The Australian Journal of Emergency Management

Vol. 24 No. 2, May 2009 ISSN: 1324 1540

PUBLISHER
The Australian Journal of Emergency Management is the official journal of a Division of the Federal Attorney-General's Department, and is the nation's most highly rated journal in its field. The purpose of the Journal is to build capacity in the emergency management industry in Australia. It provides access to information and knowledge for an active emergency management research community and practitioners of emergency management.

CIRCULATION
Published on the last day of August, November, February and May each year. Copies are distributed quarterly without charge to subscribers throughout Australia and overseas.

SUBMISSIONS
The *Australian Journal of Emergency Management* welcomes submissions. Please contact us on ajem@ema.gov.au for a copy of our Contributors' Guidelines. Articles for publication may be forwarded to:

The Australian Journal of Emergency Management
Main Road MT MACEDON VIC 3441

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Tel: (02) 6295 3662

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Foreword

By Martin Studdert, AM
Attorney-General's Department

In Australia and our region recently, there has been an acknowledgment of the need to broaden the 'traditional' national security agenda to include a nation's response to natural disasters, or what we have always known as 'emergency management'... This has resulted in the better alignment of nation-wide security issues such as counter-terrorism with the response to national disasters. This acknowledgement is welcome and brings with it the opportunity to better plan and implement a nation-wide strategy for the development of national security capability at the Commonwealth and State and Territory level.

To reflect this broader push towards a more disaster resilient Australia, the Commonwealth Attorney-General's Department has recently undergone an organisational restructure, effective 2 March 2009. The new structure aims to ensure a Department that is better aligned to meet the Government's current and emerging priorities. The new structure takes into account the priorities outlined by the Prime Minister in his inaugural *National Security Statement 2008* and the outcomes of the *Review of Homeland and Border Security* ('the Smith Review'), which take an all-hazards approach to national security. Those reviews were outlined in the February edition of AJEM and can be sourced at www.ema.gov.au.

The former Emergency Management Australia has changed significantly within the restructure. It is now responsible for a broader range of national security crisis coordination, including operational responses to natural hazards, terrorism and other crises of national significance. It also incorporates the National Security Hotline, disaster relief, dignitary protection and protective security. My colleague, Tony Pearce, is the Director General of this new division of the Department.

The policy and capability development areas of the 'old' EMA have now been moved into different divisions within the Attorney-General's Department. Emergency management professional and public education and information management now sits within the National Security Capability Development Division, under my direction.

This restructure gives us the opportunity to look five years hence and scope the future capability requirements for Australian communities. Without information, research and knowledge-sharing it will be difficult to accurately determine what is really required. This is where products such as the Australian Journal of Emergency Management and networks like Australasian Libraries in the Emergency Sector (ALIES) play a key role.

The government places great importance on whole-of-government coordination and cooperation, including with regional partners. ALIES very much reflects this priority and has an important role to play in the continuous improvement of the national security environment, by enhancing access to, and facilitating, the rapid and high quality exchange and sharing of information within the sector. The important role that information and knowledge-sharing plays in influencing cultural change within agencies and sectors cannot be overstated and it is in this environment that ALIES has an important responsibility to its clients as well as its parent agencies.

The annual ALIES conference recently held at the Emergency Management Institute at Mt Macedon provided an opportunity for library professionals representing member libraries from national security, such as the Australian Federal Police, Australian Customs Service and others including New Zealand Police, to interact with members from the traditional emergency management and emergency service libraries.

In this broader national security environment it will be very important to ensure that the future ALIES library membership and user base are reflective of this new direction in government policy.

I hope you enjoy this edition of AJEM which provides an update on the Victorian bushfires and floods in Queensland and New South Wales, as well as a new section titled *National Security News* incorporating the latest government briefs in relation to emergency management.

Martin Studdert
First Assistant Secretary
National Security Capability Development Division
Attorney-General's Department

The legal powers and potential cultural impact of the 2009 Bushfire Royal Commission in Victoria

Professor Jennifer McKay, University of South Australia

Royal Commissions have had an important role in the Australian federation and over 1000 (Borchardt 1990) have been conducted in Australia up to 1990. Royal Commissions also have the emotional role of catharsis of some anger for some individuals. The grief and loss experienced and the stories told in Royal Commissions can become part of the cultural identity of a nation and hence have a cultural role. All Royal Commissions are investigative bodies whose power to report is capable of damaging or prejudicing the rights, interests or legitimate expectations of many people. (*Firman v Lasry 2000 VSC 240* page 9). However, the investigative powers are generally administered formally and there are limitations on these powers.

Royal Commissions have been conducted by State governments alone, State and federal governments together and by the Commonwealth alone. They are often controversial as in *Firman v Lasry 2000 VSC 240* addressing fraud and illegality as in the Victorian Royal Commission on the Metropolitan Ambulance service. There have been many Royal Commissions on fraud and illegality of business and individuals. Royal Commissions or Inquiries have also often been called after bushfires, notably in 1939 in Victoria and several other times in all Australian States. Such Royal Commissions then have had a key role in shaping our democracy and telling stories about relations of people to nature in the case of natural disasters and between people and institutions for the investigations of fraud.

The Australian Law Reform Commission considers that Royal Commissions exist when there are controversial matters that cannot be handled by a Court or by the political process. Often, as with the Bushfires 2009 Commission, there is a need to answer a series of questions and a formal process is required to gather evidence to answer such questions. The answers can lead to law reform and policy changes.

For example, the 1939 Bushfire Royal Commission, under the fearless Leonard Stretton, led to the widespread use of systematic fuel reduction and a new organisation—the Country Fire Association (CFA) which was formed in 1945. (Australian Dictionary of Biography online edition).

Questions and powers to make recommendations

In the case of the 2009 bushfires the questions asked of the three Commissioners are broad and detailed. The Governor acknowledges the role of existing organisations but asks these questions:

1. What were the causes and circumstances of the bushfires that burned various parts of Victoria?
2. What were the preparations and planning by Governments, emergency services organisations, other entities, the community and households for bushfires in Victoria, including current laws, policies, practices, resources and strategies for prevention, identification, evaluation, management and communication of bushfire threats and risks.
3. What were the aspects of the response to the 2009 bushfires, particularly measures taken to control the spread of fires and measures taken to protect life and private property and public property, including but not limited to:
   (a) immediate management response and recovery;
   (b) resourcing, overall co ordination and deployment; and
   (c) equipment and communications systems?
4. What were the measures taken to prevent or minimise disruption to the supply of essential services such as power and water during the 2009 bushfires?
5. What are any other matters deemed appropriate in relation to the 2009 bushfires?

