# Evaluating the Community Safety Approach to Bushfire in Australia: Towards an Assessment of What Works and How[1,2]

Gerald Elsworth, Kaye Stevens, John Gilbert, Helen Goodman, Alan Rhodes

Bushfire Cooperative Research Centre and School of Global Studies, Social Science and Planning, RMIT University, Melbourne, Australia

## Abstract

Internationally, policies for householder and community preparedness for natural hazards are not well communicated and (perhaps consequently) evaluation of relevant activities and programs is infrequent and sporadic. In Australia, a major source of policy guidance to government and its agencies are the recommendations and discussion in a series of Commonwealth and state inquiries following significant hazard events, particularly bushfire.

A detailed analysis of six recent inquiry reports was conducted to support the development of a comprehensive framework for the evaluation of public education, awareness and engagement (EAE) activities and programs for bushfire. The reports were characterised by a developing transformation in thinking from bushfire response to householder and community responsibility and preparedness that parallels similar international thinking in emergency management, crime prevention and public health (the so-called 'community safety approach').

The results of this analysis were integrated with descriptive information on a large number of programs and data from an extensive concept mapping exercise to yield policy-oriented and generic program theory models. The models provide a coherent and detailed characterisation of the Australian community safety approach to bushfire. The program theory model also gives an overview of possible causal relationships between emerging community safety policy, the activities and programs designed to implement it, and the potential short and medium-term outcomes that lead to community resilience and a decrease in the loss of lives and property from bushfire.

Following this overarching model development, a 'theory-based' analysis and synthesis of published evaluation research on seven Australian community EAE initiatives for bushfire safety was conducted, largely following the approach to 'realist synthesis' developed by Pawson and colleagues. A short summary description of the research on each initiative was compiled under headings that emphasised the contexts in which the initiative was implemented, the causal processes that were activated and the outcomes and impacts achieved. A theory model was then constructed for each initiative. Finally, an integrated summary of the contexts, causal processes and outcomes described or hypothesised for the initiatives was developed.

The synthesis highlighted the diversity and complexity of the contexts that EAE programs are implemented in and identified four broad causal processes that appear to be critical for the generation of the desired community safety outcomes (household and community level planning, physical and psychological preparation for a bushfire, and a safe response if and when a fire occurs). These causal processes are: *Engagement*, *Trust and Self-confidence*, *Confirmation and Re-assessment*, and *Community Involvement and Collaboration*.

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[1] Paper presented at the Biennial Conference of the European Evaluation Society, Lisbon, October 1-3, 2008

[2] The research described in this report was supported by a grant from the Bushfire Co-operative Research Centre (Project C7 – Evaluating bushfire community education programs). Development of the inventory of programs and the review and synthesis of the EAE evaluation studies was also supported by a grant from the Australian Emergency Management Committee (National Community Safety Working Group).

# 1. Introduction

Among the natural hazards, bushfire (wildfire) is a major source of loss of life and property in Australia (McAneney, Chen, Crompton, & Pitman, 2007; Australian Bureau of Statistics, 2004, 2008) and a number of recent fires have taken a heavy toll (most recently in Canberra in 2003 and the Lower Eyre Peninsula, SA in 2005). Government initiated inquires in recent years have addressed a range of common themes relating to improved bushfire safety, many embracing the broad premise of community responsibility and self-reliance. Bushfire agencies also increasingly state openly that they do not have the resources to defend every property that may be in danger when a major event occurs. Thus in the past decade or so there has been an explicit shift in thinking to acknowledge that reducing the risk from bushfire will be enhanced by the willingness and ability of individuals, households and community groups to respond effectively. As a consequence, many fire and other emergency service agencies in Australia have adopted a risk management approach with a greater emphasis on prevention, mitigation and community preparedness (Smith, Nicholson, & Collett, 1996).

This transformation in Australian thinking from bushfire response (including recovery) to preparedness has parallels with similar international shifts in emergency management, crime prevention and public health and has become known as the 'community safety paradigm' (or 'community safety approach'). Defining characteristics include the general themes of shared responsibility, identifying and protecting those at risk, securing sustainable reductions in the source of the danger and the unreasonable fear of it, and the development of community-based programs and multi-agency partnerships (Hughes, 2002; Squires, 1997; Steelman & Burke, 2007). Community-level engagement, responsibility and empowerment are emphasised, and residents are seen as being responsible for coordinated action within their own localities in partnership with statutory agencies and the voluntary sector (Chess, Salomone, Hance, & Saville, 1995; Labonte, 1994). Writing on recent thinking about crime prevention in Great Britain, Hughes (2002, p.3) summed up the general conceptual shift towards "crime prevention, risk management and safety politics" in a manner that equally applies to the emerging policy response to bushfire in Australia.

> Overall, the promotion of crime control *in* and *by* the community, and by means of multi-agency partnerships of both the state and civil society, represents a major shift in how we think of the governance of crime specifically and social order more generally. With 'partnership' now inscribed as the primary symbolic and organizational means of delivering community safety politics, a broader rearticulation of the responsibilities between national and local government, public and private agencies and groups in local communities has begun to occur (emphasis in original).

The community safety approach thus represents a critical shift away from those perspectives that have been characterised as relying on the "professionalisation" of responsibility for hazard management and the consequent vesting of "accountability for community safety within a professionalised bureaucracy" (Barnes, 2002), p. 15). In contrast, a central component of the community safety approach is active engagement with and empowerment of the community to investigate its own risks and develop its own solutions. In this sense, the conceptual shift in emergency management is similar to the approach in public health that aims to realise, in practice, the ideals of community empowerment and 'ownership' of problems and possible solutions within the context of national, state and local government planning and provision of professional services (Labonte, 1994; Laverack & Labonte, 2000).

Reflecting this new approach to the management of the risk of bushfire in Australia, a safe community has been defined as "locally organised and resourced, well informed about local risks, proactive in prevention, risk averse, motivated and able to manage the majority of local issues through effective planning and action" (Hodges, 1999). Increasingly, bushfire agencies are seeking ways to work more effectively with communities by promoting increased involvement through a diverse range of education, awareness and engagement (EAE) programs that emphasise risk appreciation, forward planning and preparedness. There is also a wide variety of communication products and media-based campaigns intended to raise awareness and provide advice. During a bushfire event, information about the incident is also provided in community meetings and through the media to assist the public to make appropriate decisions about how to respond to the threat.

Three studies designed to elaborate the policy setting, programmatic response and expected outcomes of the community safety approach to bushfire have recently been completed (Elsworth, Anthony-Harvey-Beavis, & Rhodes, 2008; Gilbert, 2007; Stevens, 2007). The results have been integrated into a policy theory model and generic program theory model to provide a conceptual overview of the approach. The three studies and resulting models will be briefly summarised here to provide the framework for a theory-based synthesis (Pawson, Greenhalgh, Harvey, & Walshe, 2004) of published evaluations of community EAE programs for bushfire in Australia. Subsequent work will integrate into the synthesis the results of published overseas research and more recently completed case studies conducted by the present research team.

# 2. Bushfire Community Safety in Australia – Foundational Values and Operational Principles

Six recent commonwealth and state government reports were examined for recommendations and analyses that related to the general themes of community education, awareness and engagement (House of Representatives Select Committee into the Recent Australian Bushfires, 2003; Cameron, 2003; Ellis, Kanowski, & Whelan, 2004; Esplin, Enright, & Gill, 2003; Australian Government Department of Transport and Regional Services, 2004; McLeod, 2003). The reports differed in their focus; one was concerned with all natural disasters and had a national focus, one was an audit of prevention and preparedness measures in one state, and four were post fire reviews that focussed on different geographic areas. The last report to be published (Ellis et al., 2004) took a national perspective on the mitigation and management of bushfires and drew on all of the other reports. In its response, the Council of Australian Governments (COAG) noted the consistency of the themes developed in the Ellis report with those of the more general "Natural Disasters in Australia" report (Australian Government Department of Transport and Regional Services, 2004) and indicated clear agreement with its arguments and recommendations (Council of Australian Governments, n.d.).

The purpose of the analysis of the reports was to chart the recent evolution of policy thinking about community safety for bushfire in Australia and to make explicit the multiple (contrasting and possibly conflicting) values that might underpin this approach. Following the analysis by Morris-Oswald and Sinclair (2005, p. 10) in the context of flood-plain management, values were thought of as socially shared and enduring beliefs, preferences and/or principles that are shaped by existing physical and social systems, communicated by and between people within these social systems, and that show a commitment to existing (or, in the present case, emerging) social and political arrangements. Additionally, for the present analysis, we saw values as constituting beliefs that were either 'foundational' (justified not by other values but, for example, directly by perception, observation or empirical study) or 'second-order' (derived from other values - Audi, 1993) that could be organised into 'valuational chains' that logically

entailed principles of good practice and general recommendations for the design of social programs.

The methodology for identifying values and principles was iterative and unfolded during the review process. Initially the recommendations from each report were reviewed to identify those that related to community education, awareness and engagement and the consolidated list of relevant recommendations was then grouped into themes. The limitations of this approach soon became obvious however; recommendations often didn't reflect the depth and substance of discussions nor the range of findings presented in the reports, and if current practices were not found to be problematic no recommendations for improvement were made.

The reports were re-analysed to expand and build on the themes identified in the initial analysis of the recommendations. The re-examination of the reports started with the sections that focussed on community EAE activities and programs and was expanded to include factors in the context of national policy and planning that influenced community safety as well as relevant operational and recovery issues. At this stage the pertinent concepts were also sorted into whether they related to planning or activities that occurred before, during or after a fire. The final step in the review was to identify the foundational and second-order values and principles as outlined above that guide policy development and planning of community fire safety programs.

Six foundational values were identified from the analysis. They were that:

- Community safety in bushfires is a shared responsibility between householders, communities, agencies and governments;
- While responsibility is shared, individuals and households have a specific responsibility for taking action to mitigate their own bushfire risks;
- People and communities differ in terms of their risks, assets, and capacities;
- Priorities differ between individuals and communities, they include environmental, social and economic considerations that may be competing or interrelated;
- Increasing community safety requires a risk management approach;
- Bushfire policy and practice should be evidence-based.

Seven general second-order values or operational principles derived from the foundational values that, we argue, directly inform policy development and planning for community fire safety interventions were also identified:

- Adopting a comprehensive emergency management approach;
- Working in partnership;
- Understanding local people and communities;
- Identifying and prioritising risks and assets;
- Planning locally to mitigate risks;
- Household planning to stay and defend or leave early;[3]

[3] A unique element of the Australian approach to bushfire that has wide-reaching implications for fire management and community safety is the formal recommendation by the Australasian Fire Authorities Council (2005) that householders should 'stay and defend or leave early'. The recommendation is now "widely endorsed, at least on paper, by most Australian fire authorities and other emergency services" (Handmer & Tibbits, 2005, p. 82). It is based on the view that in the event of fire, residents are less vulnerable if they stay with their prepared property and defend it, or leave well in advance of the fire front arriving. Australian research has shown that most fatalities in bushfires have been the result of people fleeing at the last moment, either in vehicles or on foot, and succumbing to the intense radiant heat (Krusel & Petris, 1992). Research has also shown that a well prepared home that is actively defended by able-bodied residents before, during and after a bushfire has a high probability of survival and provides a safe refuge while the main fire front passes (Wilson & Ferguson, 1984). Given that not everyone is capable, either physically and/or mentally, of actively defending their property, leaving well in advance of a bushfire is a necessary alternative strategy and for many is a far safer option. The message is complex and success is

- Building and using knowledge through research, monitoring, evaluation and improved information management.

Finally, the analysis uncovered a small number of general recommendations for good practice that were closely linked to the operational principles. These recommendations suggested that programs and other activities should be:

- Targeted to residents and communities at high risk;
- Characterised by diverse approaches that are tailored to the priorities and capacities of local individuals and communities;
- Flexible and responsive to differences and changes in individuals and communities;
- Evidence-based but innovative; and
- Monitored and evaluated and thus able to add to an accumulating knowledge base about effectiveness for different communities in different contexts.

The links between the foundational values, second-order operational principles and broad recommendations for good practice were not simple, one-to-one linear relationships. The operational principles and practice recommendations were often informed by two or more foundational values. In some cases foundational values appeared to inform not only what *should be done*, but also the *process for doing*. For example, applying the viewpoint that community safety requires a risk management approach, and the values of shared responsibility and differences between people and communities informs how emergency management planning should be implemented. Identifying, prioritising and subsequently managing risks results in an inclusive process that involves a range of stakeholders and takes into account the fact that priorities differ between and within communities. This inclusive process would, in turn, result in programs and activities that were diverse, flexible and responsive to differences and changes in individuals and communities.

Similarly, improved knowledge by building the evidence base about what works can be viewed as a mechanism for supporting both a shift to an integrated emergency management approach and the development of partnerships, and shared decision-making about local risks and priorities for action. This should then result in effectively and efficiently targeted programs that were also flexible and responsive to local needs and, when evaluated, to successive improvements in the evidence base of what works best for different individuals and households in different localities and communities.

While the principles were common across the reports there were also differences in the detail of how they were discussed and their suggested application. For example, the views that responsibility should be shared and that individuals have primary responsibility for mitigating their own risks were often expressed in the reports. Perspectives on primary responsibility varied between the reports and in different contexts within reports however. Statements about the need for agencies to support individuals and communities to take responsibility for managing their own recovery from bushfires contrasted with discussions about the need for individuals to support the responsive work of fire agencies by undertaking preparedness measures.

# 3. An Inventory of Australian Bushfire Community Safety Programs

In a similar manner to recent work in the United States (Reams, Haines, Renner, Wascom, & Kingre, 2005; United States Department of Agriculture Forest Service) the

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likely to depend on a mix of factors including an understanding of what 'stay and defend or leave early' actually means, being able to plan accordingly, and the nature of the particular circumstances that are confronted before and during a fire.

present research team has assembled an inventory of community safety activities and programs for bushfire in Australia. Currently, approximately 90 distinct programs are represented. Program development has been rapid and, in many instances, little systematic information beyond website descriptions and examples of media materials is readily available from public sources. The manner in which community safety initiatives are implemented 'on the ground', the causal processes activated, and the householder and community-level outcomes desired or achieved are rarely researched and reported.

Employing an iterative approach similar to that used to develop the emerging values and principles described above, the content of the available program descriptions was analysed and synthesised to develop a classification scheme. In developing the scheme it quickly became apparent that a wide range of types of initiative exist. The strategies used by fire agencies across Australia have a lot of similarities but there are also many differences, which frequently reflect differences in localities and the bushfire threat around Australia. Where there are similarities it has often been the case that programs developed by one fire agency that have been perceived to be successful are replicated by other agencies and adapted to the new administrative structure and specific high-risk localities.

This wide variety of programs was usefully organised along a continuum that could be roughly described as ranging from 'top-down' information dissemination approaches to 'bottom-up' community engagement and development strategies. Thus general alert and warning systems together with the communication strategies designed to inform the public about their meaning and encourage appropriate response were located at the 'top-down' end of the continuum (the category was named Warning Systems). A wide range of information dissemination strategies was also identified including media campaigns, printed materials and an increasing use of interactive media such as DVDs and public information 'phone lines (Public Information Provision). These generic information provision strategies were also found to exist in a variety of locally developed and adapted forms, suggesting another category (Localised Information Provision). Next was a diversity of Localised Community Engagement/Education Activities and Programs. Face-to-face presentation and/or interaction was the common element in this group of activities, which could also be segmented into 'one-off' (street and community hall meetings, and, occasionally, one-on-one consultations with households) and 'continuing' activities. Continuing activities consisted of on-going community fire-safety groups and recently developed 'community briefings' that may be held regularly in the same locations for the duration of a fire. Finally, towards the 'bottom-up' pole of the continuum various Community Consultation, Collaboration and Development Approaches were identified. Along with the community briefings, this group of activities represent the more recent and emerging strategies. They include integrated planning systems that contain (sometimes mandate) community consultation as a critical element and much more localised community development activities, including those that seek to capitalise on existing community strengths and organisations.

# 4. A Concept Map of the Desired Outcomes of Community Safety Programs

One general way to surface and articulate (reconstruct) the implementation logic and/or causal theory of a social program is to select from a variety of approaches to generating 'mental models' or 'cognitive maps' of program processes and outcomes by working with program staff and/or recipients (Leeuw, 2003). The use of structured concept mapping (Trochim, 1989a, 1989b; Trochim & Kane, 2005; Trochim & Linton, 1986) has been suggested as one possible source of these mental models (Anderson et al., 2006; Rosas, 2005; Shern, Trochim, & LaComb, 1995; Yampolskaya, Nesman, Hernandez, & Koch, 2004). An evident strength of this approach to program theory development is that the activities and implicit theories of practitioners provide a

potentially rich source of ideas and hypotheses about program processes and outcomes and the ways they might usefully be classified and linked.

