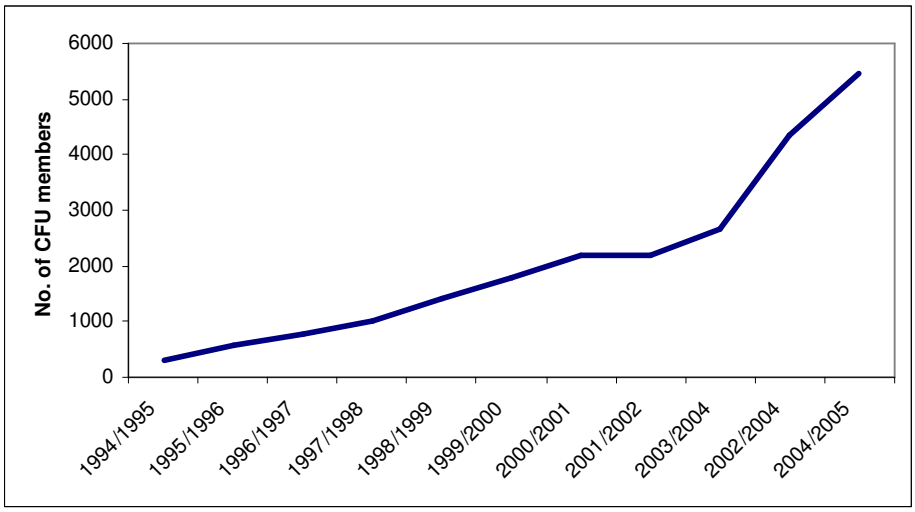
For more information on the development of the Australian bushfire management and the current policy please refer to Appendix 1.

1.2.2 *Why study the Community Fire Unit model?*

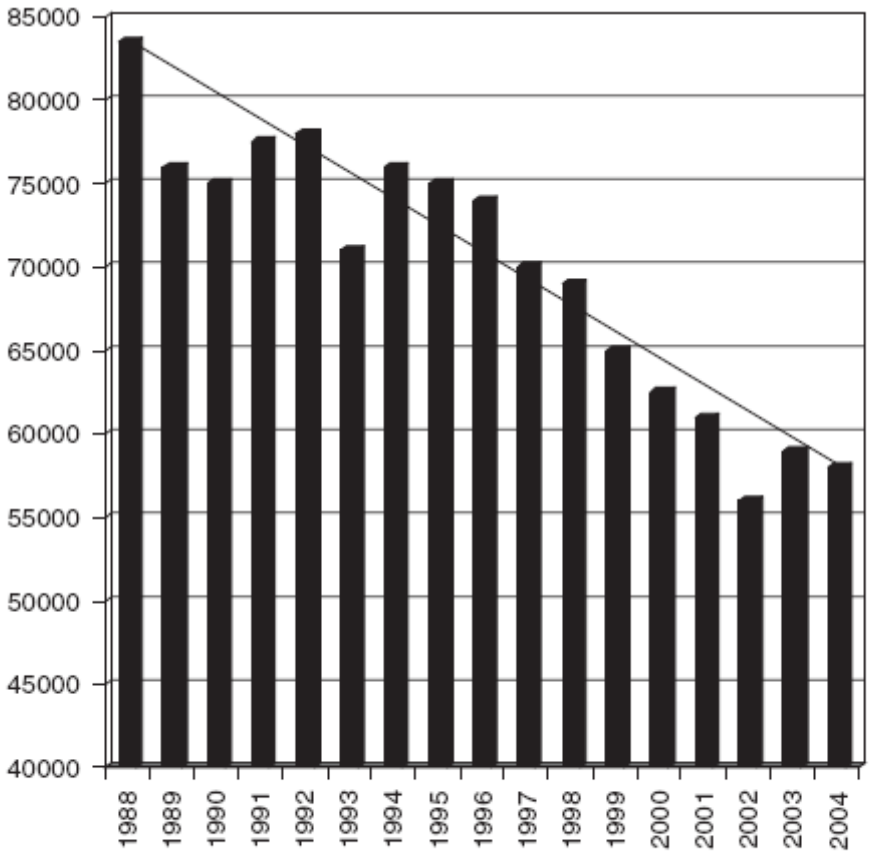
Differences between rural communities and their urban counterparts and the type of volunteers who serve them have dictated the development of CFUs. In the dynamic social, cultural and economic environment of the urban interface (see section 2 for a detailed discussion of the urban interface), there appears to be generally less sense of community responsibility and a greater reliance on agency or government support in times of crisis. This not only contributes to lower levels of awareness about bushfires, but also implies that community resilience, cooperation and volunteerism will be more limited.

Nevertheless, in terms of interest and numbers, the CFU scheme has been a great success (see graph 1.1), with the red and white livery of the NSW Fire Brigades a familiar site on trailers and hose posts throughout interface areas of Greater Sydney and Blue Mountains area. This growth of volunteer membership runs counter to declining volunteer trends seen elsewhere in the emergency management field (graph 1.2). As McLennan *et al.* (2008) note, Australia's volunteer-based fire services have experienced declining brigade memberships in some rural communities and low levels of volunteerism in some newly established urban-rural fringe communities. McLennan *et al*. (ibid) suggest that this decline is due to significant economic and demographic changes in Australian society over the last 10 years, factors which the CFU scheme appears to have overcome. See also McLennan and Birch (2005) for an overview of fire-fighter volunteerism in Australia.



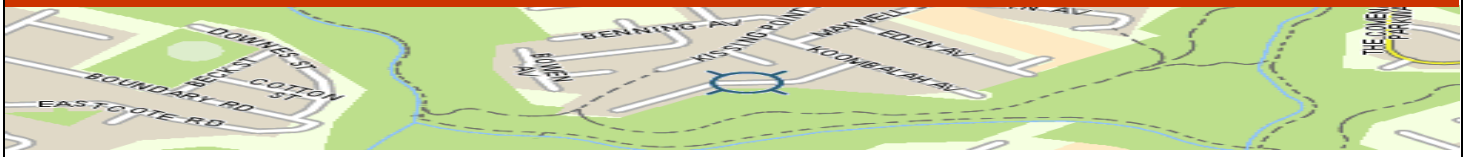


Graph 1.1: New South Wales Fire Brigades Community Fire Unit membership, 1994 – 2005 (Source: NSW Fire Brigades, 2006)



Graph 1.2 Country Fire Authority (CFA) volunteer numbers 1988-2004: 30 per cent drop in volunteer numbers. (Source: Mclennan and Birch (2005)).

1.0 Introduction, Background and Research Questions



NSW Fire Brigades identified that the traditional rural volunteer model would not work effectively in the specific context of the urban interface. Instead, they offered these communities a model that would provide a level of self-resilience with a minimum of commitment.

From the outset, it appears that the socio-economic reality in these areas i.e., many dual income families of a professional or semi-professional nature with busy lifestyles, has made the minimal time commitment and appeals to volunteer's sense of self-interest largely responsible for the success of the program.

A detailed investigation of this assumption formed part of the rationale for the CFU research as it could provide information on volunteerism and community engagement that would be useful to the NSWFB in sustaining the CFU scheme and to other Australian volunteer-based fire services.

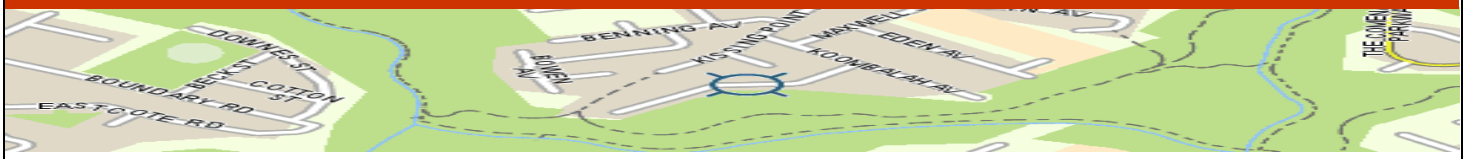
The operation of CFUs acts to create much needed flexibility in urban fire brigade resources during major bushfire events, however, a secondary effect relates to implementation of the 'Prepare, Stay and Defend or Leave Early' policy, the central tenet of Bushfire CRC's program C6.

The strategy depends upon public preparedness for its success and, in the case of CFUs, this preparedness is provided in a single package, the content of which, it is hoped, is enough to save homes and lives.

By combining 'top-down' or 'command and control' management (CFUs are covered by the Fire Brigades Act (1989)) with 'bottom-up' proactive community involvement, NSW Fire Brigades have formed a unique voluntary wing. The running of this movement must balance strong leadership and strict hierarchy with the 'people management' required to maintain volunteer preparedness for infrequent but potentially devastating events.

While the apparent success of the CFU approach has been demonstrated (e.g., Cross St., Warrimoo in the Blue Mountains during the 2001 fires season - CFU members successfully implemented mitigation strategies to protect their properties), the real capability of the scheme has not yet been tested in a significant way. This fact has also formed part of the rationale for running this study.

The research that has been carried out is intended to inform the NSWFB of potential issues or dangers that can be addressed in the management of the scheme and the development of its policies and practices. It is hoped that the research will help to create a more targeted and effective approach towards 'prepare, stay



and defend or leave early' goals and develop better connected and self-sufficient communities in bushfire threatened zones. In the same way as the volunteerism issue, much can also be learned by other emergency managers from the points that this research raises and the often generic human relationship with bushfire that it has identified.

1.3 Research Questions:

The AFAC position paper on bushfires and community safety states that:

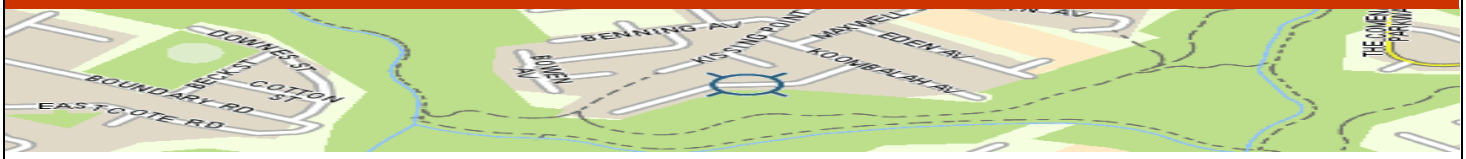
> *"Education of the community should foster a sense of partnership between residents, neighbours, land-owners and managers, fire agencies and government in terms of bushfire risk management and response"*
>
> (AFAC, 2005:4)

To date, much 'social science' research on achieving these aims has focused on individuals' risk perceptions and cognitive aspects of decision-making with an emphasis on improving knowledge, preparedness and behavioural response through targeted risk communication (see, for example, Bender et al., 2007). Little has been made of the external or contextual issues that exist, e.g. community values and interactions, in the space between risk perception and behaviour.

However it is now widely accepted that vulnerability to hazards is influenced by a far broader range of factors than risk perceptions and cognition alone (e.g. Blaikie *et al*., 1994; Quarantelli, 1998; Pelling, 2003; Bankoff *et al*., 2004; Wisner *et al*., 2004). Disasters[1], of the kind that the policy aims to avoid, are a complex mix of natural hazards and human action, with differential social vulnerability occurring as a result of historical factors and emerging cultural, social and economic patterns and interactions. A more holistic approach to vulnerability is now fundamental to disaster risk research, reduction strategies and assessments of adaptive capacity. As Pidgeon *et al*. (1992) point out:

> "*risk perception involves people's beliefs, attitudes, judgements and feelings as well as the wider social or cultural values and dispositions that people adopt towards hazards and their benefits*" (p89).

[1] We use this term to mean disruption of a functioning community or society causing human, material economic or environmental losses which exceed the ability of the affected society to cope using its own resources.



This point is echoed by Bender *et al.* (2006), who suggest that weaknesses in cognitive profiling can occur due to a lack of contextual background. They conclude that, for example, an improved knowledge of distinct cultural, ethnic, and racial groups can provide managers with an enhanced capacity for communicating and reducing risk. Thus, vulnerability can be influenced by peoples' past experience of a hazard, their trust in the information source, economic constraints and gender among many others. Field and Jensen (2005) also suggest that a focus on communities as social systems and the effects of population change in rural landscapes would serve as a unique departure from previous work.

Figure 1.1 below depicts the research priorities of this project. The first objective is to highlight difficulties and possible solutions for the implementation of the AFAC 'prepare, stay and defend, or leave early' policy within the CFU scheme. The second is to assess the extent to which the CFU scheme has affected community self-sufficiency at the urban interface.

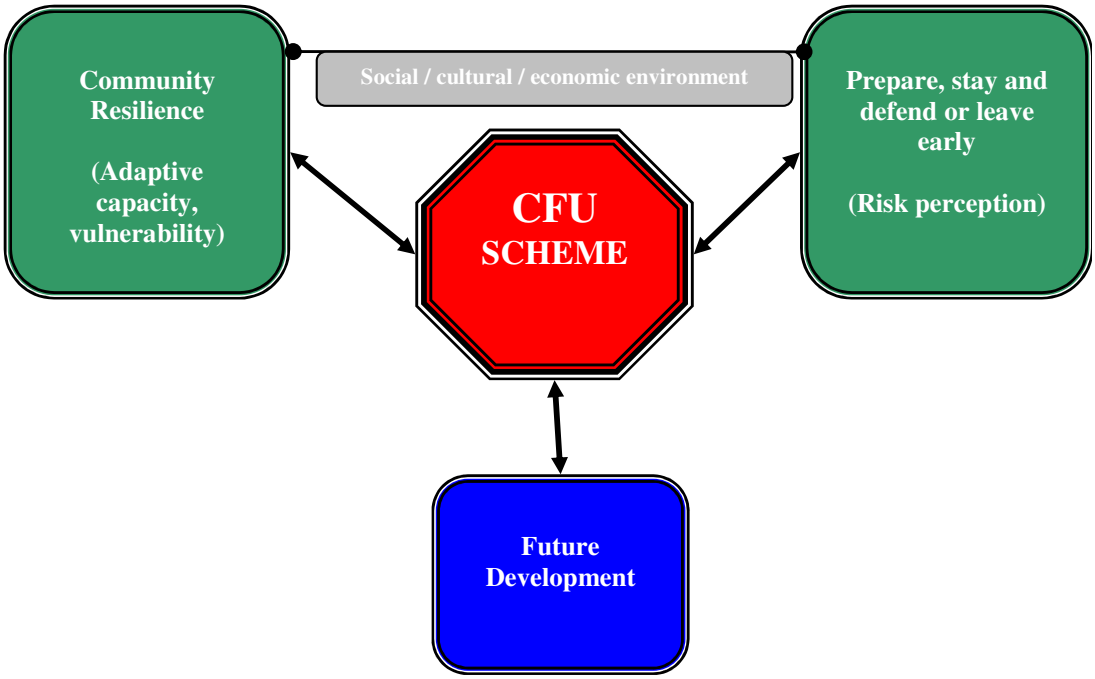
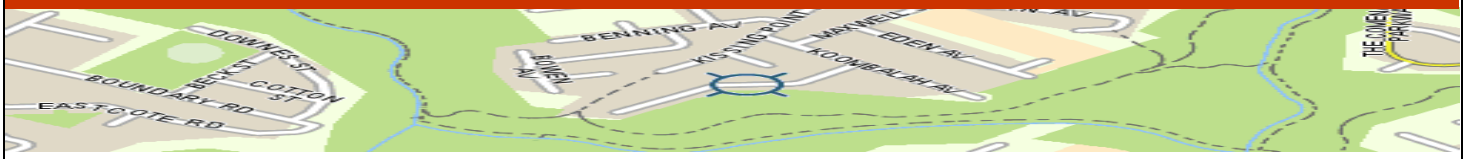


Figure 1.1: Research priorities and theoretical bases.

In order to adequately address these issues of self-protection and community resilience, it is necessary to approach from different theoretical bases. With the above discussion in mind, the first priority draws upon risk perception research, for example, knowledge of individuals' intended actions or behaviour during a bushfire often utilises psychological, decision-making and risk perception research. The second priority



focuses upon community participation and resilience research; subjects that are based in human geography, social science, and discussions of social capital.

However, implicit throughout the research is the strong connection between risk perception and the social / cultural / economic environment which dictates the extent to which risk judgements are able to be turned into action. (See section 5 for more detail on the theoretical background for the research).

A third priority of the research is to suggest possible future development the CFU scheme based upon the evidence that has been presented and to highlight findings that may be of particular relevance or interest to all agencies involved with the development of community education and preparedness activities.

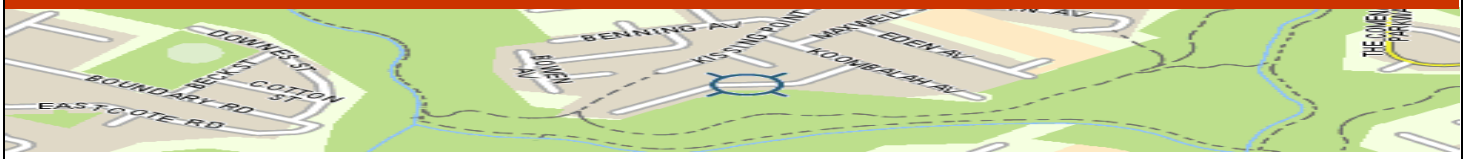
The research questions listed below are drawn from a number of the theoretical sources discussed above. It is hoped that by selecting areas of particular interest from different disciplines, relevant and contemporary questions can be asked of the CFU scheme, enabling a holistic picture to be created and ensuring that the best possible information is available for future planning and policy design.

In particular the project aims to address the following research questions:

- **Understanding the social dynamics of Community Fire Units and the effect of Community Fire Units upon communities:**
    - What are the attributes of those that become involved?
    - What kinds of communities are likely to have Community Fire Units and why?
    - How have communities benefited from their membership?
    - Has involvement promoted community resilience to bushfires?

- **Understanding the effect of Community Fire Units upon perceptions of fire risk and household behaviour in fire prone communities:**
    - What impacts do these effects have upon decisions to leave early or stay and defend property?

- **Understanding how to manage the growth and development of the Community Fire Unit movement?**
    - What issues need to be addressed?
    - How should problems be addressed?
    - Where should the scheme go from here?



1.4 Existing community engagement and education research:

A number of public engagement and education schemes have been developed by fire authorities across Australia in an effort to mitigate and attenuate the risks posed to individuals and communities when making important bushfire related decisions.

In some cases, 'in-house' research projects have been set-up by fire agencies to assess the effectiveness of community engagement and education schemes in promoting and sustaining community bushfire safety.

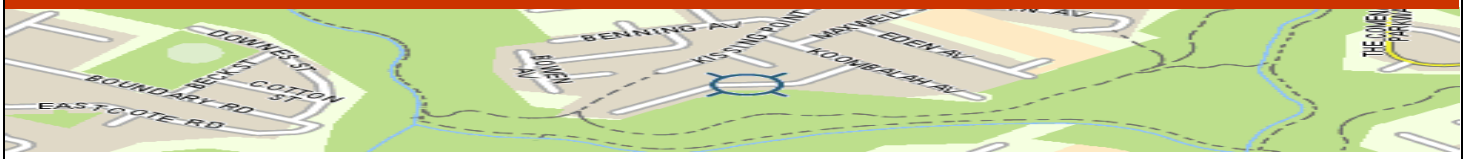
More recently, detailed research has been carried out as part of the Bushfire Cooperative Research Centre's 'Community self-sufficiency' project (Project C) – of which this project is a part. This research has been valuable as a way of publicising the existence of alternative approaches to a wider audience and helping to highlight areas of success and concern in an effort to promote learning among researchers and practitioners within the field. Two pieces of such research are reviewed within this report in order to describe alternative approaches and to help contextualise the CFU scheme (see section 4).

Below are a number of examples of Bushfire CRC projects that look specifically community self-sufficiency projects. They reveal the types of existing research that the CFU project acts to build upon but also help to demonstrate the unique nature of the NSWFB CFU approach and the need for a separate and detailed piece of research.

C1 Understanding Communities - The project aims to develop a better understanding of community perceptions and attitudes to bushfires and incorporate research from other hazard studies that can be successfully adapted to these communities.

[Project Leader: Dr Alison Cottrell, James Cook University]

C4 Effective Risk Communication - The aim of this element of the research is to understand how fire services can better deliver preparedness and warning messages to communities. The way in which communities and individuals respond to warnings and prepare in advance of an event, is strongly influenced by community psychology, and personal experiences and beliefs. For warning messages to be heeded the community needs to recognise that they are at risk.



[Project Leader: Prof. Doug Paton, University of Tasmania]

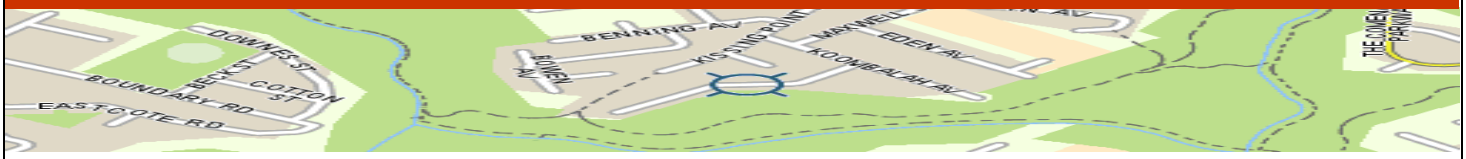
C6 Evaluation of stay or go policy - The *Stay or Go* research is investigating impediments to full implementation of the policy and examines ways of integrating the policy with other important factors in bushfire risk management. The project is collating and analysing current practices in the context of their legal, organisational, emergency planning and other issues across Australia, with the intent of developing strategies for the agencies to better implement the policy.

[Project Leader: Prof. John Handmer, RMIT University]

C7 Evaluating Bushfire Community Education Programs - The project aims to advance the capability of fire agencies to evaluate the effectiveness of community safety and education programs and facilitate application of the evaluation framework to a range of programs and initiatives that are undertaken by agencies. This project has also looked specifically at the CFU scheme, however the methods used and the outcomes produced are quite different from those used in this CFU study. For more detail on the 'Program Logic' approach see Rhodes and Gilbert (2008).

[Project Leader: Assoc. Prof. Gerald Elsworth, RMIT University]

[Source: Bushfire CRC, www.bushfirecrc.com]



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2.0 The urban interface: defining a developing hazard

Summary:

This chapter describes the complex nature of the 'urban interface', both in terms of its physical make-up and the demographic, social, economic and cultural attributes of the people that live there.

Urban interface areas can exist near heavily vegetated areas of bushland within cities or on the urban periphery, where the city meets the bush.

Emergency planning and preparedness in these areas are difficult for a number of reasons.

- Populations change frequently and cannot be easily categorised due to differences in their backgrounds and values.

- Residents may have expectations about the assistance they would receive in a bushfire that are different from each other and the emergency services.

- Tensions may exist around amenity, services and planning. Making urban interface residents aware and interested in their own safety is a complex and time-consuming role for emergency services to achieve.

In addition, fires at the urban interface present a particular hazard. Fire services encounter difficulties responding to fast-moving fires and gaining access in congested and narrow streets. In many instances the public represents a hindrance rather than a help.

Suburban growth around Australian cities is set to push housing development further into a fire-suppressed bush environment which is likely to experience longer and more frequent periods of high fire danger in the future due to the effects of climate change.

High population turnover in these interface areas suggests little experience or knowledge of living with bushfire risk. Nevertheless, Australian bushfire policy has placed the onus for bushfire protection and planning upon the public.

2.1 Introduction

NSWFB guidelines state that the objectives of the CFU are to "*Equip residents living in bushfire prone areas in NSW to carry out a limited but active role to aid in property protection activities during bushfires in and around the urban bushland interface where members of units reside*" (NSWFB, 2006:2). Thus, within this project, it is important to understand what is meant by the '*urban bushland interface*' and the particular hazard that it represents, both physically - in terms of tangible physical hazards such as housing composition, density and vegetation – and in terms of socio-cultural phenomena that are more difficult to describe due to continuing change and a lack of information,

these include demographics and the economic, cultural and social setting in which the CFU scheme exists.

By developing this knowledge it will be possible to identify the dynamics of the urban interface population and its interaction with the surrounding landscape and relate this to issues of bushfire awareness, preparedness and community resilience. This will help to gauge the extent to which CFUs capture at risk communities and address many of the issues that are associated with vulnerability and resilience to the bushfire hazard.

2.2 Defining and describing the 'urban interface'

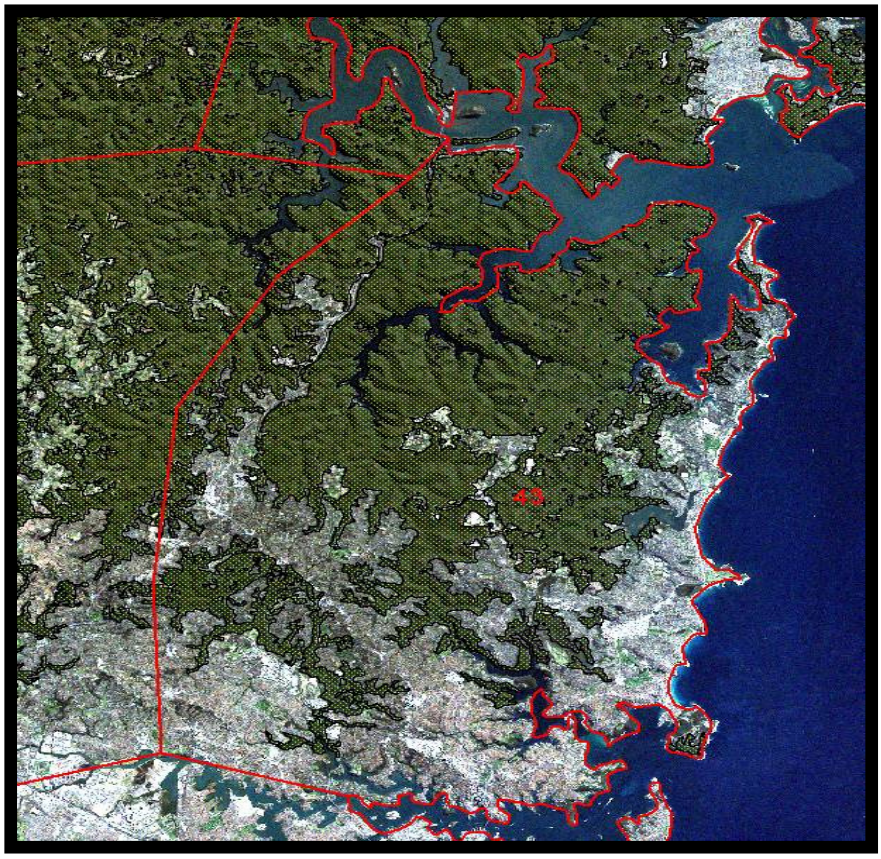


Figure 2.1 (North) Sydney's urban interface (image courtesy of Risk Frontiers, Macquarie University, NSW)

2.2.1 Physical description

Attempts to define what is meant by the term 'urban interface' encounter many problems both in the language used and in terms of the complexity and dynamics of interaction between human settlement and natural / rural landscapes.

2.0 The urban interface: defining a developing hazard

A large existing body of literature details population growth, movement and composition in urban areas with more recent attention focused upon the outward migration of urban populations towards coastal or rural locations. These processes are studied through the various disciplines of human geography and are often linked to discussions of vulnerability associated with population change, health-care provision, social connection and the needs of key infrastructure.

However, a relatively small amount of literature can be found on the specific risks and vulnerabilities associated with urban development in areas of high bushfire danger. In this context, Cottrell (2005) provides a comprehensive discussion of the various approaches and typologies utilised in describing locations at the urban periphery, with particular focus on bushfire hazard.

For the purpose of this report, the term '**urban interface**' will be used. Based upon Cottrell's (2005) discussions, this can be defined in a general, physical sense as:

1. "*Areas around urban centres which can be an extension of the suburbanisation process where the suburbs encroach on the rural hinterland*"

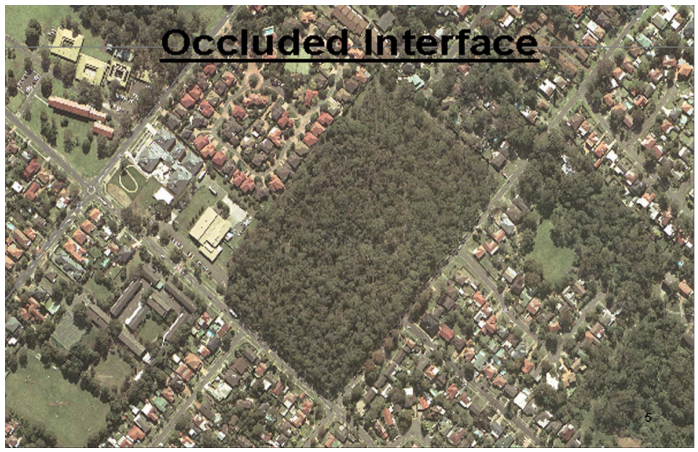
And, more specifically:

2. "*Any area where structures (whether residential, industrial, recreational or agricultural) are located adjacent to or among combustible (bushland) fuels*"

(Cottrell, 2005:110)

In addition to these definitions, it may be useful to consider the NSWFB definitions of various urban / interface interactions as exemplified by photographs a, b, c and d below.

a) A Classic interface



b) An Occluded interface

c) A Mixed interface

d) A Multiple ignition interface

Figure 2.1 types of Urban Interface. Source: NSW Fire Brigades

2.2.2 *Patterns of population settlement and growth*

Patterns of population settlement and growth are more difficult to define. In Australia and around the world urban landscapes have altered significantly since the first periods of industrialisation and urbanisation in the 1800s as populations have undergone various socio-economic transitions. Following many years of intensive urban growth around industrial centres, the post World War II pattern changed with population decline in inner and inner-middle suburbs, moderate population growth in the middle suburbs and rapid growth on the urban fringe (Hugo, 2002).

In Sydney, this outward push was accelerated by the baby boom. Population growth at this time exceeded planner's expectations and by 1971 there were 300, 000 more people in metropolitan Sydney aged under 16 than had been forecast by the Cumberland Plan in 1947. This meant that planned 'green belts' became urban landscapes; led in their design and layout by strong cultural

values and a belief that families should live in detached houses in one sixth of an-acre sections (Waitt *et al*., 2000). As Salt (2006) states, in the post-war years "*Australians pressed outwards from the inner suburbs into the light and space and independence of their own quarter-acre block. And with this shift came a cultural orientation to the suburbs…"*

2.2.3 Inner and outer interface zones

The post-war suburban growth in Sydney consumed and engulfed many areas of bushland, leaving islands of dense vegetation within a sea of urban development; Lane Cove or Turramurra for example (see images b) *occluded interface*, and d) *multiple ignition interface* above as physical examples). These areas, many of which are now long-established suburbs, formed what can be described as the 'inner-urban' interface zones beyond which housing construction extended far out into the bush, towards what is now the urban periphery.

While residential turnover in these areas may have been high, pockets of original residents still exist, particularly within the cul-de-sacs and crescents so typical of this type of Australian suburban design. In terms of bushfire experience and community cohesion, these groups may differ significantly from areas of newer development or higher population turnover.

The 'other' major area of urban interface is associated with continued growth and development in peripheral urban areas. Greater Sydney continues to experience rapid growth, with a further 1 to 1.4 million new residents anticipated over the next 25 to 30 years (New South Wales Government, 2006). The city's share of the NSW population in 2001 was 62.8 percent; this is likely to rise to 64.6 percent by 2031.

While much of this development is focused on suburban fringes - as rural-urban migration continues and urban populations seek space and affordable housing, a combination of high economic growth and rising urban land / house prices in and around Greater Sydney is also promoting growth along the coastal regions and the Sydney to Canberra Corridor.

Although development in Greenfield areas appears to be slowing (a reduction of 5 percent in Greenfield development from the 1990s to the early 2000s), housing growth in these areas remains significant, particularly when combined with existing urban interface areas.

2.2.4 *A diverse environment*

In defining the character of these new urban areas, Hugo *et al.* (2003) note that the distinction between urban and rural has now become blurred, with suburban areas gaining from improved amenity value and communication links with urban and rural resources.

The physical layout of urban interface areas is also diverse, with variation in housing densities and the extent to which developments resemble city suburbs or rural hamlets.

Despite the continued population growth and urban encroachment, Chen and McAnene (2005) argue that the overall percentages of addresses adjacent to bushland for these large spatial units are unlikely to alter significantly in the near future.

Chen and McAnene (ibid) calculated for the Greater Sydney region the number of addresses that are located at various distances from areas of bushland in order to quantify bushfire risk. Of the 2, 875, 775 addresses that were analysed, 189, 364 (6.6%) were identified as being exposed to greater bushfire risks, due to their immediate proximity to extensive bushland (about 80 m). A further 274, 327 (9.6%) were located within 130 m from bushland, and the remaining 70.7% of all addresses are located over 700 m away (see figure 2.2).

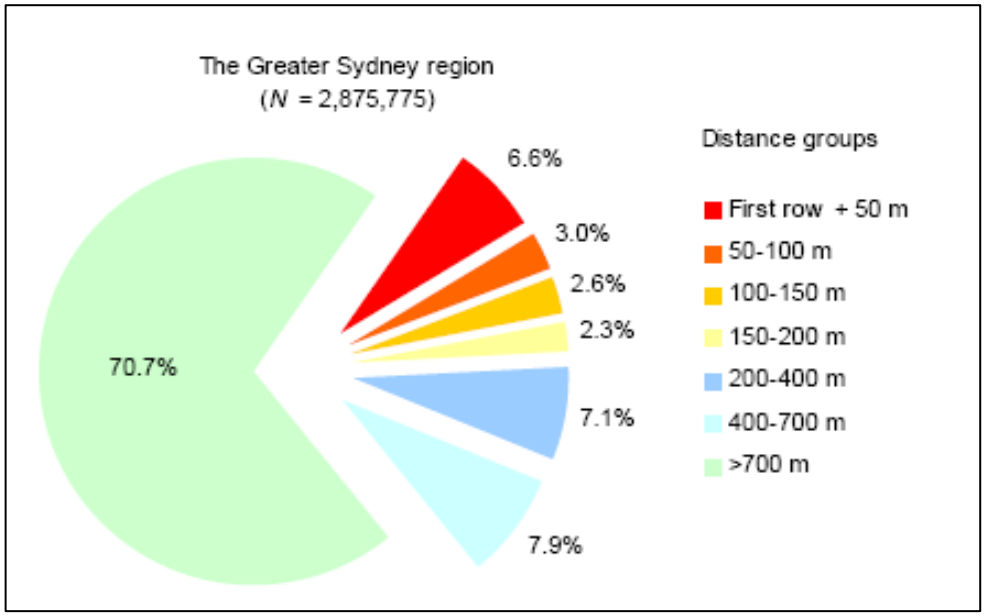


Figure 2.2 Percentages of addresses falling within different distance ranges from bushland for the Greater Sydney region (Chen and McAnene, 2005)

Nevertheless, the risk that a bushfire poses to an area cannot be calculated using spatial data alone, with many social, economic and political factors also influencing the hazards to which the public are exposed, as well as changes in vegetation and fire regime that may be associated with political change or climatic shifts.

Growth at the urban fringes may fluctuate in the future as aging or migrating populations vacate large areas of the middle suburbs developed in the 1950s and 1960s. This will have the effect of increasing opportunities for house buying and development in these established areas leading to a reduction in pressure on the fringes of major cities (Burnley and Murphy, 2004). Importantly, intra-urban migration, that is, the movement of population within the urban area, in major cities is quite common, with families moving regularly but within a definable region (Hugo, 2002).