Furthermore, the 2009 Bushfire Royal Commission is obliged to make recommendations in relation to a broad set of long term issues. These are:

1. The preparation and planning for future bushfire threats and risks, particularly the prevention of the loss of life.
2. Land-use planning and management, including urban and regional planning.
3. The fireproofing of housing and other buildings, including the materials used in construction.
4. The emergency response to bushfires.
5. Public communication and community advice systems and strategies; and
6. Training, infrastructure and overall resourcing needs.

The Royal Commission is directed to take into account and consult the Coroner, the Victorian police, the Director of Public Prosecutions and the Victorian Bushfire Reconstruction Authority. The Commissioners have full power and authority to call before it any persons that they judge shall be able to afford any information on the 2009 Bushfire.

Royal Commissions in Victoria are empowered under section 88B of the *Constitution Act 1975* and all Royal Commissions are placed under the supervisory jurisdiction of the Supreme Court to ensure procedural fairness. There is also a separate law designed to deal with evidence given to Commissions in Victoria the *Evidence (Commissions) Act 1982* and the ambit of this will be tested.

So what lessons are there from past practices in running Royal Commissions in Victoria and in NSW and at the national level Australia under the *Royal Commissions Act 1902 (Commonwealth)* which is up for review as of January 2009?

The issues have been:

1. The scope of the reference.
2. The powers to compel the provision of information.
3. The power to report instances of behaviour which can prejudice a person in many ways, i.e. to criminal investigation bodies.
4. The public nature of the evidence taken especially if recording is to be allowed.
5. Whether contempt of the Royal Commission can occur through publication of certain statements; and
6. If the rules of evidence are to apply.

Because of the difficult nature of the questions and reference it has become normal practice in Victoria to have legal practitioners assist the Commission and to cross examine witnesses *Bretherton v. Kay & Winneke [1971] V.R. 111*. This process tends to push the processes toward formal rules of evidence.

The outlook for the 2009 Bushfires Royal Commission

The scope is extremely broad and the powers to compel information are also broad. The words suggest that a steep change in the organisations maybe possible.

It is also a certainty that the Royal Commission will be an emotional time for the victims and their families and the broader community as the eye witness accounts of the events and the grief over lost family members, animals' livelihoods and cultural artefacts including homes becomes known. The question of why and how did this happen will resonate with grief and blame.

The delicate task will be to elicit many stories and then weave all these threads into one overarching story that has policy, legal and institutional ramifications. This story will change culture and lead to yet another iteration of laws, policies and management operations better able to address these events. The predictions of climate change scenarios suggest that these firestorm events will become more common and hence we need an adaptive cultural understanding of these events. This Royal Commission has great short and long term roles in modern Australia.

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About the author

Jennifer McKay is Professor of Business Law at the University of South Australia and was co editor of the Economics and Bushfires the South Australian experience, Oxford University Press on 1985. She has also written about newspaper reporting of bushfires on several occasions for academic journals. She now works on sustainable development law.

Community capacity building: Learning from the 2003 Canberra bushfires

Winkworth, Healy, Woodward and Camilleri examine what helps and hinders community capacity building.

Abstract

Research into what happens to communities after disasters is one way of understanding the elements of community capacity building and the actions that help and hinder these processes. In recent years a number of large scale disasters both onshore and offshore have become the focus of Australian State and Commonwealth disaster recovery efforts. These have provided opportunities to reflect on successful elements of 'community recovery' including what 'communities' do themselves to assist 'recovery' and what governments can do to enable and actively facilitate the 'recovery' process. Through an examination of a recent study on the recovery of people affected by the Australian Capital Territory (ACT) bushfires (known as the Canberra Bushfires) (Camilleri et al, 2007), this paper examines what helps and what hinders community capacity building, including the role of social networks and supports and community engagement activities. It also contributes to a broader knowledge base about the importance of governments recognising and enabling the development of social networks which help people 'get by', and 'get ahead', and which foster a sense of control over their lives. This knowledge can usefully frame actions used in the pursuit of many other desired policy outcomes linked to community capacity building.

Introduction

Although disasters impact upon individuals, they do not happen to individuals per se (Hutton, 2001). Disasters more accurately represent collective stress situations occurring at a community level as a result of major unwanted consequences. It has been argued that one of the defining aspects of a 'disaster' is the sense that a group of people make of an event – the shared identity that they, together, have been affected by major catastrophe. As Gist and Lubin explain, a disaster is inherently defined by its relationship to community –

a cataclysm qualifies as a disaster only to the extent that it overwhelms the capacity of a community to contain and control its consequences (1999, p. 352 in Hutton, 2001).

With most Australian disaster recovery literature tending to focus on the immediate aftermath and short term recovery phases after a disaster, questions remain about what happens to 'communities' affected by disasters in the longer term. What follows the initial upsurge of collective unity? Do the "social cleavage planes" which follow the initial phases (Gordon, 2004) invariably undermine the social fabric of communities? Can governments promote social cohesion by enabling the strengthening of the social networks that develop in the aftermath of disaster? How can governments ensure that vulnerable groups are actively supported and included?

Through an examination of a recent study on the recovery of people affected by the Canberra Bushfires (Camilleri et al, 2007), this paper examines what helps and what hinders community capacity building, including the role of social networks and supports, formal services and community engagement activities. It contributes to the broader knowledge base of community capacity building so that this knowledge can usefully frame the pursuit of other desired policy outcomes linked to community capacity building.

Disaster Recovery – an outcome and a process

Within the context of disaster management the terms 'recovery', 'resilience' and 'community capacity building' are often defined, interchangeably, in two broad ways: firstly as a desired outcome and, secondly as a process leading to a desired outcome. Within each of these broad conceptualisations it is possible to consider both outcomes and processes that apply firstly to the actions of individuals and communities and secondly, to the role of governments seeking to facilitate 'recovery'.

Recovery as an outcome

The notion that optimal recovery is restoration to an initial equilibrium point is increasingly being challenged (Maguire & Hagan, 2007). Concepts such as 'closure', so often referred to by the media and others, are regarded now as having very little, if any, useful place; instead, there is recognition that various aspects of grief alternate and re-emerge with unexpected intensity, particularly with anniversaries and other significant events (Rando, 1993) and that the challenge for people affected is how they reengage with a world which for most is forever transformed by loss (Stroebe & Schut, 2001).

The disaster literature increasingly focuses on the notion of increased community resilience after disasters as a desirable and achievable social policy goal. Resilient individuals and communities adapt to new circumstance, learn from disaster experiences and are capable of attaining higher levels of functioning (Maguire and Hagan, 2007). Berke and Campanella (Berke & Campanella, 2006), for example, consider the significant challenges of achieving resilience in the context of the catastrophic aftermath of Hurricane Katrina and Hurricane Rita in the United States.

