# THE COMMUNITY SAFETY APPROACH TO BUSHFIRE[1] IN AUSTRALIA: VALUES, PRINCIPLES AND DESIRED OUTCOMES

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[1] The Australian term 'bushfire' rather than 'wildfire' is used throughout this paper to avoid confusion as 'bushfire' is always used in the government initiated inquires that are reviewed.

# INTRODUCTION

Recent major bushfires have taken a heavy toll on life and property in communities around Australia (Australian Bureau of Statistics, 2004). Government initiated inquires into these fires have addressed many common themes relating to improved community safety. Bushfire agencies also increasingly state publicly that they do not have the resources to defend every property that may be in danger when a major event occurs. In the past decade or so there has been a shift within fire agencies and emergency management organisations more generally to acknowledge that reducing the risk from bushfire will be enhanced by the ability and willingness of householders and community groups to respond effectively. Many responsible agencies in Australia have adopted a risk management approach with a greater emphasis on prevention, mitigation and community preparedness (Smith, Nicholson, & Collett, 1996).

This tranformation in thinking from bushfire response (including recovery) to preparedness in Australia has parallels with similar international shifts in emergency management, crime prevention and public health and has become known as the ‘community safety approach’ (or ‘community safety paradigm’). 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. (Italics in original)

The community safety approach thus represents a critical transformation 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). These professionalised and "expert centred" approaches typically emphasised 'top-down' decision-making, agency responsibility and control, and deployment of professional expertise (McEntire, Fuller, Johnston, & Weber, 2002). 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 community safety approach in emergency management parallels 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). The notion of community self-reliance is often used to encapsulate these ideas. Increasingly, agencies are seeking ways to work more effectively with

communities by promoting increased involvement through a diverse range of engagement and education 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 provided in community meetings and through the media to assist the public to make appropriate decisions about how to respond to the threat. In some communities refuges, safe havens and relief centres provide a form of 'backup' for those seeking protection and support during fires.

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 a fire residents are less vulnerable if they stay with their prepared property and defend it, or leave well in advance of the firefront 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 firefront 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 depends 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.

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 present research team is assembling a database of community safety activities and programs for bushfire in Australia (Gilbert,

2007). Currently over 50 distinct programs are represented. Program development has been rapid and many are only partially documented; little systematic information beyond website descriptions of activities and programs and examples of media materials is available. 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. While some fire service and other agency personnel are known to share their learning across organizational and jurisdictional boundaries, such inter-organizational cooperation has focussed on the more high profile areas in operations such as the sharing of suppression resources; these activities also remain largely undocumented.

Thus, at present, there is little understanding of the effectiveness of the community safety approach to bushfire in Australia. If, indeed, the approach is effective it is also important to know for which households and communities and in what particular settings the programs work best, and how. This paper describes initial research to support the development of a comprehensive framework for evaluating the broad range of community safety policy, activities and programs for bushfire from this theory and evidence-based perspective (Kazi & Rostila, 2002; Kazi & Spurling, 2000; Lipsey, 1993; Pawson, 2006; Pawson & Tilley, 1997; Tilley, 2004).

Six recent commonwealth and state government reports were examined for recommendations and discussions that related to the general themes of community awareness, engagement and education. While the reports had different scopes and purposes and thus reflected somewhat different viewpoints, collectively they provided an evolving specification and clarification of the community safety approach to bushfire in Australia. Arising from the analysis, the broad foundational and operational principles (defining values and their implications for action) that appeared to underpin this approach were identified. In parallel to the policy analysis, structured concept mapping (Trochim & Kane, 2005; Trochim, 1989a) was used in 11 workshops with representatives of the community safety personnel in fire agencies and active community fire safe groups to identify the range of desired outcomes from community safety initiatives. The results of these two research endeavours together

with information about the range of specific activities and programs for bushfire safety (Gilbert, 2007) are synthesised in this paper to yield a generic 'concept map' (McClintock, 1990) of community safety policy and practice for bushfire in Australia. The concept map provides both a normative overview of the community safety approach to bushfire and a theory-based source of principled criteria for the evaluation of the effectiveness of the overall approach and the programs designed to implement it.

## Community Safety in Bushfires in Australia – Foundational and Operational Principles

### *Research Methods*

Six recent Australian reports were reviewed to identify the values and principles informing the development of policies and programs to improve community safety in bushfires (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) drew on all of the other reports, and the recommendations made have been accepted in principle by all Australian Governments.