As will be discussed in the sections below, the fact that urban Australian communities are not static, geographically or in terms of their demographic, social or cultural composition, has implications for our understanding of social interactions and relationships and ultimately the resilience of communities to bushfires and other hazards.

Thus, an increasing proportion of suburbs and new developments, coupled with existing interface areas at high risk from bushfires, presents emergency managers with a significant responsibility.

Despite recent improvements in building regulations at the urban interface (Building Codes of Australia, Standard 3959 -Building in Bushfire Areas), a number of factors, including proximity to high fuel loads, concentrations of buildings on flat ridge tops above steep, vegetated slopes and valley bottoms (Gill and Moore, 1994), a propensity to create green and wooded environments around the home and the sheer vastness of the urban interface - are cause for extreme concern.

In addition, the vulnerability in these areas is likely to be increased by a lack of experience and knowledge of fires in new communities whose social capital and coping capacity or resilience are likely to be initially quite low.

2.3 Social trends at the urban interface

Having described the difficulties in generating a physical definition of urban interface areas, a more complex task is to map and understand evolving social patterns and trends. Cottrell (2005) warns

against attempts to create typologies of urban interface dwellers, noting that improved service delivery and access to metropolitan centres have resulted in an intermingling between rural and urban functions and an increasingly diverse and unpredictable population.

This is supported by Burnley and Murphy (2004) who suggest that while urban migrants to interface areas may share similar geographic goals, their backgrounds and values may differ significantly, with such regions broadly consisting of either 'free agents'; idealistic, internet commuters who have chosen to relocate, or 'forced relocaters'; economic migrants seeking cheaper housing.

This polarisation of the urban interface population introduces a divergence of values, needs and expectations. The result is a suite of conceptual, managerial and planning challenges which extend to issues of local planning, health and social services.

In terms of bushfire management, Cottrell (ibid) suggests that the suburban origins of people in urban interface areas leave them lacking the independence and self-reliance normally associated with their rural neighbours.

It is quite possible that the expectations and provisions of rural and urban fire services may differ not only from each other, but from the expectations of the interface populations that they serve. As Rhode (2002) notes; "*The very values that brought new residents to these areas are often the very substance which poses the most significant risk from fire.*" (p.11).

In addition, it is commonly understood that ethnic composition in Australian cities differs between highly accessible and more remote areas; whereas 15.5 per cent of the population in the most accessible areas was born in a non-English-speaking country, less than a third of that proportion in other areas have such a background (Hugo, 2002).

However, it is likely that the need for accessibility, affordability and amenity value of interface areas will encourage greater ethnic diversity in the future. There is a need for emergency planners and community groups to keep in-step with such change if communication and social interaction are to be maintained.

Overall, Australians are highly mobile, with 17% of the population moving annually and peripheral urban areas displaying particularly rapid population change (Hugo, 2002). As will be discussed within

the Theory Section (5), such community turbidity has the potential to make these areas less resilient to significant change or disaster (Sadiki and Ramutsindela, 2002 in Cottrell, 2005).

It also has implications for volunteer recruitment and the need for ongoing provision of education programs and mitigation strategies. For example, fire service providers in these areas must continually update their knowledge of the communities they serve and adapt their approach to suit the changing social, demographic and cultural environment.

2.4 Bushfire hazard and management at the urban interface

> *"Human settlement at the wildland–urban interface creates not only physical impacts on the landscape, but also a new social system that scientists and land managers must understand."*

(Field and Jensen, 2005: 356)

2.4.1 *Competing goals in a natural/urban environment*

As we have seen, development in interface areas occurs through choice, changing values and expectations or through necessity, as space and affordable land are sought in response to burgeoning urban populations and rising prices. Either way, this new interaction with natural, semi-natural or agricultural systems has consequences for fire regimes, fire behaviour and that ways that fire management must be approached. As Rhode (2002) notes from similar experiences in the United States:

"*A factor of urban migration, people have moved ever farther into wild areas [….] in search of human values of solitude, independence, and freedom from perceived urban ills. [….] this migration is often followed by construction of whole new cities on this fringe. However, fire is a necessary natural factor, and recurrent wildfire in most landscapes is only a matter of time. The addition of a wildland-urban interface has complicated this natural cycle through competing values." (p.10)*

In the case of Sydney, the city encompasses and is surrounded by a number of conservation reserves which are often managed to conserve resident species, communities and ecosystems (see section 6.5 for a more detailed description of the case study area). These areas, which are often of regional and national significance, also offer recreational, scenic and aesthetic resources (Benson and Howell, 1990 in Bradstock, 1998).

As a result of the many actors and functions associated with urban bushland, fire management activities are often controversial and difficult to administer (e.g. Pyne, 2006). However, fuel build-up and land-use conflict in and around urban areas is just one problem making the threat of interface fires such a unique and serious issue.

2.4.2 *A new fire paradigm*

Historically, the more common sequence of bushfire events involves ignition and fire development as a result of adverse weather conditions (hot, dry, and windy) and the presence of large volumes of combustible vegetation. Even in a fast-moving fire the flames must often cover considerable distances before threatening urban communities lying in their path (Bradstock *et al.*, 1998).

In this scenario, there is time to plan and develop mitigation strategies prior to any impact with built-up areas. Urban interface fires, however, are different. Lasting no more than 1-2 days these short, sharp fires develop rapidly and can impact upon numerous properties simultaneously. Rohde (2002), in an assessment of urban interface fires in California, notes:

> "*Contemporary wildfires in urban interface areas are forming new patterns and paradigms. Urban interface fires, unlike their 20th century counterparts, require neither protracted time nor large acreage to become destructive.*" (p. 33)

He goes on to state that:

> "*Given the ever increasing population and movement of new communities into former wildlands in California, this kind of fire has the potential to become the dominant high-loss wildland structural interface fire of the future*" (p. 221).

Despite their swiftness and more localised nature, fires which impact the built environment are generally more costly than rural bushfires, both in terms of injury and loss of life and property damage (Rehm *et al.*, 2002).

Urban interface fires are also more likely to have been started deliberately due to the population pressure in these areas. This suggests that they will be more frequent, strategically placed for maximum impact and will leave little or no response time before they can be tackled by professional fire-fighters. As Muller and Bryant (2008) note:

> "*There is a clear relationship between high populations and increased probabilities of deliberate vegetation fire in Australia. Typically, between 40 to 50 percent of all fires occur in vegetation within or surrounding major metropolitan centres, and a high proportion of the remainder are associated with major or smaller urban centres"* (p. 96)

The similarities between California and New South Wales are evident not only in the types of fires that both these states are experiencing, but in the continuous expansion of communities into previously rural areas.

2.4.3 *Fire operations in the urban interface*

The urban interface is a complicated environment for fire agencies to successfully operate in. Their rapid and dynamic nature has the potential to quickly overrun local fire-fighting resources. Additional challenges include unfamiliar fire behaviour, the sheer volume of properties at risk, lack of community awareness and education, large-scale self-evacuation, narrow streets and failure of essential services such as water, gas and electricity.

As flames, radiant heat and embers enter urban areas they encounter different fuel conditions; creating fires that can be classed neither as bushfire nor structural fire. Rehm *et al*. (ibid) identify that while the density of trees, shrubs and ground cover (grass) in urban interface areas may still be important for determining fire behaviour, housing density and the combustible material within them represent a key quantity in predicting the severity of an interface fire once house to house ignition has begun, with fuel loadings in buildings typically many times those found in dense bush. In addition, self-generated winds which are often associated with bushfires may become a significant and even dominant influence over the fire-spread and behaviour.

> *"Once a fire has started, it is often too late to demand fuel modification, road access, or fire-fighting infrastructure that would aid in saving homes. Indeed, natural factors at play during wildfire, such as high winds and heavy fuel accumulations, may be sufficient to defeat the very best available fire-fighting technology in even well-prepared interface communities."*
>
> (Rhode, 2002: 11)

Operationally, the urban interface presents some particular challenges. Rehm *et al*., (ibid) suggest that both the training and response tactics of urban fire brigades will differ significantly from rural brigades with whom it is likely they must interact in the case of an interface fire. While, in New South Wales, bushfire operations are jointly coordinated between the NSWFB and NSWRFS, issues of

communication and incompatibility are bound to emerge between two such large and diverse organisations.

Many interface areas are commuter-belts with residents often travelling large distances to places of work. At the time of highest bushfire danger, early afternoon, it is likely that many residences will be unattended or occupied only by those who are not able to work, i.e. the elderly and infirm, or parents (predominantly mothers) minding young children.

Even if households have made bushfire plans, these frequently rely upon all able-bodied members being present and/or the young and elderly being taken to a safer place. Problems may be caused by large numbers of residents either leaving the area or attempting to return to their homes, creating added dangers and hindrances to operational fire-fighters.

With traffic congestion already a familiar feature of interface fires, the large fire-trucks predominantly used by the urban brigades and narrow cul-de-sacs of urban interface areas present problems associated with mobility, particularly as fire-fighters attempt to stay ahead of an often erratic fire front. As Gledhill (2003) points out:

> *"The road systems in urban interface and rural areas are typically not designed to handle high traffic flows and speeds, particularly when people are going in the opposite direction to responding fire appliances. The logistics of moving a lot of people quickly and safely make large scale evacuations very difficult."* (p.4)

2.5 Future climatic trends and the potential for increased bushfire risk

In addition to the influence of El Niño and La Niña events which affect the severity of fire years on a cyclic basis, a number of recent studies have assessed the likely effects of climate change upon fire risk in Australia.

Anthropogenic interference with the climate system is now a globally accepted phenomenon (IPCC, 1997: 2007), with much development literature suggesting an overarching framework for identifying vulnerability on a spatial and temporal scale that can encompass the influence of long-term climate impacts (i.e., Sea level rise, drought) and shorter-term shocks (i.e., storms, floods, freak weather).

Future projections have already indicated that human, ecological and physical systems in Australia will be impacted on a number of fronts (IPCC, 1997; 2007). It is thought that in the southern half of Australia, water stress will be of particular importance, with drought (Beare and Heaney, 2002) and bushfire (Hennessy, 2005) regimes increasing their intensity and geographic range to areas less used to the necessity to cope or adapt.

Hennessy *et al.* (2005) report that an increase in fire weather risk is likely with the frequency of very high or extreme Forest Fire Danger Index (FFDI) days increasing by 4-25 percent by 2020 and 15-70% by 2050 in some areas of south east Australia. The study also suggests that the window of opportunity for prescribed burning may also be reduced as periods of high fire risk extend through Spring, Summer and Autumn.

These findings are supported by Pitman *et al.* (In press) who analysed change in bushfire risk under a number of emissions scenarios. Their research highlights the increasing economic losses and costs of fire management strategies that are likely to result from the predicted change in the frequency or intensity of bushfire in Australia as a result of climate change.

Given these prognoses, it must be assumed that in the future we are likely to see increased periods of extreme fire danger. However, rather than a gradual warming, fluctuations in temperature and humidity are more likely to occur year on year. The non-linearity of these extremes will create an initial situation in which a significant commitment to enhanced emergency management resources is unlikely to be financially (or political) justifiable.

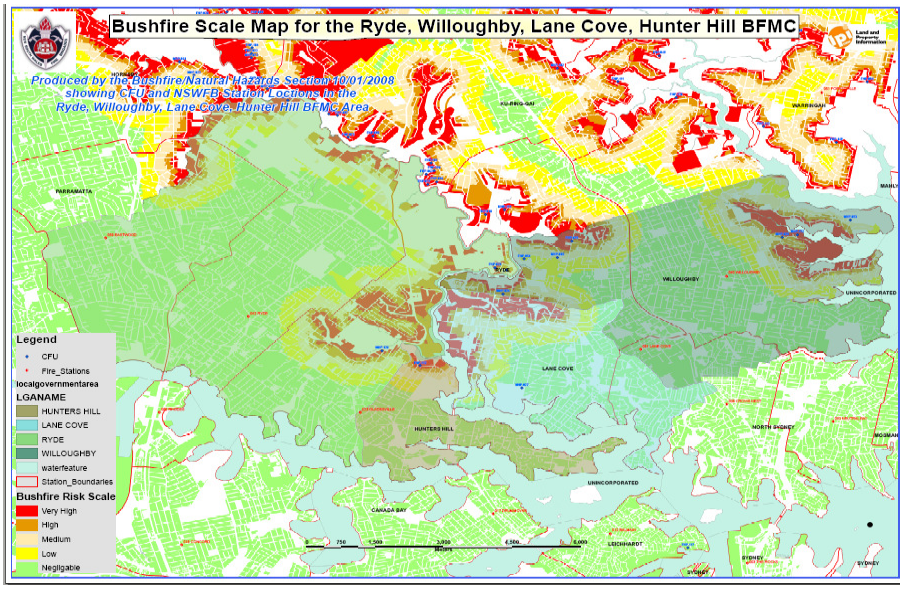
Similarly, communities are likely to experience fluctuations in levels of fire activity which may greatly aid the development of preparedness programmes during active periods but which may alternatively leave them vulnerable following longer periods of quiescence.

The environmental, social and economic effects of climate change are likely to weaken or strain many communities, exacerbating existing vulnerabilities and creating new situations for which adaptive capacity may be limited (Lowe and Lorenzoni, 2007).

For urban interface areas, it is possible to theorise that the effects of climate change may have significant direct and indirect impacts in relation to bushfire hazards and vulnerability. For example, areas in which the ability to adapt or diversify in the face of change is restricted in some way, may be at particular risk. Such restrictions may include; knowledge (particularly of potential future scenarios

and adaptive solutions); infrastructure and technology; high rates of debt (or reduced capacity to adapt), and; poor institutions and social networks, both within and outside the local community. Ultimately though, it seems that significant planning and preparedness actions are to be needed in urban interface areas if the issue is to become and remain manageable in a changing social, cultural, economic and environmental climate.

NSW Fire Brigades Update



Fire Aus Map produced by Terry Munsey, NSW Fire Brigades

The NSWFB now utilises a three stage approach to identify high risk locations for the implementation of new CFU's. In stage one the Bushfire Natural Hazards Section utilises the Risk Frontiers FireAus Database as a layer with High Resolution Imagery to assist in the risk assessment and validation process for determining the allocation or requirement of a Community Fire Unit at a requested location.

The FireAus Database was developed by Macquarie University's commercial arm - Risk Frontiers. This database identifies the risk to 2.8 million individual addresses on the Bushland Urban Interface in the Greater Sydney Area. The risk has been assessed following on from research into four major bushfires across Australia. The risks are defined using the following: 1. Aspect, 2. Vegetation, 3. Slope and 4. Distance from the vegetative fuel edge.

This research concludes that there have been no property loses beyond a 700 metre radius from a vegetative fuel edge, and risk increases exponentially the closer properties are to the vegetative fuel edge. Stage two sees further research undertaken through interrogation of local bushfire management committee risk plans, fire history and local asset registers. Stage three is achieved with the validation of outcomes from the first two stages with a ground-truthing of target communities by local fire crews in analysing the location of existing Community Fire Units against the defined high risk areas as described by the FireAus database. By using this process it has been shown that 100% of all existing CFU's are located in high and / or extreme bushfire risk locations.

This is validation of the current risk assessment process as carried out within the program. The use of FireAus will also provide the CFU Program with the ability to determine future CFU locations based on empirical research. An added advantage of this new process will be the capability to develop a long term strategic plan for the growth of the program.

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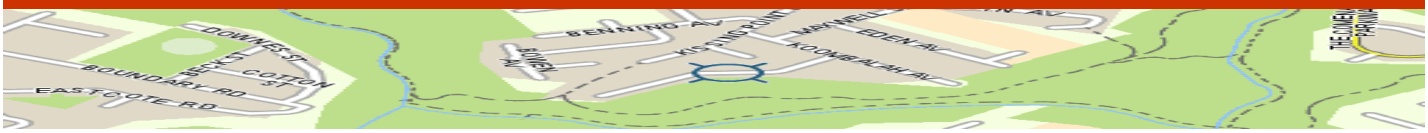


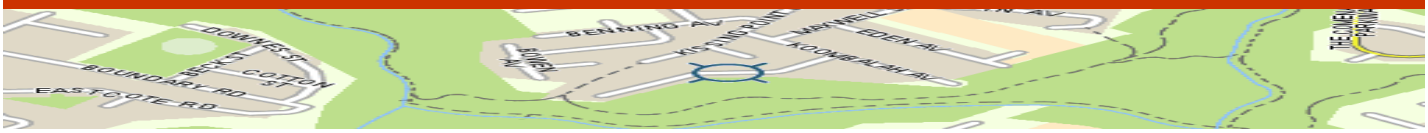
3.0 Community Fire Units: background and context

Summary:

This section provides the background to the formation of CFUs, their aims and modes of function. This is followed by details of CFU directives, duties and responsibilities, membership and other practical aspects.

The information in this section is taken primarily from the New South Wales Fire Brigades CFU Training Package, Version 2 and personal communications with the New South Wales Fire Brigades CFU co-ordinators. It is important to note that since this information was gathered in 2006, considerable changes have been made to the management, organisation and training of CFU groups. This chapter therefore acts only as a general overview of CFU operations and should not be taken as a definitive description. For more up to date information, please contact NSWFB directly.

3.0 Community Fire Units: background and context



3.1 Background and inception of Community Fire Units:

> *"**{Community fire units (CFUs)}** - volunteer teams of local residents trained to safeguard their homes during a bushfire, until the fire brigades can get there, or to 'mop up' after a fire has passed so fire units can be released to attend more urgent incidents. CFU members are not firefighters. The aim of the CFU program is to reduce the impact of bushfires on the community and to protect life and property from bushfires. A typical team is made up of six to 12 members. Recruitment is within the local community. Local fire stations conduct regular training sessions with volunteers. The training focus is on bushfire education, prevention and preparation."*

[New South Wales Fire Brigades - From Wikipedia - http://en.wikipedia.org/wiki/New_South_Wales_Fire_Brigades]

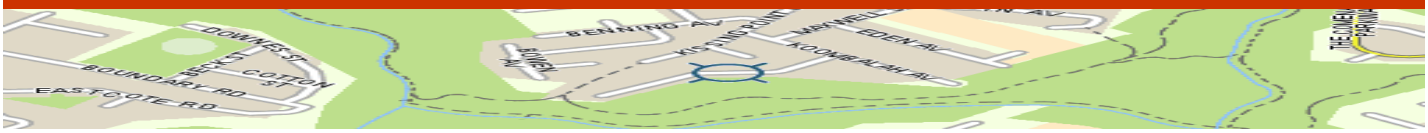
The CFU concept is a combination of existing residential fire-fighting infrastructure and a more recent emphasis upon the involvement of communities in bushfire preparedness. New South Wales Fire Brigades have supplied Hose Post Boxes to high risk neighbourhoods since the post World War II era, of which the majority are located around the Greater Sydney area.

It became clear, following the wildfires which threatened parts of Sydney in January 1994 and overwhelmed the resources of the fire and emergency services, that local Hose Posts were of great benefit to householders who would have been otherwise powerless to defend their homes.

As a result of local enthusiasm, lobbying and liaison with the New South Wales Fire Brigades (predominantly in the areas worst affected by the fires), the Hose Post program was resurrected, this time with the identification of new 'high risk' locations and the supply of either "mobile trailers" or "fixed cabinets".

The term Community Fire Unit (CFU) actually refers to upgraded hose post boxes which the NSW fire brigades regularly provided in bushfire-prone areas prior to the 1994 fires. Following much positive feedback from the public and to reflect the association of the community with these fire fighting resources following the 1994 fires, existing hose post boxes and new installations were renamed CFUs.

The scheme under which CFUs operate is the 'Fire Watch' program. This is intended to operate in a similar way to the Neighbourhood Watch program. It aims to increase community awareness of fire



prevention whilst also providing residents with training and resources to enable them to play a role in property protection (NSW Fire Brigades, CFU training package, version 2, 2006).

From a practical perspective, the inventories of these new style CFUs were a great improvement on the original Hose Post Boxes and, in addition to the extra training required for groups to use the equipment correctly, the NSW Fire Brigades stated its intention to promote greater interaction with the local communities in order to reduce the threat from bushfires. The primary focus was on areas where community members were prepared to undertake training and the responsibility for the use of fire fighting equipment to carry out property protection should the need arise.

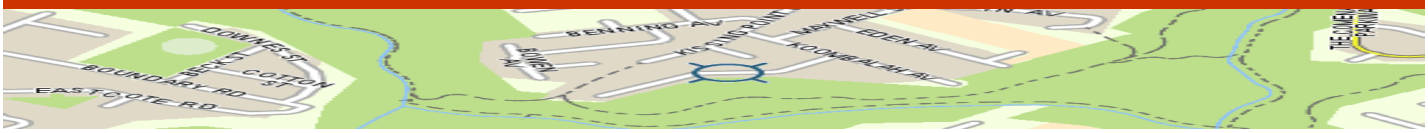
The community aspect of the CFU Program was further reinforced by the Fire Brigades' commitment to increase community awareness of fire. This was pursued through the creation of the community 'FIREWATCH' program whose modus operandi was similar to the already successful "Neighbourhood Watch" Program.

The prime directive of CFUs is to provide neighbourhoods on the urban / bush interface with a means to protect life and property from bush fires. This is achieved by "*providing community members with a level of equipment, training, knowledge and confidence which allows them to actively assist existing fire fighting agencies to prepare for bushfires and to undertake mopping up and blackening out operations when the main fire front has passed. This will allow NSW Fire Brigades and Rural Fire Service units to mobilise and relocate to critical fire front areas sooner than would otherwise be possible.*" (CFU Training Package)

The members attached to CFUs are unpaid community volunteers and represent a third tier of the Brigade's operational arm. However, the key point made in describing the role of CFUs is that they should enhance the resources of the NSW Fire Brigades and local Rural Fire Service Brigades, NOT replace them.

3.2 Criteria for CFU establishment and aims

The criteria for establishment of a CFU again rely upon a combination of practical and community based elements. In the past, the first requirement was the instigation of positive action on behalf of the community. This entailed an enthusiastic commitment by 6 or more residents towards ensuring future savings of life and property. Once an application had been lodged, New South Wales Fire Brigades



approval is based upon a combination of fire determining factors relating to the fire proneness of the area. Such factors are listed as including;

- *Fuel loadings*
- *Topography / gradient*
- *Aspect*
- *Historical fire patterns*
- *Community support*

However, as described in Chapter 2, the NSW Fire Brigades now utilise a suite of tools to identify suitable locations for implementation of CFUs. This includes use of high resolution imagery, FireAus Database, BFMC Risk Plans, fire history and community support.

Overall aims:

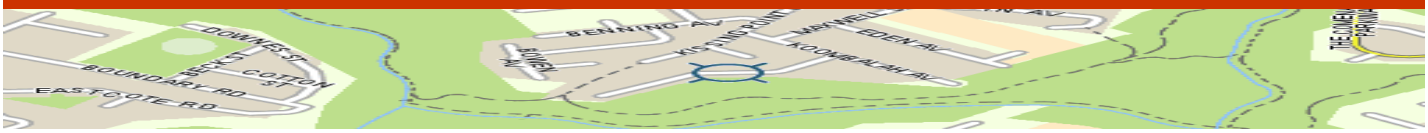
FIREWATCH is designed to provide the stimulus for community interaction with members of their local NSW Fire Brigades Station focussing in the areas of:

- *Education*
- *Training*
- *Hazard reduction*
- *Life and property protection from bushfire threats prior to the arrival of the fire services*

Volunteers can expect to be educated about:

- *bush care and bushfire behaviour*
- *safe housekeeping and gardening practices*
- *planning and preparing for bushfires*
- *operating and handling fire-fighting equipment*
- *mop-up operations*
- *processes that help to reduce bushfires in the community*
- *limiting the effects of bushfires on lives, property and community in times of bushfire*

The following extracts demonstrate a number of key aims of the CFU scheme, as outlined by NSWFB:



"The New South Wales Fire Brigades intends achieving [its] vision by providing fire fighting equipment and training to local residents by establishing 'CFUs' in Bushfire Prone areas."

"The introduction of CFUs is seen as providing the opportunity to increase the public's awareness of the New South Wales Fire Brigades and to heighten the Brigade's community involvement and interaction."

* "The CFU program represents a proactive rather than a reactive approach by the NSW Fire Brigades to decrease the impact of bushfires on the community."

* "It is a program that has been embraced by the community and is driven by the will of its members. With the help of CFUs, the NSW Fire Brigades is now able to target a larger area of the state for bushfire risk management work."

* [Source: http://www.nswfb.nsw.gov.au/community/bushfire/cfu.php]

3.3 Chain of command

Bushfire Natural Hazards Section

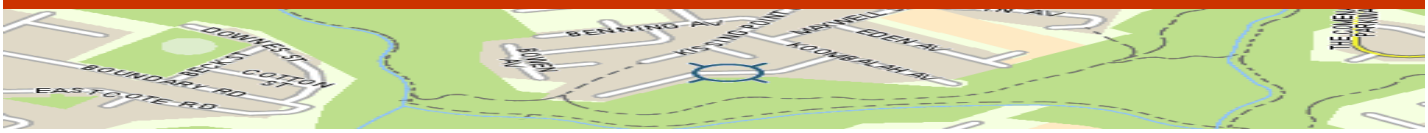
Strategic management of the CFU Program is the responsibility of NSW Fire Brigade's Bushfire Natural Hazards Section, a specialised unit within the Specialised Operations Directorate. The section provides support to the Area Commands through the following:

- Developing of strategic plans for the program
- Developing and coordinating training programs for volunteers,
- Strategic identification of CFU locations,
- Liaison between volunteers and operational command
- Research and review of all equipment and Personal Protective Equipment
- Data collection and reporting on the program

The Bushfire Natural Hazards Section provides administrative support for the program as well as specifically trained CFU Coordinators who work closely with area commands and volunteers.

Individual CFUs will organised and control under the following chain of command:

- *NSW Fire Brigades Officer*



CFUs are coordinated by a NSW Fire Brigades Officer. This individual is responsible for the administration and training of the volunteer group and overseeing the upkeep and maintenance of CFU equipment. The Officer or Station Commander ensures that the CFU Leader and Custodian are able to make regular contact with him or her and provides information on training progress and incidents to the Regional Commander and the Officer-in-Charge of the Rescue/Bush Fire Section.

- *CFU Leader*

The CFU Leader acts as the official contact between the CFU, its members and the Custodian and the NSW Fire Brigades for matters of routine training and administration. The Leader ensures that CFU members are available for action associated with training and at times of high bushfire risk. In the absence of any other member of the NSW Fire Brigades during a bush fire, the CFU Leader takes charge of the CFU. The CFU Leader receives advice and guidance either from the Station Commander in charge of the CFU or, in his/her absence, the State Fire Command, the Operational Commander or the Zone Commander.

- *CFU Custodian*

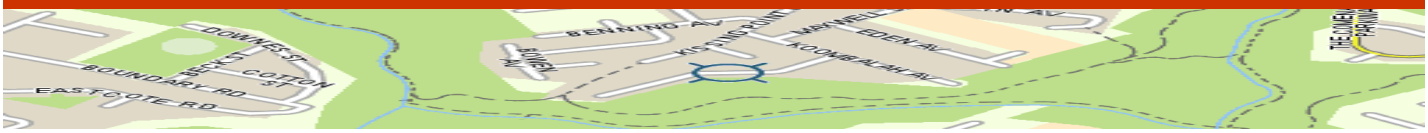
The Custodian is responsible for the safe storage, maintenance and inventory of the equipment. They must ensure that the CFU trailer containing the equipment is in a sheltered but readily available position which can be accessed by CFU members at any time. The CFU Custodian also supports the CFU Leader in monitoring the availability of CFU members and in sourcing advice and guidance from the relevant operational Commanders.

- *CFU Members*

CFU Members are obliged to make themselves available for contact by their CFU Leader particularly during periods of high bush fire threat. They must attend the training sessions organised by the NSW Fire Brigades. During operations the CFU members must follow the directions provided by the NSW Fire Brigades Officer in charge, however, in the absence of a NSW Fire Brigades Officer, the CFU Members must abide by the directions of their CFU Leader.

3.4 Method of operation

The extract below is taken directly from the NSWFB CFU training package (p11 – 12) as an example of the methods of operation that CFU members will be involved in.



[5.1] Under the direction of a NSW Fire Brigades member, take actions as directed, otherwise under the control of the Team Leader proceed to the fire scene with the CFU equipment. Supply water to the firefighting hose lines either by the use of standpipes, from hydrants or the Davey pump from swimming pools or another static water supply. Knapsack pumps should be considered for small or spot fire extinction.

[5.2] Strategies and tactics should include a direct attack on SMALL spotfires which may develop or wetting down procedures prior to the approach of a major fire front. Wherever possible, advice regarding actions should be sought from the NSW Fire Brigades.

[5.3] Property protection procedures should commence as soon as is practicable with the aim of extinguishing spot fires and SMALL outbreaks as quickly as possible. This is particularly relevant during an approaching bushfire front and for many (up to 6 – 8) hours after the main fire-storm has passed.

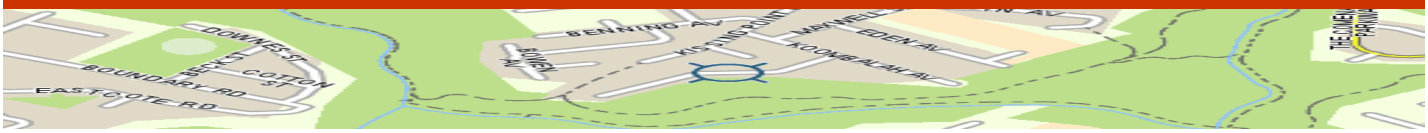
[5.4] CFU members are restricted from bush/grass land areas beyond the defined boundaries between rear property alignments and bushland interfaces, during fire activity and blackening out operations. CFU members are NOT to enter bush/grass land areas unless directed and accompanied by NSW Fire Brigades personnel.

3.5 Training

The CFU training program (Standard Operating Procedure, No. 8, CFUs, 1995) supersedes the 'In orders' 1992/23 and 1994/6 which relate to the training of Hose Post squads. Unit members receive between 16 and 20 hours of training per year, conducted over four sessions. The recommended months for training are January (one session), April (one session), August/September (two sessions).

As it is generally regarded that Unit members will be unavailable during weekdays, training is carried out at a time suitable for the CFU members – generally weekends. Training is carried out at the location of the CFU whenever possible; alternatively a local park, reserve, fire station or other suitable venue is used.

Training during hazard reduction work is considered by the New South Wales Fire Brigades as the most valuable experience community members can receive as it simulates actual bushfire behaviour and at the same time provides beneficial practical applications of their training.



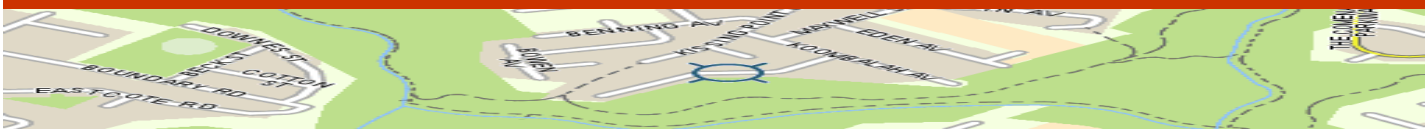
CFU training covers a number of basic but key areas of bushfire management. These include:

- *Obligations and responsibilities*
- *Personal safety*
- *Hose and small gear*
- *Fire behaviour*
- *Fire suppression*
- *The Davey pump*
- *Cabinet and trailer maintenance*

3.6 Community Safety – Prevention and Community Preparedness

A key aim of the New South Wales Fire Brigades is to encourage community involvement in bushfire safety and preparedness. The NSWFB recognises that some segments of the community are considerably more at risk from fire and other emergencies than the general population due to more than physical factors alone. Therefore, as well as producing general safety programs, the NSWFB targets these at-risk groups with specially-tailored community safety programs. For example, The NSWFB is committed to developing and implementing prevention and preparedness programs for culturally and linguistically diverse (CALD) communities (New South Wales Fire Brigades Annual Report, 2004/05: 27).

NSWFB reports suggest that the CFU approach has been shown to play more than just a physical fire fighting role. During 2004/05 the Aboriginal CFU program was further developed and implemented with new CFUs established in Dubbo, West Kempsey, and Wreck Bay. In Dubbo, the New South Wales Fire Brigades worked as part of a 'whole-of- government' response to issues faced by local residents. The donation of a CFU at a family day organised by the NSWFB and the training of people from the local community by fire officers helped integrate the NSWFB into the community, building trust and instilling a sense of pride and ownership. Early reports indicate the CFU has reduced malicious fires across the estate and contributed to a safer environment for the whole community, including fire officers. Due to the apparent success of this initiative, the NSWFB is planning to set up CFUs in other Aboriginal communities (New South Wales Fire Brigades Annual Report, 2004/05: 29).



In addition to its role in promoting public relations between at-risk communities and the NSWFB, CFUs have also been reported to promote community links. Although the extent to which this has occurred is not yet fully understood, it would suggest that communities taking part in the program are realising benefits beyond the fire fighting element alone, as the quote below suggests:

"*One of the best things about CFU's is the sense of community involvement. In our unit, there is a role for everyone, from raising the alarm to mop up operations. Not everyone has to be near the fire.*"

Dianne Gorman, Lara Crescent CFU, North Rocks:
[Source: NSWFB CFU Brochure. Accessed on-line, May 2006]

How does CFU training compare with Rural Fire Service (RFS) training?

"Rural Fire Service Volunteers must undertake the first (basic) level of training – the Bush Firefighter Course (BF) – before being able to attend fire calls. This course involves theory briefings, group discussions and practical activities and ensures that you are competent in basic firefighting skills.

The course runs for about 20 hours, followed by a similar amount of post-course practice, and is held at brigade stations or district offices. Volunteers will then be asked to attend a station for regular activities such as duty days (as a firefighter), brigade meetings, training and maintenance activities.

The more active the volunteer is in operational activities, the more skills and knowledge they develop. For volunteers that do not attend incidents, the similar (but slightly shorter) Bushfire Support (BFS) course provides an understanding of firefighting operations and safety enabling the support of firefighters conducting emergency activities."

[Source: http://www.bushfire.nsw.gov.au/dsp_content.cfm?CAT_ID=277. Accessed 11/06/06]

4.0 Other community-based schemes in Australia

Summary:

The aim of this section is to summarise the backgrounds and modes of operation of a number of urban community-based schemes in Australia. By identifying key differences in approach the section will assess how these have reflected upon their outcomes in relation to the original objectives and motivation for initiation. The schemes (apart from Land Care) all share the contemporary theme of community involvement in bushfire preparedness and risk reduction with slight differences associated with State approaches. Finally, the central elements of these approaches are compared and contrasted using a written summary and matrix table. It is hoped that by understanding how and why community based schemes exist, a clearer picture can be created of the context surrounding Community Fire Units and how they differ in their creation and modes of operation.

4.1 Introduction

As will described in more detail in the theory section (Section 5), the contemporary view among disaster risk reduction researchers and, increasingly, emergency management practitioners, is that disaster preparedness, mitigation, response and recovery are best achieved at the local level in collaboration with the communities involved (Lewis, 1999; Twigg, 1999-2000; Wisner *et al.*, 2004 in Kelman, 2007). Using evidence from existing disaster risk reduction programs, Kelman (ibid) suggests that while top-down guidance is frequently helpful, in providing guidelines, standardising vocabulary or for providing resources, the most successful outcomes frequently occur as a result of the provision of support for the actions of local residents, rather than relying solely on external specialists or post-disaster assistance. Kelman lists international examples of community-led disaster risk reduction programs, including Townwatch in the United States (Ogawa et al., 2005), Future Search also in the USA (Mitchell, 2006) and the Safe Living Program in Australia (Hennessy, 1998).