Resilience is the ability to survive future natural disasters with minimum loss of life and property, as well as the ability to create a greater sense of place among residents; a stronger, more diverse economy; and a more economically integrated and diverse population (Vale and Campanella, 2005 in Berke and Campanella, 2006).

Recovery processes – building community capacity

'Recovery' is also no longer only regarded as a desirable end point; it now signifies the active processes involved in integrating traumatic events and minimising their destructive impacts, so that individuals, communities and governments are able to move forward into a post-disaster future.

The active processes involved in building community strength and resilience in this context involve actions, firstly, on the part of individuals and communities helping themselves, and secondly, a set of interventions on the part of governments to build more resilient social, economic, physical and natural environments.

Through an analysis of the research into recovery after the 2003 Canberra Bushfires in the Australian Capital Territory this paper considers the practical meaning of these processes in relation to the social environment, that is, enabling and strengthening the social networks and community development activities which can positively impact on individual and community capacity.

The Canberra Bushfire research

Canberra, Australia's capital city, is also its largest inland city with a population of 332,000. The city, located at the northern end of the Australian Capital Territory, has a planned layout and urban landscape reflective of the city's major role as the seat of Federal Parliament and home to the national institutions that support it. Often called the "Bush Capital" Canberra covers an area of 805.6 square kilometres and the bushland within and surrounding it is a mixture of dry eucalyptus forests, scrubland, swamp, eucalyptus savanna and open grassland.

On January 18, 2003 Canberra experienced a devastating 'firestorm' in which 4 people died, 3 people were treated for serious burns, 49 people were admitted to ACT hospitals and 440 people received outpatient care. Within the space of a few hours, 488 houses were destroyed in both urban and rural ACT. Nearly 160,000 hectares were burnt including over 16,000 hectares of plantation forests and 31,000 hectares of rural leases. More than 5,000 people were evacuated to the emergency centres and many more fled to safety with family and friends (ACT Government, 2003).

Three years later research undertaken by a multidisciplinary research team[1] and funded by Emergency Management Australia and the ACT Government investigated the process of individual and community recovery. With a focus on the intermediate and longer term recovery the project investigated:

What individuals and communities did themselves to facilitate recovery and resilience:

- The role played by formal government and community recovery programs;
- Mental health outcomes for individuals; and
- Communication and information provision.

Two main strategies were used in the research. A questionnaire administered as a postal survey was distributed at the beginning of April 2006 to approximately 1600 households registered with the ACT Bushfire Recovery Centre. The survey comprised 126 questions enabling respondents to provide quantitative and qualitative responses on a range of topics related to the impact of the bushfire. It included multi-item ratings and a number of open-ended questions designed to elicit brief personal narratives concerning people's responses to the disaster, their stage in the recovery process and their perspectives on what people did to bring about 'recovery'.

Where possible standardised measures were incorporated into the survey and questions were based on those used in population surveys to enable

1 Australian Catholic University, University of Canberra, ACT Government Mental Health

comparisons with epidemiological data. Care was taken not to include questions that might be considered too intrusive for a community postal survey or beyond the scope of issues relevant to the research. Surveys were sent out by the ACT Government's Bushfire Support Unit which held the data base of names of people registered as affected by the fires. Participation in the research was naturally voluntary and responses were returned, anonymously, in the reply paid envelopes enclosed with surveys. Data sets were obtained for 500 respondents who were 15 years of age and over (Camilleri et al, 2007).

The second strand involved follow-up face-to-face interviews with forty individuals selected from among those survey respondents who returned a separate form indicating interest in being interviewed. Many more respondents were interested in being interviewed than project resources allowed, so the research team was able to select a sample of interviewees on the basis of obtaining equal numbers of males and females and a good representation of ages, households with and without children, and varying locations of current residence (Camilleri et al, 2007). Interviews were focused around seven main topics:

1. Pathways since the bushfire
2. Personal well being
3. Social relationships
4. Local neighbourhood and community
5. Services received
6. Media and communication
7. Children (if relevant)

The findings discussed in this paper are primarily concerned with three of these areas: how family and social relationships, relationships with local neighbourhood and links with government assisted the 'recovery' process.

Ethical considerations

The research was approved by the ACT Health and Community Human Research Ethics Committee, and the Australian Catholic University and University of Canberra Human Research Ethics Committees.

Given the possible adverse or unforeseen effects associated with research on survival of trauma, the team was aware of the 'duty of care' to participants and identified strategies for dealing with any adverse consequences of participation. Specific risk management/harm minimisation strategies were employed. For example, interviewers were experienced in working with people who have suffered trauma; they also had referral options for further counselling on hand if required.

Community capacity building after the Canberra bushfire

The terms 'capacity building', 'social capital' and 'social cohesion' are often used interchangeably in the literature. While acknowledging the subtle theoretical differences between these concepts, all have in common a reference to factors which contribute to the well-being and social and economic stability of a community (Dwyer, 2005) – such as levels of trust, support and the social networks or lack thereof which are critical to wellbeing, recovery and indeed 'resilience' after major adversity.

Woolcock and Narayan's 'synergy' model of social capital, for example, incorporates several dimensions which are useful in the analysis of how individuals and communities help themselves and each other after a disaster and how governments can enable or impact negatively on these processes. Three elements of the synergy theoretical model: - 'bonding' networks with family and friends, 'intra community bridging' to other networks and 'linking' to sources of formal power are considered in more detail here within the context of individual and community capacity building after the Canberra bushfires (Woolcock & Narayan, 2000) (Healy, Hampshire, & Ayres, 2004).

Bonding Networks

These informal networks which refer to the connections that people have with family and close friends are considered important because they help people 'get by' and deal with the normal adversities of everyday life.

Approximately half (50.8%) of the 482 respondents to the question about lasting impacts of the fire indicated that it did not have a lasting effect on their relationships with family. Twenty five percent said the fires had a lasting effect for the better; 22.4% said the fire had a lasting effect for the worse (Camilleri, 2007p. 47).

However, when people were given an opportunity in the survey to list those factors that they felt had helped them recover, qualitative responses to the survey question clearly indicated the importance of family, friends and neighbours. They described this help in a variety of ways which indicate the importance of these groups helping people "get by" (Healy, Hampshire, & Ayres, 2004).