The reports included in the review were:

- *Natural Disasters in Australia: Reforming mitigation, relief and recovery arrangements* – a 2004 report to the Council of Australian Governments (COAG) that included bushfires as one of several types of natural disasters;
- *Fire Prevention and Preparedness 2003* - an audit undertaken by the Auditor General of Victoria;
- *A Nation Charred: Report on the inquiry into bushfires* - an Australian Government House of Representatives inquiry following the 2002-2003 bushfires;
- *Inquiry into the Operational Response to the January 2003 Bushfires in the ACT* - commissioned by the Australian Capital Territory Government;
- *Report of the Inquiry into the 2002-2003 Victorian Bushfires* – commissioned by the Victorian Government from the state Office of the Emergency Services Commissioner;

- *National Inquiry on Bushfire Mitigation and Management* – a 2004 report to the COAG following the 2002-2003 bushfires;

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 awareness, engagement and education and the consolidated list of relevant recommendations was then grouped into themes. The limitations of this approach soon became obvious; 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 awareness, engagement and education 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 relevant concepts were also sorted into whether they related to planning and activities that occurred before, during or after a fire.

The final step in the review was to identify the values and principles informing the development of policies to improve community safety. These were grouped into 'foundational principles' - commonly accepted values shaping current approaches, and 'operational principles' - those derived from the foundational principles that guide policy development and planning of community fire safety programs. The operational principles were also found to be closely linked with a small number of recommended generic practices.

This paper does not assess the extent to which the policy directions are reflected in current practice, or the extent to which specific recommendations have been adopted and implemented by governments, fire agencies and other organizations. It is recognised that during implementation recommendations made in the reports may have been further developed. Government responses to

recommendations made in the reports have not been systematically investigated at this stage, nor does this paper attend to how other stakeholders have responded to the recommendations.

## *Results*

The foundational principles are that:

- Community safety in bushfires is a shared responsibility between householders, communities, agencies and governments;
- Individuals are responsible for taking action to mitigate their 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.

The operational principles that therefore inform policy development and planning for community fire safety interventions are:

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

A brief description of each principle follows.

### *Foundational Principles*

*Shared responsibility*. This concept referred to the need for responsibility to be shared between individuals, fire and other agencies and governments recognising that: (a) householders can take action that significantly reduces their bushfire risks; and (b) fire agencies will never have the capacity to assist all households in the event of a major fire. Research has shown that some residents

expect that fire services will be able to protect them in the event of a major bushfire, however this is an unrealistic expectation that could endanger lives; responsibility needs to be shared.

While the reports contained different emphases on the need for a broader range of stakeholders to take responsibility for mitigating bushfire risk, all agreed that responsibility should be shared. All levels of government, fire services and other agencies, small businesses and industries such as tourism, farming, forestry and insurance as well as communities and individuals have responsibilities to reduce risks.

*Individual responsibility.* Individuals and households are responsible for taking action to mitigate their risk of bushfire. This involves undertaking preventative and preparedness measures, developing household bushfire response plans that take into account the needs and capacity of each household member and maintaining adequate insurance cover. Preventative and preparedness measures include vegetation management, building and garden design and maintenance that can reduce risks regardless of whether the plan is to stay and defend or to leave early when there is a fire threat.

*People and communities differ.* Individual attitudes and perceptions influence how people respond to bushfire risks and are shaped by many factors: education, age, income, personal experience, knowledge of bushfires, peer group influences, emotions, beliefs and residential location. The factors that lead individuals to act on knowledge of how to manage risks are not well understood.

A group of people in a location does not necessarily constitute a community with common interests and a cooperative attitude. Differences between individual views about bushfire mitigation and management can be stronger in areas experiencing demographic changes such as rural-urban interface areas, and differences in the social and economic resources available within a community influence capacity to mitigate risks. The need for further research into the social and psychological factors that influence levels of preparedness and action taken during a bushfire threat was recognised.

*Diverse Priorities.* Saving lives was clearly stated as the highest priority however the ranking of other priorities varies amongst individuals and communities. Bushfires have economic, environmental and social consequences that vary depending on the landscape and land use and fire management objectives therefore vary across landscapes and over time. The landscape may support threatened plants and animals, water catchments, a range of industries, and a range of community and privately owned assets. Priorities may be competing or complementary, for example controlled burns may support some environmental priorities in some landscapes and protect private or community assets yet, at the same time, have a negative impact on health, agriculture or tourism.

*Risk management.* Steps in the risk management process include establishing the context, identifying risks, assessing risks through analysis and evaluation, and treating risks. Risk management requires relevant data and information to inform strategies to reduce the likelihood of bushfires and to minimise consequences when bushfires do occur through readiness, response and recovery processes. Community awareness, engagement and education are recognised as essential elements in bushfire risk management.

*Evidence-based policy and practice.* A key purpose of the post-fire reviews was to add to the evidence base informing policy development. Varied sources of evidence were presented, including reports of the experiences of local residents, farmers, fire fighters and others, and expert scientific and technical knowledge. Fire suppression has historically been better funded than community awareness, engagement and education activities and it is not clear whether this is the most effective use of resources. Better evidence is needed about the cost effectiveness of different strategies for reducing the impact of bushfires to inform risk management planning and the allocation of resources.