For many hazards it is recognised that outside help may be slow in arriving and that vital services, food, shelter and water will be delayed by breakdowns in communications, transport links and management systems. In this case, many manuals suggest that people should take care of themselves for at least 72 hours without outside assistance (e.g. EMA, 2003; FEMA, 2004), with some even suggestion of periods as long as 1-2 weeks (Kelman, ibid). The delays in getting help to parts of New Orleans in 2005 following Hurricane Katrina exemplify the extended periods of hardship which people must sometimes

endure. As a result, community teams are increasingly being trained for such purposes, such as the Community Disaster Volunteer Training Program in Turkey (http://www.ahep.org/ev/egitim5_0e.htm) and Community Emergency Response Teams (CERTS) in the USA (Simpson, 2001).

As an example of emergency management moves towards greater community self-reliance in Australia, the Fire and Emergency Services Authority (FESA) in Western Australia encourages communities to take greater responsibility for their own safety and to be more self-reliant and better prepared in case of emergencies. FESA calls this approach 'community-centred emergency management', the primary objective of which is to minimise the impact that emergencies such as bushfires and severe storms have on communities. This approach requires that FESA understands and responds to social, economic, cultural, environmental, geographic and other special needs of people it serves. Central to the approach are four components – prevention, preparedness, response and recovery:

- **Prevention**
  To provide a range of prevention services to increase community awareness of hazards and involvement in minimising their impact.

- **Preparedness**
  To provide and maintain appropriate and adequate infrastructure, equipment, skilled personnel, plans and programs in preparation for emergencies. To support the community in its own preparations for emergencies.

- **Response**
  To ensure rapid and comprehensive response to emergencies, to contain and minimise the impact of hazards and to perform rescues. To support the community in its own response to emergencies.

- **Recovery**
  To assist the community, employees and volunteers affected by major emergencies to recover effectively and efficiently.

[Source: http://www.fesa.wa.gov.au/internet/default.aspx?MenuID=136]

The aim of this section is to summarise the backgrounds and modes of operation of a number of community-based schemes in Australia. By identifying key differences in approach the section will

assess how these have reflected upon their outcomes in relation to the original objectives and motivation for initiation. The schemes (apart from Land Care) all share the contemporary theme of community involvement in bushfire preparedness and risk reduction with slight differences associated with State approaches. Finally, the central elements of these approaches are compared and contrasted using a written summary and matrix table. It is hoped that by understanding how and why community based schemes exist, a clearer picture can be created of the context surrounding Community Fire Units and how they differ in their creation and modes of operation.

4.2 Community Fireguard Scheme, Victoria

[Main source: Boura, J. (1998) Community Fireguard: Creating Partnerships with the Community. Australian Journal of Emergency Management, 13:59-64]

4.2.1 *Background:*

In Victoria, legislation (Country Fire Authority Act, 1958; Emergency Management Act, 1986) provides each resident with the right to decide whether they intend to stay and defend their property. The importance that the CFA attaches to the accuracy and timing of resident choice has led to the development of a community education and community participation approach, commencing formally in February 1993 as Community Fireguard (Beckingsale 1994; Boura 1998). Investment in the Community Fireguard scheme is reported to have reduced the costs of wildfire in the urban environment in terms of property, lives lost and the socio-psychological effects that are associated with community exposure to major wildfires.

4.2.2 *Factors leading to Community Fireguard group formation:*

Community Fireguard schemes can be instigated for a number of reasons, generally associated with residents' underlying concerns or following an increase in concern associated with fire incidents or awareness raising programmes and public meetings led by the CFA or local brigades, e.g. Bushfire Blitz programme and/or in reaction to media campaigns. In addition, Community Fireguard groups may evolve out of existing groups such as Land Care conservation groups or Neighbourhood Watch.

4.2.3 *Overall aims:*

Community Fireguard recognises that, on days of extreme fire danger, property protection by the CFA cannot be guaranteed. By promoting the development of wildfire survival strategies amongst the most fire prone communities, the CFA is able to transfer a proportion of risk in an effort to significantly reduce resident's vulnerability (Boura, 1998). The process of resident empowerment is designed to be ongoing

and community led. It replaces the traditional 'top-down' approach of information dissemination commonly used by agencies to date and also recognises the general lack of influence of passive publicity, e.g. media campaigns. The mentoring of residents and the development of survival strategies which consider participant's lifestyles, environment and values constitutes an advanced development of the community-oriented emphasis favoured by social science researchers (Murray, 1999; Beckingsale, 1994).

> *"Community Fireguard explains to people why they are risk – the realities of fire behaviour in their area, the limitations of the fire service in halting the fire or protecting every home, and the difficulties of evacuation. It demonstrates that there is much they can do to reduce their vulnerability without destroying their lifestyle, and helps them develop and implement survival plans that fit their values and priorities"* (Boura, 1998:6)

4.2.4 *Chain of command:*

Local community leaders are encouraged to meet with residents and later with a trained Community Fireguard facilitator who will assist in the creation of preparedness plans. Group dynamics are regarded as critical to the sharing of knowledge and the development of strategies. For this reason the facilitator actively seeks to extract and utilise local knowledge in the development of group strategies with the group very much expected to lead discussions and formulate its own solutions.

4.2.5 *Method of operation:*

Community Fireguard groups are provided with the knowledge and understanding that is required to develop a robust survival strategy. The excerpt below provides an overview of the types of knowledge that Community Fireguard membership is expected to provide and the ways in which this knowledge can be utilised:

To develop an effective survival strategy a family needs to:

- Know what they can expect from the fire and emergency services during a major fire, understand the law regarding evacuation and road blocks and appreciate the unreliability of reticulated water, power and telephones.
- Be prepared for what a major fire looks, sounds and feels like.
- Understand how houses are ignited, what can be done to improve their safety by reducing fire intensity and reducing avenues for ember attack and the importance of active defence by residents in reducing house loss.
- Make the decision to stay or evacuate considering the safety level of their home, how much warning they would get, how far they would have to travel to safety and what sort of roads they would have to use.

- Consider the capabilities of the family members who will be home. Does there need to be a different plan for week days when only mum and two young children are home, as opposed to the weekend when the whole family is there? What will the rest of the street be doing?

Working as a Community Fireguard group increases the options available to residents:

- Complementary fuel management and the organisation of working bees to help those less able to manage their property.
- The development of telephone trees to facilitate the spread of emergency information through the group.
- Selection of "safer homes" in which people can shelter whilst the fire front passes.
- Identification of more vulnerable members of the community who need additional assistance, e.g. the old, infirm, or even someone without a car at home or a shift worker asleep during the afternoon.
- Knowledge of what neighbours will do during the fire and the opportunity to support each other morally and physically during the fire.

[Boura, 1998:9]

Boura *et al*. (1995) report that under actual fire conditions, Community Fireguard groups responded in an organized and timely manner. Neighbours were warned of the impending threat and efforts to gather up-to-date fire information allowed community members to remain well-informed about the fire's progress. The preparations made by community members and the role they played in asset defence (e.g. spot-fire patrols) enabled CFA resources to be directed towards key areas of the fire front.

> "*Suitably clothed and armed with independent water supplies and home defence equipment all members of the group stayed with their homes ready to protect them if fire reached their neighbourhood*." (Boura *et al*., 1995)

4.2.6 *Education and intended outcomes:*

Groups undergo a period of intense theoretical education led by a trained facilitator. This is most often carried out in the homes of the members and is intended to provide an atmosphere conducive to comfortable learning in which ideas can be shared and all individuals can actively participate. Many of the intended outcomes of Community Fireguard group involvement are detailed in Method of Operation above.

Following the development of fire plans and strategies groups have less reason to meet and consequently become less active. However, in many cases group meetings are organised prior to fire

seasons and social interaction is frequently continued through involvement in other groups and activities.

An important outcome of the interaction between emergency managers and the 'at risk' communities is the degree to which they are able to co-operate in the processes of prevention, preparation, response and recovery. A particular advantage comes through the position of interaction with emergency managers during a wildfire. Confidence and trust are built in information sources prior to the event, enabling the dissemination of important information to be accurate and swift. In addition, the positive benefits appear to go beyond community groups alone, with non-attending residents being included in preparation, planning and early warning plans. A report into the effectiveness of the Community Fireguard scheme (Rohrmann, 1998 in Boura, 1998:11) concluded that:

> "*The Community Fireguard* [scheme] *is successful in its aim to not just raise awareness but to achieve behaviour change. Members are not only informed, but actually put in place individual and community strategies that enhance their bushfire preparedness*."

4.3 Street Fire Wise scheme (SFW)

[Main source: Gilbert. J. (2005) An evaluation of the Street FireWise Community Education program in the Blue Mountains, New South Wales. Bushfire CRC Project C7]

4.3.1 *Background:*

Street FireWise (SFW) is a community education programme developed by the Blue Mountains Rural Fire Service (RFS) that seeks to increase knowledge and awareness of bushfire risk within a region in which it is estimated that around a quarter of the population live in high risk areas. The initial concept for SFW originated from the Bushfire Blitz street meeting program that had been developed by the Country Fire Authority (CFA) in Victoria. The scheme is based upon the delivery of key educational information to an invited audience in high fire risk areas. Meetings are organised with the aim of increasing knowledge about bushfires and bushfire safety with the ultimate aim of encouraging residents to become more prepared. The program was piloted in 2000 and has run every fire season since. Between 2000 and 2005 just over one hundred meetings took place with an average of ten residents in attendance at each meeting (Gilbert, 2005:4).

4.3.2 *Criteria for location of Street Fire Wise scheme:*

The participation of a particular brigade in the SFW scheme is often dependent upon a willingness or practical ability to donate time and resources to the scheme. Some brigades are more willing and able to become involved in SFW than others. Once a brigade accepts the community education role, it is their task to identify 'high-risk' communities and to recruit a 'captive audience' for subsequent seminars. Brigades will often target high-risk communities at a very local level (e.g. one or two streets). The ability to identify areas of high risk is given great priority due to the limited resources allocated to the SFW scheme. Risk management plans and local maps are used to locate areas of topographic significance, e.g. ridge tops, or areas with no recent fire history that are therefore likely to carry a high fuel load. Once an area has been identified it is likely that the brigade will target it repeatedly.

4.3.3 *Overall aims:*

The Blue Mountains RFS distributes educational material via a range of media, including brochures and leaflets, media campaigns and school visits. However, whilst this 'broadcasting' of information helps maintain a general level of awareness, its effectiveness in increasing bushfire preparedness has been found to be limited (Robinson, 2003). As a result, the SFW scheme is intended to be locally relevant with the aim of contextualising the issues and options available to people in order to draw attention to specific risks and help them prepare effectively. The SFW scheme is seen as a way of reaching a wide audience through localised initiatives. In addition, bushfire experiences in recent years have prompted brigades to engender an understanding of the advantages that greater self-reliance can bring, particularly in bad fire years when resources may be stretched.

4.3.4 *Chain of command:*

Residents in an area identified as high risk are informed of an up-coming meeting through posters, advertising and door-to-door activities of the local brigade. Despite strong advice that it would be to their advantage to receive additional bushfire education, individuals are not obliged to attend meetings. The key message is that individuals and groups should be more self-reliant during a fire season and that in the event of serious fires there is a strong likelihood that they will need to defend their homes. Beyond this message, the brigades have little or no power to influence the decisions of residents. Brigades rely to a certain extent upon social hierarchy and peer influence to create a sense of duty and commonality among residents towards greater shared preparedness.

4.3.5 *Method of operation:*

Meetings are seasonally arranged at the discretion of local brigades captains and are likely to be more frequent during serious fire years. However, meetings are largely arranged to be at the most convenient

time for convenors and residents. Unlike the Community Fireguard 'street corner' approach, which was abandoned following poor attendance in early trials, meetings take place at focal points such as community halls or local brigade halls. Convenors deliver a flexible but scripted presentation to the residents with the opportunity for questions and interaction. The aim is to deliver a clear and positive message that will make people feel empowered to improve the safety of their property or family in the event of a bushfire. Awareness and understanding help residents develop a realistic survival plan.

4.3.6 *Education and intended outcomes:*

A major aim of the SFW program is to develop an increased awareness and understanding of the bushfire risk as it impacts on individual or group contexts. Presentations are intended to make residents 'think hard' about their particular situation and vulnerabilities. Actual preparation activities are left to the discretion of individuals following or between the meetings. The scheme attempts to create a situation in which residents become empowered to become more self-reliant in the event of a bushfire. In addition, it is recognised that informal groupings and arrangements are likely to achieve a higher level of preparedness. Therefore, the provision of information and focussing of needs is intended to prompt the independent formation of collective action groups and/or neighbourhood networks. The brigades recognise that residents are more likely to become motivated to act if they are provided with credible and often first-hand knowledge of bushfires. To this end brigades feel they are well respected in the community and are able to create a significant response through the delivery of locally relevant experiential information. Table 4.1 displays the hierarchy of outcomes that SFW programs intend to deliver.

Table 4.1 Hierarchy of outcomes for the Street FireWise program **(**Gilbert, 2005:10)

Ultimate Outcomes	*A reduced impact from bushfires on communities in the Blue Mountains (fewer houses and lives lost).* *[Formation of neighbourhood networks.]*	Longer
Intermediate Outcomes	*Residents use awareness and understanding to develop a realistic survival plan, decide whether to stay and actively defend or leave early, and adopt appropriate preparations around their property. i.e. they become more self-reliant.* *Residents gain an increased awareness and understanding of bushfire risk and how it applies to their own specific context.*	
Initial Outcomes	*SFW meetings are positively received by residents.* *Targeted residents hear about meeting, are motivated to attend and do so.* *Brigades must actively participate in SFW by targeting high-risk communities and running meetings.*	Short Term

4.4 Land Care Groups

[Main source: Curtis, A. (2003) Reflecting on the Landcare experience: A report based on information held within ABARE and BRS. Bureau of Rural Sciences]

4.4.1 *Background:*

Landcare groups first became active in firstly in Victoria and Western Australia in 1986. Their remit was based upon overseas evidence which suggested that participation through local organisations could accomplish broad-based rural development. Soil conservationists, extension agents and farmers were attracted to the approach by the core elements of rural development theory that emphasised: 1) self help supported by change agents; 2) human resource development rather than technology transfer; 3) public participation; and 4) cooperative efforts at the local community scale (Curtis, 1998). The utility of Landcare groups was quickly recognised and in 1988 the federal government committed spending of 360 million AUD in the *Decade of Landcare* program. This was later followed by the establishment of the Natural Heritage Trust (1997) which employs cost-sharing principles that enable community and private benefits from specific work on private land to be identified.

4.4.2 *Overall aims:*

Landcare can be seen as a rural development program intended to engage a large proportion of the rural population and produce more informed, skilled, and adaptive private resource managers. In turn, these managers would adopt a stronger stewardship ethic and increase their adoption of recommended practices that would assist the move to more sustainable agriculture and enhance biodiversity conservation (Curtis and De Lacy, 1996a).

A Central tenet of the Landcare programme is the use of participation as an important step in the process that leads to learning and action. Landcare has successfully mobilised a diverse cross-section of the rural population to address land and water degradation issues. A great deal of the success associated with the Landcare programme is as a result of local community-based planning and action. Groups are largely autonomous and are able to determine their own priorities and activities.

4.4.3 *Chain of command:*

Landcare groups have adopted inclusive approaches to membership. This means that landholders and others in rural communities feel they are welcome to contribute to Landcare (Byron and Curtis, 2002). A large turnover of participants (75% of groups report new members each year (Curtis, 1999)) indicates

that Landcare has reached far beyond the cohort of members in any year. Additionally, research investigating membership of catchment management organisations suggests that Landcare participants are making important contributions to the decisions of these groups.

4.4.4 *Method of operation:*

Groups are typically involved in a variety of inclusive and deliberative activities which facilitate learning. These activities include on-ground practical work, such as:

- Meetings held to discuss issues, identify priorities, liaise with agency staff, prepare funding submissions and debate resource management issues;
- Workshops conducted to develop property and catchment plans and enhance management and planning skills;
- Field days, farm walks and demonstration sites to identify and refine best practices;
- Education and promotional activities such as tours, conferences, workshops, newsletters and field guides to facilitate dialogue and information exchange;
- On-ground actions such as tree planting and seed collection, building salinity and erosion control structures, pest plant and animal control, and erecting fencing to manage stock and feral animal access to habitats.

4.4.5 *Education and intended outcomes:*

There is now a large body of evidence confirming that the participatory activities (mentioned above) significantly enhance the accomplishment of program outcomes (Curtis, 2003). For example:

- There is a significant positive relationship between the proportion of landholders in a district who are in Landcare and the amount of onground work accomplished by groups (Curtis *et al*., 2000).
- Groups with a higher proportion of members participating in the group's activities accomplish significantly more onground work (Curtis and De Lacy, 1996b).
- Landcare members with higher levels of participation in their group's activities undertake significantly more onground work on their properties (Curtis and De Lacy, 1996b).
- Landholders in districts where there is a Landcare group have significantly higher levels of adoption of sustainable farming practices than those in areas without a Landcare group (Curtis and De Lacy, 1996a).

It is apparent that the formation of Landcare groups and the deliberative community networking that they encourage are important in the development of social capital. Social capital refers to the attributes of relationships established in a community that enable participants to act together more effectively (Curtis, 2003). Thus, the networks, roles and rules of behaviour that structure relationships can be

distinguished from the norms, values and attitudes that predispose people towards cooperation (Sobels *et al.,* 2001 in Curtis, 2003). The social capital generated by Landcare involvement may have manifold benefits from the successful achievement of natural resource management objectives to wider social and cultural benefits (see table 4.2 in discussion).

Much of the Landcare focus has been on learning by working with peers and in partnership with government and industry. Examples suggest that this approach has led to the successful establishment of new relationships or the strengthening of existing relationships amongst neighbours and between landholders and industry and landholders and government. Key areas of relationship improvement include increased levels of trust amongst leaders, between leaders and agency staff, and between leaders and members; the resolution of complex and difficult issues with little conflict; the facilitation of communication and learning that has led to the adoption of more sustainable farming practices, and; new norms of behaviour. Evidence also suggests that Landcare participation leads to significantly higher levels of awareness, knowledge and concern about a range of land and water degradation issues (Curtis and De Lacy, 1996a).

Landcare continues to resonate with rural Australians, is an important part of the social fabric of many communities and has much to offer in terms of providing fora where:

1. There is sufficient trust for stakeholders to explore difficult issues, including those where there is a discontinuity between the source and impact of degradation;
2. Learning with peers is likely to increase the awareness, knowledge and skills of land managers, including their confidence in more sustainable farming practices; and
3. Co-learning occurs between land managers, program managers and researchers and contributes to greater understanding of the nature of sustainability.

4.5 Summary of approaches to community involvement

In summarising the community schemes that have been outlined, including Community Fire Units (Section 3.0), it is apparent that all share a similar view that emergency or resource management is a responsibility for which the involvement of communities is both equitable and practical. By transferring the risk to communities, agencies are redressing a balance which has more recently become skewed towards a paternal emergency or resource management role.

The new paradigm encourages greater interaction between authorities / agencies and the public in order to enhance levels of knowledge, concern and ultimately self-sufficiency and protective action. However, the extent to which decision-making power has been handed to communities appears to vary.

There is a trade-off between 'top-down', 'command and control' style information dissemination and 'bottom-up' deliberative decision-making processes. Some approaches embrace the community self-sufficiency, empowerment and social capital building ethic, whilst others maintain a strong hierarchy in an effort to retain ultimate decision-making control.

This is exemplified through different approaches to education and decision-making. Education is seen by the CFU and SFW schemes as important to fill the 'knowledge deficit' by informing residents about the dangers. It is very much treated as a 'top-down' process during which individuals are likely to become more aware of the dangers and therefore more likely to base informed decisions upon their new knowledge.

The alternative is an approach through which groups develop their own criteria for learning and are able to control the mode, location and delivery of the learning process, a situation which, it is argued, is more likely to engender deeper feelings of concern and therefore increase the likelihood that actions will be initiated.

Similarly, decision-making within the Community Fireguard and Landcare schemes is driven by means of group deliberation, with an emphasis upon inclusion and involvement. This process is felt to induce a sense of empowerment and self-efficacy which have secondary impacts upon recruitment, membership turnover, the success of programme goals and wider community benefits such as the amelioration of social ills. This contrasts with the strongly-led CFU and SFW approach in which the emergency planners / fire brigades are responsible in large part for the initiation criteria, organisational issues and training agenda.

An important issue which differed between approaches was the means of identifying areas or groups at high-risk. Again, this varied according to the degree of emphasis placed in community vulnerability and empowerment.

SFW and CFU approaches are very much based upon the physical attributes that contribute to high fire risk or particular vulnerability; this is largely a function of fuel load, slope, access and topography. In

these cases, limited community education resources are channeled into the areas that are considered at greatest risk.

However, Community Fireguard and Landcare approaches appear to rely more upon a group or community's perception of its own vulnerability or risk. To this end, physical factors may have less importance than poor social capital, social exclusion, prior experience of fires / land management issues or high proportions of old and infirm residents. Criteria based upon physical high fire risk may, therefore, identify areas of immediate danger, whereas criteria concerning socio-cultural vulnerability are useful in identifying important gaps.

Finally, it is important to note the effects that available resources, expertise and desired outcomes have upon the design of these approaches. It is clear that at present such schemes are poorly resourced in comparison to other, more visible assets, such as fire tenders and aerial suppression units. In such an environment, knowledge and expertise must be developed 'in-house', a process which is often slow, non-linear and frequently balanced against financial constraints – in most cases community outreach is one of the first extensions to be axed when other resources are demanded.

Thus, at present, emergency management agencies (fire brigades) appear only able to provide a rudimentary 'grass roots' style of community engagement that suits the time and human resources available for their maintenance. The effect that these schemes are having is also poorly understood, as accurate reviews of their impact upon community awareness and fire preparedness are infrequent and equally poorly resourced. In particular, the economic benefit of community engagement schemes is difficult to quantify, compared to other approaches.

However, it may be fair to say at this stage that a continuum exists along which community involvement may range from little or no effect to a positive and sustainable effect. Whether these effects concur with the stated outcomes of the various schemes is a question for further discussion (See Rhodes, 2008 discussion on program logic); however it is key to these schemes that the development which they set in train are viable and sustainable.

For example, the CFU approach maintains a strong 'top down' method of information dissemination and chain of command. Very little decision making power is granted to the Units and agendas are largely set by the managing fire brigade. Whilst this does not appear to provide the scheme with the broad social, cognitive and behavioural benefits associate with Community Fireguard or Landcare schemes, it does appear to comply with the resources available; in this case a large proportion of the expense is

taken up by the supply and maintenance of fire-fighting equipment and training personnel. Other schemes, which rely solely upon education and social interaction as a means of achieving goals, are more likely to apply greater resources to that end.

Community Scheme	Leading Authority	Mode of Instigation	Level of Group Autonomy / decision making power	Mode of Information Dissemination	Level of Group Interaction with Authorities / Risk Managers (Based upon high/medium/low)
Community Fire Units (CFU)	New South Wales Fire Brigades	Expression of community interest. NSW FB then assess the level of fire risk faced by the interested community.	Group activities are strictly controlled by the brigade in charge. Information and orders are generally 'top-down'.	Fire fighter training; theory and practical training sessions	Low
Community Fireguard Scheme (CFG)	Country Fire Authority (Victoria)	Individuals or groups approach CFA to express interest in the scheme.	Members are not only informed, but actually put in place individual and community strategies that enhance their bushfire preparedness	An intense period of facilitator-led group discussion during which preparedness plans are organised. This is followed by sporadic group meetings.	Medium
Street FireWise Scheme (SFW)	Blue Mountains (NSW) Rural Fire Service	Local brigades identify 'high risk' areas based upon physical / geographical assessments and fire history.	It is hoped that by providing relevant information this may prompt the independent formation of collective action groups and/or neighbourhood networks.	Posted information leaflets. Organised information sessions delivered to public audiences in village halls or fire halls.	Low
Land Care Schemes	Australian Department of Natural Heritage	Community led. Environmental / conservation issues are raised, mooted and addressed by the community groups.	Establishment of new relationships or the strengthening of existing relationships amongst neighbours and between landholders and industry and landholders and government.	Meetings and workshops to enhance management and planning skills. Tours, conferences, workshops, newsletters and field guides to facilitate dialogue and information exchange.	High

Table 4.2 Modes of operation of various community-based schemes.

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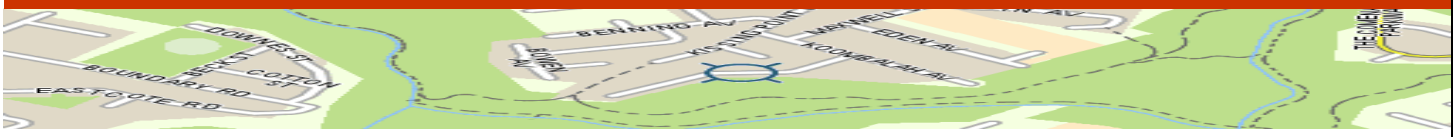


5.0 Theoretical background

Section summary:

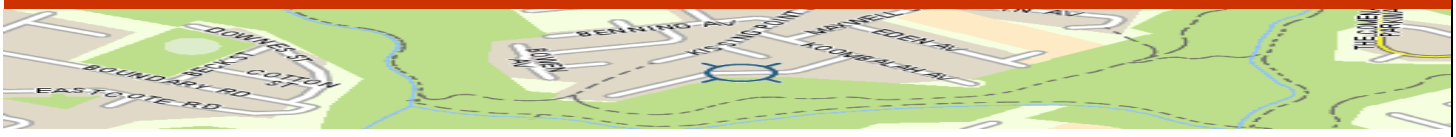
The following sections explore some of the many theories which have evolved to increase our understanding of the human relationship with risk and natural hazards. In particular, contemporary thinking on the communication of risk will be described, along with ideas that lie behind the promotion of community links and empowerment to produce more resilient communities.

Limitations of our present knowledge have encouraged wide ranging cross-disciplinary investigations, from the cognitive and psychological to anthropological. However, for the purposes of this study, a limited number of factors have been selected based upon the likelihood that they will have some bearing upon risk communication and decision-making among communities at the urban interface. These are also intended to reflect the likely influence of risk management programmes that are conducted at a community level, i.e. through collective learning and/or collective action.

Following an introduction to the social science approach to this study, the influencing factors will be discussed as follows;

- **Risk perception, communication and behaviour**
- **The psychology of risk judgements and behaviour**
  - Protection Motivation theory
- **Defining 'community'**
- **Community involvement (social cohesion) and empowerment in risk reduction**
  - Community continuity
  - The importance of community self-organisation in disaster risk reduction
  - Community groups on the front line: Community-based training and preparedness programmes
    - A case-study of San Francisco 'Neighbourhood Emergency Training' schemes

5.0 Theoretical background



5.1 A Social Science approach

This project is approached from a social science perspective. The focus (from within the scientific disciplines which constitute social science, i.e. anthropology, economics, human geography, political science and sociology) is upon three key areas (as defined by Machlis *et al*., 2002: 4):

1) *Anthropology*; primarily concerns social groupings: communities, sub-cultural groups and even entire cultures. A key variable is cultural change, with the role of tradition being a critical interest.

2) *Human geography*; treats regions, landscapes and other spatial units (governmental, ecological etc.) as critical. The central concern is the spatial distribution of people, resources and culture and thei interactions with each other and the environment.

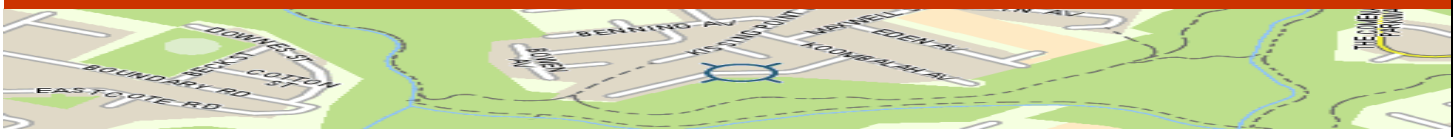
3) *Sociology;* treats social groups, organisations and communities as key units of analysis, with human behaviour as its central concern.

(To a lesser extent an element of psychology will also be discussed.)

In addition to the use of a broad range of social science disciplines, the involvement of key stakeholders such as the NSW Fire Brigades and Community Fire Units necessitates a transdisciplinary approach which recognises operational and practical requirements of bushfire preparedness and management. Community, social planning and disaster management planning are rooted in very different ideologies (Pearce, 2003), therefore the research, particularly the background and theoretical elements, may go beyond the remit and realms of possibility of Community Fire Units in their present form. This may be particularly the case when investigating issues such as community empowerment, engagement and decision-making.

In many cases of social science research, resistance to the results that are created may allow for tensions to develop between proponents of research results and disaster management practitioners and personnel. Thus, Police and fire-fighters may feel that their extensive personal experiences should count as much or more than 'academic theory'. However, it should be made clear that the research-based approach and the theory that it utilises, is a critical method of reflecting the views of many people's personal experiences.

The view among practitioners and ordinary citizens, that researchers sometimes neglect the needs of basic disaster management, is recognised by the author. As a result, every effort has been made to increase liaison and understanding between researchers and emergency managers and listen to people `on the



ground' in order to ground the findings in a way which will bring greatest practicable benefit to those currently engaged in the running of Community Fire Units. However, it is also recognised that great future benefit can be gained through discussion of the wider context and time frame.

5.2 Risk perception, communication and behaviour

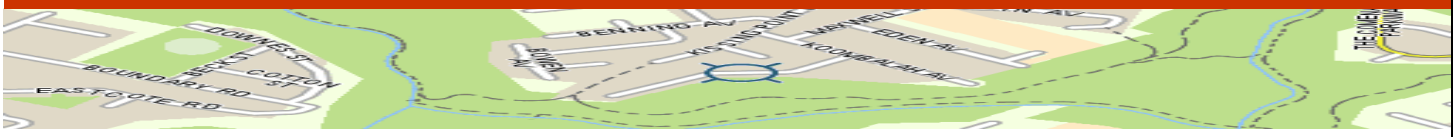
A great deal of this project is concerned with examining factors influencing people's attitudes towards bushfires and bushfire preparedness at the urban interface. Although bushfire risk is unique for a number of reasons, this research shares its theoretical background with the wider geography of vulnerability research to natural and man-made hazards including flooding, volcanoes and extreme weather events. In particular, this section will look at approaches to natural hazard risk communication and the determinants of behaviour resulting from these.

Early research approaches suggested that when presented with natural hazard risks, only residents suitably informed about the nature of the risk and options for precautionary measures were able to determine what is appropriate for their particular circumstances (Rhodes, 2005; Smith, 1993). This suggests that by providing at-risk individuals or groups with appropriate information, risk managers are able to induce 'informed judgements' that either consciously or unconsciously lead to ameliorative behaviour. Thus, community 'preparedness' is seen as a product of education and information about risks.

However, this 'knowledge deficit' approach has come under increasing attack as it fails to place the issues in their wider social and cultural contexts, underestimating the depth of public thought and knowledge of risks they face (Jasanoff, 1998 and Wynne, 1995; 1996 in Horlick-Jones 2003). Treating the issue as a basic educational problem does not take into account the social values and pre-existing conditions which may affect a community and therefore, at best can only perpetuate the adverse circumstances in which vulnerable groups live. Hewitt (1997: 42, in Haynes, 2005) states;

> "*There is a tendency to talk in terms of 'expert' and 'lay' views of risk and disaster. Lay knowledge is often referred to as 'soft', 'subjective', even uninformed. That may well be true compared with specialised knowledge…however, there is a basic aspect of geography that reverses this sense of expertness. It concerns the knowledge acquired by 'being there', of knowing conditions on the ground as a member of a community".*

More recent research suggests that the interaction between human decision-making and the natural environment is far more complicated, as Pidgeon *et al*. (1992) note, "*risk perception involves people's*



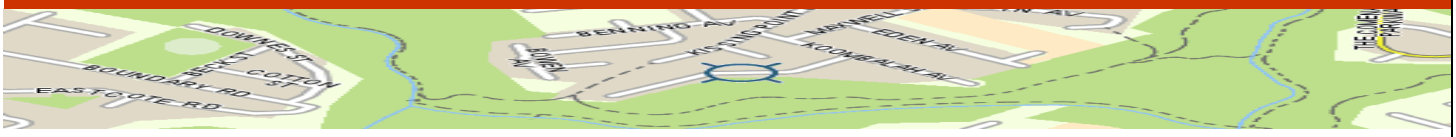
beliefs, attitudes, judgements and feelings as well as the wider social or cultural values and dispositions that people adopt towards hazards and their benefits" (p89). It can be influenced by peoples' past experience of a hazard or their trust in the information source.

Thus, an overriding factor is that even if a hazard is well understood, the link between the public's perception of the risk and levels of preparedness is tenuous (Sims and Baumann 1983; Tierney 1993). Much of the risk communication literature now accepts that heterogeneity among communities will result in a single message or warning being interpreted in various ways with limited impact on behaviour (Pidgeon *et al*., 2003).

Increasingly, research within this area has focused on the social vulnerability and resilience of people at risk (Blaikie *et al*., 1994; Quarantelli, 1998; Pelling, 2003; Bankoff *et al*., 2004; Wisner *et al*., 2004; IPCC 2007; UNISDR 2004). At its simplest, vulnerability refers to '… the potential for loss of property or life from environmental hazards' (Cutter *et al*., 2000, p. 715). The term may be used to describe characteristics of individuals, societies, ecosystems or technological systems, as well as a range of other social and ecological units (Dow 1992). 'Resilience' is closely related to the concepts of vulnerability and adaptive capacity and is gaining favour in research and management settings because of its positive connotations of coping capacity. Resilience can be defined as the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist, and recover from the impact of a natural hazard' (Wisner *et al.* 2004).

Recent advances in the understanding of vulnerability, resilience and adaptive capacity have become consolidated under the international agenda set out by the *Hyogo Framework for Action (2005-2015)*[1] agreed in 2005 by 168 countries. The framework advocates a holistic risk reduction approach to disasters, involving a more concentrated focus upon peoples' underlying vulnerabilities. Nevertheless, much of the literature on bushfire research within Australia and internationally continues to display limited learning from this framework. The current feeling within areas of community resilience research appears to be that if communication strategies intended to promote the adoption of protective actions and resources for bushfire hazards are to be effective, they should incorporate a vulnerability reduction approach and identify the wider barriers that will influence how people respond to the bushfire threat.

[1] A copy of the 'Hyogo Framework for Action (2005-2015): Building the resilience of nations and communities to disasters', can be found on the UN-ISDR website http://www.unisdr.org/eng/hfa/hfa.htm, accessed 16th May 2007.



5.2.1 The psychology of risk judgements and behaviour

Despite the emphasis that is now placed upon promoting community resilience to natural hazards, there remains a connection between environmental factors, socio-economic and political barriers, community interaction and psychological judgments of risk – which ultimately result in action or inaction. A number of theoretical frameworks have been proposed over the years in an effort to explain the rationale for peoples' behaviour. These have been critically reviewed by various authors over time, creating a complex discourse which is considered to be beyond the scope of this exercise.

However, a brief overview of these approaches is thought necessary due to the behavioural implications of the 'prepare, stay and defend' policy and community resilience strategies associated with it.