The practical and emotional support was important, as was talking with family, expressing feelings and sharing emotions with them. Simple acts of kindness by family members were important and remembered. The corollary of this was that family and friends were also mentioned frequently in the context of factors that delayed or hindered recovery. Hurt and disappointment and tension that can occur in relationships in the period after a disaster, or simply the gap that people feel if this kind of support is not available to them was evident in the interviews with some participants. "Recovery" was

hindered by "lack of close support and people who will listen to your pain" and "friends not understanding your situation".

The interviews revealed it was often the person's partner whose love and support was crucial to "getting by", with a number of participants considering that sharing the experience of the fire and all the difficulties that resulted from it actually brought them closer and strengthened their relationship, which in turn helped them in their recovery.

In a few instances, people identified this as an unexpected positive outcome of the fire, which they felt on balance, outweighed all the negatives. Similarly, several commented that the loss of all their material possessions had made them more intensely aware of the importance of their family relationships and that this helped give them perspective as they came to terms with their losses and re-established their lives.

This kind of strong emotional support and understanding was mentioned frequently in interviews as coming from sources other than family as well. Survey respondents and interview participants commonly cited the importance of talking with friends and the helpfulness of friends who were able to be patient and not judge or hurry them, who understood that this was an experience from which it might take a long time to recover fully. It is clear that recovery for many people was facilitated by the opportunity to share the practical aspects of rebuilding with neighbours along with the ongoing social contact that occurs naturally with neighbours and that is all the more important when you have survived this kind of disaster together. The following quotes illustrate this:

Since the fire, the immediate area seems to have had a stronger bond. We have helped each other, been closer. Neighbourhood seems like a positive part of life after the fire.

There was always someone there. Even in my lowest periods, someone would just walk in… The help from friends and family was tremendous. They got me through. People I hadn't heard from in ages were ringing and donating things to us. I knew I had a fairly large support base and they came forward quickly.

The importance of family and friends and their understanding of the impacts of disasters is a clear theme in this study. While most received support from both, there was also an element of disappointment expressed about those who clearly did not appreciate the medium and longer term impacts of trauma and loss. Community education is needed to help family and friends in these circumstances know how to respond, including realising the unintended negative impacts of some of their well meaning actions.

Intra-community bridging

Intra community bridging refers to the networks within a particular community or neighbourhood or across the borders of local communities which provide a basis for shared identification and support (Healy et al, 2004) and may enable increased access to resources and opportunities. These ties are especially important to disadvantaged groups because they can provide information and knowledge to deal with adverse circumstances that are outside the scope of their usual networks. They have been called, *ties that help extend people's capacity to 'get ahead', rather than just 'get by'* (Healy, et al, 2004).

There were numerous examples cited by respondents and participants of coming together with people they did not know, to organise community events and activities, to support each other socially and emotionally and to provide information to assist people to make the many decisions confronting them. New organisations such as the residents groups from the Mt Taylor estate, Chapman, Stromlo, Pierce's Creek and Uriarra and the Phoenix Association arose out of the disaster.

Existing groups based around schools, churches, service groups, business, peak groups and other communities of interest such as the Weston Creek Community Council also played a strong role in increasing peoples' access to resources and support. Organisations not previously aligned and not used to working together, such as Australian Capital Territory Council of Social Services (ACTCOSS), the Chamber of Commerce and charities came together in remarkable alliances to organise assistance for the bushfire-affected community.

These formal and informal groups, with the ACT Government, often in partnership, organised a number of social, commemorative and information events for bushfire-affected people and the wider ACT community. Events were for geographic communities such as streets and neighbourhoods, as well as for communities of interest such as children, older people, rebuilders and people interested in the regeneration of the environment, or parents who had babies close to the time of the disaster.

Figure 1: Examples of helpful or very helpful social activities.

Activity	Number of respondents who attended	% of respondents who found activity helpful or very helpful
Events organised by local streets and neighbourhoods (eg: street BBQs)	61% (n=292)	91.7% (n=268)
Commemorative events	39.1% (n=191)	86.4% (n=165)
Information sessions on the emotional effects of disaster	14.8% (n=72)	87.5% (63)
Rebuilding information events	30.4% (n=152)	79% (n=120)
Children's events	6.4% (n=30)	93% (28)
Events for particular age or interest groups	6.6% (n=32)	81.25% (26)

The most popular of these events were those organised by local streets and neighbourhoods (and in some instances by the Canberra Bushfire Recovery Centre) to assist people to get to back in touch to share experiences, discuss common issues and get information on help available. 61% (n=292) of respondents attended these events, and 91.7 % (n=268) found them helpful or very helpful.

Interview participants commented that they found these events more helpful than talking to a counsellor. Others spoke of the importance of the street parties and barbecues where people could exchange stories; get things off their chests and have a bit of fun. Even where the disaster was not discussed, they said, it was good to be with people who had been through the experience and understood. These events were said to be excellent in cementing neighbourhood relations. One woman interviewed gave this account of an initiative she was involved in:

We ran a recovery walk through [the Canberra Bushfire Recovery Centre]. We must have had about 200 people up on Cooleman Ridge. The aim of the thing was to see [the environment] recovering but it turned into some kind of fast walking race …. I don't know who came up with the idea… We made contact with the Recovery Centre – and said we'd like to do a walk. The Recovery Centre … organised flyers. Then in the Spring following, we all organised botanical walks – we had four or five botanical walks – we had great fun.

Linking with government and other institutions

'Linking' social capital - which refers to networks which have access powerful formal institutions such as government and non-government agencies are important for social and economic development and can assist in enhancing the overall level of trust in governance systems (Woolcock and Narayan, 2000 in Healy et al, 2004, Healy et al, 2003; Woolcock & Narayan, 2000). Within the recovery context 'linking social capital' refers to directly engaging with government officials or joining political advocacy groups which set up to lobby for additional resources and planning decisions.

One study found that the perception that local government and local business in Western Sydney were working in the interests of the community contributed to people's sense of life being manageable. (This contrasted with family and friendship bonds which contributed to feelings of optimism but not necessarily that life is manageable). The same study found that the absence of inter-community bridging capital and 'linking' to the decision makers (especially government and business) led to a strong sense of stigma and isolation from surrounding communities and a sense of fatalism, that is a lack of a sense of control over forces shaping their lives (Healy, et al, 2004).

Although the scope of the studies is different and a comparison can only cautiously be made, these findings are in contrast to the views of participants in the Canberra Bushfire Recovery research. Residents' associations played an important role for many in contributing to a sense of empowerment and self determination among residents.

There are many examples of how such groups, which developed only after the fire, formed successful partnerships with government to organise social, commemorative, and information events for bushfire affected people and the wider community. At these events, government officials mingled with community members so that they could be close to 'communities' and better monitor their needs. Similarly the Community and Expert Reference Group, which was set up in the immediate aftermath of the fire, not only played a valuable advisory role with the Recovery Task Force, it enabled community representatives and those whom they represented to reclaim a sense of the control that had been lost in the cataclysmic events of January 18.