*Operational Principles*

*Comprehensive emergency management.* A comprehensive emergency management approach involves a focus on the consequences of emergency events for affected communities rather than on reactive responses to the event. This requires integrated planning and processes for prevention,

preparation, response and recovery phases. Comprehensive emergency management involves whole of government planning, coordination between levels of government, fire agencies responsible for private and public land and rural and urban areas, and cooperation with non-government agencies and community groups involved in preparing for, responding to, or recovering from bushfire.

*Understand local communities.* The capacity of individuals and communities differ, for example disadvantaged communities are likely to have less capacity to respond to challenges than vibrant communities. An understanding of the limitations and opportunities influencing local people and communities informs effective planning to reduce risks. To engage all people at risk, including those who do not regard themselves as being part of a community, awareness, engagement and education activities (including fire management planning) need to be flexible and inclusive.

*Working in partnership*. Working in partnership refers to partnerships within communities, between local communities and fire agencies, between fire agencies responsible for public and private land and rural and urban areas, between fire agencies, local governments and other local agencies, between fire agencies and the media, and between government departments and different levels of government.

The increased emphasis on the provision of accurate and timely communication between fire agencies and communities during a fire threat, and the application of community development practices where local governments and state government departments support communities to manage their own recovery processes are examples of the implementation of this principle.

*Identify and prioritise risks and assets.* A risk management approach needs to be informed by a clear understanding of the relative importance of potential risks (the likelihood of the risk occurring and the impact if it did occur) and the effectiveness of different strategies (or treatments) that could potentially be adopted to reduce bushfire risks. Risks and assets prioritised at local and state-wide levels need to be integrated to inform fire management plans.

*Local planning to mitigate risks.* Local community fire planning is a bottom-up approach that supports the development of local solutions to local problems taking into account social and physical resources available in the community. Plans that identify local leaders, networks, and people with valuable local knowledge can inform the full range of prevention, preparation, response and recovery activities. Strategies that do not take into account local views are not likely to be as effective in the event of a fire.

Planning processes should enhance community partnerships, be inclusive and broadly representative. Planning processes should identify shared values, prioritise assets and include preventative and responsive measures. Local planning can inform the targeting of community awareness, engagement and education programs to high risk individuals and communities.

*Household planning to stay and defend or leave early.* Household planning to stay and defend or leave early should be done before each fire season. This principle applies risk management at a household level. Planning should assess whether the house is defendable and take into account factors such as the needs and capacities of each member of the household, non-resident family members, neighbours and pets. It might also involve prioritising assets such as buildings, equipment and livestock. Agencies promote the stay and defend or leave early recommendation and provide information to assist household decision-making, planning and preparation.

If the decision is to stay and defend, a range of bushfire specific preparations should be undertaken and residents should not assume that a fire agency will be available to assist them. If planning to leave, residents should be ready to leave well before the fire is anticipated, to know where they are going and what they will take with them. Differences between people apply at the household as well as community level. Some members of a household may plan to leave early while others stay and defend the property.

*Research, monitoring, evaluation and information management.* The need for further research as well as improved monitoring and evaluation of the effectiveness of activities aiming to improve

community safety was a theme running through all of the reports. Recommendations included improving data collection and analysis, developing a national reporting framework, improving access to information for all stakeholders, the need to value local information, the importance of non-blaming post-incident reviews and the development of learning cultures within agencies and communities.

## *Discussion*

The links between the foundational and operational principles are not direct, one-to-one linear relationships. The operational principles have often been informed by two or more foundational principles. In some cases foundational principles inform not only what *should be done*, but the *process* for doing. For example, applying the principles of shared responsibility, evidence-based policy and planning, and differences between people and communities informs how risk management planning is implemented. Identifying and prioritising risks becomes an inclusive process that involves a range of stakeholders, draws on available evidence and takes into account the fact that priorities differ between and within communities.

Similarly, improved knowledge is essential for building the evidence base about what works and is also a mechanism for supporting partnerships and shared decision-making about risks and priorities for action. The shift to an integrated risk management paradigm was described in the COAG bushfire report (Ellis et al., 2004, p. 51) as:

> … a fundamental structural reform in disaster management that will move the focus beyond recovery and relief towards a cost-effective, evidence-based disaster mitigation.

While the principles are shared there were sometimes differences in the detail of how they were discussed and their suggested application. For example, the view that responsibility should be shared *and* that individuals have primary responsibility for mitigating their own risks was often expressed in the reports. Perspectives on primary responsibility varied between the reports and in different contexts within reports. 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.

Applying local planning that takes into account differences between individuals and communities as well as the integrated 'whole of government' approach implicit in the principle of comprehensive emergency management is complex. There may be contradictions and tensions between bottom-up community driven processes and top-down agency or government determined priorities and practices such as the imperative to support local solutions as against the desire to maintain fidelity in program implementation.

## A Concept Mapping Study of Desired Outcomes of Community Safety Programs

### *Research Methods*

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 (86 participants in total). Six workshops were held with fire agency personnel and five with representatives of community groups. From one to four 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. Typically, at least one workshop with agency personnel and one with community members was held in each state. The number of participants in each workshop ranged from 5 to 12.