The present concept mapping study, described in detail elsewhere (Elsworth et al., 2008), was designed to elicit ideas about the changes that engaged and knowledgeable informants believed should occur 'to make households and communities safer from bushfires'. Fire agency personnel with general responsibilities for community safety, and community members who were participants in local bushfire safety groups took part in one of 11 concept-mapping workshops; six of which were held with fire agency personnel and five with members of community groups. Workshops were held in each of the five more southerly states in Australia; those where bushfire is most likely to result in loss of life and/or significant property damage. Statistical analysis of the data generated in the workshop yielded 11 separate concept maps that were subsequently consolidated into a single list of constructs by the project team in a process that involved both individual classification and a consensus-seeking workshop. This synthesis of the results from the 11 workshops yielded 14 general desired outcomes of the community safety approach; 12 from the results of both community and agency workshops, and one from each of the community and agency workshops only. Thirteen of the 14 general concepts were derived from the results of more than one workshop.

A salient feature of the 14 generic community safety concept clusters is that they extended across at least three 'levels' of desired change: (a) individual, household and immediate locality; (b) community and local bushfire and other agencies; and (c) central agency and policy institution. While there is some overlap, the concepts are sorted into these three levels in Table 1. Workshop participants also appeared to take a very comprehensive view of the desired changes in community safety practice; concepts were identified at clearly different points along a policy and program development, implementation, outcome continuum. A small number described aspects of the policy or program implementation context (*Policy Framework for Organisational and Institutional Roles*, *Principles Underpinning Program Development and Adult Learning* and [existing] *Neighbourhood and Community Networks and Partnerships*). Other concepts identified specific program strategies (e.g. *Use of Incentives to Increase Preparedness*, *Appropriate Information/Education Activities*) while relatively short-term and longer term outcomes were also highlighted (e.g. *Individuals/Communities have a Realistic Understanding of Risk*, *Deciding and Planning for 'Stay-Go'*, *Householder/Neighbourhood Planning and Preparation*).

As part of the concept mapping process, participants were asked to rate each concept generated in their workshop according to the "importance of the issue in making households and neighbourhoods safer from bushfires" and according to how easy or difficult it would be to achieve to achieve the change "among a group of people or in a particular neighbourhood". Focussing specifically on the 'Importance' ratings, both agency and community participants, on average, viewed the concept *Greater Community Ownership and Responsibility for Bushfire Safety* as the most important change they believed should occur. The workshops with agency personnel also viewed the concepts *Individuals/Community Have a Realistic Understanding of Risk*, *Neighbourhood and Community Partnerships*, and *Household/neighbourhood Planning and Preparation* as being of considerable importance. Interestingly, there were two other concepts that were accorded moderately high importance by agency personnel: *Appropriate Information/Education Activities* and *Principles Underlying Program Development and Adult Learning*. Their view of important community safety outcomes thus appeared to be sharply focussed on the potential direct household and neighbourhood outcomes of the programs they are associated with together with the means for achieving these outcomes.

Table 1: Desired Community Safety Outcomes for Bushfire

| Concept Name | Concept Description |
|---|---|
| Central Organisation and Policy Level | |
| Principles Underpinning Program Development & Adult Learning | The importance of creating an environment conducive to effective learning by adults |
| Policy Framework for Agency & Organisational Roles | Ensuring the fire agencies implement appropriate policies and procedures to support community safety initiatives. |
| Use of Incentives to Achieve Preparedness | The use of incentives to encourage preparedness or, conversely, the use of penalties to discourage inappropriate or risky behaviour. |
| Understanding/Application of Regulations for Bushfire Safety | The need for appropriate legislation to be put in place and enforced as well as ensuring community members and local governments understand why those laws are necessary. |
| Community and Local Agency Level | |
| Neighbourhood & Community Networks & Partnerships | The majority of people are, in some way part of community networks. These networks will influence the capacity of communities to self-organise, and to work effectively with fire agencies, and other authorities. The networks will also influence community resilience and sustainability of community safety efforts. |
| Agency/Inter-Agency Responsibilities & Co-ordination | Within this cluster two related, yet distinct concepts were identified. The first relates to agency responsibilities for the community. The second relates to the intra-agency relationship between the operational branches of an agency and those concerned with community safety initiatives. |
| Appropriate Information/Education Activities | The provision of education, to a range of groups and using a number of different methods. |
| Community & Agency Responsibilities to Address Specific Needs | Statements in this cluster are related to very specific, local issues, offering practical solutions to identified problems. |
| Agency/Community Interaction | The flow of information between agencies and the public, before an incident occurs, with the aim of increasing resident awareness of the risks posed by bushfire as well as encouraging preparation to mitigate those risks. |
| Effective Communication of Information during Bushfire | The majority of statements in this cluster are concerned with the way in which fire agencies deliver information to community members during a bushfire. Another element expressed in cluster 12 is that to improve community safety from bushfire, systems need to be implemented that enable community members to communicate information to fire agencies, making use of local knowledge. |
| Greater Community Ownership & Responsibility for Bushfire Safety | The statements in this cluster are about community members taking increased responsibility for their own safety, planning for themselves and the communities they belong to. |
| Individual Households and Neighbourhoods | |
| Individuals/Community have a Realistic Understanding of Risk | The focus of the statements in this cluster is on the importance of community members <u>understanding</u> the range of factors that influence risk. |
| Deciding & Planning for 'Stay or Go' | Understanding of the issues surrounding the 'Stay or Go' message as well as making decisions about what individuals or households will do when threatened by bushfire, based on accurate information. |
| Household/Neighbourhood Planning & Preparation | The formulation of a plan that outlines an appropriate response to a bushfire and preparation that enables the chosen plan to be implemented. |

In contrast, the community workshops gave high importance ratings to achievement of a *Policy Framework for Agency and Organisational Roles* and *Agency/Community Interaction* while the more householder and neighbourhood level outcomes *Household/Neighbourhood Planning and Preparation* and *Deciding and Planning for 'Stay or Go'* were accorded somewhat less importance. Community members, it seems, were more conscious of the need for policy and community level change than were agency personnel.

# 5. Generating Policy and Program Theory Models for the Community Safety Approach

In an original and challenging paper McClintock (1990, p.1) urged evaluators to become "applied theorists" as well as applied methodologists by

> … advancing understanding of how programs function in a specific context, and how generalizations of program effects are contingent upon organizational, community, and cultural settings.

But as well as emphasising the importance of context and causal process the 'evaluators as applied theorists' approach made the values that informed program practices explicit and prominent, and program practices and outcomes contingent on these values. McClintock presented a "concept map" for a multi-site hospice program that recognized the distinctive "guiding philosophy" of hospice programs generally as well as detailing the service providers, program components and causal processes that were believed to result in positive benefits for clients and to realise the final goal of "improved quality of life" for clients and their families. McClintock's concept map provided a template for integrating the results of the policy analysis, program classification and concept mapping studies described above into a comprehensive theory model of the community safety approach (see Figure 1).

In building the model, we found a high level of coherence between the values and principles derived from the analysis of government reports, the descriptions of practices and programs, and the desired outcomes generated by the concept mapping workshops. Perhaps this is not surprising as submissions and evidence from community members and agency personnel informed most of the government inquiries. It does suggest, however, that there is clear understanding and acceptance among engaged community groups and agency personnel of the values and principles that inform the community safety approach, even if they are accorded different levels of importance.

These values and principles are arranged in the first two rows of Figure 1. They are seen to inform the development of activities and programs that utilise a small number of general practices (third row). Analysis of the inventory of specific bushfire EAE programs provided the classification scheme for the wide range of activities developed across Australia that forms the fourth row of Figure 1. A selection of the more important desired processes and outcomes of these activities and programs as revealed in the concept mapping study are represented in the next two rows. Those relating to neighbourhoods, communities and fire agencies are listed first, followed by those relating to individuals and households. The desired long-term impacts of increased community resilience leading to a reduction in the loss of life and property, general themes that underpin the discourse in all the government reports analysed, form the final two steps in the policy theory.

The model represented in Figure 1 yields an explicit characterisation of the coherence of the Australian community safety approach to bushfire and provides an overview of the possible causal relationships between community safety policy, the

activities and programs designed to implement or support the policy, and the potential short-term and longer duration outcomes and impacts that lead to a decrease in the loss of lives and property from bushfire. It thus provides one important source of values informed and policy relevant criteria for the evaluation of specific community safety activities and programs

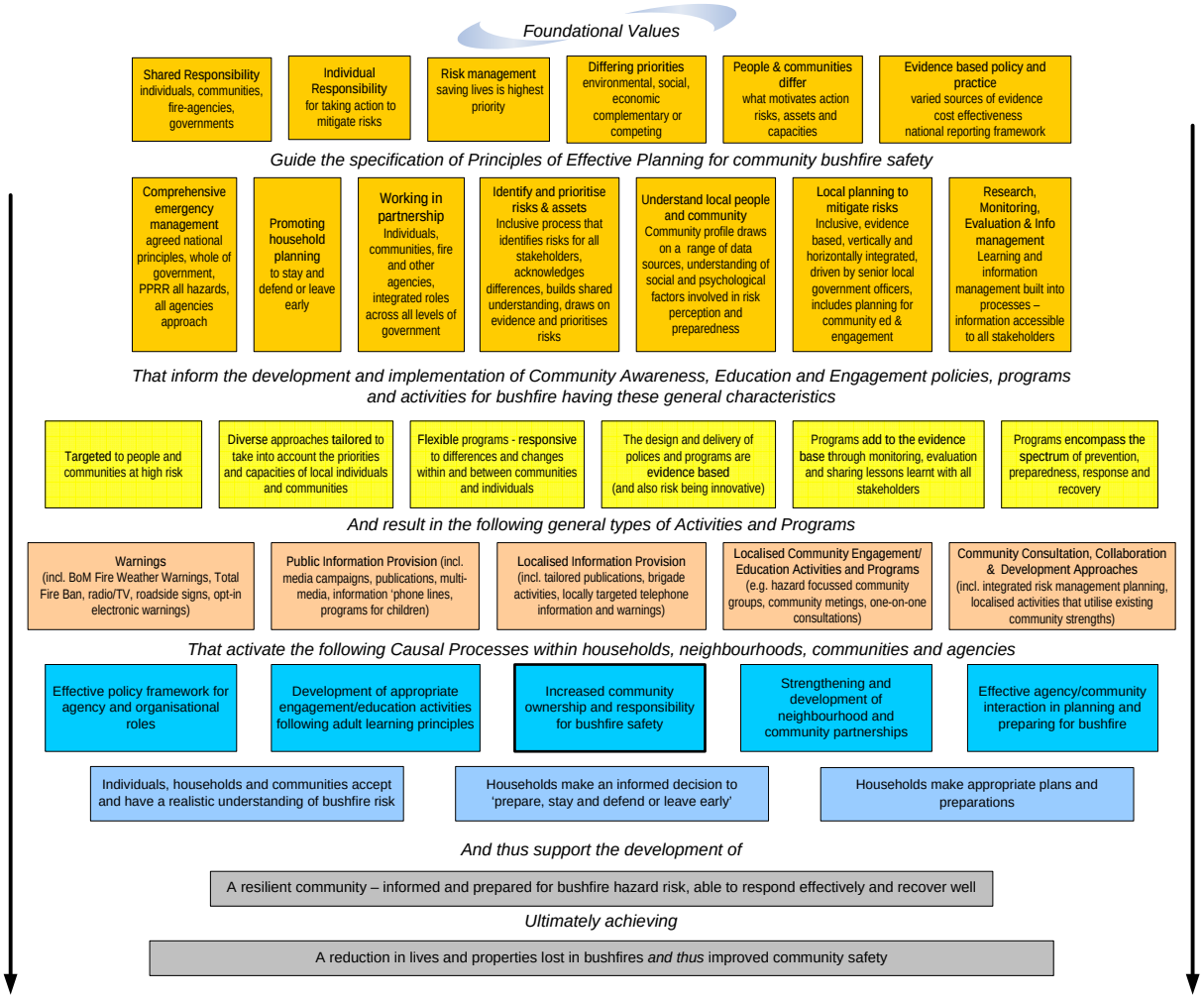


Figure 1: A Policy-theory Model of the Community Safety Approach to Bushfire in Australia

Yet the theory model doesn't provide a sufficiently explicit view of how the values informed programs might generate the anticipated outcomes and impacts portrayed in the model. Drawing on some analysis in the policy reports, a small number of concept mapping results where the workshop group interpreted the concept map in causal terms (Elsworth et al., 2008) and on-going discussions and program-theory workshops with program personnel (Rhodes & Gilbert, 2008) a preliminary program theory model was developed for community EAE interventions for bushfire safety (Figure 2). The model follows 'realist' program theory principles (Pawson & Tilley, 1997; Tilley, 2004) in distinguishing the 'macro-mechanisms' potentially operating at the community/organisational level that might be provided by (or drawn on to support) the program or activity from the 'micro-mechanisms' potentially operating at the

individual/household level. Also portrayed are a 'primary' causal pathway (from, as we understand it, the perspective of many bushfire agency personnel) represented by the solid-lined arrows, and alternative 'secondary' causal pathways represented by arrows with dashed lines.

The primary causal pathway portrays what Tilley (2004) has designated 'Supposed to do' (STD) theory. The programs and activities are hypothesised to provide the 'opportunities', 'resources' and (possibly on-going) 'support' to individuals and families that activate changes in the thinking and choices they make and initiate specific actions (e.g. discussions with family and neighbours, drawing up a 'to-do' check list etc.). These changes, in turn, result in effective planning, property preparation, a safe response during a bushfire emergency, and resilient recovery, finally resulting in increased overall resilience to the threat and actuality of bushfire, a reduction of lives and property lost, and improved community safety (Stevens, Gilbert, & Elsworth, 2008).

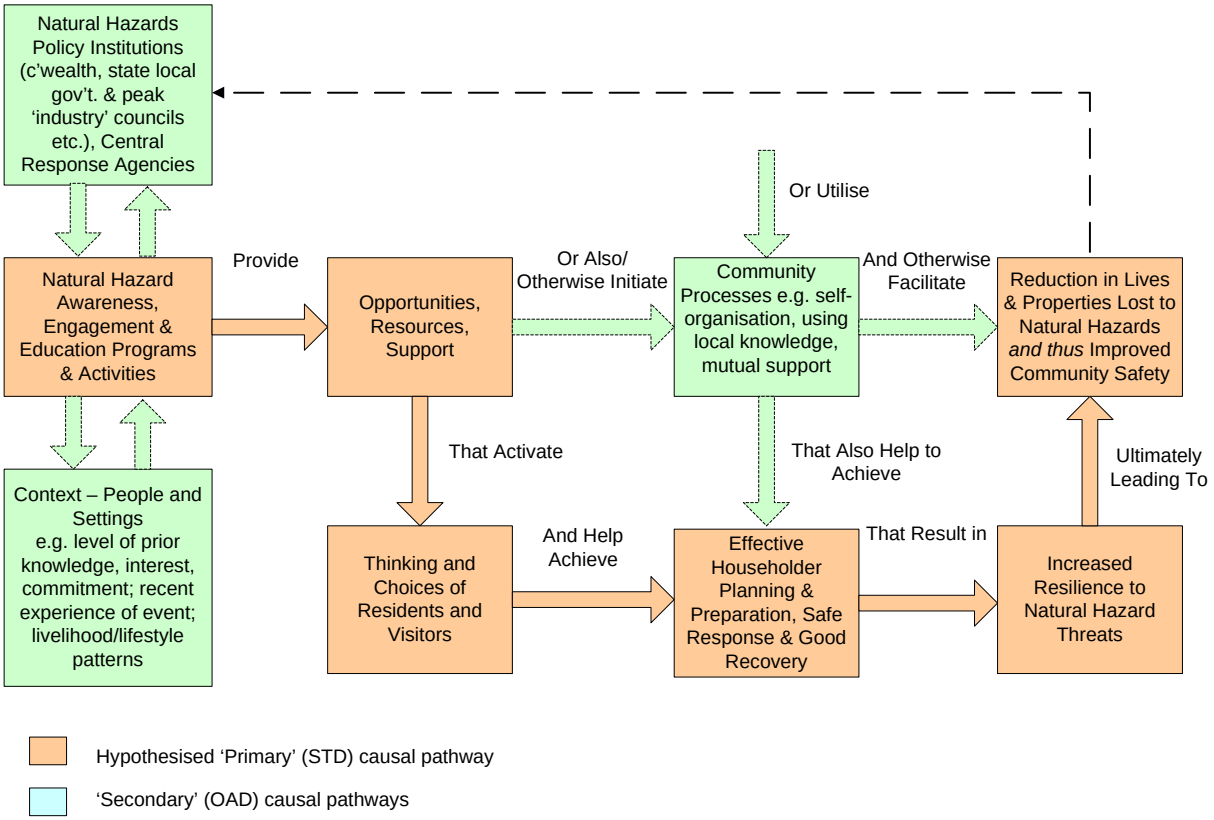


Figure 2: A Program-theory Model of the Community Safety Approach to Bushfire

Alternatively, the opportunities, resources and support may initiate (or further encourage) existing community processes such as self-organisation, sharing and/or further development of local knowledge, and neighbourhood support that may, in turn, also lead to improved householder planning and preparation and thus to the longer-term desired impacts of the community safety approach. There may also be feedback to government and agency policies from successful programs and activities which, in turn, can be expected to influence further program development. These 'secondary' causal pathways represent aspects of Tilley's (2004) 'Otherwise/also does' (OAD) theory. Additionally, the model recognises the critical influence of context (persons, households, communities and neighbourhood settings) on program implementation, and the strong

possibility that programs and activities will be adapted as they are implemented within these local settings.