There are difficult messages for governments in this; encouraging and empowering the social activism of these groups is important for the greater good but often means sustained and highly vocal criticism of government's role in both disaster response and recovery.

Adverse responses to Government's role in capacity building

Activities not sufficiently inclusive

Some people did not attend events organised by government or agencies specifically funded by government. A few who had not lost their home but whose homes had been damaged and lost gardens felt that these activities were not pitched in a way that included them. Others felt that it was unhealthy to dwell on the past and that people needed to concentrate on moving on, objecting to the dedication of the memorial three years on. Others said that there was still a need for community organised commemorative events, and commented on the importance of the continuity of activities arising out of the disaster, - such as Community Fire Unit Training.

Lack of preparedness of some institutions

While the Canberra Bushfire research referred to many examples of government facilitating mutual self-help there were also some criticisms that reservoirs of skills, expertise and energy were not sufficiently tapped into by some government institutions. Whereas the Territory human services agencies, for example, those that staffed the Bushfire Recovery Centre, demonstrated sophisticated understandings of the importance of volunteers, other institutions were regarded as less well prepared and committed to invest time in volunteers. For example, some participants were critical of a number of Commonwealth and Territory Government environmental and arts institutions for not being prepared for the roles they could play in a major natural disaster of this kind. There was a perception that some institutions regarded offers of help as obstructive and that others slavishly adhered to policies and procedures which did not allow for creative ways of working in the face of large scale emergencies.

Anger about lack of mitigation activities and response

Other government-related aspects of the fire and the recovery process prompted adverse comment and were mentioned by a number of survey and interview participants as factors affecting their recovery. The first of these refers to the mitigation and response phases of disaster management: in particular the issue of a perceived lack of warning to the general population about the approaching fire. For many of those who were surveyed and/or interviewed, this aspect of the disaster became an ongoing source of anger and helplessness about the whole event, and one that was identified by a few respondents and participants as having delayed their recovery.

The judicial process

A second aspect was the ACT Coroner's Bushfire Inquiry, with the extensive delays and perceived interference in the judicial process being cited by many as a factor delaying their recovery. Some spoke of a feeling that they could not 'move on' from the fire and the losses they experienced until there were official findings about causes and people who could be held to account for those causes. Yet another aspect of government activity that was seen negatively was the delay in decisions about the rebuilding of the small rural communities that were destroyed or extensively damaged.

Tension between government and role of community activism

The significant community activism that developed around each of these aspects was identified by some individuals as important in their recovery. For some, for example, their involvement in the fight to have their local rural community re-established helped them to channel their anger about the fire and to maintain contact with the members of that community even though they had been dispersed across Canberra in replacement housing. In the case of Tharwa, one tangible result from their activism was being given new replacement fire-fighting equipment, a significant improvement on what they had before the fire. One interviewee, who has been prominent in activity directed at making the government and public officials more accountable for what happened in the lead-up to the fire, considered that his activism and involvement in the overall recovery effort have been important to his own recovery.

Another person spoke of the helpfulness of activism engaged in on a lesser scale, having become closely involved with a small group of others (some former residents and some looking to buy blocks and move into the street) in the re-establishment and re-development of their fire-ravaged street. She spoke of this kind of involvement as 'a therapy' which helped her overcome her sense of loss and her reluctance to be part of a new 'community'.

This kind of satisfaction accords with the findings of a number of studies, which indicate that public participation, can foster a sense of community ownership in the recovery process (Petterson, 1999p. 16). Interestingly, there is evidence that self-determination may in part be enhanced by the financial position of communities and individuals, where those with greater wealth are likely to have greater choice and capacity to organise their recovery needs. This fits well with the socio-economic profile of the most severely affected suburbs in the Canberra bushfire, where the demographic

characteristics of the areas which were affected show a community that is likely to have a relatively low rate of unemployment, a relatively high income and relatively low levels of socio-economic disadvantage.

Differing views about government's performance among disaster affected people

As with almost every other aspect of the research, there were also many participants who felt quite differently about these matters. They considered that some people in the community had politicised and prolonged the inquiry process and focussed on blame at the expense of acceptance and recovery. Some felt upset or annoyed by what they saw as the outspoken and negative position taken by some more prominent activists; they put the view that this kind of negativity was of no practical value and actually delayed the whole community's recovery.

One man expressed strong disapproval of this kind of activism in terms of the impact it had on children. Having worked hard with his own children to help them come to terms with all their losses and to move on, he was upset by the publicity given to those intent on finding someone to blame for the fire. Yet another person, who lost his house and almost his life as well in the fire, came from a suburb where relatively few houses were destroyed. He spoke of feeling like an outsider at one or two meetings of community advocacy groups he attended, which sprang up in suburbs where large numbers of houses had been destroyed, but said he observed over time that involvement with these kinds of groups seemed to make some people feel 'stuck', unable to move on and come to terms with what had happened.

Yet another perspective suggested by some people was that local activist groups were 'a good thing' overall but were not appropriate for everyone, for a variety of reasons. One woman interviewed described her experience as follows:

We were really keen and got involved [in a local group] in the first few months and then our energy ran out. The two people who ran it were like saints. They worked so hard for everybody. My husband and I also wanted to work hard for everybody but we ran out of steam. I think that's where you have to be really sensible … when you run out of steam, you need to take a break, sit back and reflect… otherwise that's how you get sick. We needed that like a hole in the head. We both felt it and neither of us said anything, but we both just kind of backed off.

Discussion and recommendations

The sphere of government responsibility known as 'Disaster Recovery' provides opportunities to reflect on community capacity building generally and the actions that help and hinder these processes. The Canberra Bushfire Research provides useful messages about 'enabling' people affected by disasters to rebuild their lives and strengthen their communities. In addition to the well established role that family, friends and neighbourhoods play in facilitating recovery and resilience, the study also highlighted the role of governments and their funded agencies in community capacity building. Critical processes include the use of information about recovery; actively structuring opportunities to bring people together; active use of volunteers, commemorative events; and engaging institutions that have functions beyond an overt welfare focus.

Information

The study specifically recommended that

- information about how recovery, including medium and long term recovery, takes place be made available to individuals and families to help them understand their own responses and/or those of others in the family.
- detailed information about resilience strategies provided by participants in this research should be incorporated into a set of information guides for people affected by disasters.
- the community generally be provided with information about the nature of recovery to facilitate greater understanding and tolerance of the feelings and experiences of disaster victims, in particular that individuals experience recovery at their own pace and in their own way.