A number of heuristics[2], first identified by Tversky and Kahneman (1973; 1974), demonstrate ways in which individuals cope when making judgements about risk. The decision heuristics and biases that can induce risk message filtering commonly include the following:

- **Law of randomness:** an inability to comprehend or denial of the probabilities and related uncertainties involved with the occurrence of natural hazard events.

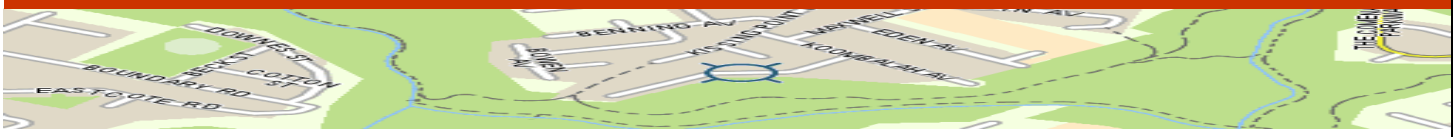
- **Availability bias** / **normalisation bias** (Mileti and O'Brien, 1993): judgement of the probability of an event by recalling it from memory, a process biased towards more recent or larger more shocking events. This may condition individuals to be complacent, expecting only the experienced and making them insensitive to changing risks.

- **Anchoring and adjustment:** (similar to Availability Bias) individuals 'anchor' on a salient value (e.g. a level of probability) and then begin adjusting confidence bounds from this anchor.

- **Risk transference:** avoidance of decision-making by passing the responsibility to others, e.g. experts, authorities, fate, custom or religion.

- **Confirmation bias:** Individuals may reach a viewpoint or attitude and then choose to ignore additional information that conflicts with this view.

[2] A heuristic is a mental shortcut that allows people to solve problems and make judgments quickly and efficiently. The rule-of-thumb strategies shorten decision-making time and allow people to function without constantly stopping to think about the next course of action. While heuristics are helpful in many situations, they can also lead to biases.



- **Levee bias:** a reduction in the perceived risk through a belief in technological solutions or the presence of experts.

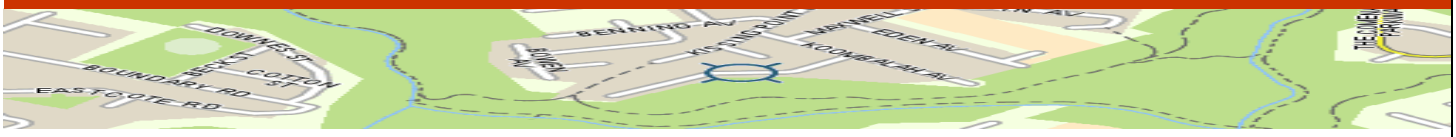
- **Affect:** orienting emotions that allow people to navigate efficiently through complex and uncertain decisions, by drawing on positive and negative feelings associated with particular risks and benefits (Alhakami and Slovic, 1994; Finucane et al., 2000). Slovic (2000) describes the more dangerous use of 'affect' in forming judgement, in that the 'attractiveness' of the object or choices under consideration may influence behaviour, leading strong emotions to over-ride more rational decision-making. It has been found that such feelings underlie a negative relationship often found between judgements of risks and benefits: i.e. the greater the perceived benefit of the choice under consideration, the lower the perceived risk (Alkahami & Slovic, (1994). For more information see Slovic (2000a p8-22). This inverse relationship between risk and benefit or cognitive dissonance is seen widely in people's responses to bushfire threat.

  Similarly, if people see the advised mitigatory actions as too costly (physically, mentally or economically) or as not reducing the risk significantly, or they do not believe they have the abilities to carry them out, they will not take them. This is known as 'Protection Motivation Theory' and was developed by Rogers (Rogers, 1983) to explain reactions or inactions to health risks. This is discussed further in the next section.

5.2.2 Protection Motivation theory

Of particular relevance to this study is a psychological risk judgment known as 'protection motivation theory'. This is important as the link between risk perception and behavioural action can be attributed to a person's environment or available resources. Rogers (1983) suggests that appeals which are seen by individuals as threatening, but which offer an effective means of coping with the threat, instigate danger control processes, which include accepting the recommended coping strategy and changing the maladaptive behaviour. However, when the threat is seen as greater than the ability to cope, fear reactions can instigate message rejection through defensive responses. Thus, within Bender *et al.*'s (2007) four critical cognitions, the first two are closely related to the psychometric influences described above, while the second two ultimately depend upon what a person feels they are able to do to mitigate or attenuate the risk:

> *"Protection motivation theory states that stakeholders' motivations or intentions to protect themselves from harm are enhanced by four critical cognitions or perceptions: the severity of the risks, the personal vulnerability to the risks, self-efficacy or confidence in one's ability to perform the risk-reducing behaviour, and the response efficacy of the risk-reduction*



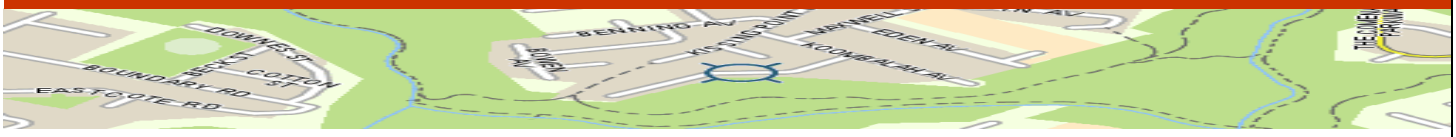
behaviour (Rogers, 1983). It also posits that people's intentions to protect themselves are weakened by the perceived costs of the risk-reducing behaviours and the perceived benefits of the alternative risk-enhancing behaviours." (p.3)

Paton (2003) explains that 'Means-End Chain theory' and social cognitive theories help understand the adoption of protective behaviours and describe how risk reduction behaviour is predicted through reasoning and social norms whose link to behaviour is mediated by intentions (Bagozzi & Dabholar, 2000; Bennett & Murphy, 1997 in Paton, 2003). Thus, Paton (ibid) argues that the adoption of preparedness measures is a function of how motivated people are to prepare, how they interpret the likely effectiveness of mitigation actions as well as their competence to implement them, and whether they believe they are capable of implementing them. This model conceptualises three phases important in adopting protective behaviour, each of which is influenced by a specific set of variables: motivating variables; variables that link motivation and intention formation; and variables that link preparatory intentions and actual preparation.

A number of authors have suggested the decision-making process required to connect risk communication to effective preparedness can be represented in a four stage process. For example, Bender *et al*. (2007) propose six decision making stages, based upon individual reactions to a health risk message: precontemplation; contemplation; preparation; action; maintenance, and; termination (Prochaska, et al.1994). The authors assign people to one of the six stages on the basis of their behaviour and intentions for future actions (e.g. Proschaska *et al*. 1994 in Bender *et al*., 2007). Rhodes, (2003) suggests a four stage process, involving: recognition of the risk; risk re-appraisal; adoption of precautionary action, and; implementation of action. However, for various reasons, information may be rejected or misinterpreted resulting in unintended outcomes or no real changes in the level of preparedness.

Differences in peoples' willingness to take precautionary actions are exemplified by the outcomes of a telephone survey into public attitudes about the 'stay or go' policy (Odgers and Rhodes, 2002). The results suggest that the public's views not only differ from those of the emergency managers, but also from each other's. Many perceived different outcomes as a result of protective actions, differences in the costs and benefits of actions and different reasoning underpinning intended actions. In addition, whilst the fire services saw protective actions as solutions, the public viewed recommended actions as entailing risk and disadvantages. Rhodes concludes that differences in the perception of risks and benefits between public and emergency services necessitates a greater understanding of risk perceptions, reactions and behaviour.

As stated earlier, there are a number of weaknesses with the pure risk perception and knowledge deficit approach, which largely ignores the wider socio-cultural and political factors which shape peoples actions.



Thus, while we view some of this as theoretically important to this study it will be considered of secondary importance to the more holistic vulnerability reduction approach.

5.3 Defining 'community'

Communities have, until recently, been defined by their geographic locality, e.g. neighbourhood, small town or island. Location was viewed as an important determinant of individual identity and sense of belonging with notions of mutual support, solidarity and cooperation helping to create an image of the strong local community (Gilchrist, 2004).

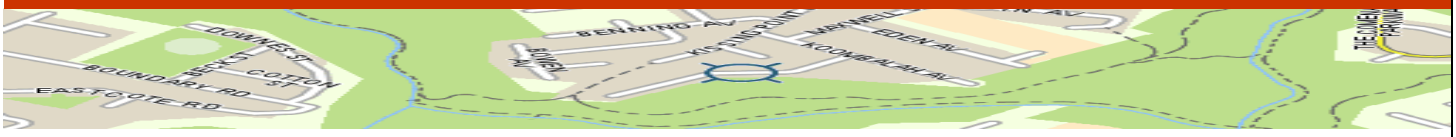
However, it is now more commonly accepted that social networks extend beyond geographical boundaries. Communities are constructed by their members who may share aspects of their working life, faith, intent, belief, resources, preferences, needs, risks or pastimes. A number of other conditions may be present, affecting the identity of groups and their degree of cohesiveness. As Gilchrist (2004:3) states:

> "*This is about conventions and customs, often linked to religious or sporting occasions, but also about the ways in which people go about their every day lives – their hairstyles, dress codes, their language and so on. Such 'badges of belonging' reinforce community boundaries and can help identify 'friends' and 'allies'.*"

Communities may be nested, with one community containing another. For example a geographic community, one which is defined by its location, i.e. local neighbourhood, suburb, village, town or city, region or nation, may contain a number of communities of culture which are defined by their needs or identity, i.e. local clique, sub-culture, ethnic group, religious sect.

In the context of Australian bushfires, a sense of shared identity can create communities at a range of levels. For example, from an international community of fire prone countries such as the United States, South Africa, Indonesia and increasing parts of northern Europe, to that which is framed within the national identity as a "*quintessentially Australian phenomenon*" (Bowmann, 2003:3).

As Twigg (2008) states, communities can be complex and are often divided by, for example, differences in wealth, ethnicity, gender, age, political affiliations etc. In addition, community identity or belonging is not exclusive and people can be members of many different communities at the same time. Communities are therefore socially, spatially and temporally dynamic, with people joining and leaving according to their current agenda.



Studies carried out following natural disasters or even prolonged periods of strike action, have shown that communities exhibiting greater social capacity are able to recover far more quickly and effectively than areas whose capacity is poor or has been removed completely (Marris, 1996 in Gilchrist, 2004). Thus, at a regional scale, the association with fire may be stronger for some Australian states than others. Cities such as Canberra or rural areas such as the Ayer Peninsula may bear the (social and physical) scars of serious bushfire experiences which unite them as a community realising the commonality of their plight and the fickleness and vulnerability of their existence (of course, there is also the potential for a breakdown of community functioning following a disaster or distressing event).

Even at the suburb or street level, shared experience or the knowledge that a threat exists has the potential to create a sense of community amongst individuals who may otherwise have little in common. As will be discussed below, the closer this association between individuals, the greater the capacity to draw together resources at times of disaster or stress.

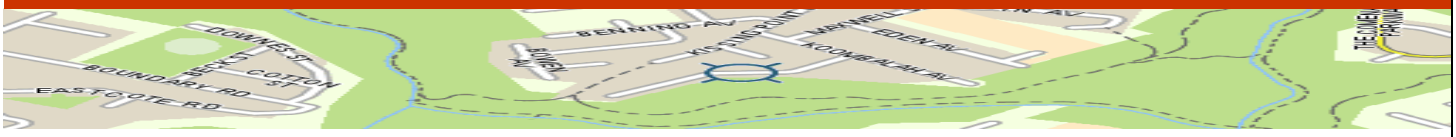
Buckle, Marsh & Smale (2001) noted that the areas of Australia in which they undertook their bushfire research were characterised by a diversity and complexity of population that remained at the same level of detail whatever scale was used. Differences included occupation, values, income, age, gender, ethnicity, living site (town or country). As the research team met with people from very small townships and localities the differences in their area were given the same degree of significance as people with a wider geographic perspective gave to the detail they perceived.

In addition, they found that people living together in a small area, township or locality did not necessarily work well together, get on or share similar values (this will be discussed further in section 5.4.4; self-organised community networks). Difference was as much in evidence at local levels as it was at broader scales. This indicated to the team that the characteristics of community are not fixed but depend on the scale at which the group or area is investigated and that ‘Community’ is a poorly defined word used often to gloss over complex differences.

5.3.1 Community resilience and ‘social capital’

A central role in modern risk management is the development of individual and community capacity to reduce their risks from disaster and improve their ability to cope and adapt in the future. Thus, ensuring the realisation of knowledge, partnerships and resources at the individual-community level is fundamental to bushfire resilience.

5.0 Theoretical background



The promotion of a community network in order to optimise the spread of knowledge and use of resources can be conceptualised in a number of ways, the most common contemporary title being 'social capital'. Gilchrist (2004:4) defines social capital as recognising that "*relationships between neighbours, colleagues, friends, even casual acquaintances, have value for the individual and for the society as a whole*".

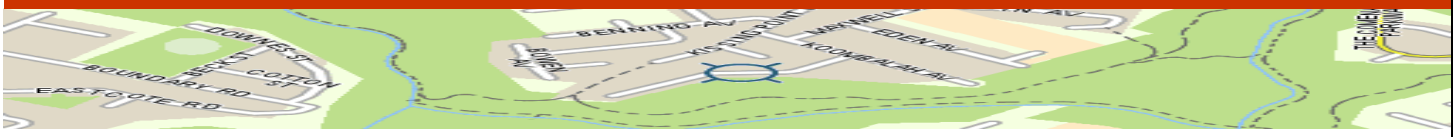
Putnam (2000) asserted that social capital takes different forms; that not all social capital has positive effects for everyone; and that it is important to distinguish between different types of social capital e.g., bonding capital and bridging capital. He noted that in many cases *social capital* can be developed by *bonding* people with similarities in age, background interest etc., while *bridging* capital links people to others unlike themselves but who may share similar goals.

As mentioned above, strong *bonding ties* are often observed within a community in the recovery period following a crisis as individuals withdraw from wider society and turn to their close-knit groups (Pelling, 2003; Pelling and High, 2005). The experience of a community facing risk is a significant motivator for collective action, leading to greater community well-being and reduced vulnerability to disaster (Flint and Luloff 2005; Bridger and Luloff, 1999).

The challenge of communicating risk with the aim of preparing individuals for difficult choices and actions is greatly aided by the presence of a well-connected community whose social capital is such that individuals within the group feel able to respond effectively to situations of hazard or stress. Gilchrist (2000) presents the theoretical argument that a 'well connected' community can only be achieved if people feel that they are part of a web of "diverse" and "interlocking" relationships (p.264).

However, Bourdieu (1986, in Gilchrist, 2004) suggests that inequalities in wealth and power may be perpetuated through advances in culture and connections. This is supported by Tittensor (2007) who points out that a high level of existing social capital indicates a community that may already be well connected, well resourced and capable of coping with stress or hazard. Various studies highlight that engagement in civic and volunteer activities is strongly correlated with socio-economic status (e.g Thoits and Hewitt, 2001). Thoits and Hewitt (ibid) found that people with higher levels of education were more likely to volunteer for all organisations, regardless of their type (religious, environmental, political, etc), than those with lower education.

Thus, the process of bottom-up community empowerment can have a potentially 'negative' effect rather than a positive one, as it draws together many of those who already possess the stock required for social



capital and can build on it, eventually leading to a policy outcome that is anything but representative. Bottom-up or community-led strategies could, therefore, favour the more vocal or organised groups, while neglecting areas that may derive more benefit from a more 'top-down' approach.

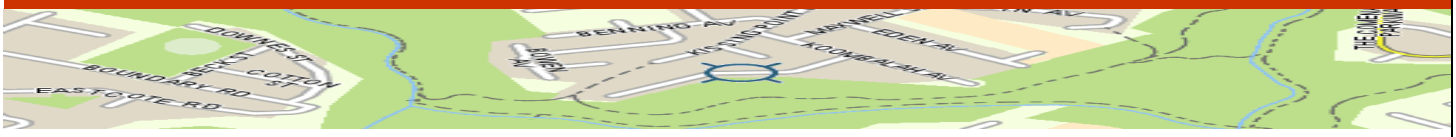
Conflict and polarised views are often an unavoidable issue during risk-reduction activities and strong community networks need not necessarily be based on consensus, as multiple values and attitudes can mobilise community action (Flint and Luloff, 2005). As noted by Rubio (1997) and discussed further by Pelling and High (2005), 'perverse social capital' - where collective action undermines social development, can be avoided by organising and harnessing attitudes, values and skills in a constructive way.

This is supported by recent research on deliberative processes which shows that they have had positive results. It has been found that stakeholders have a keen interest in the final outcomes of their participation although they perceive differences in their ability to influence decisions (Santos and Chess, 2003 in Haynes, 2006). People have been shown to support the outcome and final decision of a risk related issue, if derived in a participatory way, even if they do not totally agree with the outcome (Arvai, 2003; Chess and Purcell, 1999 in Haynes, 2006).

Nevertheless, while the development of partnerships with communities in order to enhance social capital and increase resilience is seen as an important goal, it is recognised by many risk managers and researchers as being a difficult, costly and problematic task. This represents one of the greatest barriers to change among authorities, particularly when compared to the relative ease with which risk assessments can be translated into meaningful messages (Chess *et al.*, 1995).

5.4 Community involvement (social cohesion) and empowerment in risk reduction

This section investigates the importance of community networks in integrating diversity and creating conditions for robust, yet flexible forms of collective decision-making and action in relation to natural hazards, resilience and risk. As was discussed within Chapter 2, 'Defining the hazard', the urban Australian population is highly mobile, with 17% of the population moving annually and peripheral urban areas displaying particularly rapid population change (Hugo, 2002). The section, therefore, also discusses the possible effects of such turbidity upon the social functioning of interface populations, examines the ways in which social function and dysfunction may impact on community resilience to hazards or change and



discusses the utility of developing social cohesion in pursuit of 'collective efficacy' or acts which promote the 'common good'.

5.4.1 Resilience through disorganisation?

A central role in modern risk reduction is the development of individual and community capacity to anticipate, cope with, resist, and recover from the impact of a natural hazard (Wisner *et al.* 2004).

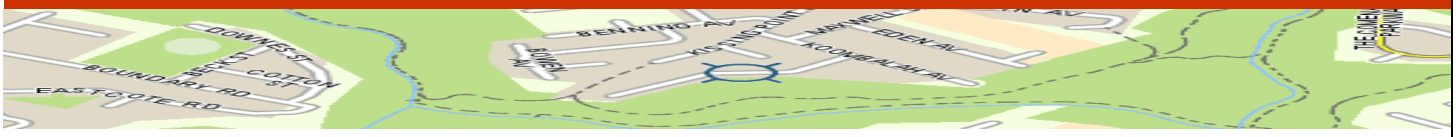
Such adaptation and adjustments should ideally be possible by using the resources available within the community system. Nevertheless, as stated by Twigg (2008) communities do not exist isolation and the level of a communities resilience is also influenced by the myriad social and administrative private and public services and political linkages with the outside world.

The development of community resilience is a complex operation. It must encourage and formalise community interactions, for example through the creation of clubs and societies, while also balancing the maintenance of constantly changing relationships. The diverse and interlocking relations that some theorists consider fundamental to a well-connected community require environments that are characterised by a complexity of factors including "diversity, autonomy, 'voluntary' choices, risk and turbulence" (Gilchrist, 2000: 265). Whilst this complexity may be considered by some as a form of social disorganisation and cause for a command and control approach to emergency management (Olson, 1971), it is increasingly being seen to have a positive effect upon community resilience, particularly at times of crisis (Drabek, 1984).

The dynamism of these complex systems, when operating at their optimum, allows them to be influenced by changes in the wider environment. Gilchrist (ibid) suggests the 'concatenation' of history and experience as an example of the ways that complex systems are able to adapt and learn in reaction to changing conditions (p.265). This implies that resilience develops and augments within a community through time, assuming the complexity of relationships is maintained. The result is a collective identity which is particular to a community and which can also be thought of as 'social capital' (Putnam, 1993 in Gilchrist, 2000).

5.4.2 External influences upon community cohesion

As an example of the changing context, mood and responsiveness of a community to resilience-building efforts, Millar *et al.* (1999) and Paton *et al.* (2001) found, after the 1995 and 1996 eruptions at Ruapehu (New Zealand), an increase in people's sense of community (feelings of belonging and attachment for people and places) which encouraged involvement in community response following disaster. They noted



that feelings of detachment from a community may trigger a feeling of isolation and encourage helplessness.

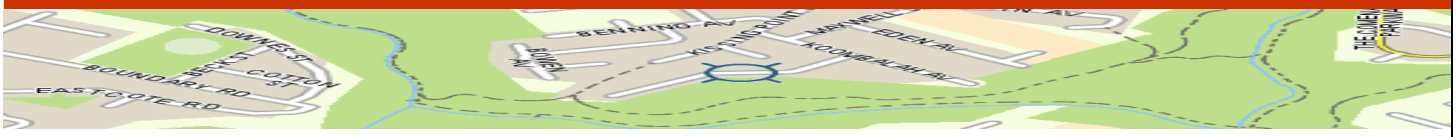
Coping style and self-efficacy (an individual's appraisal of what they are capable of performing, thus influencing whether they act to deal with hazard consequences (Millar *et al*., 1999)) were significant predictors of community stress levels; those reporting greater self-efficacy reported lower levels of symptomology. Being faced with perceived uncontrollable consequences increased perceived helplessness and produced more denial-based coping. Thus, coping is also linked to community characteristics and should be developed within a framework defined by salient community functions and resources (Haynes, 2005).

5.4.3 Communities coping with change

Carcach and Huntley (2002) argue that (functional) social disorganisation, and the ability to adapt that it brings, is particularly important given the effects of change upon the "*social, environmental and physical characteristics of localities*" (p.1). Thus, while they claim that rates of crime or social disorder are likely to be lower in stable areas displaying high levels of community oriented activities, they also note that significant changes to local economic structures can destabilise and weaken relational networks within a community. They suggest possible catalysts to include trends towards commuting behaviour, migration and a transient population. This, in turn, may influence: family formation patterns; education; ethnic make-up; age structure and demographic patterns (Rephan, 1999 in Carcach and Huntley, 2002). Such change, in many cases, is inevitable, making the ability to adapt, and the maintenance and understanding of functional social disorganisation all the more important.

Rapid development, particularly in the Sydney suburbs in the last 50 years, has given rise to relatively new residential areas in which complex systems may be yet to be develop to a significant level, or which may become disrupted by changing populations and trends. In basic terms, this may lead to a situation in which the stock of experience, social interactions, trust and resilience are poorly developed or understood. In this respect, it would seem wise to establish or augment schemes which act to mitigate the effects of social incoherence which have been brought about by short establishment time and lifestyle changes which may not be conducive to the development of complex community interactions.

At present, it seems that many people living in interface areas may only share the commonality of a 'geographic community'. A relationship exists between the degree to which communities accept disaster management planning and the degree to which they experience disasters (Drabek, 1986, in Pearce, 2003).



However, in the absence of this shared experience, public involvement and empowerment would be needed to incorporate local expertise and knowledge and to create a sense of ownership and community responsibility among those at risk. It should be remembered that, through collective learning, groups can address risk effectively even though their levels of understanding, commitment and skill may differ (Comfort, 1999; Nilson, 1995).

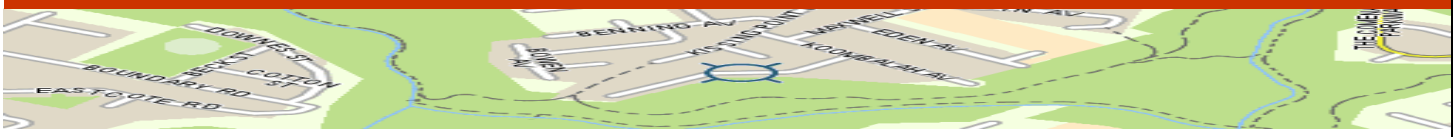
5.4.4 The importance of community self-organisation in disaster risk reduction

This section examines the tensions which exist between the need to act rapidly in a disaster situation and a tendency for the public to respond negatively to 'command and control' type emergency warnings. Since the first United Nations World Conference on Natural Disaster Reduction (WCNDR) there has been a drive towards increased preparation and resilience rather than response and recovery (Jeggle, 2005; Handmer, 1995). This was reiterated at the recent WCNDR in January 2005 within the Hyogo framework and guidelines for disaster resilient communities. Thus, negotiation, 'bottom-up' communications and encouraging community self-organisation are becoming accepted methods to achieve a more effective community response and increased resilience (Newport and Jawahar, 2003; Handmer, 2000; Comfort, 1999; Nilson, 1995; Quarantelli, 1993).

Comfort (1999), whilst examining the emergence of 'socio-technical' systems that help communities deal with seismic risk following earthquakes, points out that the success of participatory process boils down to public access to and understanding of relevant information. She challenges Olson's argument (1971, in Comfort, 1999) that rational, self-interested individuals will not pursue common interests unless the community is small or otherwise coerced into doing so. She suggests that when external conditions or factors force consideration of risk, communities will self-organise to reduce that risk.

Comfort (1999) concludes that governments should shift away from command and control administrative systems to enquiring or learning systems that permit adaptation to changing circumstances. The key elements are the willingness to provide information to communities and organisational structures that are flexible to permit innovation. In this way, communication is seen as the essential pre-requisite to the enablement and empowerment of the risk-bearing groups in society in ways that allow them to participate more effectively in decision-making about risks (Pidgeon *et al.*, 1992).

During an emergency, demands for rapid reaction and the unpredictability of certain hazards mean that a command and control framework continues to be necessary. In some emergency situations, people simply require advice and answers, requiring explicit instruction which may summarise the conclusions they would



reach if they had sufficient time and knowledge (Morgan *et al*., 2002). This information still needs to be targeted in a particular frame of reference, with a shared meaning of the risks and instructions (Handmer, 2000).

Parker and Handmer (1998) describe the technocratic nature of the flood warning system where the detection, monitoring and forecasting are carried out by workers who have little idea of the social processes interacting with the recipients, thereby producing messages which are not specific to the audience's needs. They examine the possibility of unofficial messages, personal networks and local knowledge to complement official warnings, producing an integrated warning system.

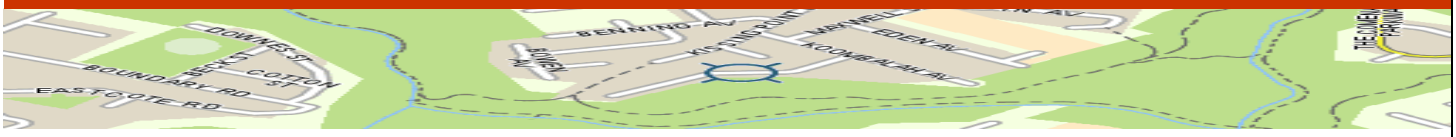
The authors define official messages as formal and staged, involving a hierarchy with a required directional flow of information, while unofficial messages evolve within the community as the need arises and play an important role in the dissemination, interpretation and response to warnings. They may also have a hierarchical staged system and may provide invaluable feedback for the official systems.

Empirical studies examined by Parker and Handmer (1998) suggest that, (a) official flood warnings perform inadequately, (b) unofficial flood warnings are widespread, and (c) due to the contextual nature of personal networks, unofficial or informal processes cover a wider breadth and depth of social needs than official systems alone. Rohrmann (2000a) also notes the importance of risk communication processes initiated by the public, where they alert authorities to their concerns and request information to help reduce the risk. Unofficial communications can also undermine or deflect official communications (Handmer, 2000).

5.5 Community groups on the front line: Community-based training and preparedness programmes:

An increasing and now almost universal reliance upon the emergency services has led to a lack of personal and community preparedness, particularly within urban areas. Support networks associated with shared concerns over potential threats have weakened, such is the expectation that emergency services will be available to protect people and property at all times.

This is in marked contrast to rural areas in which there is often (although not always) a strong likelihood that individuals or groups will defend their own and each other's property. As a result of these differences, a dangerous situation has developed surrounding the perceived roles that individuals and emergency services should play before, during and after dangerous incidents.



For example, urban dwellers may be more likely to evacuate their homes in the event of a significant fire risk than rural dwellers, in the expectation that their property will be defended and that they will be led to safety (Lowe *et al*., forthcoming). In addition, levels of preparedness are likely to be reduced if there is a feeling that individuals will not be called upon to act in their own defence. As Gledhill (2003) notes:

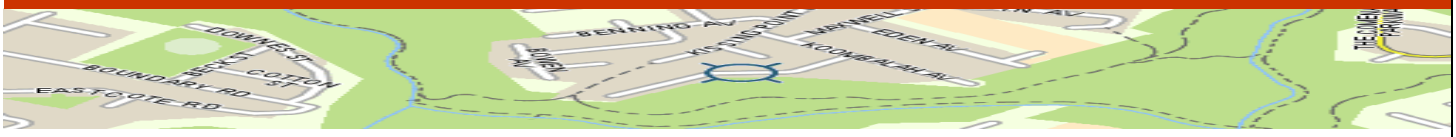
> *"Empowering people and giving them greater responsibility for their own safety is not a new philosophy. In Australia emergency services only began taking a paternalistic approach for people's welfare during emergencies over about the last 50 years as community expectation for governments to provide services and protect citizens increased. Prior to then people accepted that they were expected to take care of themselves. This was particularly so in rural areas where at times of crisis, communities took control of their own destiny. There was a greater sense of community and communities were more self reliant. Fighting bushfires was a community responsibility. Paradoxically as technological and financial capacity improved since the Second World War, emergency managers unwittingly were alienating rather than reinforcing community responsibility for natural hazard and emergency management."*

(Gledhill, 2003:4)

However, as has been found in recent urban interface fires (e.g. Canberra, see McLeod, 2003), there is a high possibility that rural and urban fire crews will not have the resources to protect all property in the event of serious fires, a situation which is made worse by an increasing incidence of drought years, public objection to prescribed burns and an ever increasing number of urban developments at the rural/urban interface.

This situation has led many community stakeholders and those within the emergency services to investigate programs to educate high risk communities as to the hazards they face and ways of living with the bushfire threat in the hope that this may help them to help themselves, e.g. Community fireguard Scheme, Bushfire Ready Awareness Group.

As is discussed in the sections above, contemporary evidence suggests that the preparation of a community for hazards in this way will promote its long-term sustainability, a state which Mileti (1999) describes as increasing tolerance and ability to overcome the negative effects of disaster in a self-sufficient way, primarily through a reduction in the loss of life and property. Thus, the involvement of communities in disaster management has provided an important impetus for resilience and self-sufficiency by supplying lay people with expert knowledge and awareness, particularly prior to emergencies and as a means of absorbing shock in the post-disaster malaise.



However, whilst preparedness and resilience are of importance, little evidence exists as to the effects of community involvement in dealing with disaster abatement, avoidance through front-line 'reactive' behaviour or the use of community 'task forces' such as Community Fire Units, in tackling practical applications head-on.

Whilst the vast majority of literature in this realm appears to centre upon the roles played by the emergency services and managers, moves towards community 'self protection' appear to derive from situations in which it is clear that official emergency services will be overwhelmed by a disaster or serious incident and will consequently play little or no part. Thus, as will be seen below and in the cases of quasi-autonomous community action groups (see section 4, 'Other community-based schemes'), developments in this regard reflect the desire of a local community to develop its own contingency or preparedness plan.

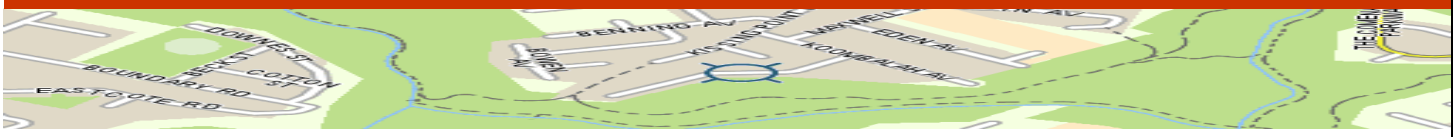
5.5.1 A case-study of San Francisco 'Neighbourhood Emergency Training' schemes:

Simpson (2002) investigated the various 'Neighbourhood Emergency Training' schemes set up in the San Francisco bay area in response to local concerns about continuous seismic risk. Similarly to the rationale for the creation of Community Fire Units in New South Wales, demand for a skills-based programme in San Francisco stemmed from the realisation that 1) local emergency services would be immediately overwhelmed and unavailable in the aftermath of a disaster, and 2) realisation by local communities that the area was completely unprepared (P60).

There was, therefore, a desire to learn the kind of disaster response skills that would improve their own survival as well as those around them. Training varied between groups with some focusing on hands-on activities such as first aid, structural safety assessments, initial search operations and fire suppression whilst others concentrated more on education and the promotion of household and individual preparedness activities such as the storage of supplies and how to react in the event of an emergency.

It was found that the training and in particular the drilling of community members in disaster scenarios was an effective means of promoting preparedness, awareness and resilience for the following reasons:

- *They [emergency drills] bring the reality of what might happen in an earthquake directly into the neighbourhood, helping residents visualise possible scenarios.*
- *It allows the visualisation of possibly frightening events in a less stressful, less threatening environment.*



- *It encourages dialogue on a subject that residents are otherwise unlikely to want to discuss with one another.*
- *It creates pressure and a possible constituency for support of emergency service items, such as funding, staffing and increased support for neighbourhood training.*

[Simpson, 2002: 61]

The San Francisco experience suggests that existing networks such as Parent / Teacher organisations, neighbourhood associations and crime-watch groups assisted in the formation of emergency training schemes. Importantly, Simpson notes that, as local creations, the groups exhibited differences and characteristics which made them unique to their community. Thus, as described above, the focus of training could be selected by community groups depending upon their preference and important local and personal characteristics.

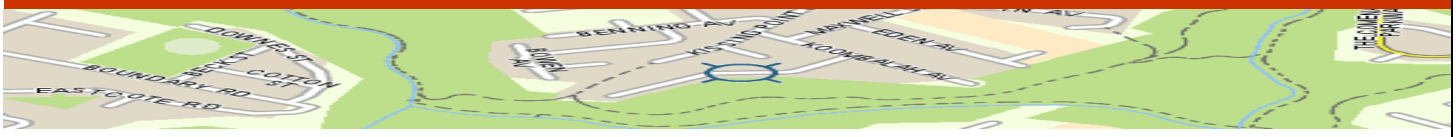
The sense of community identity that was attached to these local groups was, in some cases, manifested through individualised group names and the display of membership stickers and appears to have generated a great deal of interest and success.

In addition, (apart from the day to day running of emergency training groups which was largely carried out by the fire department and the police department) the presence of steering committees and boards of elected volunteers gave the groups a level of autonomy which appears to have suited their particular aims and objectives and introduced an important element of flexibility into their management.

This feeling of independence has been found to significantly affect the success and sustainability of community or stakeholder organisations whilst also improving channels of risk communication. Experience has shown that (risk management) decisions that are made in collaboration with stakeholders are more effective and durable (Congressional Commission on Risk Assessment, 1997 in Chess, 1999).

Further evidence of the robustness of participatory processes is provided by Simpson (2002) who, reporting the work of Nelson and Perry (1991), claims that differences in the responses of different ethnic groups to risk communication – particularly in urban settings – were quickly overcome, with all ethnic groups preferring to have "*direct 'task-force' style involvement with regard to the practice of community emergency management*" (Nelson and Perry, 1991, P21 in Simpson, 2002).

5.0 Theoretical background



The success with which the San Francisco example appears to have been implemented relates in large part to the decision-making structure of the organisations. The devolution of management decisions to community groups has not only raised awareness of the potential risks but it has promoted the long-term resilience of at risk areas through sustainable and flexible development.