# 6. A Theory-based Synthesis of Australian Community Safety Evaluations

Realist synthesis, developed in recent years by Pawson and colleagues (Pawson, 2002, 2003, 2006; Pawson et al., 2004), is a new approach to research and evaluation review that is based on the philosophy of scientific realist inquiry as applied to the social sciences (e.g. Bhaskar, 1989) and is focused on the provisional theories (frequently un-stated) that underpin social programs and other change activities. This approach, with some modifications, is being used to develop a preliminary review of publicly available evaluation studies of Australian programs for bushfire safety.[4]

As outlined by Pawson et al. (2004 p. v) realist synthesis comprises a number of critical steps that differentiate the process quite sharply from either the statistical approach of meta-analysis and the (perhaps more closely related) procedures of narrative literature review. The steps are, in summary:

- Define the scope of the review, typically with the commissioners of the study or the decision-makers who are its intended audience. This step also involves "… a careful dissection of the theoretical underpinnings of the intervention, using the literature in the first instance … to map out in broad terms the conceptual and theoretical territory".
- Search the literature for "… evidence to 'populate' this theoretical framework with empirical findings, using the theoretical framework as the construct for locating, integrating, comparing and contrasting …" the evidence.
- Use an iterative process such that new evidence is allowed to change the "direction and focus" of the review and open up new areas of theory.
- Combine both theoretical thinking and empirical evidence in the final review, and closely involve decision-makers in shaping the conclusions and recommendations to be drawn.

Further, realist synthesis follows a number of principles derived from the viewpoint that programs and other initiatives designed to bring about social change are, themselves, theories that actively engage with individuals (and families, households etc.) and involve long and complex causal chains. The principles are that:

- Realist reviews should be expected to pick up, track and evaluate the program theories that implicitly or explicitly underlie families of interventions;
- That, in tracking the successes and failures of interventions, the review will find at least part of the explanation in the reasoning and personal choices of different participants; and
- Realist reviews should inspect the integrity of the implementation chain, examining which intermediate outputs need to be in place for successful outcomes to occur,

[4] As specific aspects of realist synthesis were modified somewhat to suit the purposes and context of our project, we use the more general idea of 'theory-based synthesis' to characterise the work reported here. In particular, in contrast to Pawson et al. (2004, p. 3) while the goal of our research is indeed explanatory and directed towards understanding the process chains that lead to desired outcomes and impacts of community safety programs and activities within particular contexts, it has also been designed to yield principles and guidelines for good practice that fire agencies might adopt, a goal eschewed by realist synthesis. Additionally, the search for relevant literature was, as far as could be achieved, exhaustive and 'systematic' in that, as a starting-point, a common set of search terms was used to search a wide range of appropriate on-line bibliographic data bases. The results were then augmented from search-engine searches for 'grey' literature and by scanning the reference lists of retrieved studies. Thus the recommended iterative process occurred within the group of studies that was finally assembled rather than extending outside it to locate new studies.

and noting and examining the flows and blockages and points of contention (Pawson et al. 2004, pp. 4-6, paraphrased a little from original)

Approximately 15 separate documents that describe evaluation studies of 7 distinct Australian programs were intensively reviewed for this report. Following the above general outline and principles of the realist review process the policy and program theories for the community safety approach were used to provide the conceptual starting point of the review. Evaluation reports were searched for information on:

- The context of the intervention;
- Outcomes and impacts at the level of the individual and household;
- Outcomes and impacts at the level of the community, local (implementing) organisation and policy institution;
- Causal processes at the individual/household level – both enabling and constraining;
- Causal processes at the community and/or agency levels - enabling and constraining; and
- Evidence that these causal processes may have operated successfully in some contexts rather than others, or constrained successful implementation in some contexts rather than others.

Summaries of this assembled information on each intervention were written up in the form of a brief case study. The major causal chains that appeared to be operating in each program or activity were represented in a program-theory diagram that also included any evidence for context-process interaction. Finally a synthesis of the important context - causal process - outcome/impact relationships discovered was developed, including an overall program-theory model.

The activities and programs included in the review are sorted into the five broad categories of program outlined above in Table 2. As the Ferny Creek Fire Alert Siren originated from a community engagement and consultation process it is located in this category but also included in the table under 'Warnings'. Subsequent sections of this report provide a summary account and individual theory model for each initiative. Finally an initial overarching theory model for community EAE programs for bushfire that provides a summary of the salient contexts, causal processes and outcomes described in the individual reports and theory models is developed.

Table 2: Programs Included in the Review

| **Warnings** | **Public Information Provision** | **Localised Information Provision** | **Localised Community Engagement / Education Activities and Programs** | **Community Consultation, Collaboration & Development Approaches** |
|---|---|---|---|---|
| (Ferny Creek Fire Alert Siren) | Media materials, including the internet | Moondarra Fire Information Unit | Operation Bushfire Blitz (Fire Ready Victoria street meetings)<br>Street FireWise<br>Community Fireguard<br>Community Fire Units | Ferny Creek Fire Alert Siren |

# 7. Studies of Bushfire Safety Media Materials, Including the Internet

Rohrmann (2000; 2002) reported the results of a number of separate studies of the effectiveness of Public Information Provision (Figure 1) including various media (e.g. printed materials, videos and the internet) in communicating information on bushfire risk and preparedness.

## Evaluation Methods

Rohrmann's studies (including his evaluation of Community FireGuard described in a subsequent section of this report are noteworthy in that they are explicitly based on a coherent and detailed evaluation framework derived from risk communication theory (Rohrmann, 1992, 1998). The framework includes an analysis of the risk communication process (including a program theory model) an examination of criteria for content, process and outcome evaluation and discusses methodological considerations (measurement, study design) while advocating a multi-method approach.

Rohrmann's (2000) studies of printed media materials and videos used data derived from a longitudinal survey study of residents of a fire-prone area (a pre-test followed by two post-test waves with intervening exposures to selected bushfire information materials; N = 120, 113 and 57 respectively), a focus group discussion with residents and fire experts, and expert appraisal of the materials. His first study of the utility of the internet (2002) was based on systematic assessment of six fire agency websites (four from Australia, one each from Canada and the United States) by a group of 16 fire experts, disaster researchers, psychologists, website experts and residents (Rohrmann, 2002, p. 1). Rohrmann's second study of the internet (2007) also involved systematic assessment by a panel knowledgeable about bushfires. This panel comprised six students from diverse cultural backgrounds (Australia, Hong Kong, China, Germany and Netherlands). The panel assessed the information available in three Australian rural fire agency websites over a one month period during summer and compared the available information with that in two newspapers published during the same period.

## Program Background and Rationale

Print materials examined in Rohrmann's 2000 study included two leaflets and three brochures. Some difficulty was experienced in retrieving the documents that were examined in this study. Only one – "Living in the bush – bushfire survival plan workbook" could be unequivocally identified, while another was probably correctly determined ("Will you survive? A guide to lowering you risks before and during bushfires").[5] These two documents both address bushfire risk and preparedness issues in general. Both have comprehensive text and graphics (photographs and diagrams/ illustrations) that portray in some detail the nature of a bushfire event and appropriate responses to it. In addition, the "Living in the bush" workbook has a three-page self-completion planning worksheet that takes the householder though a planning sequence

[5] Rohrmann (2000, p. 16) indicated that all pamphlets and brochures with one exception (a modification of another in the list) were "provided by the CFA, the Victorian Country Fire Authority". A simple printed document with a name similar to "Wildfire evaluation – it's your decision" disseminated by the Orcas Highlands Homeowners Association (Orcas Island, Washington state, USA) was located. While the format is that referred to by Rohrmann it is unclear that this was one of the documents evaluated. A document titled "Will you survive – a guide to lowering your risks from bushfire" was also located. This document has the title and length referred to by Rohrmann, but it was produced by the Tasmania Fire Service, not the CFA. It is, however, probable that this was the document evaluated.

including hazard identification and associated maintenance/modification activities, and action plans for staying and defending or leaving early if threatened by an event.

Along with the printed material, two video presentations were investigated. These videos were titled "Bushfire Hazard" (EMA/DNDR, Canberra 1998) and "Living with Bushfire" (CFA, 1998). Their features are described (Rohrmann, 2000, p. 16), respectively, as follows: "Residents and a fire officer present information; strong footage of fires; text listing key points" (15 minutes); and "Several residents report their personal experiences; strong footage of fires; some use of computer simulation graphics" (20 minutes).

The websites examined in the first Internet study were reported to "differ considerably in their style and purpose" (Rohrmann, 2002, p. 6). None was "solely or explicitly" focussed on the general public but all included information relevant to residents and employees. Of the Australian websites, two were the official sites of rural fire services, one was operated by an association of volunteer rural fire brigades in the Australian Capital Territory and one was the website of a metropolitan fire brigade. The Canadian site investigated was the 'forest fire' section of the Canadian Forest Services website while the US site was the fire pages of the American Red Cross. The three websites investigated in the second (2007) study were all those of Australian state rural fire services. While not solely focussed on fire information for residents and communities these sites all feature explicit links on their home page to relevant information.

## Context

Media materials (including internet sites) from the main high fire-risk states in eastern and southern Australia were studied.

## Individual/householder Level Outcomes and Causal Processes

Rohrmann (2000, p. 17) provides a consolidated list of 15 "viewpoints" raised by respondents who were exposed to the bushfire materials in the longitudinal survey study and focus group. The points covered issues associated with the content and length of the communication material, the presentation layout and style of brochures, the usefulness of videos when viewed at home, attitudes to the use of the public media (television, radio, newspapers) and information derived from the Internet. Broadly, the respondents preferred: (a) factual, concise, ordered lists of information that was relevant to the specific audience; (b) information relating to personal safety, evacuation, animals, emergency phone numbers and to the particular community; and (c) compact leaflets/brochures. There was also a suggestion for booklets with detachable brochures on specific topics (so that materials of particular relevance could be retained while the rest was discarded). In printed material, coloured illustrations, diagrams and drawings were seen as very important. Pictures and photographs (to attract attention and add "emotional tone") were seen as "essential" but diagrams and drawings were often regarded as more instructive that photos. There appeared to be a mixed response to videos. On the positive side videos were seen to be more instructive and easy to understand than brochures (concepts presented both orally and visually), that it was possible to include a range of information (general to in-depth and technical) and that 'real-life' footage achieved a greater impact than photographs. On the negative side videos were seen to be potentially time-consuming and had the disadvantage that information couldn't be referred to instantly in an emergency.

Residents reported a positive attitude to television advertisements relating to bushfire safety and expected to see a range of media used. Short information presentations on radio to remind residents to prepare for the fire season were appreciated. Finally, responses to the use of the Internet appeared to be generally

negative; residents who were not connected could not imagine how the Internet could be used and those who were appeared to be sceptical about its possibilities.

When asked to rate the printed materials, residents regarded all the materials presented positively, but the longer workbook-style brochure was clearly the most strongly preferred. It was seen as the most interesting and reliable of those appraised and also stood out, particularly, on the criteria of 'answered questions of concern', and 'enjoyable to look at'. This brochure was also the most strongly preferred by the expert panel.[6]

In the first reported study of the Internet, Rohrmann (2002, p.8) concluded that "… the appraisal substantiates the potential of WWW-based fire preparedness programs". There was reported to be a considerable range in the average ratings given to the six websites that were appraised, however, and the experts were quite critical of the suitability of the sites for the relevant target groups. Reasons given for preferring the most favoured website included (Rohrmann, 2002, p. 10): comprehensive; good visual appeal; clear, concise, understandable; addresses necessary actions for fire preparedness; easy to navigate; links well organised; and up to date. Reasons given for disliking the least favoured included: information not relevant to target groups; information on important issues lacking; too much, too technical information; language difficult to understand; not visually appealing; difficult to navigate; outdated sections.

The following broad conclusions were drawn from second reported internet study (Rohrmann, 2007, p. 11-12):

- All three sites were generally rated positively, including navigation features, however some basic information such as the agency name and contact provisions were not always transparent;
- All sites were generally found to be helpful and informative – particularly positive evaluations were reported for "understandability", "comprehensiveness", "good examples given" and "clarity of fire safety actions";
- All sites were also seen as a "reliable source of information", as meeting "own information need" and could be "recommended to lay people".

Notwithstanding the positive appraisals listed above all participants identified shortcomings in the websites and suggested improvements (Rohrmann, 2007, p. 13). Shortcomings included (paraphrased from report):

- Some information etc. too 'texty';
- Information about present fires not as current as newspapers;
- Some sections difficult to understand by linguistically and culturally diverse (CALD) recipients;
- Technical terms sometimes hard to understand;
- '.pdf' attached information inconvenient if printer needed.

Suggested improvements included:

- Materials should reflect the (restricted) awareness and knowledge of residents;
- More maps, pictures, charts, diagrams etc. should be used to convey information;
- Downloadable videos highlighting risk and preparedness information could be incorporated into website;
- Facilities for those with poor vision should be provided;
- Material for children should be included;
- Up-to-date information on current fires should be prominent;

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[6] This brochure is available (September '08) at http://www.cfa.vic.gov.au/residents/living/litb-workbook.htm

- Core information should be made accessible by those with limited internet facilities (restricted download; no printer, no flash player);
- Access for wider potential audience should be enhanced by providing information in translation.

Rohrmann (2007, p. 13) concluded (perhaps arguably for some points) that "WWW-based risk communication has considerable advantages: The information to be provided can be updated regularly and quickly; users can bookmark and store relevant hazard info.; access is fast; and blockage is unlikely (unlike telephone contacts)." The potential value of hazard websites for CALD residents and those living in remote regions was highlighted.

## Community-level/Organisational Outcomes and Causal Processes

Rohrmann's studies of media-based bushfire preparedness information sources are clearly focussed on the individual and household. There is little mention of the possible use of these information sources in group settings or their potential impact on community-level processes. While Rohrmann (2000, p. 15) recognises in one research question the potential use of materials of this kind in fire-safe group activities this issue does not appear to have been systematically followed up in his work.

## Theoretical Models of Risk Communication

Rohrmann's studies of the effectiveness of media materials are based on complex causal models of the risk communication process including a detailed model of the proposed link between information and behaviour (Rohrmann, 2000, p. 15). Steps in this linking process include: *exposure* ('actually getting it'); *attention* ('attending and reading it'); *comprehension* ('understanding the message'); *confirmation* (possibly, 'searching for complementary information'); *acceptance* ('adopting message as personally relevant'); *retention* ('memorising content, eliciting information/material when needed'); and *realisation* (implementing advised action or behaviour change'). In summary, the following desirable characteristics of media materials were identified in his surveys and consultations: concisely presented factual information, relevant to a local community; containing meaningful information on personal safety, evacuation, animal issues; attractively presented with engaging 'real-life' video footage or photographs and instructive graphics; and a 'workbook-style' format with the opportunity to 'fill-it-in-yourself' (although it is noted that this option may not be frequently utilised). The necessity for material to be accessible to a culturally and linguistically diverse audience and others from specific groups (older residents, children) was also highlighted.

This list of desirable characteristics suggests attributes of materials that operate at different points in the 'process-chain' between initial exposure to the communication and subsequent action. These links are summarised in Figure 3.