The term 'concept mapping' can be applied to any process that results in a diagrammatic representation of the way an individual or group thinks about the content and relationships associated with a specific object, idea or issue. In one well known approach, concept maps are developed in a 'freehand' manner with individuals or groups (Novak & Canas, 2006; Novak & Gowin, 1984) and follow a designated, hierarchical form with linking lines and words or phrases. 'Structured concept mapping', as used in this research, is a related approach that is specifically designed for work with

groups and is supported by computer analysis of the ideas that are generated and structured during the workshop (Trochim, 1989a, b; Trochim & Kane, 2005; Trochim & Linton, 1986). Typically a concept map in this form consists of clusters of individual statements generated by workshop participants arranged in a two or three-dimensional display with vertical and horizontal axes. Usually both the axes and the clusters of statements are named by workshop participants but may be revised by researchers after further data analysis.

The method outlined by Trochim (1989a) was followed in each workshop using the original version of the *Concept System* computer program.[2] Participants 'brainstormed' ideas in response to the seeding statement:

> *Thinking as broadly as possible, generate statements that describe specific changes or improvements you think need to be achieved to make households and neighbourhoods safer from bushfires.*

After clarification and removal of redundancies the number of statements generated by the workshops in response to this focus statement ranged from 34 to 60. The statements were printed onto individual paper slips and returned to the participants who then sorted them 'in any way that made sense to you' but with the following general restrictions: (a) more than one pile should be used; (b) the number of piles should be less than the number of statements; and (c) there shouldn't be a 'miscellaneous' pile, statements that couldn't be allocated to a pile should be placed singly, in a pile of their own. After the sorting task participants were asked to rate each statement on two scales: (a) "… according to the importance of that issue in making households and neighbourhoods safer from bushfires" (*Importance*); and (b) "… according to how easy or difficult this is to achieve among a group of people or in a particular neighbourhood" (*Difficulty*).

Statistical analysis of the sorted statements was conducted during a break in workshop proceedings using the *Concept System* software. The analysis commenced with multi-dimensional

[2] A more detailed description of the research methods used and the results from the concept mapping workshops are available in Anthony-Harvey-Beavis, Rhodes & Elsworth (2006).

scaling, resulting in a two-dimensional ‘point-map’ on which each statement was represented as a single point and where the closeness (proximity) of two points was a measure of the similarity of the statements as perceived by the group as a whole. This was followed by cluster analysis that grouped the individual points on the map such that the similarity between the statements in a particular cluster was maximised. The number of clusters formed for each workshop was about one-fifth the number of statements generated and ranged from 7 to 12 across the 11 workshops. The results were portrayed in the workshops by a listing of the brainstormed statements within clusters and a two-dimensional map (the ‘cluster map’) where the point-map was overlayed by lines that marked out the cluster borders. Finally, as a group, workshop participants named each cluster, suggested any alterations they felt would be appropriate (e.g. occasionally moving a statement from one cluster to another, building a ‘higher-order’ structure) and were encouraged to add their own additions and interpretations to the map and to note anything that they felt was missing from the final representation.

In order to achieve a more precise (three-dimensional) representation of the results than that available from the *Concept System* software the data were re-analysed by the research team using a more specialised cluster analysis program *Clustan Graphics* (Wishart, 2004). Following re-analysis a structured meeting of the research team was conducted to achieve a synthesis of the concepts developed in the workshops. The group commenced by pairing the cluster names that were most similar in meaning, justifying each pairing as it was suggested and referring back to the detailed content of the clusters where necessary. After establishing a small number of pairs, the group worked in a hierarchical fashion, adding cluster names to existing pairs or forming a new pair where appropriate. When all individual clusters had been included in a synthesised group, each was named and a final revision was undertaken. Synthesis of the cluster analysis results from the 11 workshops yielded 14 general concepts; 12 from the results of both community and agency workshops, two from community workshops only and one from agency workshops only. Thirteen of the 14 general concepts were derived from the results of more than one workshop.

*Results*

The 14 concepts together with a summary of their content are listed in Table 1.

***[Table 1 about here]***

The ratings of *Importance* and *Difficulty* that were given by each participant to each statement generated in their workshop were averaged within each relevant concept. Scatter-plots of these average ratings for the community and agency workshops were calculated separately and the results are arranged in Tables 2 and 3. The tables are designed to emphasize the rank orders of the *Importance* ratings given to the concepts. While both *Importance* and *Difficulty* are split at the overall mean to form the table, the concepts are also ordered within cells according to their average *Importance*.

***[Tables 2 and 3 about here]***

A salient feature of the 14 generic community safety concept clusters that became clearly evident during their synthesis from the results of the individual workshops was 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, arguably, 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*).

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 appears to be strongly focussed on the potential direct household and neighbourhood outcomes of the programs they are associated with together with the means for achieving these outcomes.

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.