In addition, the low (local government) costs associated with the maintenance of such programmes are also likely to sustain their existence. The flexibility that neighbourhood emergency training groups have been afforded has allowed them to select the type of training and regime which they feel best suits their needs, thus facilitating a greater practical awareness of the likely conditions that they will encounter and decisions that they must confront.

However, whilst the need for 'capacity building' is often acknowledged, it is equally as often interpreted as a need for training of individuals rather than increased organisational development (Gilchrist, 2000). This case study, therefore, raises some important questions regarding (1) the decision making powers of Community Fire Units in NSW, and (2) the practical outcomes of the top-down training approach:

1. Generic CFU training programmes are put in place by the NSW Fire Brigades; how would greater group autonomy affect the ways that training is provided and the material that is covered?

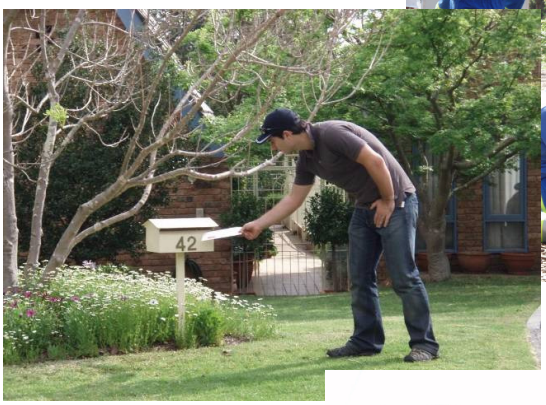
2. Does community based training provide individuals with sufficient insight into the conditions to be expected in a bushfire? How are individuals / groups likely to behave in a real fire situation?

As Gledhill (2003:4) states: "*Fire events are very dynamic and place specific. The orientation of the interface and the road network with respect to a fire front or series of fire fronts, as well as smoke effects make it very difficult to realistically simulate or predict bushfires. The inclusion of community factors such as demographics, community expectations and identification with the bush, and previous bushfire experience increase the difficulty of pre-incident planning*".

References:

*****Please note, the full reference list is available on request from the author*****

6.0 Research Methods



Quick reference methodology:

Elite interviews:

Rationale: To discuss the background and objectives with individuals at various levels of the NSWFB hierarchy.

Mode: Semi-structured interviews.

Number: 17 elites were interviewed.

Duration: (Circa) 1 hour

Recruitment: Potential respondents were approached by the lead researcher by email, telephone or in person.

Protocol: Each interview was based upon an identical protocol containing key topics and sub-topics (see interview protocol in appendix). Respondents were permitted to lead the conversation away from the key topics if the researcher thought it relevant. Each interview was recorded at the permission of the interviewee and notes were taken.

Community Fire Unit member questionnaire survey:

Rationale: To develop a clearer understanding of attributes, e.g. background, education, previous experience that are more likely to be prevalent among individuals who are aware of the bushfire risk in their area and are likely to volunteer their time to help mitigate the risks.

Survey mode: Internet, face-to-face

Survey structure: 30 open and closed questions;

- Demographic information, i.e. age, gender, occupation, education, income, level of insurance, and number of children.
- Experience of bushfires and the extent to which they had been personally affected by bushfires in the past.
- Likelihood of being affected by bushfires on a range of timescales.
- Motivations for becoming a CFU member.
- Bushfire preparedness.
- Preparedness and knowledge of non-CFU members.
- Opportunities were provided for open-ended comment.

Survey response: 670

Quick reference methodology contd.

Public survey:

Rationale: In order to understand differences that may exist between CFU members and non-members living in similar locations.

Survey mode: Hand-delivered to targeted areas. Returned by mail.

Survey structure:

- Demographic information, i.e. age, gender, occupation, education, income, level of insurance, and number of children.
- Experience of bushfires and the extent to which they had been personally affected by bushfires in the past.
- Likelihood of being affected by bushfires on a range of timescales.
- Motivations for becoming a CFU member.
- Bushfire preparedness.
- Assessment of own preparedness and knowledge.
- Knowledge and awareness of CFU operations in their area.
- Opportunities were provided for open-ended comment.

Survey response: 43

Community Fire Unit member focus groups:

Rationale: Used to further develop understanding of the preliminary survey and agency interview findings, focussing on the more qualitative aspects of individual's risk perceptions and motivations. Provided an opportunity for CFU members to introduce a diversity of issues and to discuss these in depth.

Number: Four focus groups were undertaken with 7-8 CFU members attending each.

Duration: The meetings went on for around 2 hours.

Location: Spread throughout the Sydney area (North Rocks, Heathcote, South Turramurra and Glenbrook (Blue Mountains)) in order to represent a range of geographical, demographic, socio-economic and experiential factors.

Recruitment: Locations were selected by NSW Fire Brigades administrative staff, based upon the requirement for a diverse sample.

Protocol: Discussions were led by a facilitator using a generic protocol; however these were allowed to digress if the content was deemed relevant.

6.0 Research Methods

6.1 Introduction

In designing an appropriate methodology for this assessment, a number of factors required consideration. First, the main research question relates to implementation of the 'Prepare, stay and defend or leave early' policy at the urban interface. To a certain extent, the success with which responsibility for bushfire safety can be handed over to the individual by fire authorities depends on the existing levels of awareness or perceived risk.

Risk research has shown a number of factors to have an important influence upon perceived risk and the likelihood that people will take action to reduce risks, these include; previous experience, cultural background, socio-economic background and gender (see for example Slovic, 2000; Haynes, in press).

Information of this sort was considered important to this research as it would, for example, indicate whether those most likely to be involved in CFUs considered themselves at greater risk than people who were perhaps less inclined to become involved.

Second, it was felt that within the strongly 'top-down' structure of the NSW Fire Brigades, there was scope for ideological differences between the corporate strategists, the administrative/implementation level and the CFU members on the ground. Much of the more recent disaster risk reduction theory and practice emphasises the need for communities to be included in 'bottom-up' planning and preparation processes, a requisite that is implied through the CFU approach but which is ultimately dominated by the operational hierarchy of what is fundamentally a paramilitary emergency service organisation.

In addition, the developing nature of the CFU movement necessitated a 'state of the art' in terms of its current position and intended direction. Added to this was a need to gather views on the CFU approach from a wide range of informants involved in community education and preparation and therefore avoid obtaining a biased sample.

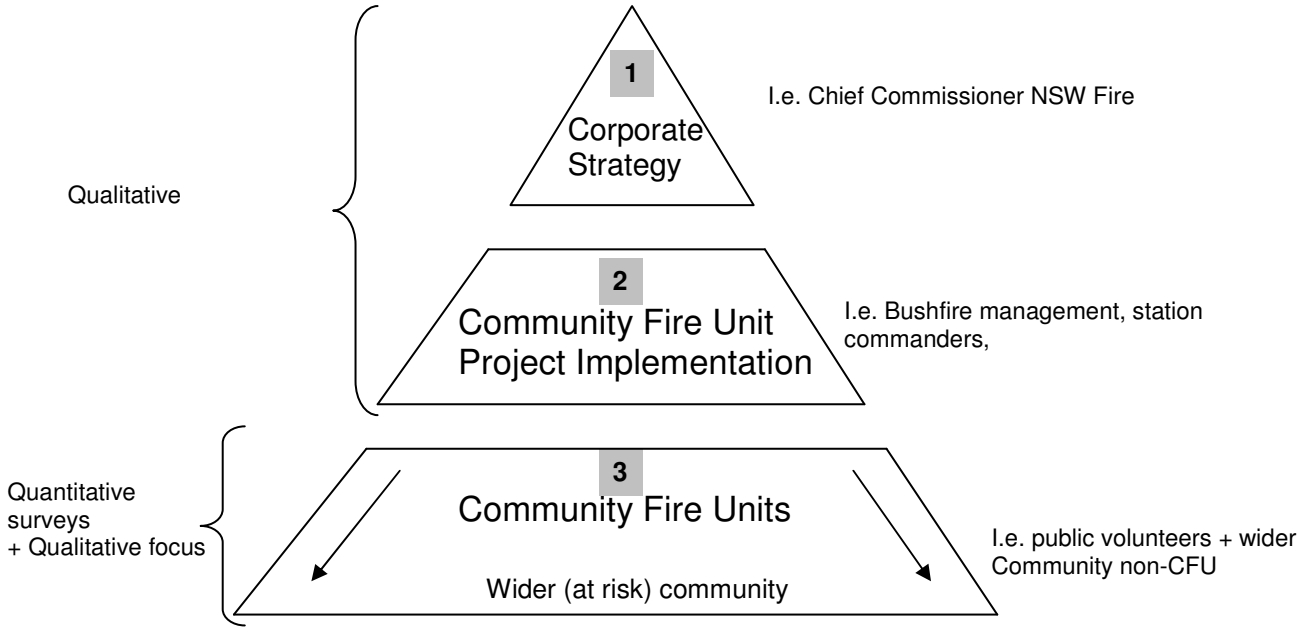
An extensive mixed-methods approach was used for this research in an effort to gather a wide range of views and perspectives of the CFU approach; its aims, objectives and intended outcomes.

Following a period of literature review and background information gathering, data collection began in May 2006 and continued until November 2006.

6.0 Research Methods

The data-gathering techniques utilised were semi-structured interviews, internet-based, postal and face-to-face surveys and a number of follow-up focus group discussions. Informants for the interviews, surveys and focus groups included: those involved in the running and management of the scheme and other similar schemes; CFU volunteers and; members of the public in urban interface areas who were not involved with CFUs.

In addition, two visits were made to regional CFU training days in which up to 600 CFU volunteers took part in training activities and information briefings. The structure of the methodology is set-out in figure 6.1 below.



1. Phase 1 of the project aimed to understand the overall aims of the community fire unit approach towards bushfire management and place this within the context of existing theory and practice in fire risk communication for public preparedness.

2. Phase 2 of the project aimed to identify the extent to which the community fire unit concept is transferred between levels of implementation, assessing a) ease of concept transferral and b) potential differences in the interpretation of overall aims and methods of operation.

3. Phase 3 of the project aimed to discover whether the community fire unit approach benefits community resilience to bushfires in terms of a) Ability of the community to understand the risks they face and prepare themselves accordingly; b) Ability of community fire unit volunteers to effectively protect themselves, their homes and their community from bushfire in a way which complements the Fire Brigade's operations.

Figure 6.1 Investigating the Community Fire Unit approach towards bushfire risk and community safety at the urban interface

6.2 Elite Interviews

Interviewees were approached on the basis of their involvement and input to the CFU scheme. The aim was to discuss the background and objectives with individuals at various levels of the NSWFB hierarchy in order to gauge any differences in opinion from the corporate or policy level to the administration and implementation levels. It was also intended that information should be compared to that gathered from the CFU volunteers. Given the relatively small amount of NSWFB personnel directly involved in the running of the CFU scheme, full coverage was easily achieved.

Potential respondents were approached by the lead researcher by email, telephone or in person. The project was described as being research into community education and preparedness schemes for bushfire at the urban interface, with the CFU approach to be used as a unique case-study. In some cases a project outline was supplied to respondents in order to further clarify the aims, objectives and process involved (see appendix 2).

The interviews lasted around 1 hour with each based upon an identical protocol containing key topics and sub-topics (see interview protocol in appendix). Respondents were permitted to lead the conversation away from the key topics if the researcher thought it relevant and informative, however the main points of the protocol were covered in every interview. The kinds of questions that led the discussions included:

- '*Can you describe in your own words what you understand about CFUs*?'
- '*How does the CFU approach fit in with wider bushfire management?*'
- '*What are the risks and benefits involved in allowing people to stay and defend their properties*?'
- '*In what ways do you think involvement with CFUs affects people's perceptions of fire risks and the way that they behave around fires*?'
- '*Do you think that there is room within the framework to allow greater decision-making powers for CFU members*?'
- '*How do you think CFUs improve community resilience*?'
- '*Does the CFU approach reach those communities most at risk*?'

The lead researcher conducted all interviews; however, in some cases two researchers were present. Each interview was recorded at the permission of the interviewee and notes were taken.

The interviews were analysed by combining the written notes with transcripts of the interviews. The content of each interview was then assessed on the level of similarity or difference with other interviews in terms of interviewee's responses to the questions provided and other points that may have been introduced.

As more interviews were analysed, areas of specific interested became apparent and could be grouped to form the basis of themes for discussion. Although the topics for discussion in the interviews were led by the questions within the interview protocol, this method of analysis allowed themes and issues within the interview materials to lead the researcher towards a more focussed and pertinent set of points for further consideration and discussion.

6.3 CFU Survey

It became clear early on that even basic demographic information on CFU members did not exist; a situation which suggested the need for a member survey. By gathering information on existing CFU members it was hoped that a clearer understanding could be developed of attributes, e.g. background, education, previous experience that are more likely to be prevalent among individuals who are aware of the bushfire risk in their area and are likely to volunteer their time to help mitigate the risks. In other words, survey data would provide an indication of the vulnerability and resilience of the communities that have become involved with the CFU scheme.

The United Nations International Strategy for Disaster Reduction (ISDR) defines vulnerability as '*The conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards*' (ISDR 2004). We knew that conditions of physical vulnerability to bushfires are high in areas targeted by the NSWFB, what we did not have was information on the conditions of social vulnerability.

This refers to the characteristics of people – shaped by social, economic and political structures and processes – that determine the damage potential of a particular hazard. For example, Wisner *et al.* (2004: 11) define this kind of vulnerability as *'… the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard*'.'

6.3.1 On-line survey (description and justification)

Due to the wide geographic spread of CFUs and a marked reliance upon Email as the communication channel of choice, it was decided that an on-line internet-based questionnaire would be used. This was

considered the most effective method for reaching numbers of people large enough to ensure a representative sample; however, in choosing this method a number of factors were brought into consideration.

The main issue is that home computer and internet use in Australia are not uniform, with many households not connected or actively using internet services. In the week prior to the 2001 census, 42% of Australians or 7.88 million people used a computer at home, while 37% (6.97 million people) used the Internet (ABS, 2001).

Although this number is likely to have risen in the years following the 2001 Census (some recent ratings suggest Australian national usage as high as 74% (Nielson Net Ratings, 2007)), detailed analysis shows pockets of population that are less likely to use home computers and the internet and, as a result, are less likely to be picked-up by an internet-based survey.

Importantly for our survey, rates of computer and Internet use are likely to decrease from middle-age, with 2001 data suggesting that only 28.6% of 55-64 year olds use a computer at home and around 25% use the internet. Above the age of 75, only 3% are likely to access the internet from home (ABS, ibid). This may be because older people are more unfamiliar with new technologies, may not see their relevance or may not physically be able to use computers due to illnesses such as arthritis (ABS, ibid).

The demographic information that we received from our internet survey showed a relatively high representation of older people, with over 70% of respondents aged 46 or more. This suggests that the average age of CFU members could indeed be higher than our figures indicate, due to the bias introduced through the sampling method.

Other biases may also exist. For example, people on a lower income or with lower educational attainment are less likely to use a computer or the internet at home. In addition, the ABS (2001) data identified slightly lower home internet usage among women. Our data show a 4:1 male to female ratio among respondents, again suggesting that higher male representation may be attributed to a greater likelihood that they will respond to an internet survey.

Despite these areas of potential bias we remain confident in the accuracy of our data. First, observations made at meetings and training days confirm high membership among the older demographic, however, it is felt that members over the age of 65 are unlikely to exist in large numbers due to the physical exertion and challenging conditions associated with CFU operations.

Also, younger professionals may be poorly represented in our data due to a lack of time to complete the on-line survey. Second, we feel that the almost universal home ownership among survey respondents is less a factor of greater internet access and more to do with bush locations at the urban interface being inhabited by individuals with higher income and educational attainment. Also, bushfire awareness and concern are rarely high among renters; therefore CFU membership among this group is not to be expected. In terms of the gender ratio, our observations suggest that there may be more females than the data imply.

In addition, this method was selected due to the resources at the researcher's disposal; it reduced the time and expense normally associated with face-to-face, telephone or mail-out surveys and removed the need for time-consuming data inputting. If the internet-based survey had not been used, a far smaller sample would have been gathered over a smaller geographic area.

Nevertheless, in an effort to also collect data from those who may not have access to email and thereby reduce some of the bias that an internet survey can introduce, forty face-to-face surveys were carried out with CFU members at large training days.

A total of 670 questionnaires were eventually completed (12% of the total CFU membership). The response rate is hard to know as emails inviting members to access the on-line survey were sent to CFU team leaders who were asked to forward them to other members; it is not clear how many they forwarded these links to.

6.3.2 Survey design

The surveys, which were developed through a wide range of input and pre-testing, contained a mix of 30 open and closed questions, starting with demographic information, i.e. age, gender, occupation, education, income, level of insurance, and number of children. Next, respondents were asked about their experience of bushfires and the extent to which they had been personally affected by them in the past.

They were then asked to consider how likely it was that they would be affected by bushfires on a range of timescales. The respondents were asked to indicate (using a 5-point scale) the degree to which they agreed or disagreed with a number of statements outlining motivations for becoming or not becoming a CFU member.

Finally, respondents were asked to rate their own bushfire preparedness and the preparedness and knowledge of other individuals in their area. Several opportunities were provided for open-ended comment.

A copy of the survey and letter of request to potential respondents can be found in Appendix 2 and 3.

6.3.2 Non-CFU member surveys

The non-CFU member survey contained the same questions as the CFU member survey with only some very slight variation. 150 surveys were hand-posted in South Turramurra along streets which were regarded as being in areas of high bushfire risk. These properties tended to be adjacent to heavily vegetated bushland but with no evidence of CFUs operating in the area. 43 surveys were returned, giving a response rate of 28.7%. The size of this sample is not deemed large enough to enable statistical comparison, however, in some cases it has been used to indicate potential trends or to test the respondents' assertions.

6.4 CFU Focus Groups

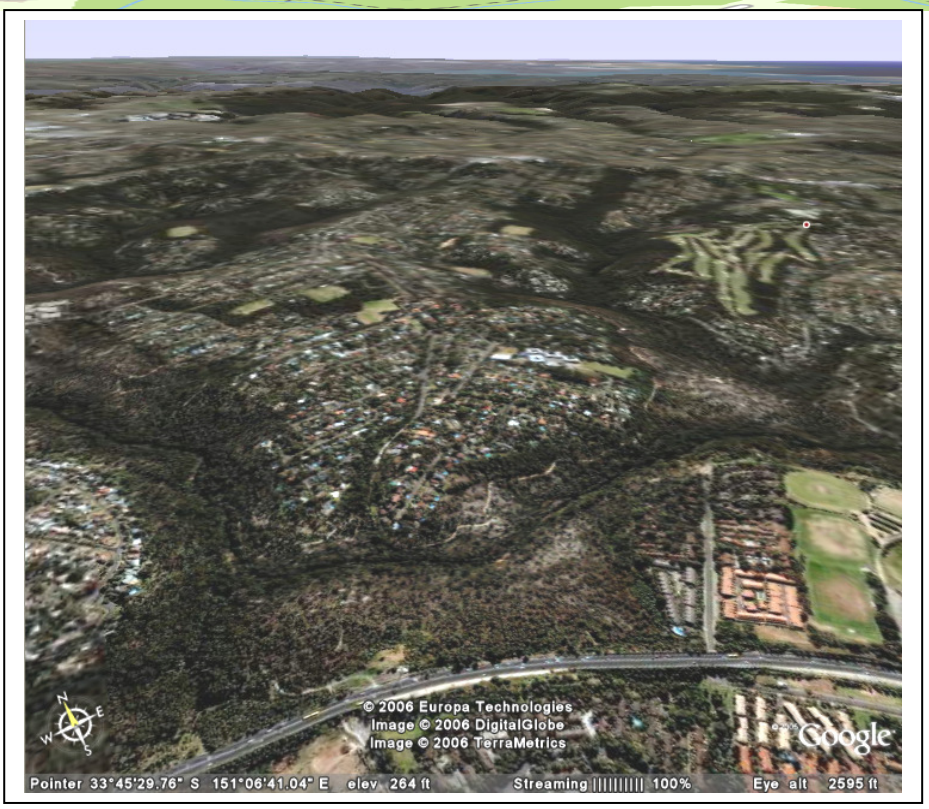
Focus groups were used to further develop understanding of the preliminary survey and agency interview findings. They provided an opportunity for CFU members to introduce a diversity of issues and to discuss these in depth.

Four focus groups were undertaken with 7-8 CFU members attending each. The 2 hour meetings were spread throughout the Sydney area (North Rocks, Heathcote, South Turramurra and Glenbrook (Blue Mountains)) in order to represent a range of geographical, demographic, socio-economic and experiential factors. Locations were selected by NSW Fire Brigades administrative staff, based upon the researcher's requirement for a diverse sample (see images below).

The groups were different in terms of their age structure, geographic and topographic settings, previous experience of dealing with bushfires and length of time in existence as an operating CFU. Discussions were led by the lead researcher using a generic protocol with questions similar to those asked in the elite interviews (available on request); however these were allowed to digress if the content was deemed relevant. The discussions worked well as the group members were comfortable speaking to and across each other. All focus groups were recorded and notes taken for later analysis in the same way as the elite interviews.

Focus Group1: North Rocks, Sydney (south). Post code 2151

Focus Group 2: Heathcote, Sydney (south). Post code 2233



Focus Group 3: South Turramurra, Sydney (north). Post code 2074

Focus Group 4: Glenbrook, Blue Mountains. Post code 2773

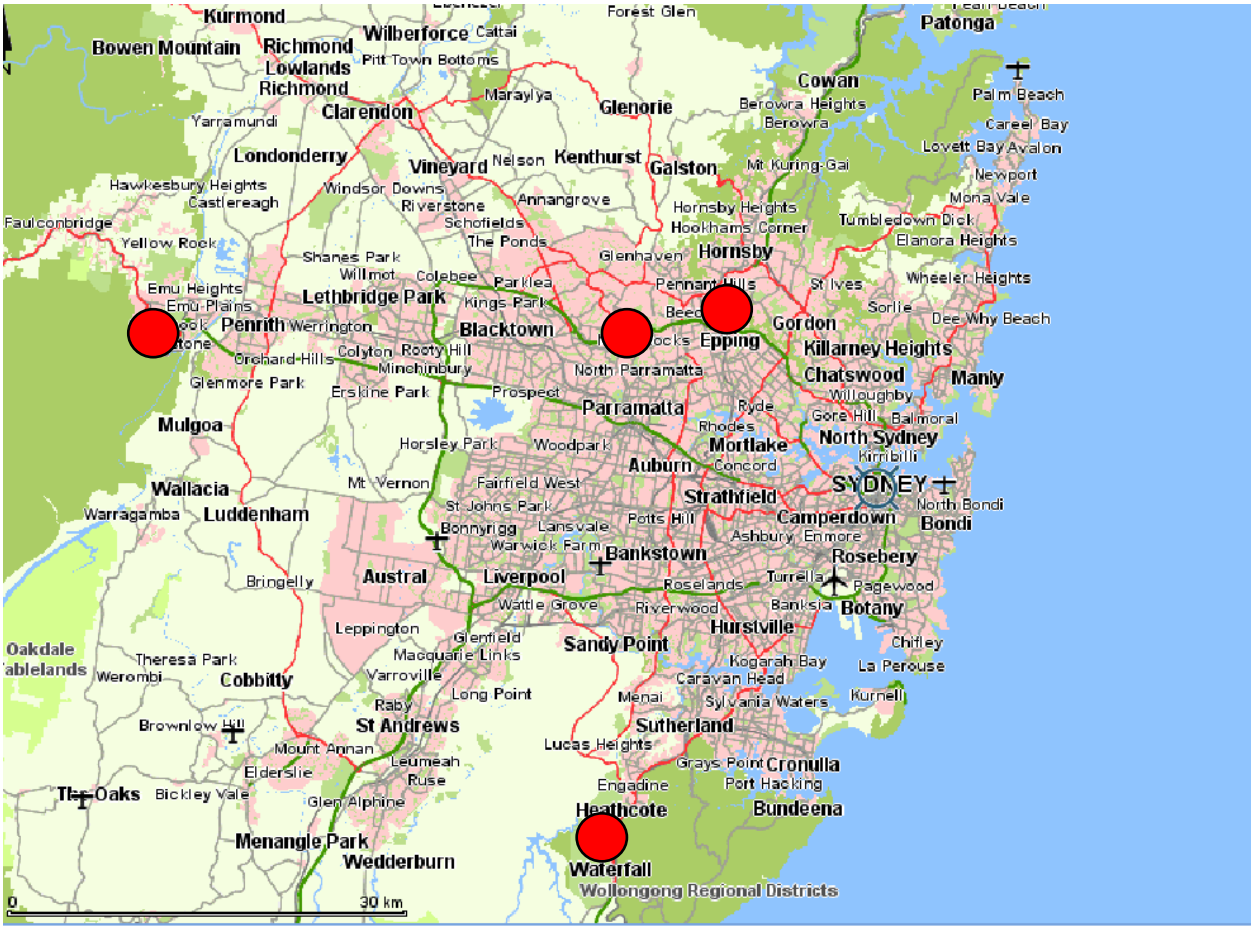


Figure 6.2 Focus group locations

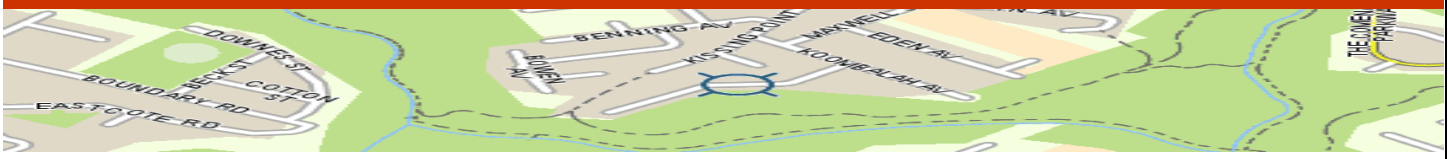
6.5 Case study area

CFUs exist across the whole of New South Wales, however, due to their concentration around the Greater Sydney and Blue Mountains, the case study for this research focussed upon this area. Sydney is located on Australia's south-east coast; one of the most fire prone environments on earth (Luke and McArthur, 1978). Since European colonisation serious fire seasons have occurred in this region every two to three years with major events occurring on a rough eleven to thirteen year cycle (Pyne 1998). At the time of writing, the south east is heading into its 11th year of drought conditions with four out of the past 5 years being serious fire seasons.

Sydney's metropolitan area is surrounded by national parks, with the Royal National Park to the south (154, 000 ha), Ku-ring-gai Chase National Park to the north (154, 000 ha) and the Blue Mountains reserve

(267,000 hectares) to the west. These areas contain heavy vegetation, high ridges and deep gullies. The Sydney region has a temperate climate with warm summers and mild winters. The weather patterns are largely controlled by the effects of the El Niño and La Niña Southern Oscillation. These can bring drought and bushfire in some years and storms and flooding in others. Many areas of the city's urban interface areas have experienced damaging bushfires, most notably in 1994 and 2001/2002 fire seasons. Bushfire risk is predicted to increase as suburban development continues into bushland areas and due to a likely increase in the frequency of very high or extreme Forest Fire Danger Index (FFDI) days as a result of the effects of anthropogenic climate change (Hennessy *et al.*, 2006).

New suburban areas have developed in a radial pattern since World War II and suburban growth continues to push into bushland on the city's fringes. Greater Sydney continues to experience rapid growth, with a further 1 to 1.4 million new residents anticipated over the next 25 to 30 years (New South Wales Government, 2006). The city's share of the NSW population in 2001 was 62.8 percent; this is likely to rise to 64.6 percent by 2031. The city has the highest house prices anywhere in Australia, a fact which is focussing development upon suburban fringes as urban populations seek space and affordable housing. A combination of high economic growth and rising urban land / house prices in and around Greater Sydney is also promoting growth along the coastal regions and the Sydney to Canberra Corridor. Sydney has the seventh largest percentage of a foreign born population in the world, with three of the more recent sources of immigrants being the United Kingdom, China and New Zealand.



7.0 Findings and discussion

Summary:

This section introduces the key findings of the study and discusses them in the context of wider research and evidence.

The issues are discussed in relation to the 'research question' headings that were introduced in the Introductory Chapter.

7.1 Understanding the social dynamics of Community Fire Units and the effect of Community Fire Units upon communities:

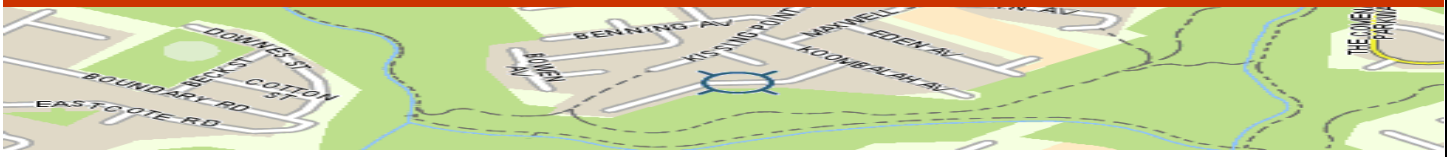
7.1.1 What are the attributes of those that become involved?

Apart from some minor variation, the results gathered through the CFU member survey paint a familiar picture of Australia's bush fire-fighting volunteers. This is except for one important aspect, CFU volunteer numbers are increasing markedly.

It is common for a high percentage of fire service volunteers to be aged over 55; in Tasmania the number of over-55 year olds is 17% and in Queensland the number is 31% (McLennan, 2004a). The modal age group (the number that is repeated most often) for CFU survey respondents was 56 and over (37%); this was closely followed by the 46-55 age group (graph 7.1).

Similarly, the gender balance among fire service volunteers is strongly skewed towards higher male involvement (Beaston, 2005). This is also reflected in the CFU member survey, with just under 80% of respondents being male (graph 7.2), compared with 83% among Australia's fire service volunteers as a whole (McLennan, 2005).

Despite a clearly spread geographic range (see figures 7.2 and 7.3, below), the outcomes of the member survey appear to indicate two major trends. First, the survey respondents could be regarded as well-off and



well-educated. Second, a great deal of social, demographic, economic and educational likeness exists between respondents.

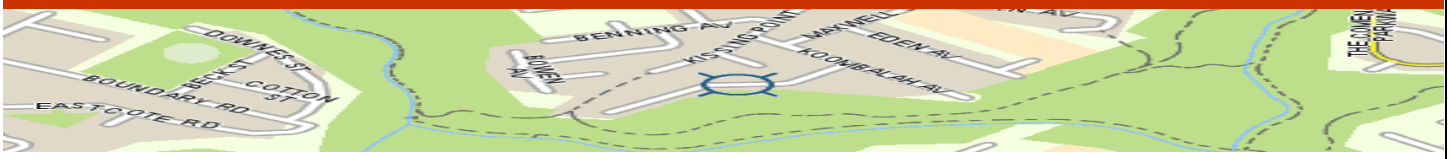
Focus group data highlighted the fact that many respondents considered their social bonds to be tighter than in surrounding areas due to similarities in spatial setting, age, family development, background, greater community stability and shared bushfire experience. The survey data support these perceived similarities, with 80% of those surveyed aged 45 or over, 92% owning their own homes, 56.2% with an average household income of $90,000 or more and 57.3% of European ethnic origin.

These findings are not surprising given the existing evidence in community collaboration and volunteerism literature which suggests that people more likely to self select, or be selected, to civic and voluntary organisations may be in positions of privilege and have higher levels of education (Thoits and Hewitt, 2001 in Tittensor, 2007) and that volunteers may share many similarities in terms of cultural background and status.

Hogan and Owen (2000 in Tittensor, 2007) found similar results in Australia, identifying a strong relationship between socio-economic status measures, e.g. educational attainment, income and social class identity – and social capital. In addition, a recent study (Healey, 2007), based on 2006 census data for Melbourne, has demonstrated the domination of voluntary groups by limited social groups. The research shows that migrants from non-English-speaking countries are less likely to volunteer than Australian-born people or those from English-speaking countries, even when income and age are similar.

However, caution should be used before arguing that the CFU members constitute elite pockets of wealthy and highly educated people of white Anglo-Saxon backgrounds that are not representative of wider urban interface communities. While this may be inferred within the literature, a more conclusive measurement may be reached through a comparison of the socio-economic backgrounds of the wider urban interface community. However, as figure 7.1 below demonstrates, it is rare for an entire census district to contain homes that are at high risk from bushfire impact; areas that are most likely to be provided with equipment and training by the NSWFB.

Indeed, as Chen and McAnene (2005) point out, 70.7% of all Australian addresses are located over 700m away from areas of bushland. Thus, while current Census Collector's District (CCD) information is useful, it may not provide the kind of resolution to enable accurate assessment of how representative CFUs are of high risk urban interface communities.