Structuring opportunities to bring people together

Street barbeques and parties are clearly popular events for people affected by disasters such as bushfire and the study recommended that government notes the value in actively structuring local opportunities to bring people together for contact and support immediately after disasters and at particular points afterwards.

The positive effects of volunteering

There are advantages in supporting the ongoing development of groups which form after disasters. Support should be provided to the development of self-help and mutual help groups, with a particular focus on volunteerism to harness the energy and creativity and increased sense of control that seems to result from this kind of involvement.

Commemorative events

The positive effects of commemorative events such as memorial services and anniversaries to mark losses were noted; also that losses are not confined to loved ones, loved animals and personal assets; lost environments should also

be commemorated and conscious attempts should be made to help people look forward with hope to rejuvenation and the part that can be played by all in assisting this.

Engaging institutions beyond traditional welfare

Of particular significance in this research are the 'linking' networks that develop between individuals and groups and powerful institutions such as government and business in the aftermath of a disaster. There are many examples of how such groups, which developed only after the fire, formed successful partnerships with government to organise social, commemorative, and information events for bushfire affected people and the wider community and contributed to the sense of empowerment and self determination that is an essential part of capacity building. To do this successfully government needs to be aware of the importance of engaging beyond traditional welfare sector institutions, especially to those concerned with the arts and the environment. There is an argument for all disaster recovery plans to articulate strategies for engaging government and community institutions with a particular emphasis on those concerned with the arts and the environment.

Conclusion

In examining what helps and what hinders the process and the outcomes of disaster recovery, including the development of resilient communities , this paper contributes to a broader knowledge base about the importance of recognising and enabling the development of social networks which help people 'get by', 'get ahead' and which foster a sense of control over their lives. This knowledge can usefully frame actions used in the pursuit of many other desired policy outcomes linked to community capacity building

Acknowledgements

The authors would like to acknowledge the work of other researchers on this project: Susan Nicholls, University of Canberra, Jolyon Sykes, University of Canberra; Elspeth McDonald, ACT Mental Health, Morag McArthur, Institute of Child Protection Studies

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About the authors

Dr Gail Winkworth is senior research fellow at the Institute of Child Protection Studies, Australian Catholic University.

Chris Healy is a doctoral student in disaster recovery at the Australian Catholic University; she was the Director of the ACT Bushfire Recovery Centre after the 2003 bushfires.

Merrilyn Woodward is a project officer with the Institute of Child Protection Studies, Australian Catholic University.

Professor Peter Camilleri is Deputy Director of the Public Policy Institute and Professor of Social Work, Australian Catholic University.

Natural hazards education in Australian schools: How can we make it more effective?

Neil Dufty identifies ways to improve the effectiveness of natural hazard education programs in our schools.

Abstract

Most of Australia's emergency management authorities have developed and implemented some type of education program for youth. Generally, these programs are delivered through schools. Even though these activities have the potential to build community resilience to natural hazards, some may not be as effective as they could be. This article provides guidelines to improve the effectiveness of school natural hazard programs and identifies further research required through program evaluation.

As shown on their websites, most of Australia's emergency management authorities have developed and implemented some type of education program or activity for youth (i.e. people under the age of 18 years). Generally, these programs and activities are delivered through schools.

This article uses learnings from research and practice to identify what appears to be the most effective ways to deliver natural hazard education in Australian schools.

The role of youth and schools in building resilience

Social resilience involves the ability of a community to resist, recover and learn from a natural disaster. Ronan and Johnston (2005, p.5) stress the importance of the youth-school-family network in building community resilience to disasters. They base this view on research that shows that 'youth and families comprise risk groups for increased problems following a hazardous event'. They argue that, 'a focus on educating youth, the adults of tomorrow, has considerable promise. However, in terms of more current concerns, youth also link into the family setting who, in turn, link into multiple community settings and groups'. They add that 'hazards education in schools can play a vital role in increasing a community being ready, willing, and able to do what is necessary to prepare for and respond to a disaster' (page 95).

Other studies demonstrate the need to educate young people about the risks associated with natural hazards and how to be prepared for them. For example, Berry and King (1998, p. 28) in a study of the tropical cyclone awareness and preparedness of far north Queensland school students found that 'they have very limited real understanding of cyclones and the storm surge risk'. They noted that the student's 'direct personal experience is very limited, which is to be expected at this stage, however the families upon whom many depend for information are also relatively inexperienced and very likely to be biased in their own perceptions of cyclone risk'. Furthermore, these researchers found that the students surveyed had little understanding of cyclone preparedness including 'the roles and responsibilities of all members of the community from household residents to emergency service managers and the expectations of them in times of disaster'.

Finnis et. al. (2004, p. 19) investigated natural hazard risk perceptions, levels of preparedness and participation in children from a school in Christchurch, New Zealand. They found that 'the children's awareness of hazards impacting Christchurch was fairly accurate' and 'some vital safety behaviours were well known by the children, with other safety behaviours not as well known'. Moreover, the study found that 'preparedness plans and practices were reported to be poorly adopted by the children's household'.

Both studies recommended improvements in the design and delivery of hazard education to youth through local schools.

Major reviews into natural hazard mitigation and management have also stressed the importance of school education. For instance, the National Inquiry on Bushfire Mitigation and Management (2004, p.37) states that, 'knowledge of "living with bushfire" should be one of the life skills all Australian children acquire during their schooling, wherever they are educated'. The Inquiry recommended that 'state and territory governments and the Australian Government jointly develop and implement nationally and regionally relevant education programs about bushfire, to be delivered to all Australian children as a basic life skill.

These programs should emphasise individual and household preparedness and survival as well as the role of fire in the Australian landscape'.

The context for school natural hazards education

Although the importance of conducting natural hazards education with youth and in schools is promoted above, it should be placed in a broader context.

Dufty (2008, p. 3) defines flood education as 'any learning process or activity that builds community resilience to flooding'. Similarly, 'natural hazards education' is here defined as any learning process or activity that builds community resilience to natural hazards.

The term 'community' includes all spheres of government, business, industry and the general public. In community education it is critical to understand the groups, networks, sectors and organisations that comprise the community and how these entities interact. Maguire and Hagan (2007, p. 18) stress that, 'in order to truly understand the social impacts of disasters, and to manage and prevent adverse consequences, we must understand the impacts of disasters on particular groups. Moreover, it is important to identify the potential "fracture points" or social cleavages within a community. From this, it may be possible to predict future breakdowns in social resilience in disasters, and to design preventative measures.' They also note that 'the resilience of a community can vary with different types of disasters.'