Concepts in the upper left quadrants of Figures 2 and 3 are those accorded relatively high *Importance* but lower than average *Difficulty* ratings. These concepts might be thought of as representing desired areas of action where more immediate achievements might be possible, while those located in the upper right quadrants might be regarded as requiring more detailed, longer-term planning.

## *Discussion*

In interpreting these results it is important to appreciate that the 14 concepts are the product of a structured process that elicited and subsequently combined the ideas of 86 agency personnel and community members from five Australian states. All participants, in different ways, were closely engaged in promoting bushfire community safety.

The results reveal the detail and complexity of the notion of community safety held by these agency and community participants. A particularly important feature is that individual and household-level outcomes are seen to be underpinned and supported by a network of principles, processes and outcomes at the community/agency and policy/organisational levels. Arguably, to be successful, bushfire safety policies and programs that aim to achieve individual and household level self-reliance and preparedness must take these intermediate and higher level contextual factors that are integral to the idea of community safety into account.

Both agency and community participants, on average, gave their highest ratings to elements of the concept *Greater Community Ownership and Responsibility for Bushfire Safety*. Thus both groups emphasized the importance of one of the central ideas within the community safety approach. The concept mapping also revealed clear support for another central idea within this approach, the development of partnerships across the levels of householders, communities and agencies. Further, while the specific ‘stay and defend or leave early’ message does not appear to have been accorded high importance by the agency groups who participated in the workshops, the more general idea of householder and neighborhood planning and preparation was clearly supported by both agency and community participants.

## A Concluding Synthesis

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." More recently the similar idea of 'what works, for whom, in what setting, and how' has become the driving concern of 'realistic evaluation', a form of theory-based evaluation (TBE) that places a central emphasis on understanding the causal processes initiated by social programs within particular contexts (Pawson & Tilley, 1997; Tilley, 2004). The 'evaluators as applied theorists' approach also made the values that informed program practices explicit and prominent. 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 realize the final goal of "improved quality of life" for clients and their families. McClintock's concept map provided a model for synthesizing the results of the policy analysis and concept mapping studies described above (along with information contained in the programs database) into a comprehensive model of the community safety approach (see Figure 1).

***[Figure 1 about here]***

The first step in constructing the model portrayed in Figure 1 was to 'backward map' (Elmore, 1979-80) the 14 outcome concepts for improving household and neighbourhood safety in bushfires identified by agency and community workshop participants onto a classification of the range of community safety programs currently offered around Australia together with the recommended principles and practices that were derived from the policy analysis of the six recent government initiated reports.

A high level of coherence between the principles, practices, programs and desired outcomes was observed. Perhaps this is not surprising as submissions and evidence from community members and agency personnel informed most of the government inquiries. However, it does suggest that there is clear understanding and acceptance among engaged community groups and agency personnel of these foundational and operational principles and related practices, even if they are accorded different levels of importance.

To illustrate these connections, examples of the links between a community and an individual level outcome and the principles, practices and types of activities and programs that contribute to the outcomes are detailed. At the householder level the principle of individual responsibility guides the promotion by bushfire agencies of household planning and preparation to mitigate risks. Local level planning that involves working in partnership supports greater understanding of the circumstances of local people and assists in developing strategies to target households at high risk. Developing activities that are flexible and diverse results in a range of programs such as the formation of community groups, street and community meetings and one-on-one consultations as well as web-based and printed information resources that support households to understand why they need a bushfire plan and how to go about deciding whether to stay and defend or leave early in the event of a fire.

A desired community and local agency level outcome was effective communication between agencies and the community during a fire (community members rated this outcome as more important than participants in the agency workshops). The principles that communities differ and that responsibility is shared leads to working in partnership, needing to understand the local community, and local planning that takes into account existing community networks and the capacity of the community to work cooperatively with a range of agencies. The development and implementation of activities and programs can then take into account the priorities and capacities of local individuals and communities and enable the sharing of information and lessons learnt from past experience between agencies and the community. Community meetings during an event and direct communication between members of the community, fire and other relevant agencies as detailed in the local fire management plan contribute to effective communication between agencies and the community during a fire.

There were a small number of discrepancies between the policy review and concept mapping studies. The use of ‘carrots and sticks’ to achieve planning and preparedness was not strongly advocated in the reviews, however some possible incentives were discussed including lower insurance premiums for households who had a high level of bushfire preparedness. Also reduced levels of

commonwealth government assistance for local governments who had not undertaken disaster mitigation planning unless there were exceptional circumstances that limited their capacity to plan were suggested.

Increasing understanding and application of regulations for bushfire safety were also not emphasised in the reports reviewed – with the exception of legislation covering land use and building codes which was not within the scope of this review. Promoting and enforcing regulations in the context of community awareness, engagement and education were not presented as effective ways of increasing community safety.