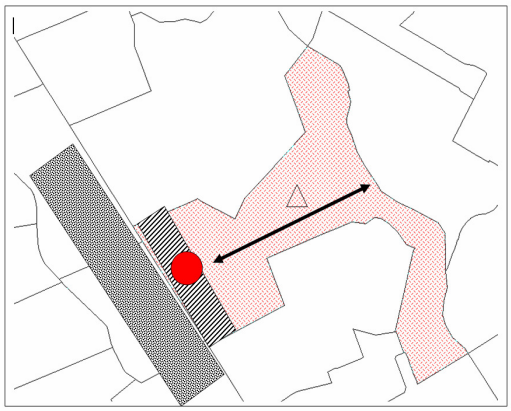


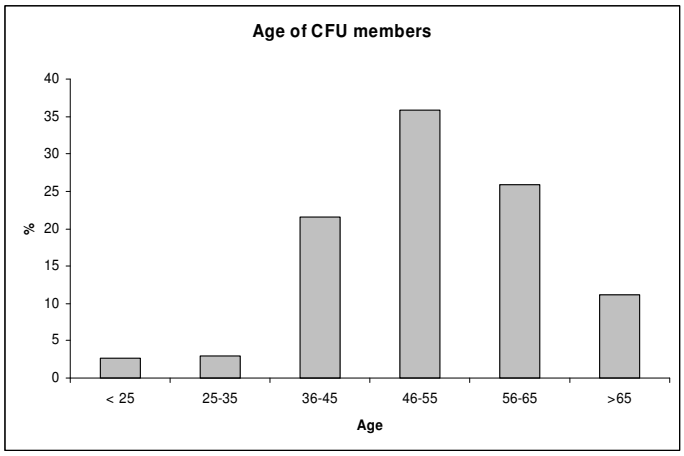
Figure 7.1 Collector's districts rarely border an interface zone entirely

Number of surveys completed	670
Percentage of CFU volunteer community surveyed	12%

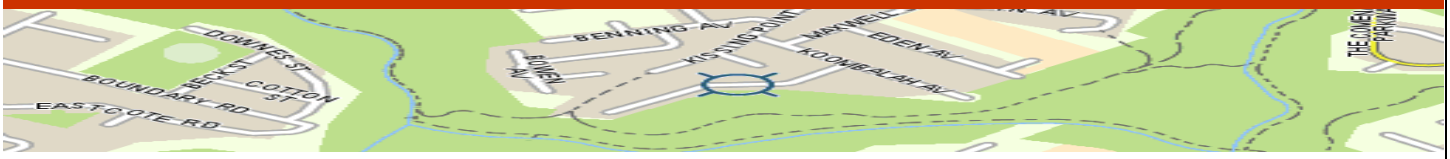
Table 7.1 Respondent numbers and % of CFU members surveyed

Gender	CFU %
Male	78.9
Female	21.1

Table 7.2 CFU member gender distribution



Graph 7.1 CFU member age distributions



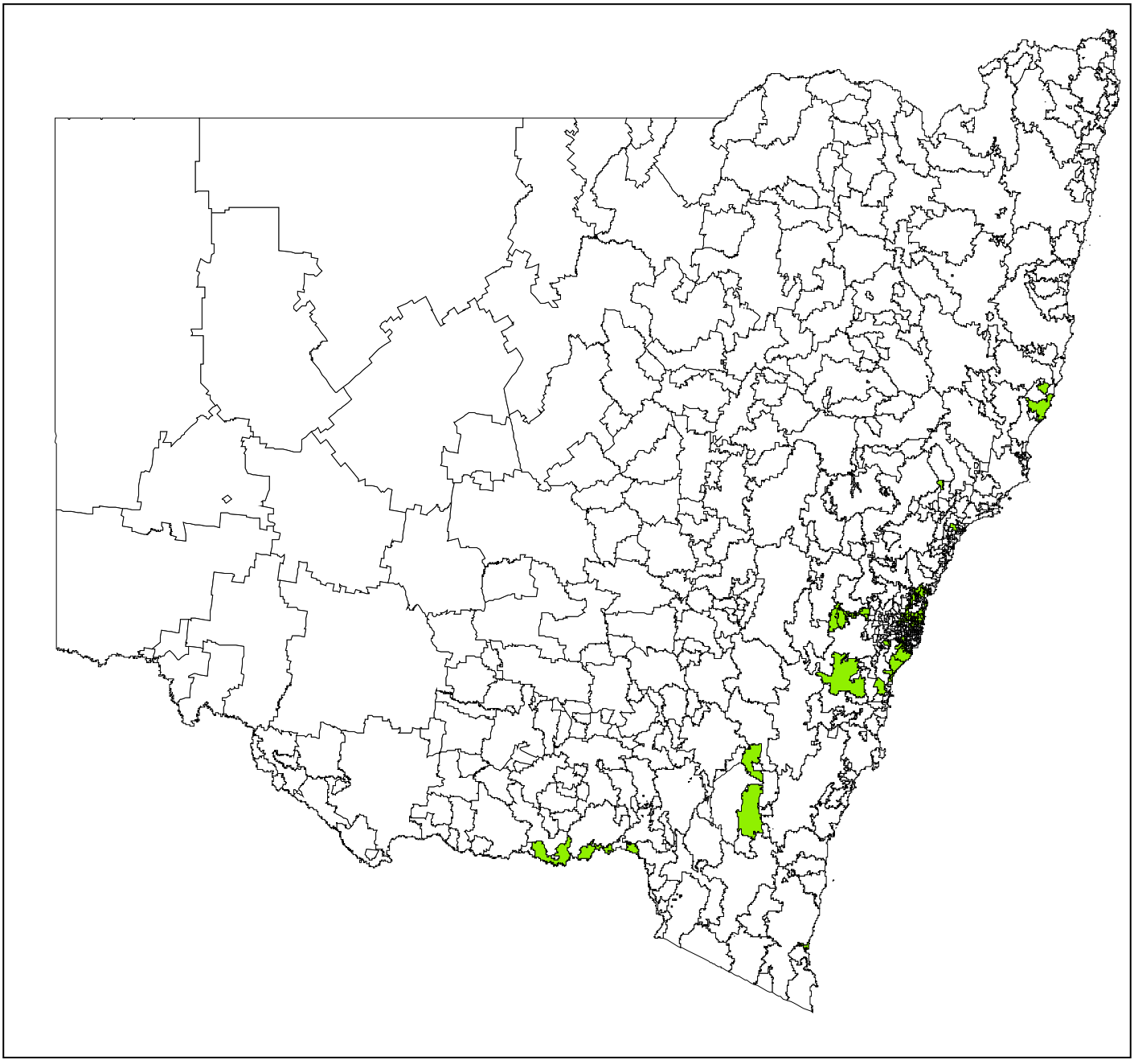
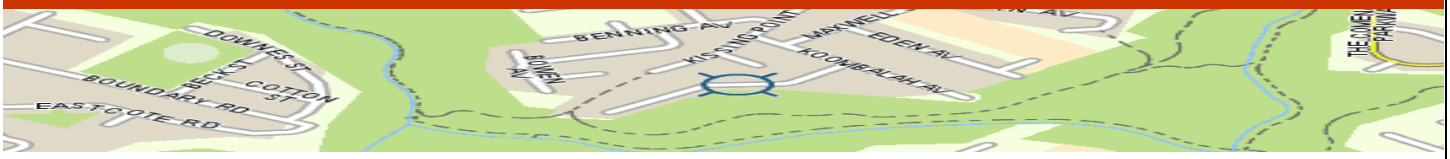


Figure 7.2 Survey respondent distributions in NSW (Image courtesy of Risk Frontiers).



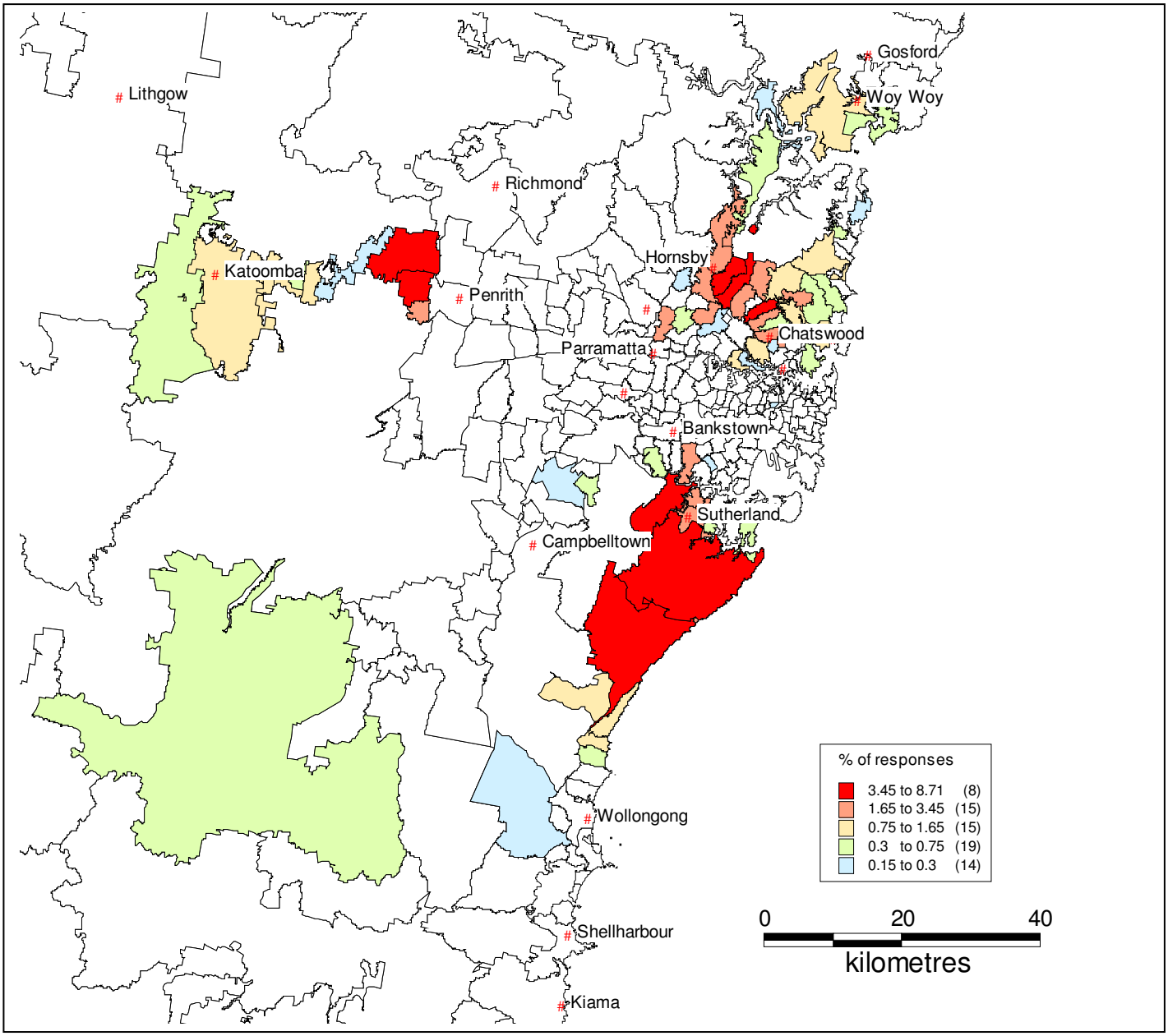
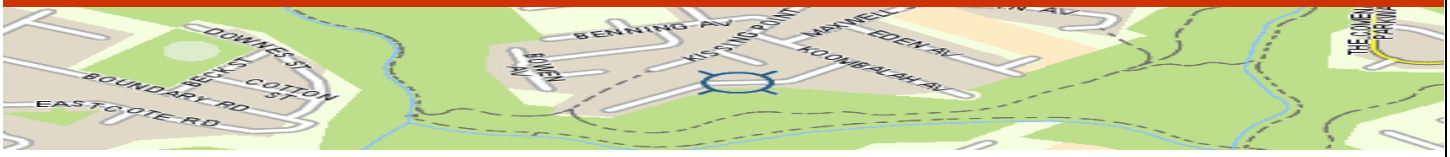


Figure 7.3 Survey respondent distributions and % responses in Sydney and Blue Mountains area, NSW (Image courtesy of Risk Frontiers).



7.1.2 What kinds of communities are likely to have Community Fire Units and why?

Our research suggests that those involved in CFUs already recognise the high bushfire risk in their local area. Many of the CFU members surveyed and interviewed had experienced bushfires in the past and were likely to have defended their homes using their own resources or shared between neighbours. Those that had not experienced bushfires first-hand claimed to have been informed of the risk by their neighbours or were generally aware of the fire-prone nature of their surroundings.

> *"We live right on the bush, we all knew when we built here that bushfires would come through. When we bought the land a fire had just come through."*

(Focus group respondent)

NSWFB have focussed on individual streets or parts of streets that are at particular risk, either due to poor access, topography, or proximity to high fuel loadings. In these terms, the areas targeted appear to be well represented with the local community members necessary to actively defend these limited areas.

The high-risk status of cul-de-sacs in the urban/bush fringe appears to coincide with a greater degree of social interaction and shared identity compared to areas along busier roads with less opportunity to meet or interact with neighbours. In addition, focus group information identified that CFU members were likely to be involved in other forms of community action (or had been in the past) such as Neighbourhood Watch or Bush-Care groups, suggesting an existing spirit of community action and cooperation.

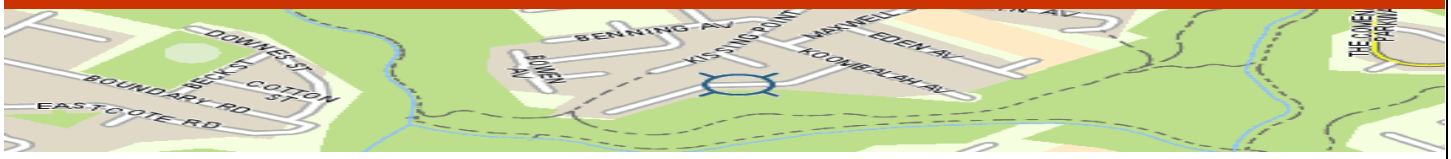
> *"We are a group that has been together for a long time in a tight cul-de-sac, whereas up at the other end they are stretched along…..we're more tight."*

(Focus group respondent)

> *"Community minded people are in CFUs. Other people aren't interested in committing to the community and are happy to let other people do the work. It's the same for school and sports etc."*

(Focus group respondent)

These initial bonding ties, accompanied by a higher perceived risk and community spirit, are a likely formula for the formation of CFUs. Although, in many cases, communities have rallied around a collective



understanding of their perceived risk, their wider 'bonding ties' have been fostered and *formalised* through the interventions of the NSWFB (see Pelling and High, 2005: 313).

As can be seen from table 7.3 below, it is clear that survey respondents were well-aware of the threat from bushfire in their area, either though a general knowledge or having experienced bushfires in the past. The NSWFB personnel viewed this existing awareness as having a major influence on community members' decisions to join or form a CFU; making much of the work of informing potential volunteers of bushfire risk largely unnecessary. Awareness and concern were coupled with a strong motivation to be prepared to defend families and property and a feeling of empowerment that was reinforced by enhanced cooperation with neighbours.

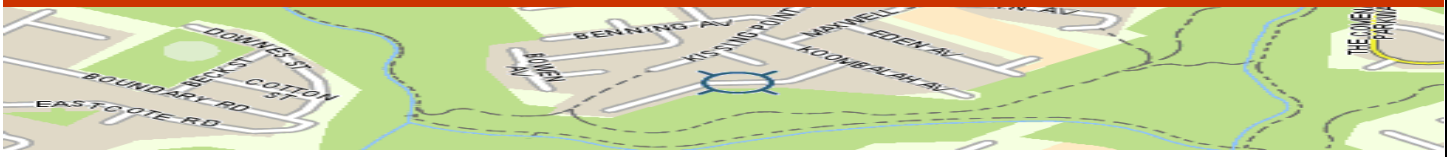
Motivation to join CFU (top 3)	**%**
"I know that I live in a bushfire prone area so I wanted to be able to protect myself/property/family in the future"	**36**
"Bushfires affected my local area in the past so I wanted to be able to protect myself/property/family in the future"	**22**
"If I and my neighbours are trained and equipped to defend our homes it gives us the greatest chance of saving them"	**20**

Table 7.3 Motivations to join a CFU

CFU members appear to represent an interface community that is significantly different to the traditional rural pool of bushfire volunteers. As McLennan and Birch (2005) point out, a number of barriers now exist to people volunteering their time to fire agencies, including: competing claims by education and training commitments; employment obligations and social and recreational commitments (Volunteering South Australia, 2004; Volunteering Victoria, 2002 in McLennan and Birch, 2005).

In addition, McLennan and Birch (ibid) refer to a report by the Western Australian Premier and Cabinet (2002) which suggests that volunteers of the 55 and over age group will, in future, have specific expectations as to the activities they are willing to undertake. They go on:

> *"Their expectations are likely to involve restrictions on the amount and frequency of time they are prepared to donate and an unwillingness to commit themselves to long-term volunteering obligations."* (p. 105)



It appears then, that the historical formula for volunteerism has been overtaken by a new set of needs and expectations. Nowhere is this likely to be more acute than in urban interface areas where work, travel, recreation and family commitments are all likely to reduce opportunities to volunteer, despite peoples' best intentions. NSWFB have recognised these needs and have designed the CFU scheme accordingly; to great success. However, as will be discussed in the sections below (7.1.4), this success creates some important management challenges.

7.1.3 How have communities benefited from their membership?

All evidence from our research suggests that by becoming involved with a CFU, members feel a greater connection with their immediate neighbours. While the initial core is likely to have been already familiar, the need to expand this network in order to meet the commitments of maintaining an active CFU appears to involve a wider range of people with more diverse skills and attributes. Many now trust each other's ability, feeling that looking after each other would become increasingly important as they become older;

> *"…being part of a CFU certainly has secondary dividends…"*

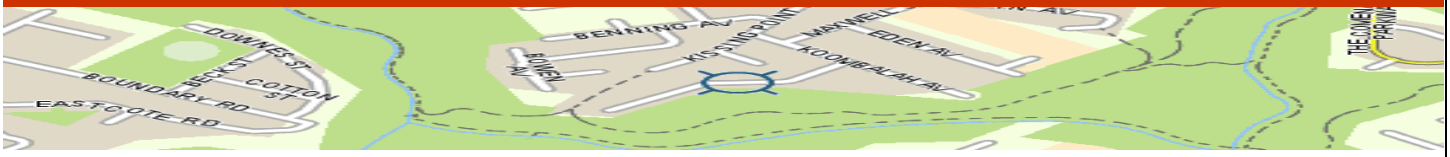
(Focus group respondent).

It is generally felt that the skills, knowledge and experience gained through association with the CFU are beneficial to the resilience of those involved. In some cases, respondents felt that they were no longer a burden on the government or emergency services as they were more able to look after themselves;

> "*We take the pressure off the government because we are not going to stand there weeping because we didn't get support. Now we can do what we need to do, with the equipment we need, with the support we need….."*

(Focus group respondent).

Some individuals felt that the presence of a CFU in their local area had also made a positive impact upon non-members as it raised awareness and formed a central focus for community efforts both in preparation for the fire season and in actively defending the area during bushfires.



7.1.4 Has involvement promoted community resilience to bushfires?

> "*The advantage to us of the CFU is that we know our community. We know who's there….that's why the call-out people call my kids to say "do you feel safe?"… We know each other so we can respond to that in a more personal way….Someone coming from the outside wouldn't have a clue who lives in that house or that house….whether they're young, old, likely to be asleep.*"

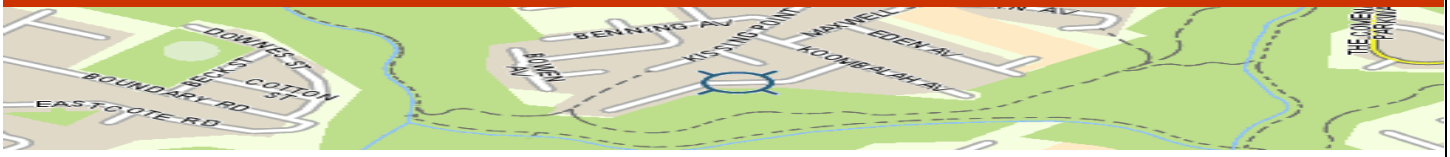
(Focus group respondent)

The feedback from survey and focus group respondents was overwhelmingly positive. It is clear that the equipment, training and heightened levels of interaction among neighbours is greatly appreciated. Members recognised the benefits of understanding both how to protect themselves from bushfire and how to utilise their local knowledge to ensure the best possible response. It is likely that in a post-bushfire situation the organisation networks would continue to operate in a beneficial way as residents are able to draw upon each other's support and resources and share the experience as a group.

A criticism of the CFU program, expressed by interviewees involved in other types of community bushfire education programs, relates to the equipping of groups that may already be well-resourced, aware of the risks and operating well as a community. This assertion is supported by the evidence presented in section 7.1.2 above).

The application process for setting-up CFUs is dependent upon approaches from motivated groups of residents to initiate and maintain CFUs in their local area; a situation that suggests higher levels of existing social capital. However, as Tittensor (2007) points out, such groups or communities may already be well connected, well resourced and capable of coping with stress or hazard. Various studies highlight that engagement in civic and volunteer activities is strongly correlated with socio-economic status (e.g. Thoits and Hewitt, 2001).

As discussed in section 5 - Theoretical background, Tittensor (ibid) found that people with higher levels of education were more likely to volunteer for all organisations, regardless of their type (religious, environmental, political, etc.), than those with lower education. Similarly, Tittensor (ibid) reports that in Victoria, a state funding for Community Capacity Building initiative (CCBI) was channelled towards already powerful groups, which "*used the programme to become even more powerful at the expense of the rest of the community*" (Tittensor, 2007:515).



There is, therefore, a danger that bottom-up or community-led strategies could favour the more vocal or organised groups, while neglecting areas that may derive more benefit from a more 'top-down' approach which actively identifies and targets areas of particular vulnerability. Thus, it is possible that the CFU scheme could have a negative effect rather than a positive one, as it draws together many of those who already possess the stock required for social capital and can build on it, eventually creating a vacuum between individuals who may be members of the same 'geographic community' but who do not share other important similarities.

A number of similar points were raised with regard to the structure and make-up of CFUs and how this developed within the local community. While interest in CFU membership and training following bushfires is often high, this tends to wane over time as the perceived risk is reduced. The effect is that CFUs can either lose all interest or that only a core group remains active. This core will tend to share more similarities and, over time, may be regarded by other community members as an impenetrable 'clique', who hold more power through their knowledge and access to training and equipment, a phenomenon described by Putnam (2000) as the 'dark side' of social capital or Rubio's (1997) 'perverse social capital'.

> *"We have a member from a different location whose home is highly exposed but he can't break into the existing group in his area…[he has] major issues with that [established] group. He is younger than those members."*

(Focus group respondent)

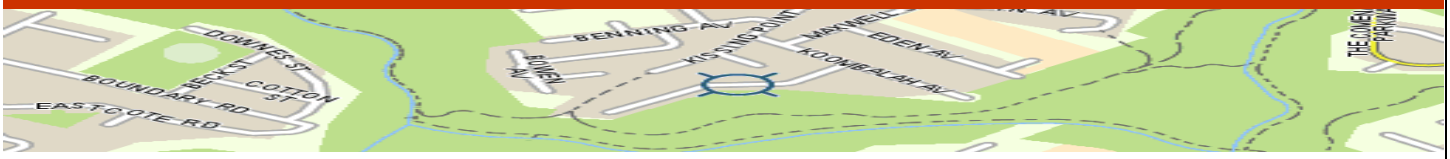
Such barriers to community integration may be exacerbated if fire threatens a neighbourhood; CFU members reported that they resented the (attempted) involvement of untrained and non-committal neighbours. The quotes below show that while efforts to fight fires prior to the CFUs may have been disorganised, they tended to involve the whole community.

> *"In previous years all the neighbours and even strangers had formed into 'bucket brigades' and lined up to protect the houses."*

(Focus group respondent)

> "[In the past] *There wouldn't be standing room on the fire line*…[reference to neighbours helping each other]*…there were just all these people all around, side by side fighting the fire."*

(Focus group respondent)



However, the more structured formation of CFU groups appears to have created a division within the community. The quotes below demonstrate this contrast:

> *"They* [non CFU members] *are also the danger when the fire does come through – they think they've got the training and try and get in there and do the wrong thing."*

(Focus group respondent)

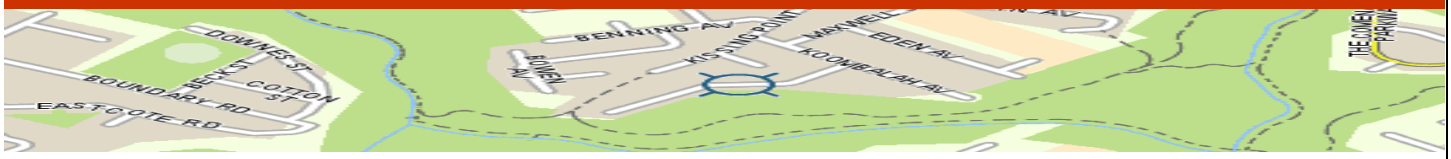
> *"You have to be very strong in your attitude towards them and say "no, I'm trained; I'd prefer you to do this…"*

(Focus group respondent)

Although CFU members are not specifically tasked with information dissemination to their surrounding community, respondents were asked about the extent to which they felt bushfire and CFU information had been transferred. Only 12% of respondents felt that information transfer had been successful, with 45% feeling that it had been somewhat successful and 43% feeling that it had been unsuccessful. While these findings are not conclusive, they do suggest that non-CFU members in high risk interface areas could derive more benefit from an increased focus on community interaction.

NSW FIRE BRIGADES UPDATE

The CFU application process has changed considerably. Under the previous system, residents applied to the NSW Fire Brigades as a result of the impact of a major bushfire to have a CFU established in their location. The NSWFB would then canvass the local area with letter drops explaining the program and seeking interested residents to establish a unit. A paradigm shift has now occurred as a result of the NSW government directive to establish an additional 400 units across NSW. This will have the effect of increasing the program to a total of 770 units and 12, 500 volunteers by the year 2011. As there are not currently 400 applications from interested residents, the Bushland Urban Interface Section of the NSWFB has now utilised a strategic risk assessment process to identify suitable locations for the establishment of new units. This risk process includes the use of High Resolution Imagery, FireAus Database, and Fire History where available. Once high risk locations are identified, the local communities need to be encouraged to participate in the CFU Program through a strong marketing and media campaign.



7.1.5 Bridging capital

As discussed above, the CFU members that were studied display a strong bonding capital, which has been strengthened and formalised by the creation of the CFU. However, this bonding appears to be highly localised and frequently confined to groups that share similar demographic and socio-economic attributes or existing connections.

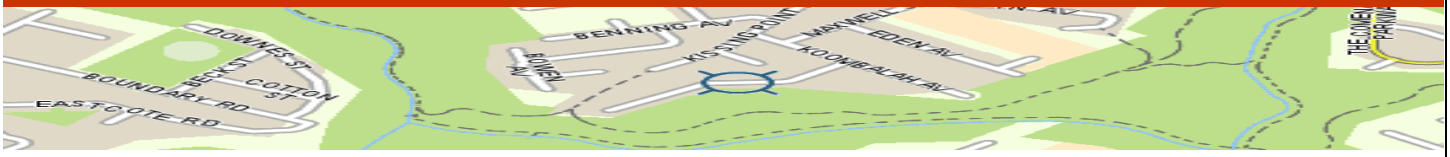
The groups do, however, appear to possess formidable bridging abilities. This is exemplified by their ability to lobby for establishment and access external funds and support through their 'bridging ties' to the NSWFB, local government and funding bodies; a fact which has propelled CFU membership to a size that the NSWFB now find hard to manage efficiently.

Pelling and High (2005) note suggestions within the literature that it is more common for rural communities to exhibit strong *bonding* but weaker *bridging* ties, a situation that is reversed for urban communities. CFU's, which sit on the interface between urban and rural areas, demonstrate a mixture of these attributes. This is a likely result in a space that contains a richness of skills, backgrounds and connections associated with diverse populations but which also displays an impoverished sense of community feeling or common goals due to its transient, commuter population and lack of civic interaction (Putnam, 2000). Alternatively, the selfish motivations that respondents confessed lay behind their interest in CFU involvement may be driving a more insular movement towards self-defence which is best managed at a micro-scale.

The extra support provided by NSWFB is without doubt a positive step in ensuring the organisation and preparedness of certain community groups. Nevertheless, it is also important to provide support for less proactive, aware or articulate communities for whom the risks or social vulnerability may be much higher. In order to involve these groups, and effectively close gaps on the urban interface, a far higher input of awareness-raising, time and resources would be needed for recruitment and maintenance.

7.2 Understanding the effect of Community Fire Units upon perceptions of fire risk and household behaviour in fire prone communities:

As detailed in APPENDIX 1, **The development and future of Australian bushfire management**, the Australian bushfire safety position suggests that, if early evacuation is not possible or desirable, adequately prepared people should protect their homes and themselves by staying with and actively defending against



the flames and embers (AFAC, 2005; Handmer and Tibbits, 2005; Tibbits *et al.*, 2008). Thus, by informing residents that a properly defended home is a safe shelter, it is hoped that a last minute bid to escape the flames - by far the most deadly response, can be avoided.

However, the 'prepare stay and defend policy' is no panacea, with many problems persisting despite the best efforts of those involved. Within the 'prepare, stay and defend or leave early' ideal, a number of key challenges have been identified in relation to risk reduction prior to and during bushfires.

Broadly speaking, these fall into two divisions: first, are the logistical, regulatory and planning issues such as land management, building design, access to timely and accurate information, services such as electricity and water supply and reliable fire-fighting equipment.

The second barrier, which we are more concerned with in this project, relates to the diverse factors that contribute to an individual's vulnerability and capacity to prepare their property for bushfire. The following behaviours are frequently identified as indications that people are poorly prepared or supported in their bushfire decision-making and are therefore more likely to take dangerous actions:

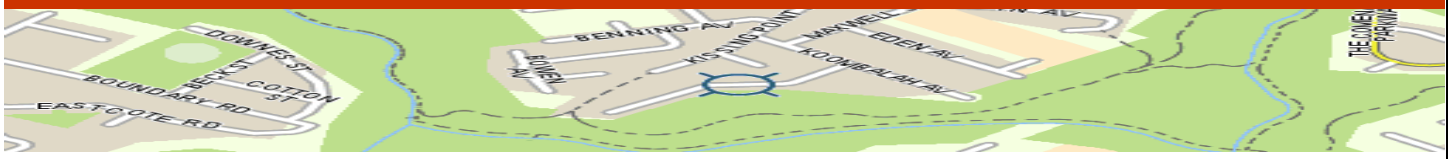
1) People may wait until a bushfire ignites in their general area before making serious preparation to structures and property;

2) People may wait until a bushfire is close or visible before deciding whether to leave or stay and defend the property (e.g. Rhodes, 2005);

3) People may rely upon others, e.g. fire-fighters, friends, family to make decisions or carry out actions, and;

4) People may retain the option of leaving at the last minute if it is felt the situation is too dangerous (e.g. Tibbits and Whittaker, 2007).

The aim of this section is to assess the research findings of this project against these commonly identified attributes.

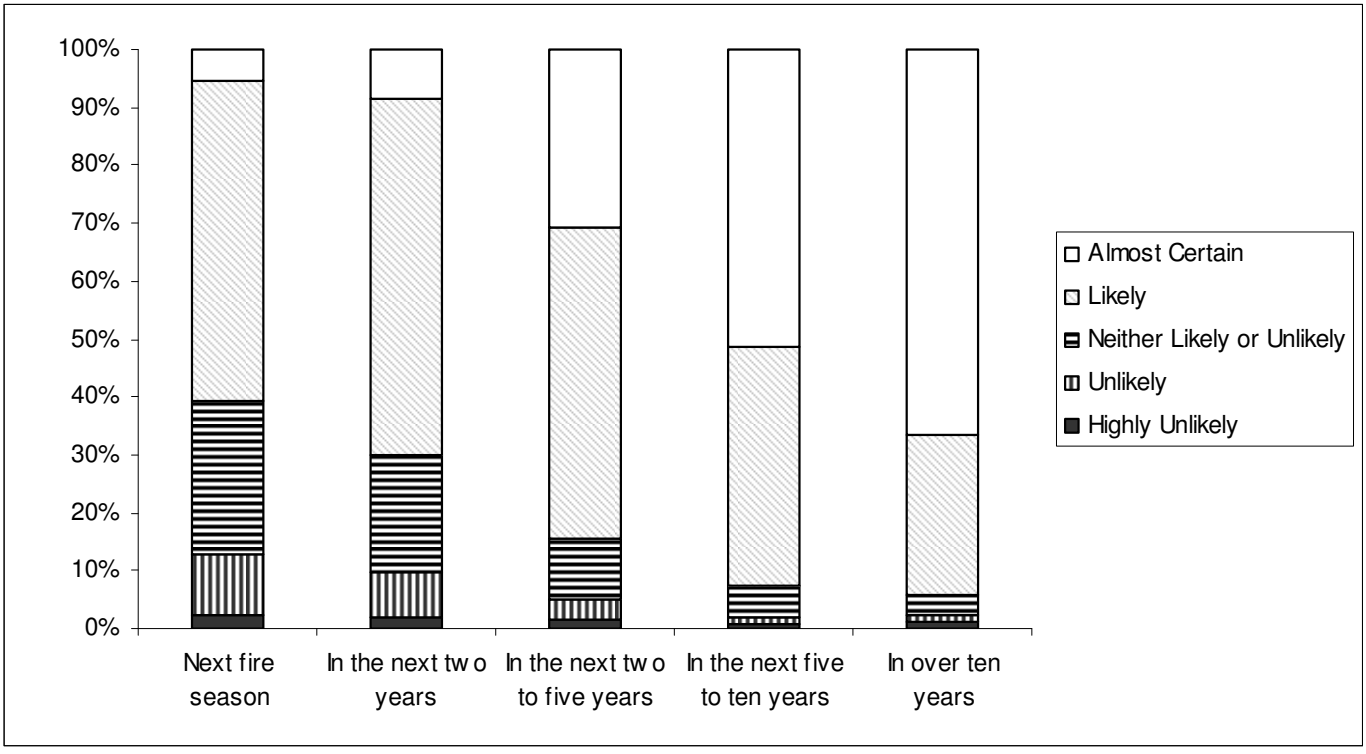


NSW FIRE BRIGADES UPDATE

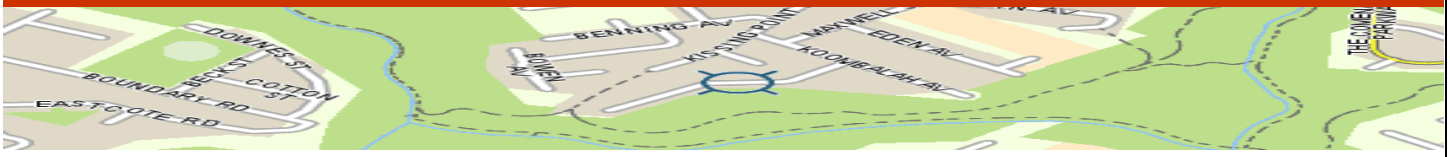
I-Zone planning has been introduced into the CFU Program. This I-Zone planning gives local volunteers a spatial mapping tool that identifies various layers of information that volunteers can taken into account when making operational decisions. The plan is to develop these I-Zone plans for each individual CFU location. The resulting plans will indicate fire threat, fire path travel, structures at risk, safety issues, water supplies, and refuge areas. This I-Zone planning tool will assist in providing broader bushfire education and planning capabilities to CFU volunteers.

7.2.1 Bushfire risk awareness among CFU members

As was discussed in section 7.1.2 above, survey and focus groups respondents perceived a high degree of bushfire threat, with the likelihood of bushfire in their local area increasing dramatically over time (graph 7.2).



Graph 7.2 Likelihood of bushfire in local area over time



Some respondents felt that their CFU involvement had helped them not only to recognise the risks they faced, but also to deal with them in a community-minded way.

> *"In cities there is a feeling that bushfires are not an issue of importance and, if they do happen, someone else will deal with it. We feel we have fostered a country town mentality in our own street"*
>
> (Focus group respondent)

7.2.2 A feeling of preparedness and guidance

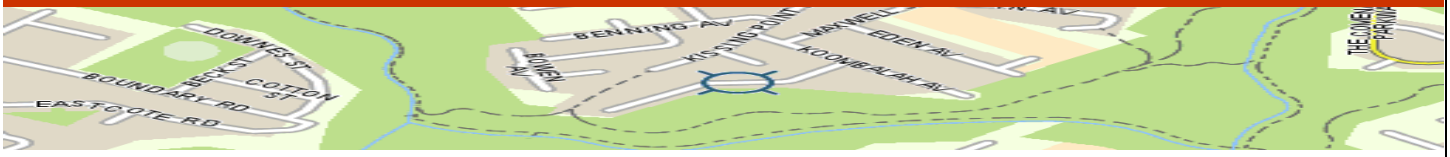
Many focus group and survey respondents in our research stated that, prior to their CFU involvement, they had felt helpless and unsure as to what they should do in the case of a bushfire. It was commented that, before the arrival of CFUs, fire incidents had been disorganised; the fire services arriving and departing with little interaction with local residents. For some, the trauma associated with previously experienced bushfires had generated a heightened state of anxiety.

Since receiving the equipment and training, most respondents had gained confidence in their ability to organise themselves and defend their homes. While often accepting that it was impossible to be 100% prepared, access to knowledge and resources and integration into the fire brigade's operations provided many with the feeling that they are now a formidable fighting force against the bushfires. The possession of identity cards[1] added an extra boost as it increased the likelihood that CFU members would be permitted beyond road blocks to return to their properties; in previous years, residents have avoided the police by walking home through bush land.

It was found that the guidance and strict hierarchy that CFU volunteers are governed by acts to build confidence in their actions. Members are happy to be instructed either by full-time fire-fighters or the CFU leader who receives orders directly from the NSWFB. The evidence from groups that have already had to defend their homes from fire is positive. The teams work well together and benefit from an understanding of the fire brigade's operations and procedures.