School natural hazards education should be viewed as one possible component of a local community education 'package' that could target a range of vulnerable groups and organisations such as the elderly, people of Non-English Speaking Background, those living in especially high risk areas, businesses and special uses e.g. caravan parks.

The decision as to which group/s to focus on, including youth and schools, and at what level, should be made by representatives of the local community in conjunction with emergency management authorities. Dufty (2008) recommends that this should be coordinated and implemented through a local community natural hazards education plan.

Planning of school natural hazards education should be guided by the functions of natural hazards education. Dufty (2008, p. 4) identified four main functions of flood education that can be applied as below to all natural hazards.

1. **Preparedness conversion.** Helping people, organisations and communities learn how to commence and maintain preparations for natural disasters.
2. **Mitigation behaviours.** Learning what to do before, during and after a natural disaster.
3. **Adaptive capability.** Learning how to change and maintain systems, networks and build community competencies (e.g. skills, leadership) to minimise the impacts of natural disasters.
4. **Post-disaster learnings.** Learning how to improve 1, 2 & 3 above (i.e. preparedness levels, mitigation behaviours and adaptive capabilities) after a natural disaster.

According to Dufty, there has been a tendency for all forms of natural hazards education, including that in schools, to focus on the first two functions above. There is therefore a need to particularly consider the latter two functions when developing school natural hazards education programs and activities.

It should also be noted that schools are only one of many forums for youth to learn about natural hazards. Other forums include:

- Internet
- Radio
- Television e.g. documentaries, advertising
- Magazines and other print media
- Public events e.g. agricultural shows, concerts
- Billboards and other signs
- Personal conversations e.g. with people who have experienced a natural disaster.

Obviously, learning for youth can also occur through personal experience during and after a natural hazard event or disaster. Planning for youth education programs should consider all these non-school forums for learning.

Types of school programs and activities

From the websites of Australian emergency management authorities, three main types of school natural hazards education programs can be found.

1. Interactive programs presented by emergency management authorities
2. Teaching/learning units and lessons
3. 'Extra curricular' activities.

There are several examples of the first type of school program. For example, Butters (1998) describes a range of learning experiences for primary students provided by instructors in the Tasmania Fire Service Education Program. The Country Fire Authority Victoria provides the Brigades in Schools program and uses a Mobile Education Unit in its education of primary students. There are also several examples of units of work (a sequence of lessons) and lessons developed by authorities that can be taught by teachers. For example, Melbourne Water has an animated 'Flood Investigator' program that can be found online and is supported with lesson outlines, teacher's notes and worksheets. In Tasmania, 'The Floods and You' program includes a

sequence of lessons for primary-age students. In NSW, Wollongong City Council has developed a program for secondary Geography students which include an interactive computer flood model, student activity sheets and student broadsheet. Emergency Management Australia has recently re-launched its school education section of its web site to include information and lesson plans about natural disasters and what to do if an emergency or disaster arises. Most of the websites of emergency management authorities have some 'extra curricular' or 'fun' activities that could be used in school teaching programs or accessed by young people, usually of primary age, independently. These activities include cartoon books, puzzles and colouring books.

Effectiveness

What are effective natural hazard school education programs? To answer this question, we need to define 'effectiveness'. The effectiveness of school natural hazard programs can be measured at several levels including:

1. The program compared with learnings from education psychology and leading practice
2. Student's understanding of the natural hazard/s risk
3. Student's understanding of appropriate preparedness behaviours
4. The preparation and maintenance of an emergency management plan by the student's family
5. If a natural disaster occurs, the ability of the student to cope with and learn from the event.

A major weakness in natural hazards education programs, including for schools, is the lack of evaluation to gauge the effectiveness using measures such as those listed above. This issue is further discussed below.
In relation to the first effectiveness measure above, there have been several attempts at relating education psychology to how young people learn about natural hazards. For example, Towers and Paton (2007) researched how children perceive bushfire risk and mitigation as the basis for developing more effective education strategies to increase levels of awareness and preparedness in areas susceptible to bushfires. Their research raised two significant issues. 'Firstly, children's understanding of concepts such as causality and prevention are strongly influenced by age-related changes in cognitive ability. Secondly, the acquisition of knowledge about risk and mitigation takes place in a social context, with some elements of social context exerting more influence than others.'

Also in relation to the first effectiveness measure above, Ronan and Johnston (2005, pp.163-165) list nine 'leading practices' or basics to consider in the planning of school hazard education programs.

1. Use graduated sequence of learning across school years.
2. Combine the raising of concern about local hazards with a 'confident, coping model'.
3. Promote interaction with families such as home-based discussion and developing home emergency plans.
4. Incorporate an emergency management perspective that focuses on readiness, response guidance and planning for recovery.
5. Use natural opportunities to learn (e.g. media coverage of a hazard).
6. Use demonstrations (e.g. by emergency management authorities) and use of computer and other visual aids (e.g. hazard documentaries) to supplement learning.
7. Practice preparedness responses using in and out of class simulations.
8. Promote the school program in the community to increase community-based 'hazards discussions' and 'hazards doing'.
9. Integrate hazard school education programs with other community hazard education programs.

Note that inherent in these guidelines is the need to use a cross-hazard approach to education, where this is possible. For example, some Australian communities have both a high risk of flood and bushfire; a combined hazard education program would be more appropriate and probably more effective for schools in this scenario.

The programs developed by Australian emergency management authorities as categorised above appear to relate well with the nine practices identified by Ronan and Johnston. The second type of program identified (teaching/ learning units and lessons) can be designed to satisfy all nine practices. The first type of program (presentations by emergency management authorities) can also satisfy most of the practices, although these presentations or mobile units can be costly, labour intensive and need to be repeated, at least annually. The third type of program ('extra curricular activities') has questionable effectiveness as they are generally only support the practices at best.

A few Australian emergency management authorities use all three types of programs in an integrated manner, thus maximising opportunities for effective impacts.
It should be noted that many organisations involved in developing programs for schools believe that 'if we teach the students – they'll teach the parents and community'. This linkage should not be assumed. With students learning from a broad range of sources, unless there is a prescribed activity (e.g. homework task to develop a family home emergency plan) students may not take home hazard-related learnings and messages.

This author contends, based on several years of research, that a critical success factor for the uptake of natural hazard activities in schools is the ability to embed these activities in existing school programs that are already linked to learning outcomes in curriculums and syllabuses. This helps to ensure that the school will accept the natural hazards program as a valid activity as part of its existing

teaching program and not as a 'one off'. Moreover, as a natural hazard can occur at any time, this approach will also mean that 'natural hazards' will be taught each year. Curriculum-based programs are developed by initially identifying opportunities for the inclusion of natural hazards education in appropriate State and Territory curriculums through a process known as 'curriculum mapping'. After this has been achieved, programs can be designed with activities that link with learning outcomes and subject matter in the appropriate parts of the curriculums and thus school programs. For expert advice, it is crucial to involve the curriculum support section from the respective State or Territory department of education and a sample of teachers in this process.