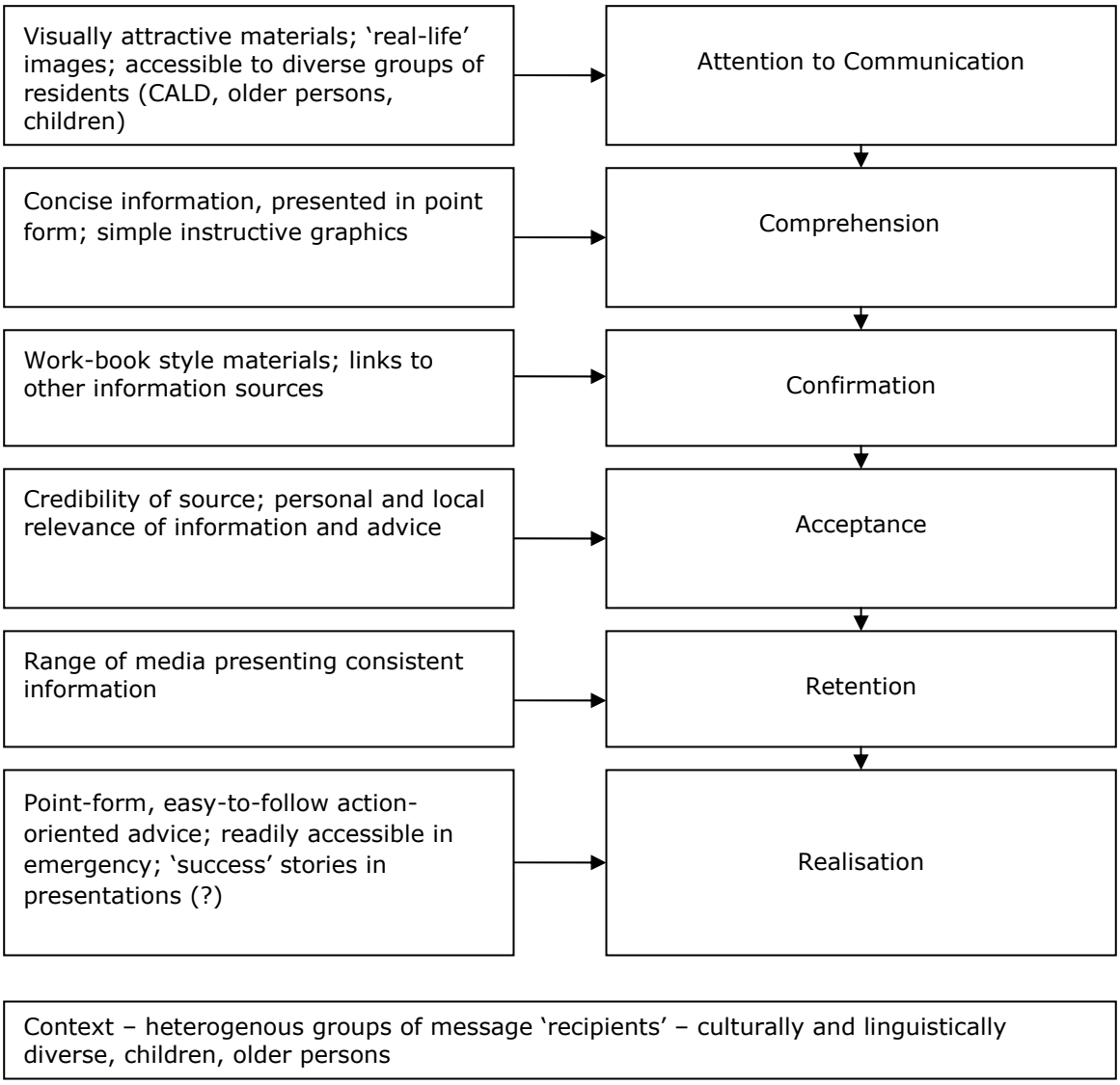


Figure 3: A model of the relationship between media materials and the risk communication process

# 8. The Moondarra Fire Information Unit

A Fire Information Unit (FIU) was established for the duration of a long-running bushfire in January/February 2006. The FIU is classified as a Localised Information Provision project (Figure 1). A case study of the Moondarra Fire Information Unit (Department of Sustainability and Environment, n.d.) is available (http://www.dse.vic.gov.au/dse and search for 'Case Studies') and the unit is also mentioned in a debriefing report on the 2005/06 fire season to Victorian agencies (Smith, 2006).

## Evaluation Methods

No detail provided. The DSE case study report appears to have been written by a member of the FIU. It is noted that the FIU established a database to log communications with the community. As the report contains a number of direct quotations it is possible that this database was the source of some of the information used. The debriefing report (Smith, 2006) was prepared by an independent consultant.

## Program Background and Rationale

The case study report noted that experience gained by relevant agencies during an extended period of fires in the alpine regions of the state in 2003 was used to develop "a number of new tools, processes and concepts" relating to information flows during a fire incident (Department of Sustainability Environment, n.d., p. 1). The report appears to suggest that the units were in operation prior to the 2005/06 fire season but this could not be verified. However, the de-briefing report on the 2005/06 fire season does explain that

> Trained and effective Information Units are now an integral component of the community engagement process and are based in incident control centres during incidents. Their roles include collation and distribution of pertinent information to a range of outlets, including media, VBIL[7] … and direct to communities either during community meetings or through recognised information centres where residents could either view information sheets or collect a copy (Smith, 2006, p. 22).

It is also apparent from the debriefing report that the FIU was part of a rapidly evolving development in community engagement activities *during fire events* in Victoria.

> The 2005/06 campaign saw the emergence of the next phase of community engagement in the form of direct and regular contact with threatened communities either through the Victorian bushfire Information Line, access to internet websites maintained by CFA and CSE of directly by Incident Management Teams, in a bid to keep residents as aware as possible about fire movement, behaviour and potential threats. Much of the direct engagement occurred between ignition and when fires rapidly went out of control with arrival of adverse weather (Smith, 2006, p. 4).

[7] The Victorian Bushfire Information Line, a telephone information service providing both personal advice from operators and recorded information.

The Moondarrah FIU was designed to go beyond "just providing for the flow of information to the community" to adopting "community engagement principles to assist in the development of positive and lasting relationships beyond the immediate event" (Department of Sustainability and Environment, n.d., p. 1). Three objectives were adopted for the FIU:

- Inform the community by providing timely, relevant, accurate and authorised incident information relating to risks, fire safety messages, firefighting strategy, weather predictions, relevant local community messages, rehabilitation and recovery processes.
- Seek relevant local knowledge from the community by consulting with them about the fire, its effect and impacts to better inform the Incident Management Team. Listen, record and respond to community needs and concerns.
- Empower the community to respond and implement personal fire plans through provision of relevant, timely and accurate information to assist them in their decision making (Department of Sustainability and Environment, n.d., p. 2).

Strategies used to inform and engage with the community included:

- Core advice and immediate threat messages;
- Media community updates;
- Community meetings – 31 separate community based meetings held at 7 different locations during the fire period (Smith, 2006, p. 80);
- Daily visits to local communities (including street walks and organised times for one-on-one meetings in one township);
- School visits;
- Community bus shopping trips (through traffic controls to assist isolated residents access supplies).

## Context

The Moondarra FIU was established in the township of Erica, one of three townships in the close vicinity of the State Park. The deliberately-lit fire burnt for 3 ½ weeks over an area of 15,000 hectares. While the area burnt was very largely state-owned and administered forest and there was little eventual impact on private land, community interest in the fire was high due to the potential threat it posed to private land and assets (Smith, 2006). The Moondarra State Park where the fire started is situated approximately 160 k east of Melbourne and approximately 20 km north of the main eastern highway. The park has extensive areas of open forest and provides a variety of recreational facilities for camping, bushwalking, fishing etc. The surrounding areas include actively logged state forest, private forests and farm land. During the early stages of the fire the roads that lead south (towards the highway) from the main townships in the region were closed. This required residents to make an early decision whether to stay on their property or leave. Additionally, absentee land owners were unable to return to access and defend their properties. Local businesses were also unable to replenish stocks.

## Individual/householder Level Outcomes and Causal Processes

Causal processes at the individual/household level highlighted in the report can be classified under three headings:

<u>Community information provision</u>

- Coordinating information from different fire agencies (DSE and CFA);
- Providing this information in a form that was understandable;
- Utilising a variety of channels including community meetings, community updates, presentations, notice boards etc.;

- Where possible, considering physical and social barriers that inhibited residents from receiving information;
- Logging all requests for information and contacting resident within an agreed time-frame with an answer, details of who the matter had been referred to, or re-scheduling if answer not available.

Community support

- Maintaining a presence in the community;
- Listening to and supporting local residents;
- Providing access to incident controllers at community meetings ('putting a face' on decision-makers);
- Being honest (about the course of the fire, availability of response teams etc.) and empathetic;
- Helping community find needed support;
- Assisting residents in transition from the fire event to recovery, balancing need to support those entering the recovery phase while others were still being impacted by the event.

Seeking local knowledge and feedback

- Establishing community contacts, networks and processes to give and receive information;
- Listening to community knowledge to help inform decisions in the Incident Management Team;
- Senior officers attended a community meeting to discuss options to control a specific aspect of the fire.

Comments from residents provided in the report suggest that a number of these putative mechanisms were effective. The comments ranged across: the value of advice provided at the community meetings; the value of face-to-face contact and the opportunity to talk and ask questions on an individual basis (as community meetings were felt to be overwhelming for some residents); residents feeling listened to, taken seriously, cared about, and supported; the value of up-to-date knowledge about the fire (in one comment to support a stay-go decision, while another highlighted the value of information provided at community meetings, on the internet, and, particularly, on ABC radio – the official broadcaster – for "those of us who were feeling vulnerable and isolated …").

## Community-level/Organisational Outcomes and Causal Processes

An early decision was made to take a community engagement approach to the operation of the FIU to encourage the development of lasting positive relationships with the community. The case study suggests that the community meetings were a critical link with the community and that the portrayal of the fire as a 'community fire' (and not an 'agency fire') was "a very powerful message" (Department of Sustainability and Environment, n.d., p. 3). Early in the fire period it became apparent that the community at one township (where the FIU was based) was "using the meetings to check on community wellbeing after difficult nights and pass on local messages". It is noted that members of a community who are not volunteer or professional fire fighters may feel helpless during an event. At the meetings, residents were encouraged to look out for others, to visit neighbours to see if they needed help, and to share information gained at the meetings as a way to contribute. A shopkeeper from one of the townships commented that "The community updates helped me to help others" (Department of Sustainability and Environment, n.d., p. 4)

It was also reported that the strategy of logging concerns, information requests etc. and providing timely feedback overcame initial community scepticism ("why bother talking to you, no one ever gets back to us").

> People were genuinely pleased and thankful even when we hadn't been able to help them. This process enabled a lot of issues to be resolved immediately rather than allowing them to linger. *Consequently community concern in the weeks and months following the even was low* (Department of Sustainability and Environment, n.d., p. 4, emphasis added)

While a large number of 'stakeholders' in the FIU are mentioned in the report it is apparent that the FIU was a partnership jointly staffed by DSE and CFA officers. The state Department of Human Services (DHS) was also reported to be involved during the recovery phase. Smith (2006, p. 80) noted that

> One of the most remarked issues by the community was having a "face" to DSE, as usually an IMT representative and a DSE representative attended each meeting. The community focus changed quickly from a negative to a positive note when IMT representatives attended meetings and were able to explain what was happening. Communities were pleased to get input from the "decision-makers".

Smith (2006, p. 80) also commented that the FIU contained a

> Great mix of skills between DSE and CFA Information Officers resulting in dynamic team working in Information Unit. Information Unit was well resourced with equipment to do the job and was supplied with quality maps that were an excellent resource for Community Briefings and Information Points set up in localities.

It is apparent from these comments that the collaborating agencies resourced the FIU well and that the partnership arrangement, particularly the link with the IMT, facilitated the attendance of incident controllers at the community meetings, a feature of FIU activities that was positively regarded by residents.

## A Theory Model for the Moondarra Fire Information Unit

The Moondarrah FIU was a complex partnership initiative between community education and information officers from two responsible fire agencies and an Incident Management Team of officers from the same agencies. Through a strategy of listening to and acknowledging as legitimate the concerns and knowledge of members of the local community, the FIU endeavoured to, in effect, incorporate residents into the partnership and thus develop "positive and lasting relationships beyond the immediate event …". An attempt is made to capture the important elements of the causal processes activated by this partnership and the anticipated outcomes of the process in the theory model below (Figure 4).

**Context**

Long running bushfire in a state forest – three townships and residents of outlying properties in the vicinity – early in event residents cut off from access to main highway and associated towns

**Fire Information Unit (FIU) formed:**

- As a partnership between two responsible agencies
- Located with Incident Response Team in a township close to the event
- Information Unit endorses a community engagement process (in addition to an information communication strategy)
- Agencies provide adequate resources to FIU

**FIU carries out the following activities**:

- Provides 'core advice' (on bushfire awareness and preparedness) and immediate threat messages to community meetings and 'information points'
- Regular media updates
- Hosts 31 community meetings in 7 locations over duration of event
- IMT officers attend community meetings
- Fire portrayed as a 'community fire'
- FIU officers make daily visits to townships, street walks and have face-to-face meetings with residents at stated times when officers are available (in one township)
- School visits
- Community-bus shopping trips for isolated residents

**That initiate the following causal processes:**

- Residents able to identify agency decision-makers and appreciate honesty of information presented
- Rapid change to a positive attitude towards and acceptance of agency personnel
- Residents feel they are taken seriously, supported, cared about
- Timely information through multiple channels assists residents in day-to-day decision-making about response to event
- One-on-one meetings support residents who are diffident about asking questions in public meetings
- Intra-community support activities develop – local messages passed on in meetings, residents encouraged to check on others
- Community-bush shopping trips strengthened rapport with residents
- Networks established to feed-back local knowledge to IMT

**That result in:**

- Residents implement fire plans during event
- Reduction in community concern in period following event
- Positive on-going agency-community relationships (?)

Figure 4: A provisional model of the causal processes activated by a fire information unit

# 9. Operation Bushfire Blitz

Bushfire Blitz community street meetings (now known as Fire Ready Victoria street meetings) were classified as a Localised Community Engagement / Education Activity / Program (Figure 1).

## Evaluation Methods

The project manager published an evaluative report on the first year of the program (Hill, 1998). Subsequently, Rhodes (2001) summarised the results of a number of unpublished internal agency research studies and developed a program theory for the initiative. The unpublished studies reported the results of: (a) a nominal group consultation workshop with 10 fire services personnel in the areas of fire behaviour, risk management, education and fire prevention to elaborate an understanding of "effective household preparedness for bushfire" (Rhodes, 2001, p. 59); (b) eight focus groups with residents from outer metropolitan and rural areas of Victoria; and (c) two multi-method studies (structured and semi-structured interviews, questionnaire surveys, participant observation of meetings) of presenters and attendees at Bushfire Blitz meetings across two fire seasons.

## Program Background and Rationale

Bushfire Blitz was a neighbourhood street meeting program delivered by the Country Fire Authority, Victoria. The program continued under that name until the 2003/04 fire season. Its format has since been incorporated, along with parallel community-hall meetings, under an expanded 'Fire Ready Victoria' program.

Bushfire Blitz was first conducted during an eight-week period at the commencement of the 1997/98 fire season. During that season approx. 1,400 meetings attended by around 33,000 people were conducted (once in each locality) in identified high-risk areas in Victoria (Hill, 1998). Meetings were between 1 – 1 ½ hours duration. Target areas for Bushfire Blitz were identified using GIS technology. Fire intensity, population and housing data were utilised to generate the maps, which were then distributed to local fire brigades to validate and select specific locations. The program was managed and administered by a project manager, seven program co-ordinators who were employed for a 12-16 week period, and was delivered by 55 'community consultants', recruited from volunteer fire brigades who worked for a period of eight weeks (Hill, 1998). The community consultants were given a lesson plan to guide their presentation and they and the program coordinators attended a two-day training session. The presentation was designed to cover the following issues: facts about bushfire risk; personal and family safety; preparing your home; helping your neighbours; risk identification and practical solutions; planning what to do on high risk days; what residents can expect from the fire brigade; and Community Fire Guard (the CFA on-going community group program, see Section 12). The Bushfire Blitz session also incorporated a street walk.

## Context

In its first year of operation Bushfire Blitz meetings were mainly targeted to high fire-risk localities within an area 100 km radius around Melbourne. This included localities that had experienced extremely low rainfall during 1997, and urban/rural interface localities where, historically, the majority of lives and properties in the state had been lost to bushfire. The program was extended to other, more rural, areas of Victoria in later years.

## Individual/householder Level Outcomes and Causal Processes

From survey data Rhodes (2001, p. 64) concluded that the program appealed to both previous and new attendees and that there was a strong emphasis on obtaining contextualised information about bushfire among attendees. Almost half the respondents to one survey indicated the "importance of having information about their environment" as their reason for attending the meeting, while the majority of respondents to the other highlighted their desire "to develop their understanding of the risk associated with living in a fire prone area" (p. 76). The latter responses also suggested that what residents valued most about the meetings were "the opportunity to learn and test knowledge", the "community interaction" and the "personalised and local information".