A more detailed knowledge of pre-fire preparations, fire behaviour, likely ignition points and each other's strengths and assets in a highly localised area all appear to have contributed to the successful defence of homes and property. NSWFB interviewees felt that after defending their properties from fire, most CFU

[1] CFU members have been issued with photographic identification cards since 2005. It is intended that all members possess these cards in the future.



members tended to be more confident in what they could do. Although there were some harrowing stories from CFU members, they had stayed and probably benefited from the experience.

7.2.3 Introducing the capacity to cope

A minority of operational fire-fighters that were interviewed felt that certain CFU members would not be able to cope with the stressful and frightening conditions experienced during a serious bushfire. This finding highlights a number of factors, including the suitability of some CFU members to be present during bushfires (for example, 80% of those surveyed were aged 45 or over), the willingness of fire-fighters to interact and collaborate with volunteer members of the public during operations and the adequacy of training provided for CFU members.

This concern was also expressed by some focus group respondents who noted that the work can be dangerous due to the heat and exertion involved. Noting the large contingent of elderly CFU members, they suggested that they would be in particular danger from heat stroke or heart attack as they pushed themselves harder to protect their own homes. The point was also made that first aid training had been overlooked due to the emphasis upon pumps and hoses.

> *"All these [old] boys think they're gung ho…they all think they're 20 year olds but they're not…."*

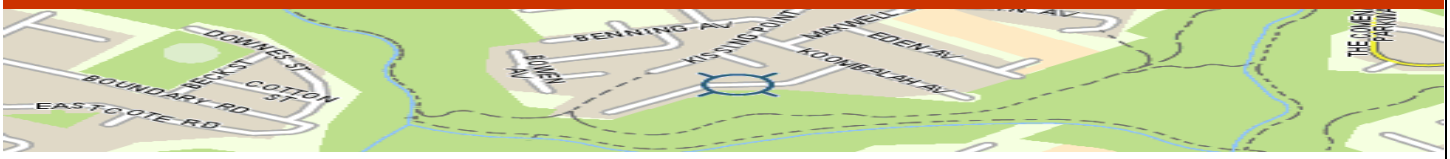
(Focus group respondent)

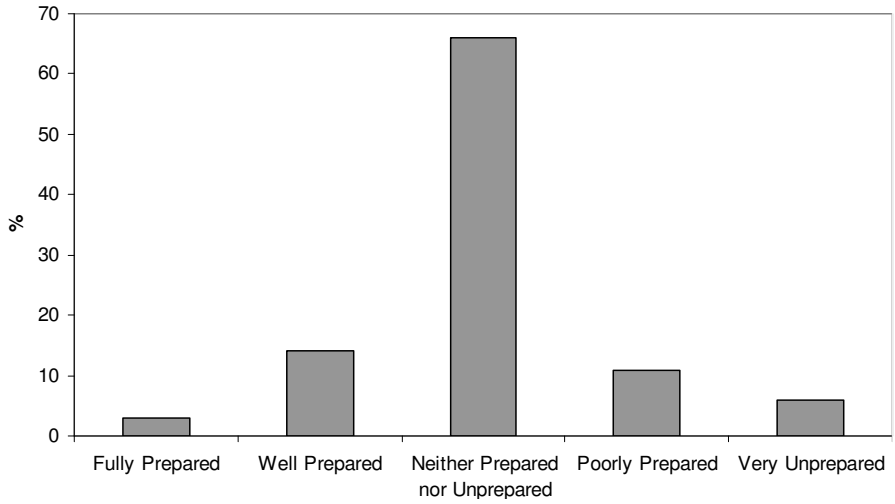
Communicating the reality of a bushfire situation through training and education is particularly difficult. Many respondents felt that their training had not adequately prepared them for what to expect during a real bushfire, leading to concern at a lack of psychological readiness and an unknown in terms of how they would cope with stressful situations and dilemmas such as fires impacting upon multiple properties at once;

> "*When we get hit it's going to come from the north west and it's going to come through in about 10 minutes and we won't have a clue…we'll be in trouble*"

(Focus group respondent).

This finding is supported by the survey data which show feelings of bushfire preparedness as being fairly ambiguous (graph 7.3 below).





Graph 7.3 CFU members' perceived level of bushfire preparedness

Weaknesses in the training were acknowledged by one NSWFB interviewee who explained that it was necessarily restricted and repetitive. However, among some members there was a desire to learn more, with a feeling that if a number of years were to pass without a significant bushfire, people may begin to lose interest;

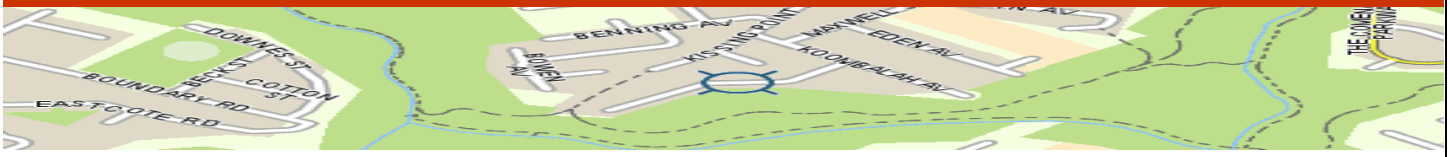
> "*CFUs may want more training but it is not relevant to the role that they are undertaking….The challenge – if there aren't major bushfires – is to keep that motivation going, to ensure people are still skilled-up*"

(NSWFB Interviewee)

[Issues of training and future management are discussed further in section 3.3]

7.2.4 Bushfire planning: primary and secondary preparedness actions

Preparing for the event of a bushfire is a fundamental part of the role of CFUs. This includes the clearing of vegetation and fuels from around buildings and the development of detailed bushfire plans between householders in areas that are likely to be impacted. To a great extent, this preparation appears to form an integral part of volunteer's activities, as formal training only constitutes 20 hours annually.



Many focus group respondents used winter working bees and spring clean-ups as an excuse for a barbeque or social gathering. There was a feeling among some that CFU membership formalised arrangements and encouraged a greater commitment to activities which would normally have been put off until a later date. A minority view was expressed that the Unit and training represented only a small part of bushfire preparedness, with fuel reduction, house protection and wider community awareness all important facets of CFU involvement;

> "*It's quite easy to think you should* [plan] *but it just doesn't get done*…[being in a CFU] *makes you plan……"*

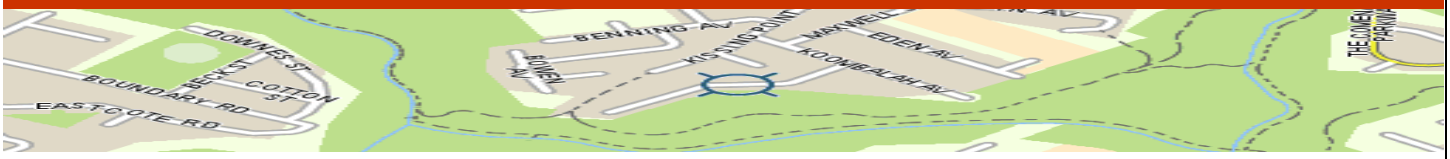
(Focus group respondent).

Although a direct comparison is not possible, the reported preparations of the CFU members do not appear to be uncommon among bushfire threatened communities. A public survey carried out in Victoria in 2007 suggests that eight out of ten householders are likely to carry out basic safety measures around their homes.

Bushfire safety activity	% of respondents likely to carry this out
Remove leaf litter, undergrowth etc from 20-30m round house	88.0
Clear gutters of leaves	88.0
Move combustible materials such as firewood, fuel away from the house	86.9
Get equipment such as ladder, bucket and mops for spot fires	86.8
Cut back branches overhanging and remove bushes close to house	83.5

Table 7.3 Source: Community Attitudes to Bushfire Safety 2007/08 CFA & Strahan Research

Nevertheless, CFU members differ significantly from non-members in terms of their training, knowledge and possession of fire-fighting equipment. As the table below shows, individuals from the 2007 Victorian study are far less likely to have made more detailed secondary preparations to defend their homes from fire or have the equipment to do so.



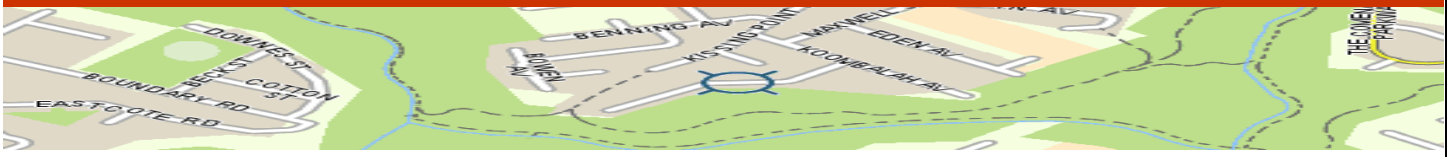
Bushfire safety activity	% of respondents unlikely to carry this out or not at all
Written down important things to remember to do if a fire occurred	36.3
Practised plan including using equipment that would be needed in fire	31.6
Thought about what they would do if unexpected and undesirable things happened during bushfire e.g. loss of power	13.0
Set up phone tree or system with neighbours to provide a warning about bushfire in area	37.7
Obtain pump suitable for fire fighting	35.8
Obtain fire-fighting hoses to reach all parts of house	20.9
Prepare a kit of personal protective clothing for each member of household	17.1
Install a non-mains water supply, e.g. tank, dam, pool	17

Table 7.4 Source: Community Attitudes to Bushfire Safety 2007/08 CFA & Strahan Research

Despite possessing superior equipment and training, it was found that CFU members had rarely considered their fire-plans in a detailed way, with many survey and focus group respondents stating that they (and/or their families) would leave if they considered the situation to be too dangerous. 10% of survey respondents stated that their families would stay at home as long as possible then evacuate in the event of a bushfire in their area.

> "[You] *always have to reassess your situation….not going to stay in a die-hard situation. If my contingencies have now failed, I've got to now reassess things and perhaps get out."*

(Focus group respondent)



The decision whether to leave a threatening situation was largely unclear; dependent upon individual's own assessments of conditions, or left to the authorities to decide. This stance has obvious limitations and dangers, for example, CFU members appear to neglect more detailed action plans relating to their individual or family circumstances, concentrating instead on their operational role as a unit member.

A loss of water pressure, electricity or the absence of key individuals from a CFU could seriously compromise operations by creating unfamiliar and challenging conditions, making the group extremely vulnerable. In addition, waiting until told what to do by emergency services is not recommended because people cannot be guaranteed of receiving a warning of an approaching fire.

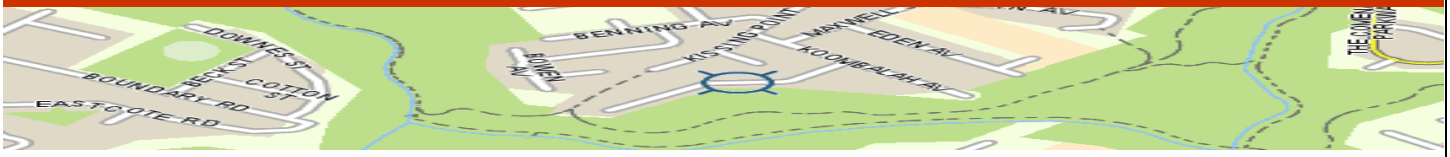
"*I don't know if we've got that great a plan; we would probably work it on the day*"

(Focus group respondent)

Related to this point is the finding that CFU member's attention appears to be sharply focussed upon the operation of equipment, with little in the way of more general preparation. CFU members' heavy reliance upon their equipment may bias their overall preparedness and ultimately reduce levels of resilience.

Much of this attitude is borne out of experience of being poorly equipped while fighting fires; by being given the means to address this problem some see the hoses, overalls and water pumps as sufficient protection from bushfires. This stance has obvious limitations and dangers, for example, CFU members appear to neglect more detailed action plans relating to their individual or family circumstances, concentrating instead on their operation role as a unit member.

Evidence of this was seen in the 2006/2007 fire season when CFUs in the Blue Mountains deployed hoses, pumps and personnel admirably, while neglecting to close windows and doors on individual properties (Munsey, Pers. Comm., 2006). This 'tunnel-vision' effect may also be exacerbated if members are unaware of or closed to the possibility of cooperation with the wider community or do not create contingencies for a range of situations or developments. A loss of water pressure, electricity or the absence of key individuals from a CFU could seriously compromise operations, making the group extremely vulnerable.



"Even if we can connect all of the hoses, lay them out….that is a very basic level. Certain individuals within the group have experience and knowledge to cope with fire and organise rest of group. However, if they weren't here, I think we would be in real trouble."

(Focus group respondent)

Focus group information highlighted the fact that individuals had rarely considered fall-back plans in a detailed way, This was exemplified by many of the survey and focus group respondents who suggested they would 'wait and see' what action would be needed on the day, with most effort concentrated on extinguishing spot fires around the outside of the home.

"First reaction is..there's a fire we should go down to the trailer and put on our uniform. Never gave much thought to what we should, what we should put together, how we should prepare, who we should let go…"

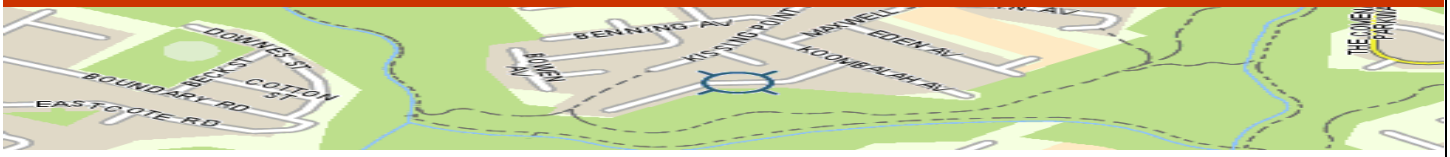
(Focus group respondent)

7.3 Understanding how to manage the growth and development of the Community Fire Unit movement?

As was described in the introductory chapter, the CFU scheme is experiencing unprecedented success in terms of community interest and willingness to volunteer their time in return for basic training and equipment. While this growth may be the envy of other volunteer organisations around Australia, conversations with those involved highlighted the difficulties in managing such large numbers of people and the infrastructure necessary to maintain a safe operational standard.

It is apparent that the current design and administration of the CFU scheme is not set up to cope with the tasks it is required to undertake, having been based upon a much smaller initial model. However, the popularity of the scheme among urban interface communities has created a momentum that many political figures find hard to ignore. Despite the lack of administrative capacity, funding has frequently been sourced and major investments in CFU trailers signed-off, leaving the scheme in a precarious position.

This final section details some of the wider management problems that were identified through the course of the research, largely as a result of the changing nature and scope of the CFU scheme in reaction to its increasing size. The section concludes by suggesting some possible directions for the CFU scheme in



terms of community bushfire safety and community self-sufficiency. It does not presume to suggest policy changes, rather the intention is to highlight what would be most beneficial to those communities involved so that they may be considered as future strategies are developed and implemented.

7.3.1 Training and development:

A great deal of the success of CFUs is dependent upon the management of motivated and proactive community groups. Maintaining this interest is vital if the CFU program is to remain effective and is to operate as a well-coordinated wing of the NSW Fire Brigades. However, managing such large numbers of volunteers is already placing a strain upon the existing limited administrative and management staff.

Changes to the running and organisation of the program, while making economic and logistical sense, are acting to alienate some groups from what they perceive to be the main reasons for their participation.
A number of respondents recognised that the growth of the CFU movement had not been accompanied by adequate increases in support and administration. However, some felt that the more personal 'bottom-up' focus had now been lost as communications with the NSW Fire Brigades became more difficult. Similarly, it was noted by some respondents that the quality and adequacy of training depended upon the shift at the fire station.

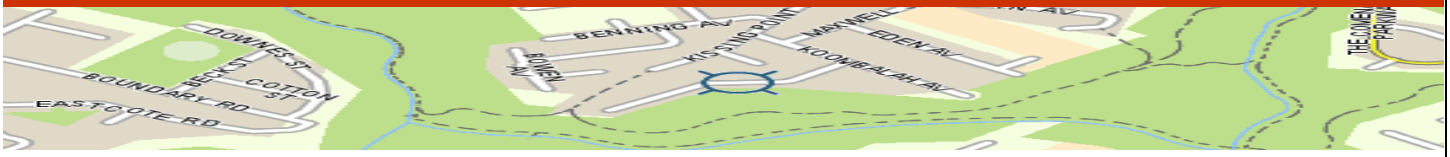
> "*Since the changes have come in there is a feeling we have lost the thread of what it's all about*"

(Focus group respondent).

Many expressed concern that the kind of training they received at training days was not appropriate to their local situation, minimising the nurturing and transference of local knowledge. The majority of focus group respondents found the large regional training days and repetitive training drills to be a significant effort for little reward, with the increased travel acting as a further disincentive for some volunteers who no longer attended training days. This was particularly acute among groups that have been in existence for some time and have witnessed the changes in management style.

> *"The Training is always conducted assuming everything is going alright, never assuming the shit's hit the fan, you know…the house has gone, where are you going to go?…..we don't do any of that."*

(Focus group respondent).



> *"The training is general, hoses & Davey pumps etc. What it can't teach you is how to work as a team, who should do what when; operational issues that could make or break it. The sorts of things that actually make you good on the day, I don't think we have training for."*

(Focus group respondent).

Thus, some members felt that without the close personal relations and locally focussed training, experienced when membership numbers were lower, it is likely that some individuals will begin to question the commitment of the NSW Fire Brigades to the scheme.

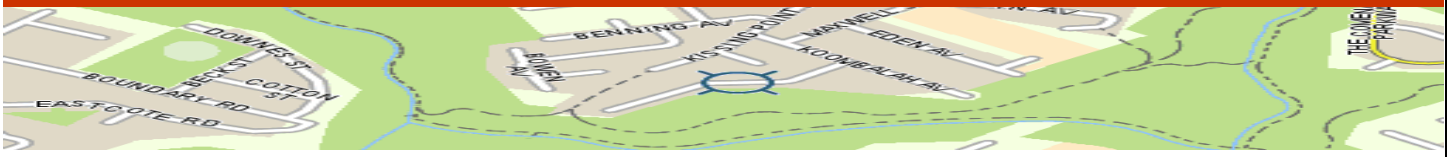
NSW FIRE BRIGADES UPDATE

Large training days as previously utilised during the development of the report have largely been phased out in favour of smaller more geographically strategic locations that provide amore local emphasis. Tis has meant a larger number of events which challenges the limited resources of the personnel tasked with facilitating these events but volunteers are happier with this approach. Training is still concentrated on equipment as there have been inconsistencies in the application of this training in previous years but there is greater flexibility in the training being currently delivered. Topics such as weather, first aid, situational awareness and bushfire behaviour are all additional to the nuts and bolts approach of previous years.

7.3.2 What management issues need to be addressed?

The research highlighted a number of examples of the kinds of issues that have arisen or may arise as the NSWFB attempts to balance the needs and preferences of volunteer groups with safety protocol and scarce resources. This section details some of the key points that can be gleaned from the data.

As was discussed in the section above, there was a feeling that changes that had occurred since the inception of the CFU scheme in 1994 were, largely, a negative factor. While it should be considered that issues associated with change are likely to be felt more by longer-term members than those that have recently joined, the issues still bear consideration.



Some respondents considered that the increased rules and regulations created a feeling that the power has been taken away from the group and that they must now rely on a system which is confused and poorly communicated. NSWFB coordinator roles had often been filled by fire staff while they were recovering from injury. This resulted in a high turnover of staff in roles that they did not choose to be in. Some respondents saw this as being responsible for a lack of continuity.

Importantly, there was concern that Concern that a lack of training and monitoring by NSWFB may be putting volunteers in danger and the view was expressed that funding should not be towards equipment but rather it should be focussed upon the needs of the support and administrative staff.

Despite occasionally creating a sense of frustration, the CFU members recognised the difficult task that the NSWFB managers had and, in some cases enjoyed the challenge of sourcing equipment or information, as the quote below demonstrates:

> *"Within the funding constraints of the organisation, what we've got is pretty fair. We work within what's available. Over a period of time we have done things for ourselves to make up for those perceived deficiencies."*

(Focus group respondent)

> *"If anything is ever required it's only ever a phone call or an email away."*

(Focus group respondent)

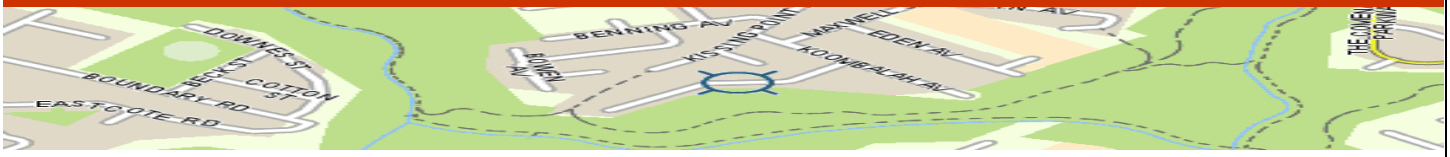
The very personal relationships between CFU members and the NSWFB that appear to be a necessary part of resourcing and managing the groups did, however, appear to some to be a weakness. Concern was expressed over the relationship involving only one person.

> *"[You] need that personal element to pull strings – what would the group do if the team leader moved-on or stood down? We Need continuity for survival."*

(Focus group respondent)

Finally, it seems that a lack of control or guidance over the maintenance and management of CFU groups is a cause for concern, particularly as numbers grow and direct contact becomes less frequent. Survey and

7.0 Findings and Discussion



focus group respondents highlighted two avenues that groups may follow as a result. First, there was concern that some groups suffered from a lack of leadership, with the appointed CFU leader unable to organise the group to make regular contact or train as a unit. Second, it is clear that some groups may be bending the rules and not following protocols. Evidence was presented of people not being able to break into other CFU groups as they are very closed and strictly controlled by an individual.

Thus, despite the focus upon continuity of training, procedure and operation that the NSWFB have enforced, the correct balance between community self-sufficiency and top-down command and control structure appears yet to be struck.

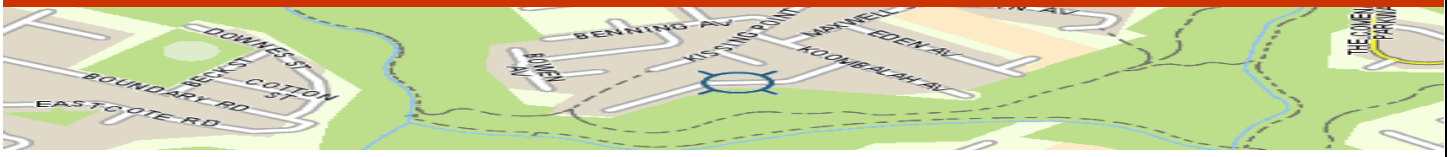
For all the stories of successful communication, empowerment and community interaction that this research has discovered, the process of learning and development by both sides still requires time and reflection. In particular, lessons should be learned from agencies and organisations that have a long history of volunteer management.

The fact is that while the number of Fire Unit trailers is increasing rapidly, measures to manage this volunteer army are being under-resourced and overlooked. In assessing the key issues of concern within the current CFU structure and organisation, all evidence points towards the need for a more focused and capable support network to adequately manage the CFU movement. Until the resources are available to constantly monitor, analyse and adjust this most valuable of assets, issues that start small and locally focussed, could quickly amplify and replicate across the scheme with consequence for response efficacy and public trust.

NSW FIRE BRIGADES UPDATE

Policies and procedures
Policies and procedures are currently being overhauled. Whilst volunteers may lament the development of rules and governance it is critically important for universal policies in relation to management of Health and Safety issues to be developed and enforced.

Administrative Support
A number of new positions are being sourced to support the program. These include a dedicated project manager, GIS specialist officer, Community Development Officer, Media and Marketing, and a Policy and Procedures writer. With these additional positions being made available a significant chunk of human resource infrastructure is being sourced that will serve the future needs of the program as it grows to over 12,000 volunteers.



NSW FIRE BRIGADES UPDATE CONTD.

Leadership

The development of a Team Leaders Training course for the current 370 team leaders is a priority for the program in 2008. This team leaders training course will take place over 1 day and will consist of the following topics: Basic leadership, CFU portal, Administration, Basic Incident Command and I-Zone planning.

It is envisaged that this course will be offered to team leaders throughout the next five years to address theses leadership issues within the program.

CFU Portal

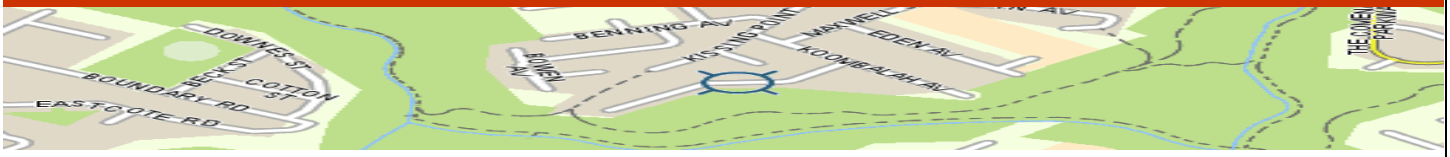
In 2007 the NSW Fire Brigades developed a web site for its 6,400 CFU volunteers. The web site or Portal is accessible from any P.C. that has an internet connection. The Portal uses Microsoft SharePoint which allows NSWF personnel to upload information for volunteers from a number of sources simultaneously. The portal contains information on volunteers such as contact details, training records, volunteer history, unit details etc. The portal also provides weather alerts, general organisational bushfire educational material, an electronic version of the NSWFB Fire News and other related material including summaries of this research.

Overall there have been a number of changes particularly in the areas of training and mass communication, since the original survey and report. The important point is that the program continues to develop and improve systems as more resources are allocated and greater emphasis is placed on it by government. Undoubtedly the CFU Program systems will be significantly improved in years to come. An example of this is the development of a proposed blended learning system for theoretical information for volunteers. This will be based on an E-Learning platform to reduce the total of 12 required training by 60% and allow volunteers to undertake pre course assessments in their own time and when motivated to undertake.

7.3.3 Possible areas of focus in the future

Extra training modules are now available to interested CFUs. However, opportunity should be provided for CFU members to access additional bushfire information in order that their interest does not stagnate. In addition, periodic presentations, seminars or lectures with guest speakers could be organised within the various regions.

A firm connection should be maintained between CFU members and the NSWFB in order to avoid feelings of neglect or dislocation. This could take the form of a web-based or printed CFU news letter. The periodical could provide important organisational information while helping to share and distribute the knowledge and experiences of CFUs across the State. It could also act as an important conduit for feedback and comment



from CFU members. This would increase members' feeling of inclusion in the decision-making process and allow NSWFB to identify and address problems that may arise.

Much of the popularity of the CFU scheme appears to stem from its highly localised focus. This provides members with the confidence to know what to expect (i.e. likely path of fire, areas of particularly flammable vegetation) and how best to cope with it. This confidence is of particular importance if individuals are to safely stay and defend their properties. Thus, emphasis should be placed upon training CFU groups in their local environment.

Relying on local fire stations to organise and carry out training with CFUs can work very well in some situations and is the preferred approach for CFU members. However, this system is prone to difficulties in the frequency, style and delivery of training programs. The end result may be uneven levels of training across the State, with potential issues of safety and litigation arising. A review should be carried out of this process, with perhaps more structured guidelines and training for NSWFB staff in order to unify the process. CFUs should be aware of what they should expect in terms of training and guidance.

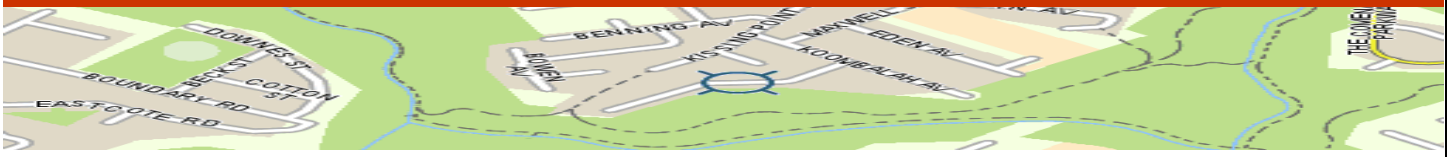
7.3.4 Where should the scheme go from here?

- A number of elements of the CFU approach have been highly successful at gaining volunteer interest. Further research should be carried out, investigating how this can be applied to other voluntary organisations.

- CFU members tend to share social, economic, experiential and educational attributes, a situation that yields committed and well-prepared volunteers. However, methods must be found to engage with and sustain a volunteer relationship with less aware or cohesive groups at the urban interface.

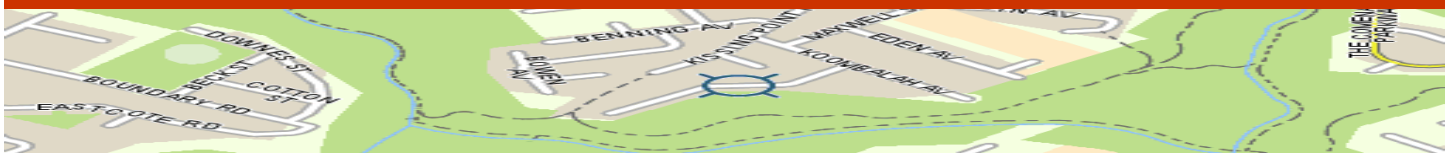
- The popularity of the CFU movement and its consequent growth has raised questions regarding future management and the allocation of resources among high risk groups at the urban interface. There exists a challenge in maintaining effectiveness and ensuring the most vulnerable are identified and included.

- The program has been successful at developing a sense of empowerment and community resilience. However, there is a need to widen member's focus from equipment operation to include a more holistic preparedness approach.



- The program has not yet defined its saturation point, i.e. the total number of units and volunteers that can be sustained both financially and safely in a difficult environment. The program has grown to over 6,000 volunteers in 2007, with figures of 9,000 volunteers forecast by the end of the decade. Research to determine the total number of volunteers that the NSW Fire Brigades is capable of managing, with the current administrative and financial constraints would be beneficial to all stakeholders.

Appendix 1: The development and future of Australian bushfire management



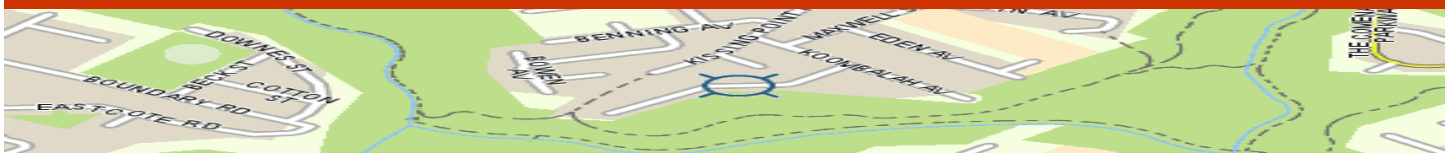
Summary

The aim of this section is to provide a brief overview of the development of bushfire management from the white settlement of Australia in the late 1700s to the present day. In particular the summary aims to depict the ways in which responsibility for bushfire fighting and protection has shifted between the public and the authorities and the ways in which this has affected community participation and preparedness. It is clear that the dynamic social, cultural and economic situation, particularly at the wildland / urban interface, has necessitated different approaches to bushfires. The section explores how bushfires have come to be perceived and how resources (including social capital) are allocated towards their mitigation.

Bushfire – a 'frontier' phenomenon

The development of attitudes and behaviours towards bushfires in Australia can be seen to have been affected by a range of factors concomitant to its settlement and subsequent socioeconomic evolution. Colonial records and early ecological data suggest that European settlers would have encountered a far more open landscape, the result of millennia of aboriginal 'fire stick' management and natural fire regimes. The higher frequencies of fire acted to stunt the growth of woody species and produce lighter fuel loads (Bowman, 2003). Despite the brief adoption of aboriginal burning practices by early settlers, this soon became rare as valuable infrastructure such as fencing and habitations made fire impractical (Bowman, 2003) and predominantly European farming practices took precedence. From this point on, large landscape fires were regarded less as a management tool and more as a phenomenon which could (and should) be suppressed through appropriate management.

The effect of white settlement was to create changes in the distribution and composition of vegetation, with a general trend towards stands or far greater densities than had originally been permitted under natural or aboriginal regimes (Luke and McArthur, 1978; Bowman, 2003). From the change in management style there soon evolved a new fire regime which moved from regular landscape fires of low-intensity towards infrequent but intense blazes, often the result the amalgamation of numerous small blazes. Whilst the periodic destruction of lives and property that they brought was seen as inevitable, with little that could be done to avoid them (Leonard, 2003), the infrequency with which 'disastrous' events occurred - either due to

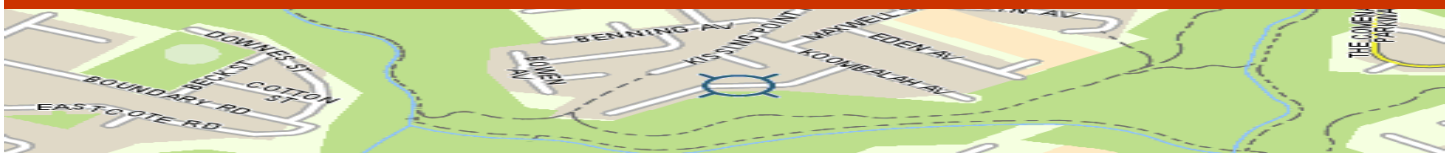


climatic variation (see Lindesay, 2003) or fire suppression methods - enabled significant development to occur. As the threat from fires grew, so too did fear of the widespread destruction to people and property that they could bring. This led to an almost complete removal of fire from the landscape and, as will be seen below, the organisation of volunteer bushfire brigades and the development of fire suppression measures and technologies (Luke and McArthur, 1978; Bowman, 2003).

Changing roles in bushfire fighting

A complex set of social, economic and environmental developments over the last 150 years has set in train dynamic interactions between the public, authorities and emergency services with regard to the management of bushfires. The effect has been a handing over of responsibility for protection and safety firstly from the public to the authorities and more recently from the authorities (to a certain extent) back to the public. As Gledhill (2003) reports, the recent allocation of responsibility to the public for their own safety, is not a new philosophy. Prior to the formation of large, organised fire brigades, people accepted that they were expected to take care of themselves. This was particularly the case in rural areas where communities regarded it as normal and necessary to take control of their own destiny. As a result, there was a greater sense of kinship with communities being largely self-reliant. Under this arrangement, evacuation or abandonment of properties was unlikely to have been an option unless strictly necessary, as the burden of responsibility lay with the individual (McGee *et al.*, 1999, in Roberts *et al.*, 2004). However, in developing settlements with no forms of insurance, the protection of livelihoods was (and continues to be) imperative. In such circumstances, and with far more at steak than pure 'property', it is hardly surprising that individuals acted in this way. The formation of bushfire brigades was common in the rural areas of the eastern states, however they received little or no official recognition and interest often weakened following long periods without significant fore activity (Luke and McArthur, 1978).