The principles that represent the expression of the community safety approach in emerging bushfire policy in Australia are arranged in the first two rows of Figure 1. These principles are seen to inform the development of activities and programs that utilize a small number of general practices; that are: (a) targeted to residents and communities at high risk; (b) characterized by diverse approaches that are tailored to the priorities and capacities of local individuals and communities; (c) flexible and responsive to differences and changes in individuals and communities; (d) evidence-based but innovative; and (e) monitored and evaluated and thus add to an accumulating knowledge about effectiveness for different communities in different contexts.

The developing database of specific bushfire awareness, engagement and education programs provided examples of the wide range of activities that have been developed across Australia that form the fourth row of the concept map. These range through: (a) media warnings, campaigns and publications (including multi-media projects) that focus on bushfire awareness, preparedness and recommended response; (b) pre-season street and community-hall meetings; (c) community briefings held during a fire event; (d) on-going community fire preparedness groups and neighborhood groups with both an immediate response and education focus; and (e) programs based on community development approaches and consultations with individual households. The desired outcomes of these activities and programs as revealed in the concept mapping study are represented in the last three rows of Figure 1.

The synthesized concept map yields an explicit characterization of the coherence of the Australian community safety approach to bushfire while revealing potential paradoxes, possible conflicts and missing elements. It also provides an overview of the possible causal relationships between community safety policy (including the 'stay and defend or leave early' recommendation), the activities and programs designed to implement or support the policy, and the potential short-term and longer duration outcomes that lead to a decrease in the loss of lives and property from bushfire and a minimization of environmental damage. It thus provides one important source of values informed and policy relevant criteria for the evaluation of specific community safety activities and programs.

One particular challenge in implementing the community safety approach is also highlighted. 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. 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 ownership of it. The importance that both agency and community groups accorded the concept *Greater Community Ownership and Responsibility for Bushfire Safety* 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.

**Table 1: Desired Community Safety Outcomes for Bushfire**

| Concept Name | 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 understanding 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.

**Table 2: Perceived Importance and Difficulty of Achieving Community Safety Outcomes - Fire Agency Workshops**

| | Lower Difficulty | Greater Difficulty |
|---|---|---|
| Greater Importance | Appropriate information/education activities provided.<br>Neighbourhood and community partnerships.<br>Principles underlying program development and adult learning. | Greater community ownership and responsibility for bushfire safety.<br>Individuals/community have a realistic understanding of risk.<br>Household/neighbourhood planning and preparation. |
| Lower Importance | Agency/inter-agency responsibilities and co-ordination.<br>Deciding and planning for 'stay or go'.<br>Agency/community interaction<br>Effective communication of information during bushfire. | Understanding/application of regulations for bushfire safety.<br>Policy framework for agency and organisational roles. |

**Table 3: Perceived Importance and Difficulty of Achieving Community Safety Outcomes - Community Workshops**

| | Lower Difficulty | Greater Difficulty |
|---|---|---|
| Greater Importance | Greater community ownership and responsibility for bushfire safety.<br>Agency/community interaction.<br>Household/neighbourhood planning and preparation.<br>Deciding and planning for 'stay or go'. | Policy framework for agency and organisational roles. |
| Lower Importance | Appropriate information/education activities provided.<br>Agency/inter-agency responsibilities and co-ordination.<br>Understanding/application of regulations for bushfire safety. | Neighbourhood and community partnerships.<br>Community and agency responsibilities to address specific needs.<br>Effective communication of information during bushfire.<br>Use of incentives to achieve preparedness.<br>Individuals/community have a realistic understanding of risk. |