Two important outcomes were identified on the basis of a variable that categorised the pattern of meeting attendance. Firstly, people who had attended previously and during the current fire season had higher levels of knowledge about bushfire compared (in order) with those who attended during the current season but had not attended previously, those who had attended previously but not during the current season and, finally, those who had not attended a meeting. A similar pattern was observed for self-reported levels of bushfire preparation (both outcomes were measured by multi-item indices). While it is not possible to infer from these cross-sectional data that there was a causal relationship between attendance and knowledge and preparedness, the observation that, for both outcomes, recency of attendance as well as frequency was associated with both is persuasive in relation to a causal impact of program attendance.[8]

Rhodes (2001) also tentatively identified a number of possible causal processes in relation to these outcomes, including:

- Trust and credibility of the fire agency;
- 'Readiness' from recent experience of a bushfire;
- Two-way communication in meetings (albeit that audience participation in most meetings was found to be low with most presenters using a didactic approach);
- A 'sense of obligation' resulting from the perceived commitment of the fire agency to the issue and the program;
- Positive reinforcement and encouragement of resident actions by the presenter;
- Peer influence, hearing other community members discuss their preparations and plans for bushfire;
- An 'inspiration effect' of first attendance at this type of meeting resulting in motivation to take preparedness action, often for the first time.

## Community-level/Organisational Outcomes and Causal Processes

Hill (1998, p. 36) highlighted that one of the aims of the Bushfire Blitz program was to "promote the concept of community interdependence" (p. 36). He also noted that the agency approach to bushfire management was focused "heavily on social solutions to safety and creating a partnership with the community, rather than a total reliance on technological solutions" (p. 35). In assessing the outcomes of the program Hill (1998, p. 37) noted that:

- The decision to use trained volunteers as presenters was successful as (among other factors) "in many cases (they had) an empathy with the local community and brigade";

[8] The differences between attendance groups in relation to both 'knowledge' and 'preparedness' outcomes were statistically significant overall (p. <0.001 in each instance). In a follow-up path analysis the standardised direct effect on preparation of meeting attendance in the current year was 0.25 while the direct effect of previous meeting attendance was 0.20. There was, however, no evidence of a link between knowledge and preparedness.

- Bushfire Blitz had "achieved a level of community development and interdependence that goes far beyond the direct benefits of fire safety"; and that, during the first year of operation of the program;
- "250 brigades … improved the relationship with their communities" including an increased recruitment of volunteers.

In conclusion, Hill (1998, p. 38) emphasised the value of Bushfire Blitz as part of a range of programs offered by the agency: "What is clear is that no one program has provided all the solutions in isolation. *It is the full suite of integrated programs and activities that provides real benefits to the community*" (emphasis added).

## Aspects of Context

Rhodes (2001, p. 71-72) highlighted the importance of differences between residents in high fire-risk localities. On the basis of the survey research he identified sub-groups of:

- " Resistors" – residents who had done little preparation, had no plan except to leave if threatened, were least knowledgeable about bushfire, less interested in finding out, had low self-reliance, had never attended a bushfire safety meeting and were least likely to in future;
- "Motivated" – residents who had undertaken up to moderate amounts of preparation but had no plan except to leave if threatened, were more knowledgeable and interested than the Resistors and had a higher level of self-reliance, and had attended a fire safety meeting at least once and were more likely than Resistors to attend one in the future (also includes residents new to the area with limited preparation but some interest);
- "Actives" – residents who had high levels of preparation including a plan with a clear intention to stay and defend their property or to leave early before being directly threatened, were the most knowledgeable, self-reliant and interested, had typically attended a fire safety meeting more than once and would attend in the future.

These sub-groups of residents also had a different response to the agency and level of acceptance of the agency programs. Rhodes (1991) speculated that different mechanisms might be in operation within the three sub-groups in relation to the Bushfire Blitz program but this idea of an interaction between 'resident type' and program was not investigated further.

## Theoretical Models for Bushfire Blitz

A primary purpose of Rhodes' (2001) study was to develop a program theory for Bushfire Blitz that would focus future evaluative work. Some aspects of this theoretical work are summarised below.

<u>A comprehensive list of desired short/medium term outcomes</u>

Rhodes' (2001 see also Rhodes 2003) initial consultation study identified five 'key dimensions' of community preparedness that provide a broad and comprehensive list of the specific short/medium term outcomes at the individual/household level that might be achieved through community safety initiatives. They are (Rhodes, 2003, p. 1, emphasis added):

- *Awareness and recognition* of the wildfire risk;
- *Knowledge* of fire behaviour and fire safety measures;
- *Planning* for the event of fire;
- *Physical preparations* of property and household; and
- *Psychological readiness* involving confidence and self-reliance.

A revised conception of preparedness

Rhodes (2001, p. 79-80) argued that placing preparedness along a simple continuum from less effective to more effective is not appropriate. This is because what may be considered 'prepared' in one social or physical context may not be considered as prepared in another. Rather, he proposed that preparedness should be considered as a "tiled mosaic" where "different forms of preparedness are defined relative to each other and the context" and thus in relation to the circumstances of each household, the physical environment, the capacity of individuals and the community to deal with the risk and the likely nature and severity of a fire event. Rhodes (1991, p. 80) concluded that

> To a large extent, only the residents, suitably informed about the nature of the risk and precautionary measures, are able to determine what is appropriate for their particular circumstances.

A model of the decision making process

Developing from this revised conception of preparedness Rhodes argued that different forms of preparedness (some more effective than others) will be the outcome of different patterns of decision making. This process will be shaped by various influences including the nature of the hazard, individual attitudes and prior beliefs, social influences and socio-economic factors. Collectively these factors are seen as constituting an "orientation to the risk" that influences the decision-making process (the choices made and the ways available resources are used) that, in turn, shape the decision to adopt and the implementation of precautionary actions and thus result in a particular pattern of preparedness. Critically, the model suggests that a program such as Bushfire Blitz will, if successful, result in attendees re-tracing and re-examining risk appraisals and decisions previously made at the various stages of response to the risk and modifying the choices made to achieve a different, more effective, pattern of preparedness.

A generalised model of program impact

In conclusion, Rhodes (2001, p. 100) presents a simple four-step causal model for a program such as Bushfire Blitz. The model posits that a "meeting with the appropriate qualities" will *engage* those who participate and subsequently *activate* a range of psycho-social mechanisms that will lead them to *revise* their prior decisions about responding to the bushfire risk and thus take "appropriate additional actions". Participant characteristics and the nature of the meeting are seen as possibly influencing the various psycho-social mechanisms directly but are also likely to be mediated through the level and nature of the active involvement of participants in the meeting.

## A Synthesised Program Theory Model

A provisional program theory model for Bushfire Blitz was developed (Figure 5) from a synthesis of the generalised theory model developed by Rhodes (2001) discussed above and a table in his report that identified the salient contexts, mechanisms and outcomes identified from the various studies of Bushfire Blitz he summarised.

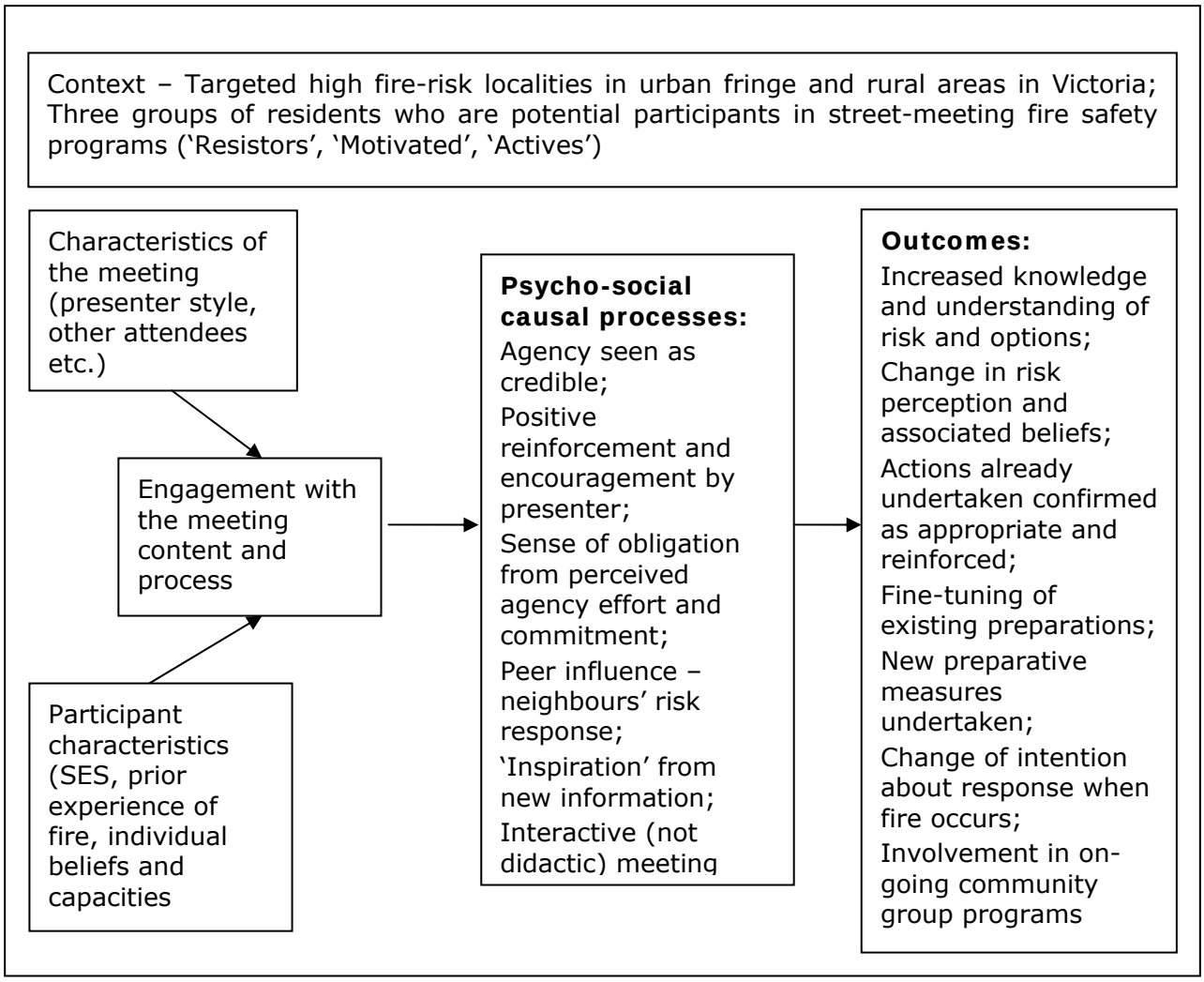


Figure 5: A synthesised program theory model for Bushfire Blitz

# 10. Street FireWise – Rural Fire Service, NSW

Street FireWise community meetings in the Blue Mountains region of New South Wales were classified as a Localised Community Engagement / Education Activity / Program (Figure 1). An evaluation of this program was reported by Gilbert (2005).

## Evaluation Methods

A study of Street FireWise was conducted in 2004-05 under the aegis of the Bushfire CRC. Data were gathered by semi-structured interview with fire brigade captains, program presenters and a sample of residents augmented by discussions with key members of the Blue Mountains RFS Community Education Group (a management group consisting of volunteer representatives from local fire brigades). A range of other resources was also used including a report on a pilot program. A series of eight key anticipated/desired outcomes of the program were identified from the discussions with the Community Education Group and arranged into an outcomes hierarchy. This hierarchy informed gathering and analysis of outcomes data from the semi-structured interviews and was gradually extended to a more comprehensive program theory as various conditions that either facilitated or constrained achievement of the outcomes were identified.

## Program Background and Rationale

Street FireWise is a bushfire community education program offered by the Rural Fire Service (RFS) in the Blue Mountains region of New South Wales, commencing as a pilot program in 2000. The number of meetings held peaked in the 2001/02 fire season (a little fewer than 50) and the number of attendees in 2002/03 (300-350). Since that time meeting and attendance numbers have declined. The program is typically delivered as a ninety-minute 'street corner' meeting on a Saturday by a volunteer presenter and members of a RFS volunteer brigade, but has also taken the form of a community hall meeting. A mobile information trailer supports the program presenters.

## Program Context

The Blue Mountains is a high fire risk region in New South Wales between 55 and 95 kilometres west of the Sydney CBD. The region comprises about 26 towns and townships with a population of approx. 27,000 of whom approx. 20,000 live in high fire risk localities. Topographically, the Blue Mountains area is an uplifted plateau dissected by numerous rivers and creeks that form a broken landscape of ridgelines, escarpments, deep valleys and canyons. Most settlements lie along the main highway that follows a ridgeline between two of the major river systems that dissect the plateau. The region experiences an average of 14 bushfires each year (range 2 to 40). Since 1911, 580 houses have been destroyed by fire. Fourteen lives were lost in the period 1945-2,000.

Locally, three sub-regions of the Blue Mountains are distinguished: 'lower', 'middle' (central) and 'upper' (see location map – Figure 6). The lower region is an urban-fringe locality continuing through the first 7 or 8 townships on the main highway while the Central Blue Mountains largely consists of a collection of approx. 8 towns and townships that lie further west on the highway up to well known tourist centre of Katoomba. The upper Blue Mountains region is constituted by a small number of townships still further west together with some more isolated settlements. Significant demographic change has occurred in the region over the last twenty years with many townships (particularly in the lower Blue Mountains) attracting young couples and retirees. These changes have been associated with the conversion of holiday homes to permanent accommodation and an increase in commuting to work in the Sydney region.

Climatically, the region is divided into 'dry' and 'moist' zones. The dry zone corresponds roughly with the lower Blue Mountains on the eastern escarpment and lower areas of the plateau and experiences a significantly higher incidence of fires. This complex geographic, climactic and socio-demographic context posed a significant challenge to fire brigades in selecting appropriate venues for SFW meetings.

Figure 6: The towns and townships in the Blue Mountains, NSW

## Individual/householder Level Causal Processes and Outcomes

The focus of the report in relation to householder response is on interviewee perceptions of factors that generate a positive householder response to the program.

<u>Awareness of meetings</u>

Hand delivery of flyers advertising meetings, word-of-mouth in close-knit communities and newsletters were identified as strategies that initiated and supported meeting attendance.

The following mechanisms were also identified as possible determinants of meeting attendance:

- Credibility of the local fire brigade – differs across the region and lower in the more suburban localities where brigades are no longer a central part of a local community;
- Initial appreciation of bushfire risk in the region – again likely to be lower in the more urbanised localities;
- Residents' perceptions of meetings.

<u>Short-term outcomes</u>

The following strategies were related to a positive resident response to the meetings:

- A two-way interactive meeting process (rather than a didactic presentation) – presenters who were able to generate discussion were positively regarded by residents;
- Use of the information trailers;

- Use of a 'standard' script to ensure 'message' consistency;
- Continuing amendment of the meeting script to enhance local relevance;
- A focus on the 'key' elements of the bushfire safety message;
- Use of positive reinforcement of householder activity rather than negative messages and "scare tactics";
- The ability of the presenter to utilise local features in the presentation and discussion.

These strategies were believed to lead to an increase in resident awareness and understanding of bushfire risk mediated by the following processes:

- Building on existing resident knowledge;
- Changing misconceptions;
- Introducing new ideas;
- Contextualising issues to the local situation;
- Generating resident understanding of how they can contribute to mitigation;
- Generating a clearer understanding of the role of the local fire brigade.

Longer-term outcomes

The Street FireWise model assumes that the program is only one element in a change process leading to more effective resident planning and preparation for bushfire. It is seen as building on existing resident thinking and action through a process of re-examination of present plans and strategies, and discussion with family, neighbours and friends to facilitate empowerment and self-reliance.

The following were seen as possible enabling and constraining conditions in relation to this process:

- Availability of time, money and resources – seen to vary across socio-demographic differences in the region;
- Ability to carry out necessary preparatory work – elderly or single residents may not have the necessary capacity;
- Motivational factors, the willingness to accept new ideas;
- Peer influence, triggered by enthusiasm observed and/or networks established at the meeting.

## Community-level/Organisational Causal Processes and Outcomes

Approximately half of the 21 fire brigades in the region were characterised as 'active' in delivering the program. Levels of brigade participation varied considerably. Those brigades where involvement was greatest were, typically, those with membership links with the Community Education Group and where there was an individual member who facilitated the program (a program 'champion'). Four groups of brigades were identified in the evaluation. Drawing on the description in the report, these groups might be characterised as: (a) active fidelity adopters; (b) active adapters; (c) non-adopters who implement other community education (CE) initiatives; (d) non-adopters of CE generally.