As urban centres grew throughout Australia in the 1800s, the protection of lives and property continued to be regarded by the authorities and the public as a voluntary community responsibility. However, as diagram 1 shows, losses of property and lives during the early part of the last century were high. This was presumably due to a range of new conditions such as heavy fuel loads, the encroachment of suburbs upon bushland areas and factors which allowed fires to move further into urban areas such as greater housing densities, inappropriate building location (e.g. ridge tops) and design and the increasing popularity of garden



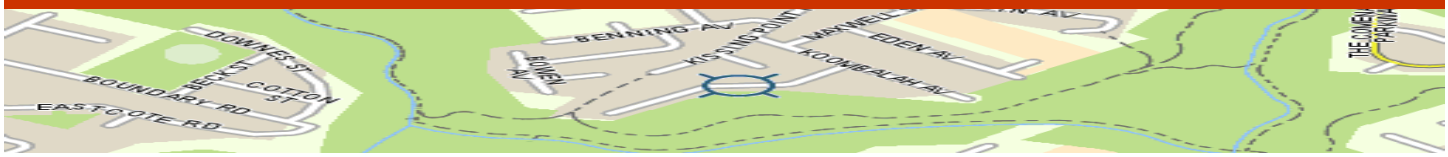
vegetation and 'bush' style homes and gardens. In addition, poor public understanding of bushfires and appropriate means of preparation were likely to have compounded losses.

A number of prominent fires highlighted the destructive nature of the largely human induced phenomenon of bushfire egress in the urban fringe in the early 1900s and led to the formation of small organised fire fighting groups such as the Bush Fire Brigades in New South Wales and the beginning of legislation which would allow State-wide brigades to be funded. Despite a lull in the development of fire services during the two World Wars, the last 50 years have seen significant expenditure on the Australian emergency services and a capacity which has been steadily increased with the aim of taking responsibility for the public's welfare. As a result of this paternal approach (Gledhill, 2003), urban communities have come to expect significant governmental provision for their safety, in a sense, handing over responsibility for their safety to the emergency services. This shift was evidently reciprocated by the fire brigades and epitomised by slogans such as 'We'll be there' [ref].

The 'evacuation' paradigm

In contrast to the risks taken by householders and smallholders in the early days of white settlement, the duty of care, which more recently has rested upon the authorities and emergency services, has led to far more cautious and less case specific approaches. Thus, the popular view held by both emergency services and the general community has been that evacuation presents least risk in the event of a serious bushfire (Gledhill, 2003; Roberts *et al.*, 2004). As a result, large scale evacuation has been the most common reaction to fire risk in recent years.

However, evacuations have brought with them a great deal of problems. For example (as will be discussed in some detail later in this report), the 'top-down' or 'command and control' method of communicating and enforcing evacuations, while often successful in motivating the majority of those affected, does not guarantee total compliance. Past experience has uncovered a complexity and diversity of risk understanding within what some erroneously view as a single, homogenous 'community'. However, psychological, social, cultural, institutional, economic and political interactions have been identified as significant factors affecting people's risk perceptions and risk reducing behaviour (Rhodes, 2003; Rohrmann, 2000a; Jasanoff, 1998; Wynne, 1995 & 1996 in Horlick-Jones 2003; Pidgeon, 1992). Tensions within communities have been manifested in terms of issues of trust in risk information or the information provider; risk acceptability and the



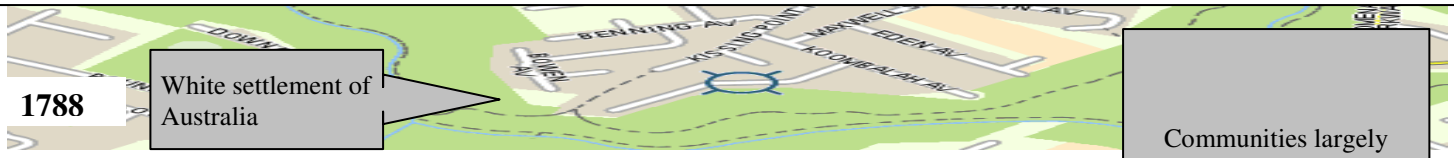
balancing of risks against benefits (associated with the particular cultural values of individuals or groups); the perceived ability to cope with risk and the relevance of the risk message and risk management aims to the lives of those at risk (Haynes, 2006).

In this case risk communication has begun to evolve into a more interactive process in recognition of the diversity of the audience and the requirement to target their needs.

An equally important aspect of mass evacuations has been the timing of their execution by emergency managers. Such is the nature of bushfire behaviour that it is often difficult to predict in advance whether, or when, an area is likely to be affected (Roberts *et al*., 2003). As a result, evacuation is frequently left until the last moment (e.g. Chambers and Brettingham-Moore, 1967). As many post fire and coronial reports indicate, this is the most deadly time for individuals to leave the protection of their homes due to the threat of radiant heat, heavy smoke and the hazards it can cause, particularly when fleeing flames (NSW Coroner, 1994; VIC Coroner, 1997 in Roberts *et al*., 2003). In addition, people are often delayed in leaving an area as they collect belongings and pets (Krusel and Petris, 1992) or are overcome with the emotional trauma of leaving their homes or loved ones. Despite these dangers, evacuations are often enforced by the Police who have the power to overrule an individual's decision to stay and defend their home.

A final problem with the paternal approach of the emergency services (also discussed in section ????), relates to the technological and financial improvements made to the emergency service infrastructure over the past 50 years. As Gledhill (2003) observes, rather than reinforcing community responsibility for natural hazard and emergency management, this may have led emergency managers to alienate communities from their traditional roles.

Diagram 1: An abbreviated chronology of the development of present Australian bushfire management policy



1788 White settlement of Australia

Communities largely expected to defend themselves from bushfires.

1939 'Black Friday' 71 lives lost 1, 300 buildings destroyed

Stretton (1939) Royal Commission

Highlights the need for a co-ordinated approach to bushfires

1944 'Victoria Fires' 20 lives lost 927 buildings destroyed

Formation of the 'Country Fire Authority'

First scientific report on bushfire building damage (Barrow, 1945) challenges existing beliefs about building survival.

Creation and development of fire services. Major public expenditure on emergency services.

Evacuation treated as key form of risk reduction.

1962 Dandengong Ranges fire (Victoria) 14 lives lost 454 buildings destroyed

First major fire to be broadcast on television. Triggers major public response.

1967 'Hobart Fires' 62 lives lost 1, 430 buildings destroyed

Surveys and investigations carried out in order to understand how and why houses and lives were lost.

McArthur and Cheney (1967); report that The majority of houses that burnt down were unattended at the time they caught alight.

Increasing empirical evidence (e.g. Petris, 1995) (regarding dangers of late evacuation and benefits of property defence) and public concern over the limitations of the emergency services lead to a shift in emphasis towards 'stay and defend or go early'

1983 'Ash Wednesday Bushfires' 75 lives lost 1500 buildings

Major survey initiatives carried out by a number of research organisations. Detailed house to house surveys and occupant interviews.

Krusel and Petris (1992) reporting on the Ash Wednesday fires suggest that fatalities were due to people implementing ineffective survival strategies (e.g. last minute evacuation), insufficient warning or inability to implement an effective survival strategy without support.

1994 'New South Wales fires' 202 buildings destroyed

Further surveys carried out and lessons learned. Local hose posts proved successful. Calls from public for greater emphasis on self-protection i.e. training and equipment from fire brigades.

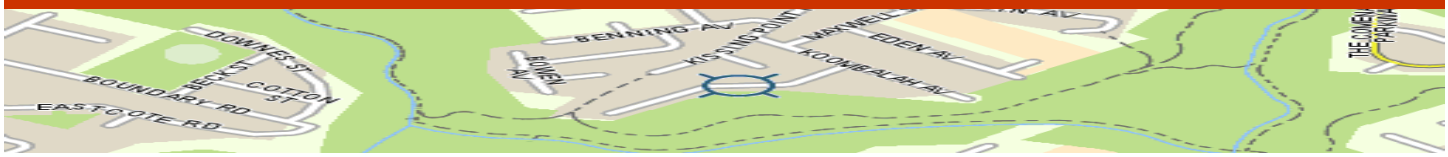
Formation of Community Fireguard Scheme in Victoria and Community Fire Units in New South Wales.

2003 'Canberra Fires' 4 lives lost 530 buildings destroyed

Various studies (Odgers and Rhodes, 2002; Alexander and Lear, 2003; Rhodes, 2003) suggest that individuals continue to posses misconceptions and poor knowledge regarding critical issues about personal and house protection in a bushfire. Thus, implementation of the 'prepare, stay and defend' policy requires 'careful consideration of the factors that influence how communities respond to bushfire threat' (Roberts *et al*. 2004, p26).

Compiled after Roberts *et al*. (2004) and Leonard (2003)

Appendix 1: The development and future of Australian bushfire management

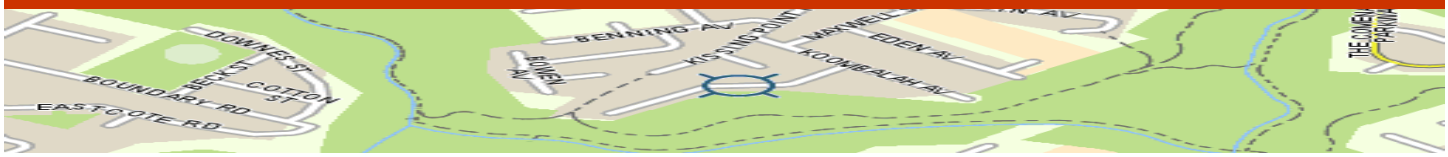


Bushfire Myths

Public knowledge and media reporting of bushfires

As a result of gathering evidence on the evacuation strategy, there is an increasing acknowledgement among disaster managers and researchers in Australia that evacuation in the face of bushfires is not necessarily the most adaptive response, and may, in fact be more dangerous than remaining to defend one's property (Murray, 1999). To this end, Murray (1999) notes the importance of findings such as the parliamentary enquiry into the Ash Wednesday bushfires in 1993, which states that "a general evacuation in a serious bushfire emergency was not wise", and that "in most instances the need to resort to evacuation does not exist" (Commonwealth of Australia, 1984:25). This stance has been supported by several empirical research studies (Vines 1967; CSIRO 1983; Wilson and Ferguson, 1984) - conducted following fires - which provide evidence of the increased survival rates of people and property to be expected from staying and defending the home. Whilst the majority of research in this area has investigated how evacuations can be executed more efficiently (e.g. Sorensen, 2000; Roberts *et al*., 2004), findings of this nature are becoming increasingly integrated into the emergency management and preparedness policies of Australian fire management services such as the Australian Fire Authorities Council (AFAC), signalling a need for a change in approach towards fire management.

Strongly connected both to the problems associated with the evacuation paradigm and greater community empowerment is the education of the 'at risk' public about the possible effects or behaviour of fires. An assumption was made by emergency managers that those not actually employed in the act of fire fighting would not require such information as (it was hoped) they would be in a safe area as the worst of the fires passed. However, as new information on fire behaviour, building destruction and human survival has emerged, it has become patently clear that a lack of engagement with the public on such matters (in addition to the public 'alienation' mentioned above) has led to a dangerous information deficit. As will be discussed later, the means by which such information could be imparted to the public and incorporated into existing knowledge and belief systems, has been, and remains now, an under-explored area of emergency management.

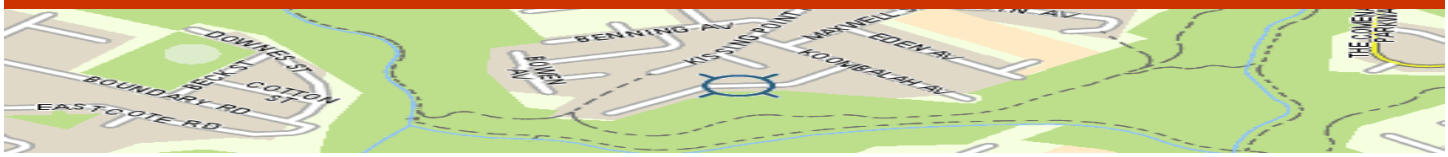


Research into "disaster mythology" (e.g. Murray, 1986) highlights the fact that misconceptions about fire danger are not limited to the general public. A sample of tertiary students at Chisholm Institute of Technology showed that around 60% were not aware of the dangers associated with the late evacuation of homes during a serious bushfire emergency (Murray, 1999). A slightly higher number (63%) of a sub-sample of mature police studies students disagreed with the statement which related to the prudence of remaining within one's home during a serious bushfire emergency. Murray (1999) suggests that despite their training and much greater experience of disasters, "Police were just as susceptible disaster mythology [as] were inexperienced 20 year old Arts and Engineering students." (p.2). It is clear that the issue of 'enforced' evacuations, which occur in some cases despite the doctrine of the state authorities that individuals may stay and defend their properties, relates to a conflict of interest between the police and the public. A continuing lack of knowledge coupled with an imperative to remove people from danger is often the cause for confusion and exposure to greater danger.

The effect of media reporting on public perceptions and attitudes towards bushfires has, more recently, become an issue of key importance to fire fighting efforts. This is particularly so as communities become more involved in decision making and 'hands-on' property defence. Whilst radio, television and increasingly internet based media are employed in the transfer of up to date fire information, many experts have pointed to news 'hype' and 'journalistic exaggeration' as a source of public hysteria and panic, having particular influence over public bushfire behaviour [ref??]. For example, a common perception has been that buildings will explode in the face of fire (Roberts *et al*., 2004; Gledhill, 2003). Despite the lack of empirical evidence to support this, and having been largely discounted by various authors following post-fire investigations (e.g. Barrow, 1945), Silberbauer (1997, in Boura, 1998) and Rhodes (2003), note that media coverage tends to concentrate on the dramatic stories of householders' who have evacuated their properties only when they perceived the fire as being very close. This portrayal suggests to the public that evacuation is the only possible, and hence correct, response.

"*People defend homes and* homes *defend people*": A return to community self-protection and the development of 'stay or go' policy.

It can be summarised from the discussion above that there has been a recognition by the Australian authorities in recent years that the challenges faced in managing bushfires can not be tackled through 'one-way', 'linear' or 'technological fixes' alone. This has led to a shift in focus towards a mix of 'technical',



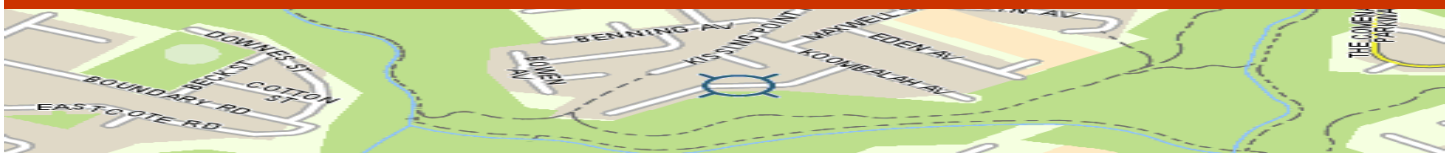
'organisational' and 'socio-psychological' measures (Rohrmann, 2003). The paternal approach of fire services in the past is now giving way to a new paradigm with an increasing acceptance of the need for partnerships between those at risk from bushfires and the emergency services (Gledhill, 2003; Rhodes, 2003). The reasons for this shift can be grouped into a number of key factors:

- Increasing recognition (by public, authorities and emergency services) of the problems and shortfalls associated with evacuations as the main bushfire emergency strategy. Mounting evidence on the benefits associated with staying and defending property (e.g. Packham, 1995).
- Larger peri-urban populations (and the possibility of larger, more devastating fire conditions – see below) mean that during major fires emergency services are unable to provide protection to the entire community at risk.
- Cost-benefit analysis suggests that in many instances, community empowerment and involvement in programs such as the Community Fireguard Program in Victoria, which is aimed at increasing individual responsibility for safety and survival strategies (Rohrmann, 2003; Boura, 1998), is more cost-efficient than provision of extra manpower and equipment. In addition, this can also provide wider community benefits and is of use over the longer-term.
- Community desire to be more involved in decision-making and self-protection.

Further to this mounting body of evidence, the shift within emergency services towards an active role for the community in their own protection has been central to the acceptance of the 'Stay or Go' position (Roberts *et al.*, 2004). In addition, Rhodes (2003) notes a review of major fire inquiries (Petris, 1995) which identifies the extent to which residents can take action to reduce impacts.

As a result of this attitude change, the AFAC has developed a position which proposes that communities at risk from bushfires should be allowed and encouraged to take responsibility for their own safety. Using the maxim "*houses protect people and people protect houses"* the AFAC suggests that where people have adequately prepared themselves, their houses and property, they should remain with their homes during bushfires.

The Australian position, which is endorsed by the peak fire and emergency services industry body the Australian Fire Authorities Council (AFAC), is based upon the experiences of many years of devastating



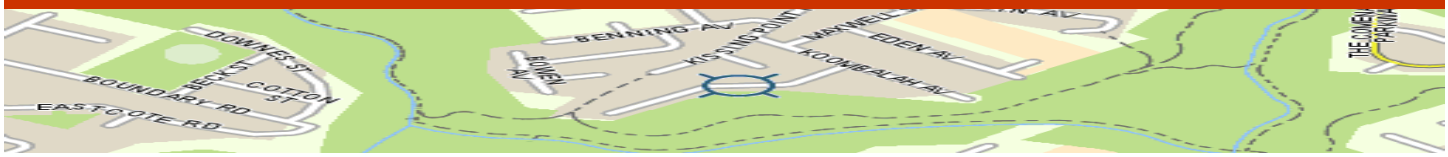
bushfire (Handmer and Tibbits, 2005; Tibbits et al., 2008). These have highlighted the dangers of last-minute evacuation and the benefits to personal safety and property protection that actively defending property can bring.

A number of major post-fire investigations (McArthur and Cheney, 1967; McArthur, 1968; Miller et al. 1984; Wilson and Ferguson, 1984; Krusel and Petris, 1999) have demonstrated that the majority of civilian fatalities occur during last-minute evacuations, most commonly instigated as the fire front becomes a physical or visible threat (Haynes and Tibbits, 2007). These actions can be broadly attributed to a number of interrelated factors associated with a lack of information, preparedness and awareness about the movement of fires, and knowledge of the appropriate actions if caught in a dangerous situation (Tibbits et al., 2008; Tibbits and Whitaker 2007; Handmer and Tibbits 2005; Krusel and Petris 1999). In tandem with this evidence, research has shown that well-prepared properties can be successfully defended from bushfires (the most common source of building ignition is ember attack) while also providing safe shelter from deadly radiant heat (Wilson and Ferguson 1986; Ramsay *et al.* 1987; Leonard and Bowditch 2003; Blanchi *et al.* 2006a).

It is therefore suggested that, if early evacuation is not possible or desirable, adequately prepared people should protect their homes and themselves by staying with and actively defending against the flames and embers (AFAC, 2005; Handmer and Tibbits, 2005; Tibbits *et al.*, 2008). Thus, by informing residents that a properly defended home is a safe shelter, it is hoped that a last minute bid to escape the flames - by far the most deadly response, can be avoided.

While largely successful in its uptake and implementation by fire authorities and bushfire threatened communities, the 'prepare stay and defend policy' is no panacea, with many problems persisting despite the best efforts of those involved. Among these issues has been the dramatic shift in focus, from fire agency response to public self-reliance. This has realised the need for strong 'bottom-up' public participation accompanied or balanced by appropriate 'top-down' policy in order to implement mitigation strategies and manage bushfire risk in an effective way (Pearce, 2003).

However, the empowerment of communities in order to successfully mitigate the harmful effects of bushfires extends far beyond people simply knowing what to expect and how to react when threatened. The transition from 'command and control' and the deployment of mass evacuation orders towards individuals and groups



staying to defend their property is not simple and; whilst the empowerment of the public creates many advantages, it also brings many challenges (Gledhill, 2003).

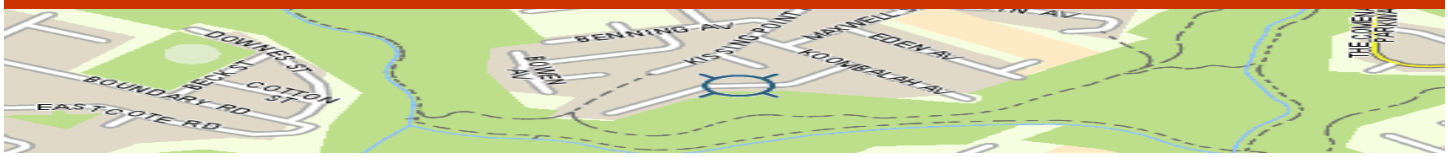
It is accepted by AFAC that the approach can only be effective if 'at risk' communities are '*of adequate mental, emotional and physical fitness [and] equipped with appropriate skills and basic resources*' (AFAC, 2005: 6). However, losses and disasters also occur because of the everyday contextual conditions which shape people's capacities to cope and adapt (Wisner *et al*., 2004), therefore, the state of preparedness that the Australian bushfire position requires necessitates a holistic, community-based approach, which harnesses local expertise and knowledge and creates a sense of ownership and community responsibility among those at risk.

For example, the stay and defend strategy can only be effective if it is preceded by adequate preparation (see also Rhodes and Reinholtd, 1999). In this case there is a duty of care upon the emergency services to provide appropriate training of local communities. This entails not only practical fire fighting knowledge, but also "mental preparation - knowing what to expect" (Gledhill, 2003:7) or psychological readiness involving confidence and self-reliance (Rhodes and Reinholdt, 1999).

Recent studies into preparedness for natural hazards have shown that individuals or groups are often limited by their prior exposure or 'frames of reference' against which they can judge their understanding and consequent preparedness (Rhodes, 2003; Haynes, 2005). Thus, individual judgment is unlikely to lead to a situation in which a person is adequately prepared, in which case expert knowledge and experience of risks must be imparted in an appropriate way. Additionally, and as will be discussed in section 5, community safety from bushfires is more effective if approached from a position of shared responsibility.

Thus, whilst communities may no longer expect the fire service to be their saviours, there is now a need to for the fire services to develop expertise and experience in helping individuals and groups recognise how they may assist in partnerships and how they may better prepare for bushfires.

As Roberts *et al.* (2004) note, 'prepare, stay and defend' appears to be a better strategy than 'evacuate when the fire is near'. However, they also make the point that many bushfire scenarios exist, with an equally large range of potential survival strategies each of which may be dependent upon the prevailing conditions.



In addition, the authors state that the range of responses, attitudes and behaviours which research suggests should be expected in response to risk information and communication suggests that implementation of the 'prepare, stay and defend' policy requires 'careful consideration of the factors that influence how communities respond to bushfire threat' (p26).

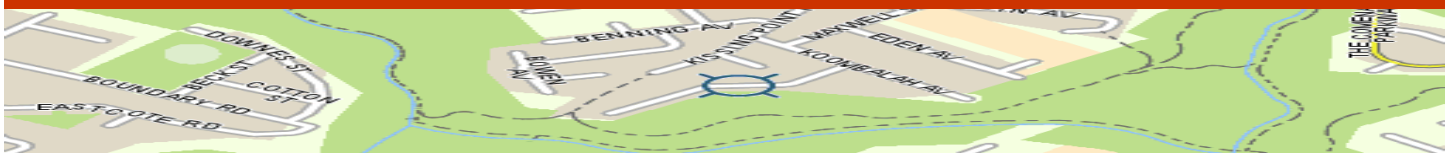
Future scenarios for urban development and bushfire danger

Sydney is experiencing rapid growth, with a further 1 to 1.4 million new residents anticipated over the next 25 to 30 years. The city's share of the NSW population in 2001 was 62.8 percent; this is likely to rise to 64.6 percent by 2031. The growth of Sydney has an influence in other parts of NSW, with a combination of high economic growth and rising urban land / house prices attracting growth along the Coastal regions and the Sydney to Canberra Corridor. Whilst development in Greenfield areas appears to be slowing (a reduction of 5 percent in Greenfield development from the 1990s to the early 2000s) this remains a significant amount, particularly when combined with urban areas already at the wildland interface. Pressure to open new land for satellite developments and housing is likely to increase in accordance with population growth (New South Wales Government)

Thus, the increasing proportion of suburbs at high risk from bushfires along the urban / wildland interface presents emergency managers with a significant responsibility. Despite recent improvements in building regulations along the urban / wildland interface (Building Codes of Australia, Standard 3959 -Building in Bushfire Areas), a number of factors, including proximity to high fuel loads, topography, a propensity to create green and wooded environments and the sheer vastness of the urban interface are cause for extreme concern.

In addition, the vulnerability in these areas is likely to be increased by a lack of experience and knowledge of fires in new communities whose social capital and coping capacity (resilience) are likely to be low. As discussed in section 5, the fact that many of these areas lack a central focus and are largely a base from which to service the central Sydney area may act to exacerbate problems associated with social capital and community resilience.

In addition to the influence of El Nino and La Nina events which affect the severity of fire years on a cyclic basis, an increase in fire weather risk (as a result of climate change) is likely, with the frequency of very high



or extreme Forest Fire Danger Index (FFDI) days increasing by 4-25 percent by 2020 and 15-70% by 2050 in some areas of south east Australia. This also suggests that the window of opportunity for prescribed burning may also be reduced as periods of high fire risk extend through Spring, Summer and Autumn (see section 2).

As has been discussed within this report, it must be assumed that in the future we are likely to see increased periods of extreme fire danger. The non-linearity of these extremes will create an initial situation in which a significant commitment to enhanced emergency management resources is unlikely to be financially (or political) viable. Similarly, communities are likely to experience fluctuations in levels of activity which may greatly aid the development of preparedness programmes during active periods but which may alternatively leave them vulnerable following longer periods of quiescence.

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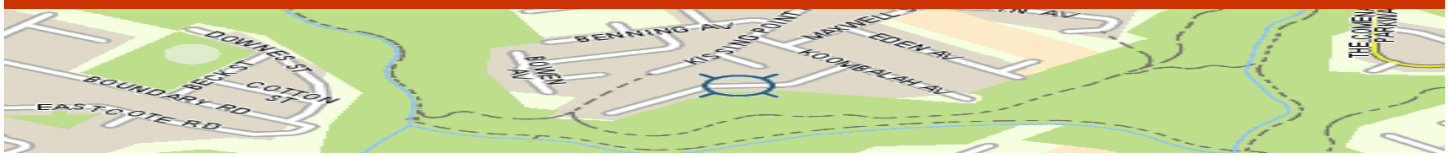

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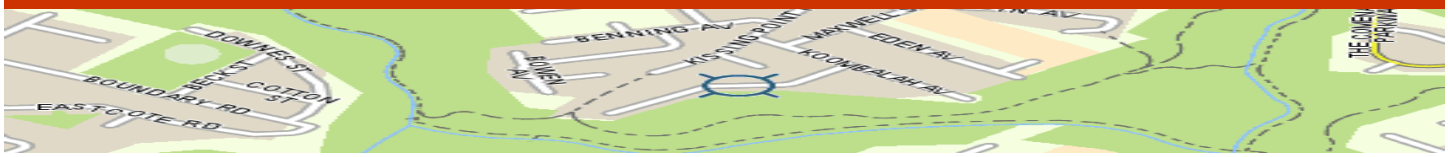

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Appendix 2

Dear community Fire Unit member,

The aim of this short questionnaire is to gain an idea of the people that are involved with Community Fire Units in the Sydney area. By understanding how representative Community Fire Units are of their community we can help encourage membership from a wider public cross-section, increase community resilience to bushfires and identify potential problems as the popularity and use of Community Fire Units as a strategic resource increases. The questions also enable us to gain an idea of what members think Community Fire Units bring to the community; why they are good or bad, whether they improve community preparedness for bushfires etc.

As you will notice, we do not ask for your name or full address. We do not require this information and, as a result, you can be confident that the information you provide will be **completely anonymous**. You are welcome to request access to reports arising from this research. Please keep this sheet and the contact information below.

Thank you for your time!!

Further information on the Bushfire Cooperative Research centre and its work can be found at its website: http://www.bushfirecrc.com

Or,

Contact Tom Lowe – Research Officer
School of Mathematical and Geospatial Sciences, RMIT University, GPO Box 2476V
Melbourne VIC, Australia 3001, thomas.lowe@rmit.edu.au, Phone: (03) 9925 9663

PLEASE RETAIN THIS SHEET

CFU Member Questionnaire

*Q.1 Please enter your post code: _ _ _ _

Q.2 For how long have you been a Community Fire Unit member? (Tick one box)

Less than two years	
Two to four years	
Four to six years	
Six to eight years	
More than eight years	

Q.3 Please indicate the age group to which you belong: (tick one box)

18-21	22-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	65+

Q.4 Please indicate your gender by ticking one of the choices below:

a) M__ b) F__

Q.5 Please select the option which best describes your occupation: (tick one box)

	Tick		Tick
1)Advertising/Media/entertainment		16)HR & Recruitment	
2)Administration		17)Industry	
3)Academic		18)Information Technology (IT)	
4)Community & Sport		19)Legal	
5)Construction		20)Marketing	
6)Consulting & Corporate Strategy		21)Public Service	
7)Customer services		22)Retired	
8)Education & Training		23)Salesperson / Retail	
9)Emergency services		24)Self-employed	
10)Engineering		25)Transport & Logistics	
11)Financial services		26)Tradesperson	
12)Government/Defence		27)Unemployed	
13)Health care & Medical		28)Volunteer	
14)Home based		29)Other....	
15)Hospitality & Tourism			

Q.6 If other, please state your occupation in the space below:

_____

Q.7 Please select the option which best describes your residential status:

a) Australian National (born in Australia)	
b) Expatriate / Permanent resident (born outside Australia)	
c) Temporary resident	
d) Other	

Q.8 Please can you specify in the space below what you consider to be your ethnic background (e.g. Indigenous Australian, European, Asian etc.):

Q.9 Please select the option which best describes your annual income:

a) $20, 000 or less	
b) $20, 000 - 40, 000	
c) $40,000 - 90, 000	
d) $90, 000 - 120, 000	
e) $120, 000 or more	

Q.10 Please select your HIGHEST educational attainment from the options below (tick one only):

a) No Formal qualifications	
b) HSC or Interstate equivalent	
c) Vocational qualifications, Diploma/skills learned at work	
d) Bachelor Degree or Equivalent	
e) Postgraduate qualification – Masters or PhD	
f) None of the above	

Q.11 Please indicate the number of people that usually live in your home:

a) None (only me) – go straight to question 14	
b) One	
c) Two	
d) Three	
e) Four	
f) Five	
g) Six	
h) Seven	
i) Eight or more	

Q.12 Of these people, how many are children (under the age of 16)?

a) One	
b) Two	
c) Three	
d) Four	
e) Five	

Q.13 If you share your home with others (e.g. family, friends), what would they do in the event of a bush fire in your area (e.g. evacuate, stay at home etc.)?

Q.14 Please indicate whether you are renting or you own your **primary** residence:

a) Renting	
b) Home owner	
c) Neither	

Q.15 Please indicate what level of insurance you are covered by:

a) None	
b) Home only	
c) Contents only	
d) Home and contents insurance	

Q.16 Please tell us what experience you have had of bushfires: Tick the statement(s) which best resembles your experience of bushfires (you may tick more than one box):

a) I have had no direct experience of bushfires but have seen and heard about them from various sources, e.g. in the news, training videos, family and friends	
b) I have only seen bushfires from a distance	
c) Bushfires have damaged my neighbour's property in the past	
d) Bushfires have damaged my property in the past	
e) I have fought bushfires in the past	

Q.17 Please tell us if your Community Fire Unit has been activated at some point in the past:

Yes	
No	

Q.18 From the list below, please select how likely you think it is that you will experience a bushfire in your local area:

	Highly Unlikely	**Unlikely**	**Neither Likely or Unlikely**	**Likely**	**Almost Certain**
a) Next fire season					
b) In the next two years					
c) In the next two to five years					
d) In the next five to ten years					
e) In over ten years					

Q.19 Please indicate how prepared you feel you (and your family) are to deal with bushfires in your local area:

Fully Prepared	
Well Prepared	
Neither Prepared nor Unprepared	
Poorly Prepared	
Very Unprepared	

Q.20 Please read the statements below and select the option that best reflects your motivation to become a Community Fire Unit member:

	Strongly agree	**Somewhat agree**	**Neither agree or disagree**	**Disagree**	**Strongly disagree**
a) "Bushfires damaged my property in the past so I wanted to be able to protect myself/property/family in the future"					
b) "Bushfires affected my local area in the past so I wanted to be able to protect myself/property/family in the future"					
c) "I know that I live in a bushfire prone area so I wanted to be able to protect myself/property/family in the future"					
d) "Bushfires are a major threat in Australia and everyone should be prepared to fight them"					
e) "I feel that staying at home is the best way to protect my property and wanted to be able to do this safely"					
f) "If I and my neighbours are trained and equipped to defend our homes it gives us the greatest chance of saving them"					
g) "My friends joined so I joined too"					
h) "I wanted to become more involved with my community"					
i) "I thought it would be fun to join a Community Fire unit"					
j) "I wanted to be of help to the New South Wales Fire Brigades"					

Q.21 Of the statements above, please select the one which you consider to be your <u>main motivation</u> for joining a Community Fire Unit: (circle one)

a) b) c) d) e) f) g) h) i) j)

Q. 22 If you would like to mention another motivation for becoming a Community Fire Unit member please use the space below

Q.23 In your opinion, how much knowledge do you think people in your area who are NOT Community Fire Unit members have of bushfires?

a) No knowledge	
b) Very little knowledge	
c) Some knowledge	
d) Good knowledge	
e) Excellent knowledge	

Q.24 In your opinion, how prepared do you think people in your area who are NOT Community Fire Unit members are for bushfires?

a) Not prepared at all	
b) Poorly prepared	
c) Somewhat prepared	
d) Quite prepared	
e) Well prepared	

Q.25 How much have you communicated with people in your area who are NOT Community Fire Unit members about bushfire?

a) Not at all	
b) Very little	
c) To some extent	
d) A good deal	
e) A great deal	

Q.26 How successful do you feel the transfer of information from Community Fire Unit members to the surrounding community has been?

a) Not successful at all	
b) Fairly unsuccessful	
c) Somewhat successful	
d) Quite successful	
e) Very successful	

Q.27 Please briefly describe the kind of information (if any) feel has transferred from Community Fire Unit members to the local community and the way that this has occurred:

Q.28 What do you consider the best thing about being a Community Fire Unit member?

Q.29 Can you think of any negative aspects of being in a Community Fire Unit or having a Community Fire Unit in your area?

Q.30 Are you aware of members who have left your Community Fire Unit since it began? If so, please select from the choices below the reason that you think this occurred (you may tick more than one box):

Other commitments took precedent, e.g. job, family, other voluntary groups	
Moved from the area	
Disagreement within the group	
Dissatisfied with New South Wales Fire Brigades management of Community Fire Units	
Became disinterested	
Too concerned about the dangers involved	
Became ill / passed away	
Other....	

Q.31 If your answer to the above question was 'Other' or you would like to expand on your answer above, please include detail in the box below:

Q.32 What suggestions would you have for others setting up a Community Fire Unit?

Q.33 Do you have any comments you would like to add? Please use the space provided.

THANK YOU – PLEASE NOW RETURN THE COMPLETED QUESTIONNAIRE

Appendix 3

24/08/06

Dear Community Fire Unit Team Members,

I have attached a link to a questionnaire developed by the Bushfire Cooperative Research Centre. The aim of this short questionnaire is to gain an idea of the people that are involved with Community Fire Units in the Sydney area. By understanding how representative Community Fire Units are of their community we can help encourage membership from a wider public cross-section and identify potential problems as the popularity and use of Community Fire Units as a strategic resource increases. Some questions are designed to gather simple demographic information, while other questions enable us to gain an idea of what members think Community Fire Units bring to the community; why they are good, how they improve community preparedness for bushfires etc.

As you will notice, we do not ask for your name or address. We do not require this information and, as a result, you can be confident that the information you provide will be completely anonymous.

It would be greatly appreciated if you would spend a little time to complete the questionnaire, this will certainly benefit the program in the long term.

http://fd2.formdesk.com/bushfirecrc/form1

If you have any questions please contact the CFU Team.

Kind regards
Rachel Scott
CFU Administration Officer