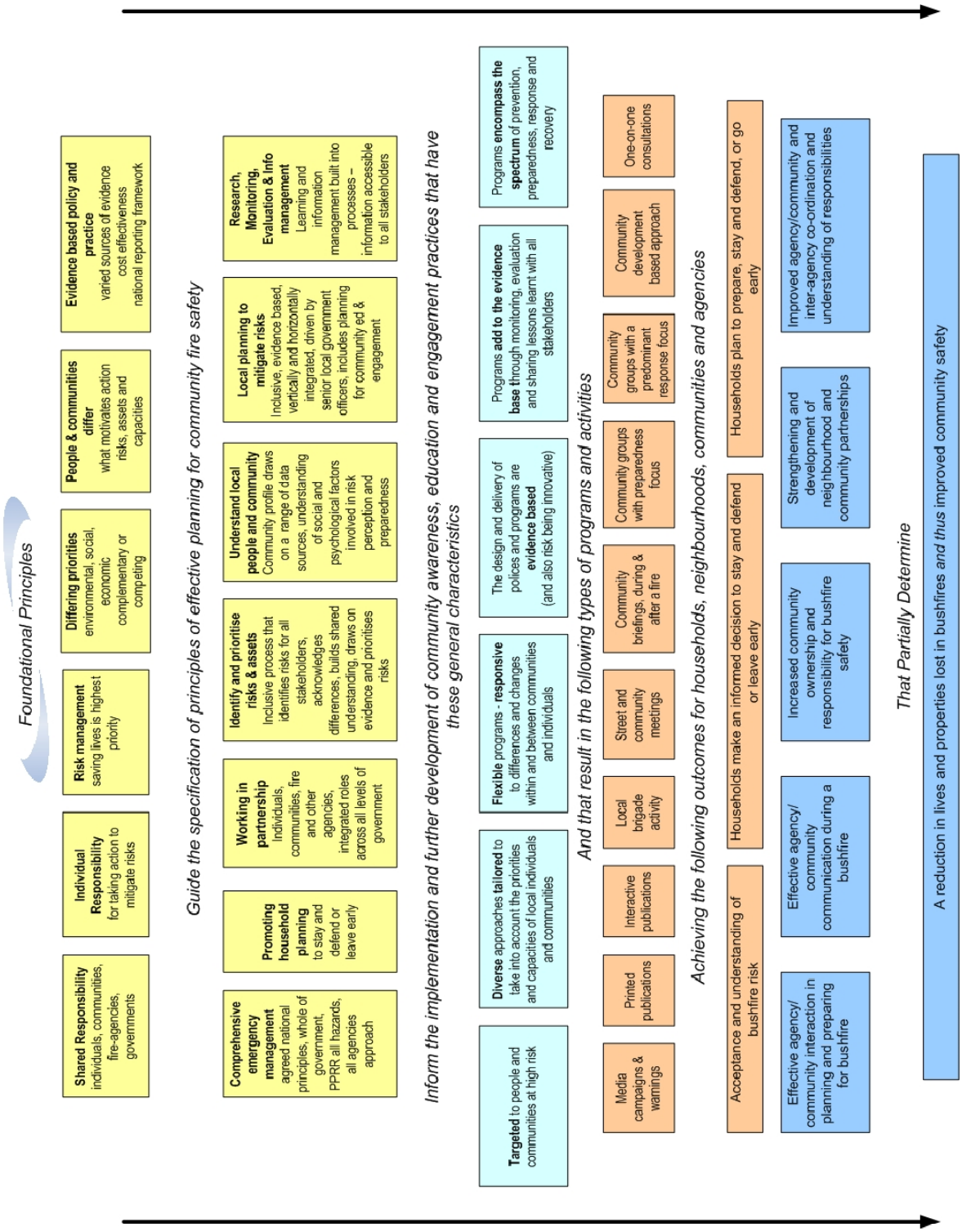


**Figure 1: Concept Map of the Community Safety Approach to Bushfire in Australia**

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## REFERENCES

Anthony-Harvey-Beavis, K., Rhodes, A., & Elsworth, G. (2006). *Conceptualising Household and Neighbourhood Safety from Wildfire in Australia*. Paper presented at the 2006 International Conference of the Australasian Evaluation Society. Retrieved June 26, 2007, from http://www.aes.asn.au/.

Australasian Fire Authorities Council (2005). Position Paper on Bushfires and Community Safety [Electronic Version] from http://www.afac.com.au/awsv2/publications/documents/PositionPaperonBushfiresandCommunitySafety.pdf.

Australian Government Department of Transport and Regional Services on behalf of the Council of Australian Governments (2004). *Natural Disasters in Australia: Reforming Mitigation, Relief and Recovery Arrangements*. Canberra: Commonwealth of Australia.

Barnes, P. (2002). Approaches to community safety: Risk perception and social meaning. *Australian Journal of Emergency Management, 17*(1), 15-23.

House of Representatives Select Committee into the Recent Australian Bushfires (2003). *A Nation Charred: Report on the Inquiry into Bushfires*. Canberra: HRSCRAB.

Cameron, J. (2003). *Fire Prevention and Preparedness*. Melbourne: State Government of Victoria.

Chen, Y. T. S. (1990). *Theory-driven Evaluations*. Newbury Park: CA: Sage Publications.

Chess, C., Salomone, K. L., Hance, B. J., & Saville, A. (1995). Results of a national symposium on risk communication: Next steps for government agencies. *Risk Analysis, 15*(2), 115-125.

Ellis, S., Kanowski, P., & Whelan, R. (2004). *National Inquiry on Bushfire Mitigation and Management*. Canberra: Commonwealth of Australia.

Elmore, R. F. (1979-80). Backward mapping: Implementation research and policy decisions. *Political Science Quarterly 94*(4), 606-616.

Esplin, B., Enright, N., & Gill, A. M. (2003). *Report of the Inquiry into the 2002-2003 Victorian Bushfires*. Melbourne: State Government of Victoria.

Gilbert, J. (2007, May). *Developing a Realist Typology for Community Safety Programs for Wildfire*. Paper presented at the Wildfire 2007: 4th International Wildland Fire Conference.

Handmer, J., & Tibbits, A. (2005). Is staying at home the best option during bushfires? Historical evidence for an Australian approach. *Environmental Hazards, 6*(2), 81-91.