While the level of acceptance of SFW appeared to be associated with brigade participation in the program there was reported to be generally good support among fire brigade members. While not all were supportive, there were generally sufficient interested members to attend meetings if required. It was also reported that SFW in active brigades was becoming more widely accepted and "seeping into the culture". The high workload of volunteer brigade members, a more general decline in volunteerism and the need for support at the district level to locate the right personnel for the program were mentioned as barriers to wider acceptance. A small core group of program presenters has been developed by the CE Group but recruitment of appropriately skilled

volunteers and retention were identified as problematic. Reliance on a small group of presenters was perceived to impact negatively on the quality of meetings.

It was originally intended that SFW meetings might facilitate the formation of formal on-going fire-safe groups. This had not been successful and is no longer part of the scripted SFW strategy. However, there is evidence that some less formal on-going groups have formed and are, in some cases, assisted by SFW presenters.

## The Importance of Context

Adoption of SFW was found to vary with context. In the words of the report:

> … small/medium sized settlements in the middle region of the Blue mountains have had the biggest uptake. The upper and lower Blue Mountains have had greater difficulties with implementing SFW. The challenges in the upper Blue Mountains have been the isolated and spread out rural communities, which make a street meeting format unsuitable. Meanwhile in the lower Blue Mountains, the settlements are considerably larger in size and much more suburban …

Geographic and socio-demographic context thus appeared to be critical in the adoption of the program. Additionally, the nature of the fire season had an impact on program delivery. Prior to the evaluation the region had experienced a number of bad fire seasons and brigade activity had been diverted away from community education to operational work.

## A Theory Model for Street FireWise

The SFW evaluation was framed by an outcome hierarchy that was developed on the basis of early interviews conducted in the evaluation. This outcome hierarchy was linked in the evaluation report with many of the causal processes discussed above to form a revised program theory matrix of mechanism-outcome links. A modified version of this matrix is reproduced below (Table 3). It should also be emphasised that aspects of the socio-demographic and associated geographic context of the Blue Mountains region appear to be very important in moderating the effectiveness of the program. The more demographically stable Central Blue Mountains, consisting of a number of townships that run along the main highway with a pattern of side streets, parks etc. appears to provide a generally supporting context for the successful implementation of the street meeting format.

Table 3: An outcomes hierarchy for Street FireWise with associated causal processes

| Facilitating causal processes | | Program Outcomes (Short to Longer Term) |
|---|---|---|
| Availability of on-going community fire safe group in local brigade area.<br>Sense of community.<br>Level of community interaction. | ⇨ | *Formation of neighbourhood networks.* |
| Time, money and resources available to residents to undertake work.<br>Ability to carry out necessary work.<br>Motivational factors (e.g. peer influence, past experience, inspiration of new ideas).<br>Support network.<br>Residents reassess previous decisions.<br>Residents develop strategies and mechanisms to overcome limited capacities. | ⇨ | *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.* |
| Presenters convey the relevant information (in an interactive rather than didactic manner).<br>Residents 'take on board' the information.<br>Presenters utilise local features. | ⇨ | *Residents gain an increased awareness and understanding of bushfire risk and how it applies to their own specific context.* |
| Atmosphere is conducive to learning.<br>Quality of presentation.<br>Content of meeting and quality of the script followed.<br>Presenter provides positive and clear messages.<br>Messages 'strike a chord' with residents. | ⇨ | *SFW meetings are positively received by residents.* |
| Adequate provision of information about meetings.<br>Timing of meeting convenient to the majority of residents.<br>Credibility of the local brigades.<br>People have a basic appreciation that there is a bushfire risk in the area. | ⇨ | *Targeted residents hear about meeting, are motivated to attend and do so.* |
| Local brigade is willing and/or able to participate.<br>Volunteers understand and recognise the benefit of SFW treatment.<br>Brigades identify clearly the high-risk areas.<br>Availability of appropriately skilled presenters. | ⇨ | *Brigades actively participate in SFW by targeting high-risk communities and running meetings.* |
| Context – Program facilitated by the geographic features of the locality and the socio-demographic characteristics of the Central Blue Mountains | | |

# 11. Community Fireguard

Community Fire Guard, an on-going group fire-safe program in Victoria, was classified as a Localised Community Engagement / Education Activity / Program (Figure 1). An evaluation of this program was conducted by Rohrmann (1999) and was also reported by Boura (1998a; Boura, 1998b).

## Evaluation Methods

Rohrmann's (1999) study involved a sample of 110 Fireguard group members active for 1-2 years, members from one newly formed group (21) and three comparison samples of non-members. A group of 20 CFA staff members also participated in the study. Data were gathered by face-to-face structured interview.

The evaluation was informed by a conceptual model derived from social-psychological risk communication theory. The model suggests that the final desired change (outcome variable) 'risk-reducing behaviour' results from a cognitive process involving risk (re)appraisal and decision-making in relation to preventive actions that follow a risk communication activity. This might be thought of as the primary causal pathway in the model. However the model also recognises, importantly, that a complex evaluation process is activated in those who are exposed to the risk communication that is influenced by both personal characteristics of the recipient (e.g. prior hazard exposure, risk-specific beliefs) and "manifold context factors" including characteristics of the information source and the recipient's social environment (family, friends, community).

## Program Background and Rationale

Community Fireguard (hereafter 'Fireguard') is a program developed and supported by the Country Fire Authority (CFA), Victoria. The program commenced operation in 1993 and had grown to include approximately 400 active groups by 1998 (Boura, 1998a, 1998b). Fireguard involves the formation of on-going groups of residents in fire prone localities supported by professional facilitators employed by the CFA. As stated in the introductory brochure to the program, Fireguard groups are ideally small and made up of neighbours or residents "living in a shared bushfire risk environment". Usually the groups meet in members' homes.

While Fireguard groups are encouraged to develop their own local bushfire safety strategies, the program has common elements that are covered during the first year of operation (typically in four or five meetings). The common elements include: introduction to the program; fire behaviour; personal survival; house survival; street walk; fire protection equipment; and developing personal and household bushfire survival plans. Additional on-going activities might include: organising fuel reduction working bees; planning a shared response and becoming familiar with other members' properties and equipment; making plans with the more vulnerable community members; establishing a telephone warning tree; working out new ways to share resources and information; and bulk buying personal protective clothing and equipment.

Community Fireguard groups are not volunteer fire fighting groups and there is no expectation that members will be active in responding to a bushfire beyond the protection of their own home and its immediate surrounds.

## Program Context

Fireguard groups are active across most rural and urban interface regions in Victoria but appear to be particularly prevalent in peri-urban and rural localities on the outskirts of Melbourne. Municipal websites, for example, report that there are currently (September, 2008) 153 Fireguard groups in the Shire of Yarra Ranges to the east of Melbourne and 60 in the Macedon Ranges to the west.

## Individual/householder level Outcomes and Causal Processes

The evaluation reported that Fireguard participants: (a) were more likely to accept responsibility for bushfire preparedness and safety rather than seeing this as predominantly a fire agency task[9]; (b) rated their overall bushfire preparedness higher[10]; and (c) undertook more preparedness actions[11]. A similar comparison of two newly formed Fireguard groups against two groups of non-participating residents from the same areas showed that the view that the fire agency was responsible for fire safety decreased in the Fireguard group over an initial six-month period of membership more than it did in the comparison group. Additionally, the number of preparedness actions taken by the new Fireguard members increased significantly. More specifically, the greatest change was observed for "joint planning with neighbours" and "writing down planning for bushfire events". Further, it is reported elsewhere that the evaluation found that:

> … Fireguard members rate significantly higher for more sophisticated strategies; in terms of planning (including family, clothing, animals), discussion of plans with family, joint planning with neighbours, taking care of the vulnerable in their community, setting up warning systems within the community, and deciding on evacuation (Boura, 1998b, p. 11).

## Community-level/Organisational Outcomes and Causal Processes

As the focus of the primary evaluation report is on attitude and behaviour change among individual Fireguard participants little information is available on processes or outcomes at the group or community level. It is interesting, however, to note again that a strong change in the newly formed groups appeared to have occurred in joint planning for bushfire with neighbours. As Fireguard groups are desirably formed from householders within an immediate neighbourhood this finding is an initial indication that strengthening local ties are a feature of early participation in the groups.

Boura (1998b, p. 6) noted that "The vast majority of … groups are self initiated", often by one or two residents concerned about their bushfire safety or in response to a local issue. Other groups are formed following agency activity or develop from other community groups (e.g. Landcare). It is also claimed that Fireguard activities are built on principles of adult education including the recognition of local knowledge and, importantly, empowerment principles.

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[9] As calculated from the reported results, the relevant effect sizes (ES) of the comparison between the Fireguard group (N=110) and residents in similar fire prone areas (N=126) ≈ 0.37 and 0.43 respectively. These figures indicate small differences between the comparison groups (conventionally an ES > 0.2 is regarded as small, an ES >0.5 as medium and an ES>0.8 as large).
[10] ES ≈ 0.64 i.e. a *medium* sized difference.
[11] ES ≈ 1.6 – i.e. a large difference. Note that the author regarded all these differences as "not very large".

> Empowerment requires people to realise that they are responsible for their own safety, and accept that they themselves can do what is necessary to successfully manage the threat of fire. They need to overcome the learned helplessness promoted by inaccurate and sensationalised media reporting of wildfires. They also need to have the knowledge and skills to develop their own strategies, and they need the technical and resource support to enable them to implement those strategies. (Boura, 1998b, p. 8)

Additionally, it is argued that Fireguard is designed to facilitate a partnership between the fire agency and the community. Fireguard is viewed as not just an education program. Rather it provides a framework for emergency services to interact with high risk communities throughout the emergency management process - prevention, preparation, response and recovery. In this way Fireguard is viewed as "fundamentally different from other 'education' programs, which are seen as limited to provision of prevention or preparedness messages (Boura, 1998b, p. 10).

Finally, it is argued that this evolving partnership placed members of fireguard groups in a unique relationship with fire agencies during an event and results in increased trust of agency decisions and activities.

> Community Fireguard groups are in a unique position to interact with emergency managers during a wildfire. Not only does the education phase give them the knowledge necessary to appreciate the issues of emergency management, but their history of working with local CFA brigades and staff, and personnel from local government and public authorities to solve fire safety issues has built up confidence and trust (Boura 1998, p. 10).

These expectations of the Fireguard program at the group and community level have, however, not been explicitly validated by research findings. There is, for example, no specific evidence that 'empowerment' is a critical causal factor in group success (e.g. that those groups formed on the basis of local initiatives and managed by community members are more successful compared with those initiated and possibly directed by agency personnel) and, similarly, no information about the specific nature of the hypothesised agency/community partnership arrangements and how this partnership leads to the increased trust in the fire and other agency staff and activities.

## A Theory Model for the Community Fireguard Program

A tentative program theory model for the Community Fireguard program that incorporates the more salient of the causal links proposed in the evaluation is presented in Figure 7.

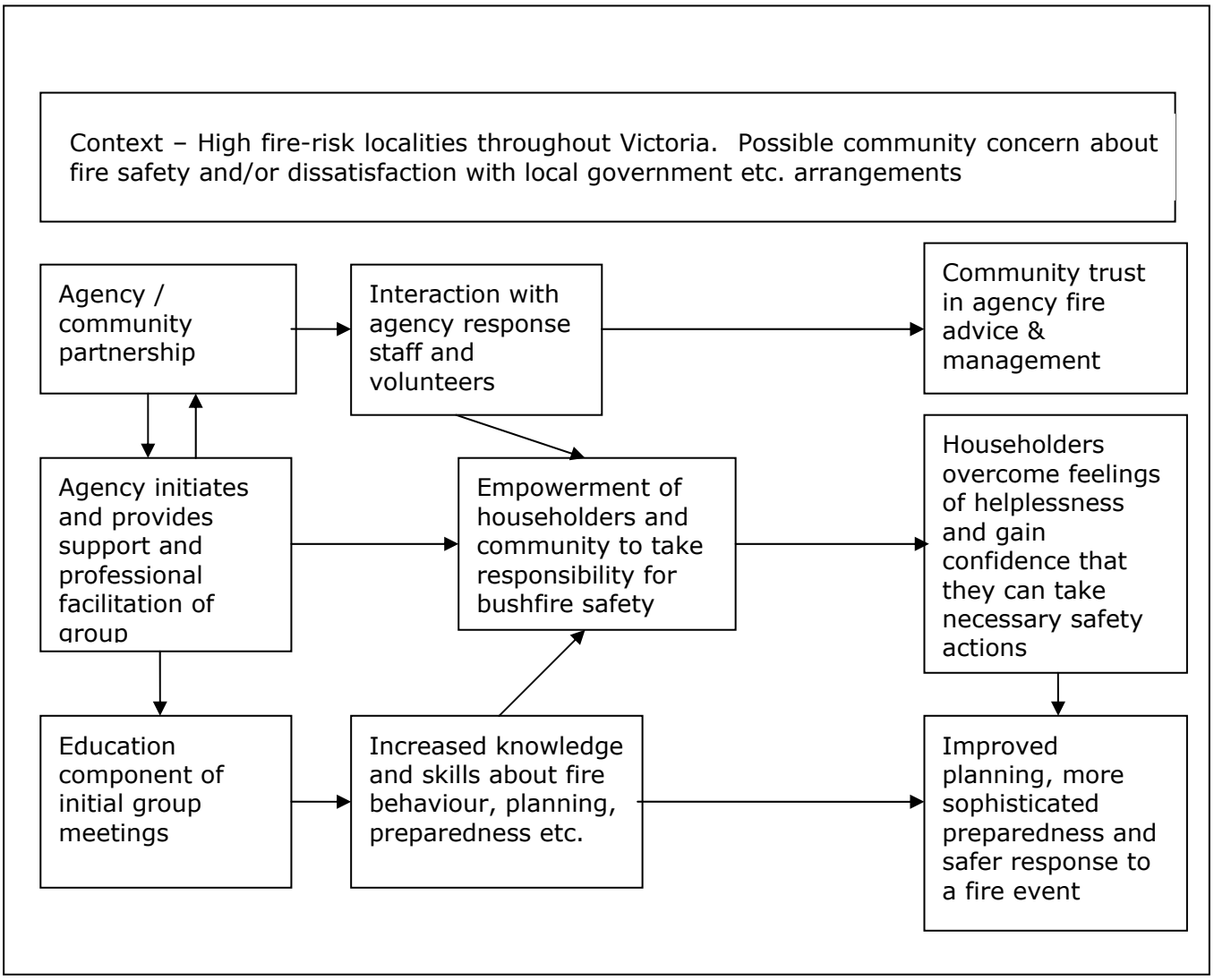


Figure 7: A tentative program theory model for Community Fireguard

# 12. Community Fire Units

Community Fire Units (CFUs) are volunteer teams of local residents organised and trained under the aegis of the New South Wales Fire Brigades (NSWFB) and, more recently, the Australian Capital Territory Fire Brigade. CFUs have both a preparedness and first response role in relation to bushfire and they have been classified as a Localised Community Engagement / Education Activity / Program. A case study that, inter alia, focussed on the context, causal processes, outcomes and unintended consequences of the CFUs for individual members and communities is reported by Lowe, Haynes and Byrne (2008). Some additional information for this summary was drawn from the NSWFB Community Fire Units Brochure (http://www.fire.nsw.gov.au).

## Evaluation Methods

A multi-method approach was used (Lowe et al., 2008, p. 21) including interviews with agency personnel, a questionnaire survey of 670 CFU members, a questionnaire survey of the general public and four focus groups with CFU members. The published report relies largely on the CFU member survey and focus groups.

## Program Background and Rationale

The New South Wales Fire Brigades is an urban fire and rescue service with responsibility for fire emergencies in the major cities and towns of the state. The service is responsible for fires in urban interface localities in these major cities and towns and thus has a significant bushfire fighting capability. Aside from CFU members it is a fully professional service with no volunteer fire brigades. The CFU program is a unique approach in Australia in that it is designed to combine household preparedness and first-response/mopping-up activities and might be best described as a "hybrid volunteer system" (Lowe et al., 2008, p. 23).

Members of CFUs are local volunteers and have the task of protecting their properties in their specific designated locality (e.g. a street section or cul-de-sac) from an initial bushfire attack (ember attack) and spot fires prior to the arrival of a NSWFB response team. CFUs also assist with mopping up operations after the fire front has passed. Members are fully insured and provided with protective clothing and 20 hours of training from the NSWFB. The training covers bushfire knowledge, safe house care and gardening practices, household planning and preparation, operating basic fire fighting equipment and mopping up operations. A typical CFU team is made up of 6 to 12 members and, when trained, is provided with a trailer or fixed cabinet of basic fire fighting equipment and protective clothing. Local NSWFB stations provide ongoing training of units.

The CFU program commenced in New South Wales in 1994. Membership and the number of units has grown quite rapidly and steadily from that time. As of May 2007 there were 330 units with approximately 6,000 members throughout the state.

## Context

CFUs were developed specifically for the urban interface context of NSW cities and larger towns where it was believed that there was a less well developed "sense of community responsibility" than in rural areas and a "greater reliance on agency or government support in times of crisis" (Lowe et al., 2008, p. 23). Additionally, the socio-economic characteristics of many urban interface localities meant that potential volunteers were not able to make a large time commitment to an organisation such as that required for membership of a volunteer fire brigade. The CFU model was thus designed to provide urban interface communities with "a level of self-reliance with a

minimum of commitment". Urban interface regions are expanding rapidly into rural areas in New South Wales and are subject to quickly developing fires with the potential to overrun available fire fighting resources (Lowe et al., 2008, p. 23). Localities that were targeted by the NSWFB for development of CFUs included streets that had a particular risk due to poor access, topography, or proximity to high fuel loads (Lowe et al., 2008, p. 29).

It was also reported that localities with CFUs were "also likely to exhibit other forms of community action … such as neighbourhood watch or bushcare groups, suggesting an existing spirit of community action and co-operation" (Lowe et al., 2008, p. 29). This increased social cohesion might be associated with the homogeneity of households in the locality (similarities in age, family development, background, community stability, shared bushfire experience) and the particular nature of the high-risk locality (suburban cul-de-sacs on the urban fringe).

## Individual/householder Level Causal Processes and Outcomes

Lowe et al (2008, p .29) reported that individuals involved in CFUs:

- Recognised the high bushfire risk in their local area;
- May have " … felt that a declining number of fuel reduction burns in recent years had increased their risk …";
- Were likely to have been involved with bushfires in the past and to have defended their homes using their own resources (often shared with neighbours);
- For some, if previously involved with bushfire, felt that the trauma had "generated a heightened state of anxiety"
- If not previously involved with bushfire, were aware of the fire risk in their neighbourhood;
- Felt "helpless and unsure" prior to their involvement with the CFU;
- Had a strong motivation to protect their home and property.

As a result of CFU membership they reported:

- Gaining confidence in their ability to organise themselves, plan and to stay and defend their homes;
- Having enhanced local knowledge (knowing each others resources, the best configuration of equipment for particular circumstances, status and whereabouts of other residents);
- As a specific result of the fire fighting equipment, feeling more independent and self-reliant;
- Feeling a greater connection with their immediate neighbours;
- Learning to trust their neighbours;
- Feeling that 'looking after each other' would become increasingly important as they become older;
- Feeling that they had obtained great personal benefit from CFU membership with little sacrifice.

## Community-level/Organisational Outcomes

(Lowe et al., 2008, pp. 23-24) summed up the community-level 'theory' of the CFUs succinctly as follows:

> The CFU approach is intended to empower community members to be proactive in the defence of their own properties by utilising existing social capital and local knowledge … as an important resource. This … is enhanced by providing communities with equipment, further knowledge and improved social networks required to carry

> out a limited but important role. It is hoped that this fusion of expert and local skills, knowledge and networks will produce a more resilient urban interface.

The CFU approach was designed to combine the top-down 'command and control' management structure that is typical of fire response agencies with bottom-up community involvement. The aim is to "balance strong leadership and strict hierarchy with the people management skills required to maintain volunteer preparedness …" (Lowe et al., 2008, p. 23).

Lowe et al (2008, pp. 29-30) suggest that the evidence from their survey and focus groups confirms that the formation of a CFU has led to increased community resilience and cohesion in a locality (connections expanding from an initial core group to a wider range of residents). CFUs that had been actively involved in an incident "worked well together" and benefited from "understanding fire brigade operations and procedures". Successful defence of homes and property resulted from "a more detailed knowledge of pre-fire preparations, fire behaviour, likely ignition points and each other's strengths and assets".

## Unintended (Negative) Outcomes

The report by Lowe et al. (2008) is noteworthy for its clear and explicit discussion of a number of unintended and possibly negative outcomes of the CFU program. These include, particularly:

- A focus within the CFU on equipment operation and bushfire response to the possible detriment of household planning and immediate pre-event preparation (many survey respondents, for example, were reported to have a 'wait and see' policy in relation to evacuation, a position that is believed by fire agencies to be particularly disadvantageous to safety);
- That training had not prepared members for what to expect during a real event;
- That, particularly in the period after a major event, CFU membership could decline to a small 'core' group that might, in time, be regarded by other community members as an "impenetrable clique" (Lowe et al., 2008, p. 31);
- That the agency strategy of recruiting CFUs from neighbourhoods where there is existing social cohesion and community groupings excludes less proactive or articulate neighbourhoods where the need for support and resources may be greater;
- That their may be conflict between CFU members and others in the locality about prioritising properties to be defended and/or that the presence of a CFU in a neighbourhood might result in a false sense of security.

## A Theory Model for the Community Fire Unit Program

The evaluative report on the CFUs by Lowe et al. (1008) is particularly rich in information relating to the context, and causal processes potentially activated when a Unit is formed in a specific neighbourhood. Figure 8 represents an attempt to summarise the more important aspects of the program in a causal theory model.

**Context:**

- Urban fire service with no volunteer fire brigades
- High fire-risk urban fringe localities (suburban streets, cul-de-sacs etc. abutting bushland)
- Localities with some existing community strength; individuals likely to have had prior fire experience and/or be aware of local risks and motivated to become more self-sufficient [‘Readiness’ at both individual and community levels.]
- Individuals may have felt anxious, helpless and unsure about present circumstances.

**Program strategy:**

- Potential locality identified by fire agency
- Agency provides 20 hours initial training at local fire station in household planning and protection and basic fire fighting techniques
- On completion of training agency provides CFU with a trailer or cabinet of basic fire fighting equipment and personal protective clothing.

**Causal processes – individual members:**

- Local knowledge enhanced (‘knowing others resources etc.)
- Increased confidence in organisation, planning property defence
- Feel more independent, self-reliant
- Increased connectedness with neighbours, trust, sense of looking after each other (reciprocation?)

**Causal processes – CFU and wider community:**

- Local skills, knowledge and networks combines with NSWFB expertise
- Unit understands basic fire fighting operations
- ‘Command and control’ structure successfully combined with community involvement
- Non-members awareness enhanced

**Longer –term outcomes:**

- CFU volunteer preparedness maintained
- Increased community resilience, cohesion, self-reliance
- CFU functions cohesively in actual event and successfully defends properties

**But (possibly):**

- CFU members focus on equipment and fire fighting to detriment of preparedness
- CFU over time becomes impervious clique, alienates other community members
- Neighbourhood gets false sense of security
- Training and resources focussed on ‘ready’ neighbourhoods leading to program successes. Less ‘ready’ neighbourhoods not included, miss out on needed support [‘creaming’?]

Figure 8: A tentative program theory model for Community Fire Units

# 13. The Ferny Creek Fire Alert Siren System

Development of the Ferny Creek Fire Alert Siren was classified under 'Community Consultation, Collaboration & Development Approaches' (Figure 1). While the result of the activity was a local warning system, accounts of the evaluation (Betts, 2001, 2003; Free, n.d.) clearly show that it was primarily a community consultation and collaboration process.

## Evaluation Methods

Results of a study of the community-related aspects of the Ferny Creek siren development have been reported by the evaluator (Betts, 2001, 2003) and a stakeholder (Free, n.d.). While information on the evaluation strategy is somewhat sketchy, it apparently involved interviews with all members of the working group for the project, a questionnaire distributed to residents mid-way though the consultation phase (46 respondents), and a follow-up residents' questionnaire after the subsequent fire season (54 respondents).

## Program Background and Rationale

A lobbying campaign by a small group of local residents followed a fire in Ferny Creek that was believed to be deliberately lit and in which 3 lives and 33 dwellings were lost. A coronial investigation that followed the fire identified the importance of 'early warning to residents in areas of particularly high fire risk'. A working group established by the municipality developed a number of options for a fire alert system and a preferred strategy that corresponded with the resident lobby group proposal; installation of a fire brigade-type 'warning' siren. One of the central aims of the working group was to "Maintain a consultative communication link with the Ferny Creek community on the progress of the project" (Betts, 2001, p. 4). The consultation and communication strategy involved four main strategies: (a) a questionnaire to landowners in the trial area, (b) a residents' meeting, (c) a door knock campaign to disseminate information about the alert siren and other bushfire safety issues, and (d) a community education campaign using a community newsletter ("On the Alert"). Additionally, information on the progress of the trial was circulated to local news papers and radio stations, a forum for residents was held prior to the next fire season and a Community Safety Fair was held.

## Context

Ferny Creek is a township on the north-western side of the Dandenong Ranges approx. 35 K to the east the Melbourne CBD. There were reported to be a total of 680 households in the locality in the 1996 national census. Ferny Creek is a high fire-risk peri-urban setting. The residential sub-division is adjacent to the Dandenong Ranges National Park that includes spectacular Mountain Ash forest and tree fern gullies. Additionally, the residential locality faces in a direction that is vulnerable to hot, dry summer winds and contains a topographic feature, referred to by locals as the Devils Chimney, which can funnel and concentrate these potentially damaging winds (Free, n.d.).

## Individual/householder Level Outcomes

A follow-up survey of residents indicated that the majority (72%) had a 'thorough knowledge of the fire alert siren and that they had sufficient opportunities to comment on its introduction" (Betts, 2001, p. 6). The local municipality newsletter was identified by 77% of respondents as the means by which they kept themselves informed about the project; informal communication was also identified as significant. Approximately 43% of

respondents to the survey rated the siren of 'high importance' to them and 39% of 'medium importance'. In contrast, 68% of respondents believed that the siren would be 'extremely valuable' or 'very valuable' to the community while 38% believed it would be of high value to the community but of little influence to their own bushfire response. It was reported that the combination of the alert siren and community education information supported the development of individual/householder bushfire survival plans.

Data also suggested a trend towards safer behaviour during a bushfire. Seventy-nine percent of respondents indicated that they would put their bushfire survival plan in place after hearing the alert siren (an increase from 28%). There was also a reduction of 50% in those indicating that they would leave their home on hearing the siren (Free, n.d.). Taken together these findings suggest a quite substantial increase in the number of householders reporting that they would follow the core recommendation of the 'stay-go' policy (stay and defend a prepared property).

## Community-level/Organisational Outcomes

Very little explicit data are reported for outcomes at the community and/or organisational levels. It is reported that the results of one follow-up survey "… identified the significant role of informal communication (social networks of friends and neighbours) …" but there is no indication that this important facet of community resilience was changed by the community consultation intervention (Betts, 2001, p. 6). There is also discussion of the role of community engagement in social trust and building partnerships. It is indicated that "the evaluation findings confirmed the complexity of this process" but, again, not that the consultation process may have improved aspects of social trust and partnerships in the community.

## Causal Processes

The evaluation identified that the critical leadership role of the Mayor and commitment of working group members throughout the process were positive contributions to progress. Recognition by the working group of community demand was reported to have resulted in a shift in working group attitudes from 'antagonism to acceptance' of the concept of a warning siren. Thus the project "… provided a clear example of community engagement whereby residents confirmed that their voice was heard" (Betts, 2001, p. 8). Further, the effectiveness of "a cooperative partnering process between multiple agencies and the community" was highlighted, particularly in achieving an appropriate balance between expressed community need and agency policies. The positive role of community education in improving the nature of the potential household response to a bushfire alert (to stay and defend a prepared property) was also highlighted while the potential unintended outcome of late evacuation was recognised.

In summary, while proposing that "A successful integrated alert system requires the development of shared meaning and expectations between stakeholders including the community" the evaluation report observed that "Currently there is a wide range of meanings and expectations of the Ferny Creek fire alert system" (Betts, 2001, p. 7). This 'wide range of meanings and expectations' might be seen as a potential constraint on successful implementation of the siren as an effective early alert system. No intra-community interactions with these causal processes were reported.

## A Theory Model for the Ferny Creek Fire Alert Siren

Based on the studies reviewed an initial model of the main causal processes and outcomes identified is presented in Figure 9.

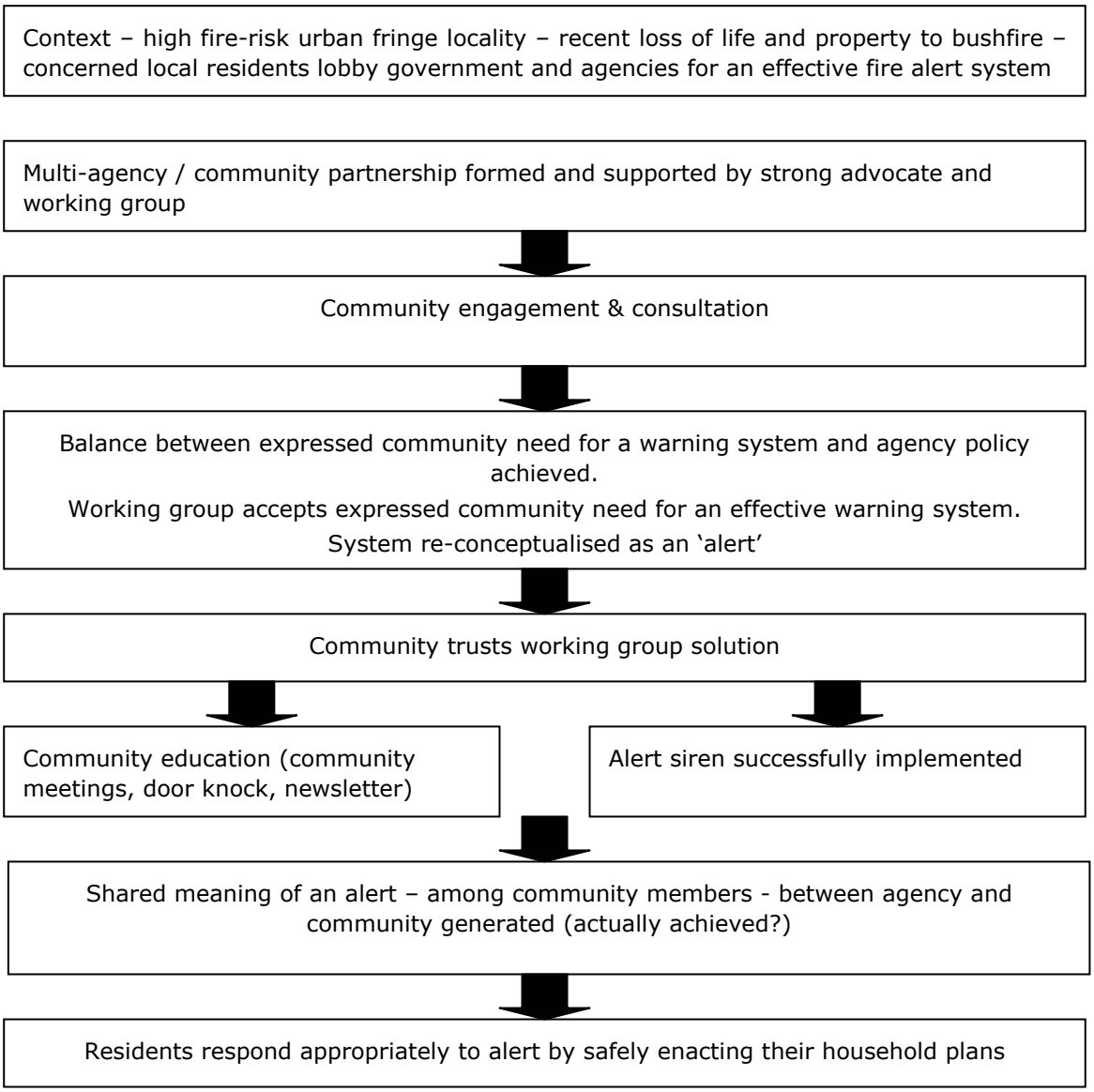


Figure 9: A tentative program theory model for the Ferny Creek Fire Alert Siren community consultation

# 14. Synthesis

Reviewing the available evaluative studies of community EAE activities and programs for bushfire in Australia has been a challenging task. The studies were quite diverse, varying considerably in detail and methodological rigour. While some explicitly utilised mixed-method approaches (e.g. surveys, individual interviews, focus groups, expert appraisal etc.) others were more-or-less anecdotal studies for which the data gathering and analysis methods used were not clearly apparent. However all contained a rich discussion of the actual or potential causal processes that were activated by the initiative and that, potentially, resulted in the desired outcomes. Additionally, for many, a useful description of the context of the program could be derived, either from the study itself or from other sources (e.g. municipal or state government websites). It is also interesting to note that a number of the studies, in one way or another, were either

based on an explicit theory of causal processes and desired outcomes or had the development of a theory model of the activity as an objective of the investigation.