Hodges, A. (1999). *Towards community safety.* Paper presented at the Australasian Fire Authorities Conference, Priority Community Safety, Melbourne.

Hughes, G. (2002). The shifting sands of crime prevention and community safety. In G. Hughes, E. McLaughlin & J. Muncie (Eds.), *Crime Prevention and Community Safety: New Directions* (Vol. Sage Publications). London.

Kazi, M., & Rostila, I. (2002, October). *The practice of realist evaluation in two countries.* Paper presented at the European Evaluation Society Fifth Conference, Seville, Spain.

Kazi, M., & Spurling, L. J. (2000, October). *Realist evaluation for evidence-based practice.* Paper presented at the European Evaluation Society Fourth Conference, Lausanne, Switzerland.

Krusel, N., & Petris, S. N. (1992). *A Study of Civilian Deaths in the 1983 Ash Wednesday Bushfires, Victoria, Australia* (CFA Occasional Paper No 2). Melbourne: Country Fire Authority.

Labonte, R. (1994). Health promotion and empowerement: Reflections on professional practice. *Health Education and Behavior, 21*(2), 253-268.

Laverack, G., & Labonte, R. (2000). A planning framework for community empowerment goals within health promotion. *Health Policy and Planning, 15*(3), 255-262.

Lipsey, M. W. (1993). Theory as method: Small theories of treatments. In L. B. Sechrest & A. G. Scott (Eds.), *Understanding Causes and Generalising About Them* (New Directions for Evaluaton, Vol. 57, pp. 5-38). Wiley Periodicals Inc.

McClintock, C. (1990). Evaluators as applied theorists. *Evaluation Practice, 11*(1), 1-12.

McEntire, D. A., Fuller, C., Johnston, C. W., & Weber, R. (2002). A comparison of disaster paradigms: The search for a holistic policy guide. *Public Administration Review, 62*(3), 267-281.

McLeod, R. (2003). *Inquiry into the Operational Response to the January 2003 Bushfires in the ACT*. Canberra: Australian Capital Territory Government.

Novak, J. D., & Canas, A. J. (2006). *The theory underlying concept maps and how to construct them, Technical Report IHMC Cmap Tools 2006-01*. Pensacola, Fl.: Florida Institute for Human and Machine Cognition.

Novak, J. D., & Gowin, D. B. (1984). *Learning How to Learn*. Cambridge: Cambridge University Press.

Pawson, R. (2006). *Evidence-based Policy: A Realist Perspective*. London: Sage.

Pawson, R., & Tilley, N. (1997). *Realistic Evaluation*. Thousand Oaks, CA: Sage.

Reams, M. A., Haines, T. K., Renner, C. R., Wascom, M. W., & Kingre, H. (2005). Goals, obstacles and effective strategies of wildfire mitigation programs in the Wildland-Urban Interface. *Forest Policy and Economics, 7*(5), 818-826.

United States Department of Agriculture Forest Service, National Database of State and Local Wildfire Hazard Mitigation Programs (Retrieved June, 17, 2007, from United States Department of Agriculture Forest Service: http://www.wildfireprograms.usda.gov/index.html).

Smith, P., Nicholson, J., & Collett, L. (1996). Risk management in the fire and emergency services. *Australian Journal of Emergency Management, 11*(2), 1996.

Squires, P. (1997, July). *Criminology and the 'community safety' paradigm: Safety, power and success and the limits of the local.* Paper presented at the British Criminology Conference, Queens University, Belfast.

Australian Bureau of Statistics (2004). *Year Book Australia, 2004, (Environment, Bushfires)*. (Retrieved June 17, 2006, from http://www/abs/gov.au/websitedbs/D3310114.nsf/home/home).

Steelman, T. A., & Burke, C. A. (2007). Is wildfire policy in the United States sustainable? *Journal of Forestry, 105*(2), 67-72.

Tilley, N. (2004). Applying theory-driven evaluation to the British Crime Reduction Programme: The theories of the programme and of its evaluations. *Criminal Justice, 4*(3), 255-276.

Trochim, W. M. K. (1989a). Concept mapping: Soft science or Hard Art? *Evaluation and Program Planning, 12*, 87-110.

Trochim, W. M. K. (1989b). An introduction to concept mapping for planning and evaluation. *Evaluation and Program Planning*, *12*, 1-16.

Trochim, W. M. K., & Kane, M. (2005). Concept mapping: an introduction to structured conceptualization in health care. *International Journal for Quality in Health Care*, *17*(3), 187-191.

Trochim, W. M. K., & Linton, R. (1986). Conceptualisation for evaluation and planning. *Evaluation and Program Planning*, *9*, 289-308.

Wilson, A. A. G., & Ferguson, I. S. (1984). Fight or flee? A case study of the Mount Macedon bushfire. *Australian Forestry*, *47*(4), 230-236.

Wishart, D. (2004). Clustan Graphics (Version 6.06) [Cluster analysis]. Edinburgh, Scotland: Clustan Ltd.