An explicit aim of realist or theory-based research synthesis and review is the generation of preliminary configurations of contexts, mechanisms and outcomes for the general kind of initiative being studied.

> So, for example, in order to evaluate whether a training program reduces unemployment (O), a realist would examine its underlying mechanisms (M) (e.g. have the skills and motivation changed?) and its contiguous contexts C (e.g. are there local skill shortages and employment opportunities?). *Realist evaluation is thus all about hypothesising and testing such CMO configurations* Pawson et al. (2004, p. 2, emphasis added).

And further:

> Realist evaluation asks of a programme, 'What works for whom in what circumstances, in what respects and how'? Realist review carries exactly the same objective, *namely program theory refinement*. What the policy maker should expect is knowledge of some of the many choices to be made in delivering a particular service and some insights into why they have succeeded and/or failed in previous incarnations (Pawson et al., 2004, p. 3, emphasis in original).

A summary program theory model is presented in Figure 10 as a first step towards a full synthesis of knowledge about the effectiveness of community EAE programs for bushfire. While it is arranged in a context-mechanism-outcome sequence, the model does not, at this stage, contain specific CMO configurations as envisaged by Pawson and colleagues. It is anticipated that these specific configurations will be generated when the results of planned selective reviews of overseas EAE programs and the case studies presently being conducted by the research team are incorporated into the review.

The summary model in Figure 10 is based on those aspects of the theory models reconstructed for each initiative that were judged to be the more salient in (potentially) generating the desired outcomes of the community safety approach. Overall, there appeared to by a very high level of agreement and coherence between the results and discussion of the available studies; both across the studies themselves, and with the principles, recommend strategies, processes and desired outcomes of the community safety approach reviewed in the early sections of this report. This was particularly the case in relation to the recommended processes and desired outcomes for individuals, households and communities. Two initiatives, however, involved explicit agency-agency and agency-community partnerships (the Ferny Creek Alert Siren and the Moondarrah Fire Information Unit) and both were reported to have resulted in increased community trust and effective collaboration (between the fire agency and the municipality in the case of the Ferny Creek Siren and between the fire and land management agencies in the case of the FIU). What is lacking from the studies is any explicit indication of the way the implementation of these various initiatives may be influencing on-going and developing government and agency policy for community safety (although some of the initiatives are mentioned as examples of good practice in the various government reports reviewed in the first phase of this investigation).

**Context**

Diverse contexts are important in determining the appropriateness and success of specific community EAE initiatives for bushfire. These include:

- locality (urban fringe, rural township, rural)
- livelihood/lifestyle (commuter, small land-holder, farmer)
- community (existing ties, local organisations, local advocates, diversity – CALD, disabled, older residents)
- the nature of past and present events (recency, duration, phase (mitigation, preparedness, response, recovery)
- Prior level of engagement/interest in issue (resistant, motivated, active)
- inter-organisational relationships during planning/implementation (e.g. partnerships between response agency, land management agency, local government)
- intra-organisational relationships (e.g. response/community engagement officers)
- agency/community relationships (e.g. with local brigade or community fire unit)

**Engagement**

Individuals, households and families in bushfire prone localities in Australia are not necessarily strongly engaged with the risks and suitable safety responses. Programs *actively engage* their interest and motivation to enable participants, individually and collectively, to *think through* and *discuss* issues, *form the intention* to take appropriate action, and *plan* and make appropriate *choices*. Strategies that encourage engagement include well-presented visual materials, 'first-hand' accounts, well-organised authoritative presenters, personal contact and *'localising' content to the participants' context*.

**Trust and Self-confidence**

A consistent message from fire agencies is that they cannot necessarily defend every property during an event. Programs *generate trust* in agencies to give *credible advice*, listen to and respect *local knowledge*, make sound decisions that *respect local concerns*, and do their best in challenging circumstances. Residents also develop *confidence and trust in their own capacity* to plan, prepare and defend their property and, where appropriate, assist in their community.

**Confirmation and re-assessment**

Residents *actively seek confirming and additional information* (e.g. when a warning is received, when a safety strategy is recommended) from both *formal and informal sources* and, where appropriate, *re-assess and re-negotiate* their planning, preparation, and response options.

**Community involvement and collaboration**

Residents *get to know neighbours and other community members* better, *understand* their needs and capacities, *learn* from their skills and experiences, *collaborate* during an emergency, and *generate a shared understanding* of agency advice and warning messages.

**Planning, preparation and safe response**

Residents *individually and collaboratively* within families develop *plans*, *prepare* their properties and *respond safely* during an event (leave early or actively defend their property). Residents *share* their response plans with neighbours and agency personnel, *support each other* (including vulnerable community members) and *act as a group* where appropriate.

Figure 10: A preliminary theory model of community engagement/education initiatives

## Context

A notable feature of the summary theory model is the richness and diversity of the contexts that are discussed or implied in the evaluations. These differences in context range across:

- The geographic locality, including its fire history, the characteristics of individuals, households and families in the locality, and the extent to which they are linked by informal ties and more formal social networks and organisations [that, when present, might constitute the locality as a community (Pacioni, 2005; Walmsley, 2006)];
- The agencies involved in program implementation and their relationships (informal and formal partnerships); and
- The prior nature of any relationships between these agencies, partnerships and the community.

Additionally, there is some evidence from the studies reviewed that elements of this context interact with the nature of the initiative such that the initiative might only generate its anticipated outcomes if those elements are present. This evidence is sketchy at present, however, and considerably more analysis is required to make it more systematic. For example, the evaluation of the Street FireWise program in New South Wales highlighted the role played by a combination of geographic and socio-demographic characteristics of a neighbourhood (small townships with a pattern of side streets, parks etc.) in facilitating the specific format of the intervention (a Saturday street meeting) and providing a clientele that is potentially receptive to the content of the meeting. Similarly, the study of the Moondarrah FIU suggests that 'during event' community engagement initiatives that are built around a 'suite' of activities including community meetings, street walks, information points, school visits etc. are best suited to longer-running fires.

## Causal Processes

The causal processes highlighted in the model are Engagement, Trust and Self-confidence, Confirmation and Reassessment, and Community Involvement and Collaboration. Engagement (of individuals, households, families and community groups) with the program messages and ideas is the first challenge in the development of a successful community safety initiative for bushfire. Engagement is a broad idea that includes individual curiosity and interest, and the motivation to learn more, think carefully and form the intention to commence appropriate planning and preparation activities. Various strategies for gaining and maintaining attention are discussed in the studies reviewed. Perhaps the most clear-cut recommendations from these studies is that, to activate engagement, fire safety activities and materials should be: (a) *localised*, that is to say, carefully and explicitly adapted or tailored for the locality *and* community; and (b) visually attractive, with simple explanatory images not overburdened by text.

The generation of Trust and Self-confidence is proposed to result from successful Engagement. Residents need to be assisted to overcome possible initial hostility to agencies and their staff - "why bother talking to you, no one ever gets back to us" (Department of Sustainability and Environment, n.d.) - so that agencies can be seen to be offering credible advice, that negotiated solutions continue to be accepted, and that agencies with finite resources can be seen to be making sound decisions, taking co-ordinated action and thus doing their best for communities that are threatened by fire. Trust also suggests the idea that residents believe they can rely on *themselves, their families and their neighbours* in the event of bushfire; that they come to believe in the efficacy of what they know and have learnt, and understand their own and others' capacities and limitations so that they have the confidence to make decisions that are appropriate for themselves and their families and to put those decisions in to action.

The studies by Rhodes of Bushfire Blitz and Rhormann of media-based approaches both suggest that the process of seeking Confirmation and Elaboration of information that is received from media or in face-to-face events and the use of this information to confirm or re-assess and re-negotiate prior decisions is a critical causal process at the individual and household level. Confirmation, elaboration, re-assessment and re-negotiation can be supported by both formal and informal sources of information and it is very likely in some communities that informal sources of information may be critical for this process, particularly during an event (Goodman, Healey, & Boulet, 2007). While the theory that these processes are critical for successful planning and preparation and an effective and timely response is plausibly argued there is only scattered evidence in the studies reviewed that they are actively and consciously supported and encouraged in community EAE materials and activities (exceptions include the insertion of 'workbook' sections in fire awareness and preparedness booklets, the encouragement of 'two-way' interaction in street corner and other community meetings rather than didactic presentations, and the acknowledgement of the importance of one-one-one meetings with residents following community meetings in the Moondarrah FIU study.

Community-level processes including collaboration with neighbours, generation of shared understandings of the nature of the threat in a locality and of any alert messages, and collaborative decision-making and action were hypothesised in the preliminary program theory model for this investigation (Figure 2) to be 'otherwise-also-does' processes (i.e. possible unintended positive outcomes of an activity that was primarily concerned with response at the individual level). It is, however, clearly apparent that some programs, in quite different ways, actively seek to encourage community-level engagement, decision-making and collaborative action as a primary causal process. These programs include, for example, to on-going community group programs such as Community Fireguard where groups, having completed the 'formal program' over the first four or five meetings are encouraged then to consider specific community characteristics and needs and to explore the development of local solutions such as setting up a telephone tree. Similarly, while the possibility of the Street FireWise program leading on to the formation of formal on-going groups was abandoned as an objective there was evidence that informal groups had been formed and were, indeed, being assisted by agency volunteers.

## Outcomes

The expert consultation conducted by Rhodes and Reinholtd prior to the series of evaluation studies of Bushfire Blitz (Rhodes, 2001, 2003) identified a comprehensive list of the specific short/medium term outcomes at the individual/household level that might be achieved through community safety initiatives. They were:

- *Awareness* and *recognition* of the wildfire risk;
- *Knowledge* of fire behaviour and fire safety measures;
- *Planning* for the event of fire;
- *Physical preparations* of property and household; and
- *Psychological readiness* involving confidence and self-reliance (reported by Rhodes, 2003, p. 1, emphasis added).

Positive reports of outcomes across the full spectrum identified by Rhodes and Reinholtd were found in the review. For example:

- In Rhormann's studies of media materials, respondents reported positive views of printed materials (in particular a longer workbook-style booklet), television advertisements relating to bushfire safety and some agency websites.
- The Moondarra FIU was positively regarded for the value of advice provided at the community meetings and the face-to-face contact and opportunity to talk and ask questions on an individual basis following community briefings. Residents also

valued the up-to-date knowledge about the fire and being listened to, taken seriously, cared about, and supported by the FIU team.

- In Rhodes' studies of Bushfire Blitz, residents who had attended meetings previously and during the current fire season had higher levels of knowledge about bushfire compared (in order) with those who attended during the current season but had not attended previously, those who had attended previously but not during the current season and, finally, those who had never attended a meeting. A similar pattern was observed for self-reported levels of bushfire preparation (both outcomes were measured by multi-item indices). These differences were found to be statistically significant.
- Gilbert's study of the Street FireWise program reported residents who attended increased their awareness and understanding of bushfire risk. These increases were mediated by processes such as building on existing resident knowledge, changing misconceptions, introducing new ideas, contextualising issues to the local situation, generating resident understanding of how they can contribute to mitigation, and generating a clearer understanding of the role of the local fire brigade.
- Rohrmann's evaluation of Community Fireguard reported that, compared with non-participants, Fireguard members (a) were more likely to accept responsibility for bushfire preparedness and safety rather than seeing this as predominantly a fire agency task, (b) rated their overall bushfire preparedness higher, and (c) undertook more preparedness actions. A comparison of two newly formed Fireguard groups against two groups of non-participating residents from the same areas showed that the view that the fire agency was responsible for fire safety decreased in the Fireguard group over an initial six-month period of membership more than it did in the comparison group. Additionally, the number of preparedness actions taken by the new Fireguard members increased significantly. More specifically, the greatest change was observed for "joint planning with neighbours" and "writing down planning for bushfire events".
- Among other outcomes, Lowe et al (2008) reported that individuals involved in Community Fire Units (CFUs) (a) gained confidence in their ability to organise themselves, plan and to stay and defend their homes, (b) had enhanced local knowledge (knowing each others resources, the best configuration of equipment for particular circumstances, status and whereabouts of other residents), (c) felt more independent and self-reliant, (d) felt a greater connection with their immediate neighbours, had learnt to trust their neighbours, felt that 'looking after each other' would become increasingly important as they become older and (e) felt that they had obtained great personal benefit from CFU membership with little sacrifice.
- From the evaluation reports on the process that resulted in the installation of the Ferny Creek Fire Alert system it was concluded that (among other outcomes) the consultation process and siren installation had resulted in a trend towards safer behaviour during a bushfire. On a follow-up survey 79% of respondents indicated that they would put their bushfire survival plan in place after hearing the alert siren (an increase from 28%) while there was a reduction of 50% in those indicating that they would leave their home on hearing the siren. Taken together these findings suggest a quite substantial increase in the number of householders reporting that they would follow the core recommendation of the 'stay-go' policy.

Positive program outcomes at the community level were less frequently reported, the following, however, are indicative of the potential impact of community-based activities:

- Early in the establishment of the Moondarra FIU a decision was made to take a community engagement approach to encourage the development of lasting positive relationships with the community. The case study suggests that the community meetings were a critical link with the community and that the portrayal of the fire as a 'community fire' (and not an 'agency fire') was "a very powerful

message" (Department of Sustainability and Environment, n.d., p. 3). Early in the fire period it became apparent that the community at one township (where the FIU was based) was "using the meetings to check on community wellbeing after difficult nights and pass on local messages". At the meetings, residents were encouraged to look out for others, to visit neighbours to see if they needed help, and to share information gained at the meetings as a way to contribute. A shopkeeper from one of the townships commented that "The community updates helped me to help others" (Department of Sustainability and Environment, n.d., p. 4).

- Lowe et al (2008, pp. 29-30) suggest that the evidence from their study confirms that the formation of a CFU in a locality led to increased community resilience and cohesion (connections expanding from an initial core group to a wider range of residents). CFUs that had been actively involved in an incident "worked well together" and benefited from "understanding fire brigade operations and procedures". Further, successful defence of homes and property resulted from "a more detailed knowledge of pre-fire preparations, fire behaviour, likely ignition points and each other's strengths and assets".

# 15. Conclusion

Contrary to the sceptical view that very little in community education, awareness and engagement initiatives for natural hazards 'works'[12], this preliminary synthesis of evaluation studies clearly suggests that programs across the broad spectrum of 'top-down' to 'bottom-up' activities have the potential to achieve positive outcomes at both the 'individual' (resident, household, family) and community levels.

Three particular challenges in implementing the community safety approach are, however, apparent. Firstly, as mentioned above, the critical importance of context in successful program implementation is clearly evident. A specific aspect of context that has only recently been consciously addressed is community diversity. There is, perhaps, a tendency for community EAE activities for bushfire to be 'one size fits all' activities. There have been some recent initiatives that have explicitly considered aspects of community diversity, for example a post-fire interview study and follow-up community forums focussed on the needs of disabled residents in regional Victoria and the translation of printed brochures into a range of community languages. But the increasing trend towards technology-based communication solutions suggests that the diversity of the Australian community is still an important challenge for Australian emergency management agencies.

Secondly, from an agency perspective, it is clearly important that a consistent and coherent message of planning and preparation for bushfire is disseminated to householders and communities, and, where community members are engaged in response activities, that a shared understanding of necessary 'command and control' structures in generated and accepted (as stressed, for example, in the Community Fire Units program). The community safety approach, however, entails acknowledging that communities will adapt and perhaps re-invent this message both to fit it to their own setting and to achieve a measure of control of it. The importance that both agency and community groups accorded the concept *Greater Community Ownership and Responsibility for Bushfire Safety* in the concept mapping study suggests a critical task for policy institutions, agencies and communities: to seek to achieve greater community engagement with and responsibility for bushfire safety while encouraging appropriate agencies to continue to provide expert professional support through relevant policy principles and objectives and the institutional arrangements, broad strategies and programs necessary to implement them.

[12] See, for example, Paton (2003) and Paton, Kelly, Burgelt, & Doherty (2006).

Finally, if the length and complexity of the causal chains between a community safety activity and the desired medium-term outcomes of planning and physical and psychological preparedness is carefully considered it becomes evident that a single stand-alone initiative is unlikely to achieve all the desired changes. This suggests that the careful selection and integration of a small suite of initiatives and strategies that are, for example, focussed sequentially on generating Engagement, Trust and Self-confidence, Confirmation and Re-assessment and Community involvement and Collaboration may be more successful than any individual stand-alone initiative. An overarching program theory that linked different activities and programs to these different outcomes in a manner similar to that derived from Rhormann's model of the stages in the risk communication process (see Figure 3) would, we believe, greatly facilitate this development.

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