There are numerous opportunities for the development of natural hazard programs and activities related to Australian curriculums. Kriewaldt et. al. (2003) conducted a study of hazard or disaster education across State and Territory curriculums. They found that hazard education 'is evident in years 5-6 and more comprehensively addressed in years 7-10. Most education systems in Australia include study of hazards in their post-compulsory geography course.' A few Australian emergency management authorities have mapped and linked their school natural hazards programs to appropriate curriculums. For example, the Country Fire Authority Victoria has mapped its Brigades in Schools, Mobile Education Unit and Pakenham Learning Centre programs to Victorian curriculums.

Evaluation

Although school natural hazard programs can be easily evaluated in relation to education psychological research and leading practices, it is much more difficult to gauge effectiveness based on other measures such as those listed above. There are a few studies that help in an understanding of the immediate effectiveness of school and community hazard education programs in raising student's awareness and preparedness levels. For example, Johnston et. al. (2001) evaluated school-based activities in four communities in Washington State, USA that are at risk from lahars (volcanic mudflows) at the base of Mount Rainier. They found that all students surveyed from the schools had a good awareness of hazards that might affect them in the community and had practiced emergency preparation at school. One school, Orting, had linked hazard awareness programs with additional community initiatives. At this school students perceived lahars as an additional likely hazard. It is also interesting to note that although students were encouraged to discuss hazards and practice emergency preparation at home, few had done so (further supporting the assertion above that transfer of learning from students to their parents cannot be assumed). Ways to evaluate the effectiveness of immediate outcomes (e.g. awareness, personal preparedness, transfer of learning to families) should be built into all school natural hazards programs to further build up research knowledge to guide planning. There are a dearth of studies that gauge the effectiveness of school programs in student and family response to and recovery from a natural hazard event. Although it is difficult to isolate the program as the cause of response and recovery impacts, on-going (longitudinal) studies will assist in providing some indication of the long term effectiveness of school programs.

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About the author

Neil Dufty is a Principal of Molino Stewart Pty Ltd. He has extensive experience in curriculum development across Australia, especially in the fields of environmental education and sustainability education. He has designed several natural hazards teaching programs including for the Victoria State Emergency Service.

Community safety programs for bushfire: What do they achieve, and how?

Through a synthesis of evaluative studies, Gerald Elsworth, John Gilbert, Alan Rhodes, Helen Goodman argue that community safety programs 'work'.

Abstract

This paper provides a summary of the findings from a review of available evaluative studies of community education, awareness and engagement (EAE) activities and programs for bushfire in Australia. It provides a brief account of the background to this work and the innovative approach used, known as realist synthesis. 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 (risk awareness and knowledge of fire behaviour and safety measures, 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.

Introduction

Bushfire is a major source of loss of life and property in Australia (McAneney, Chen, Crompton, & Pitman, 2007); (Australian Bureau of Statistics, 2004, 2008). Recent government initiated inquires have addressed a range of common themes relating to improved bushfire safety, many embracing the broad premise of community responsibility and self-reliance (Stevens, 2007). 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.

Thus in the past decade or so there has been an explicit shift in thinking to acknowledge that reducing bushfire risk is critically dependent on the willingness and ability of individuals, households and community groups to actively support agency activities.

This transformation in thinking from bushfire response to preparedness has parallels with emerging international approaches to emergency management, crime prevention and public health that have 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). For example, writing from the perspective of crime prevention in Great Britain, Hughes (2002, p. 3) described 'partnership' as the "primary symbolic and organizational means of delivering community safety politics". Community-level engagement, responsibility and empowerment are also emphasised, and residents are seen as being responsible for coordinated action within their own localities in collaboration with statutory agencies and the voluntary sector (Chess, Salomone, Hance, & Saville, 1995; Labonte, 1994).

Another 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 change in thinking 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 wide

variety of education, awareness and engagement (EAE) programs and activities that emphasise risk appreciation, planning and preparedness.

Community Safety Programs and Activities

In a similar manner to recent work in the United States (Reams, Haines, Renner, Wascom, & Kingre, 2005; Service) an inventory of community safety activities and programs for bushfire in Australia has been developed (Gilbert, 2007). 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 available.

These programs and activities can usefully be organised along a continuum 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 might be located at the 'top-down' end of the continuum (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 are 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.

A Theory-based ('Realist') Synthesis of Australian Community Safety Evaluation Studies

An innovative approach to research synthesis and review has recently been developed in Great Britain by Pawson and colleagues (e.g. Pawson, Greenhalgh, Harvey, & Walshe, 2004). Called 'realist synthesis', it is focused on uncovering and 'testing' the provisional theories (frequently un-stated) that underpin social programs and other change activities. With some modifications, realist synthesis was used to develop a review of publicly available evaluation studies of Australian bushfire community safety programs.

As outlined by Pawson et al. (2004 p. v) realist synthesis follows a number of principles that differentiate the process quite sharply from either the statistical approach of meta-analysis and the (perhaps more closely related) traditional procedures of narrative literature review. The principles are 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, and noting and examining the flows and blockages and points of contention (Pawson et al. 2004, pp. 4-6, paraphrased a little from original).

Studies of seven distinct Australian activities and programs (based on approximately 15 separate reports) were intensively reviewed. The reports were searched for information on:

- The context of the initiative;
- 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
- Any 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.[1]

The programs included in the synthesis are sorted into the five broad categories outlined below in Table 1, with references to the evaluation studies reviewed. 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'.

Results of the Synthesis

Reviewing the available evaluative studies of community EAE activities and programs for bushfire in Australia was a challenging task. The studies were quite diverse, varying considerably in research approach and reporting detail. 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 always clearly apparent. All, however, 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(s) in which the initiative was implemented 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 initiative as an objective of the investigation.

Table 1: 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 (Rohrmann, 2000, 2002, 2007)	Moondarra Fire Information Unit (Drumond, 2007; Smith, 2006)	Operation Bushfire Blitz (Hill, 1998; Rhodes, 2001, 2003) Street FireWise (Gilbert, 2005) Community Fireguard (Boura, 1998a, 1998b; Rohrmann, 1999) Community Fire Units (Lowe, Haynes, & Byrne, 2008)	Ferny Creek Fire Alert Siren (Betts, 2001, 2003)

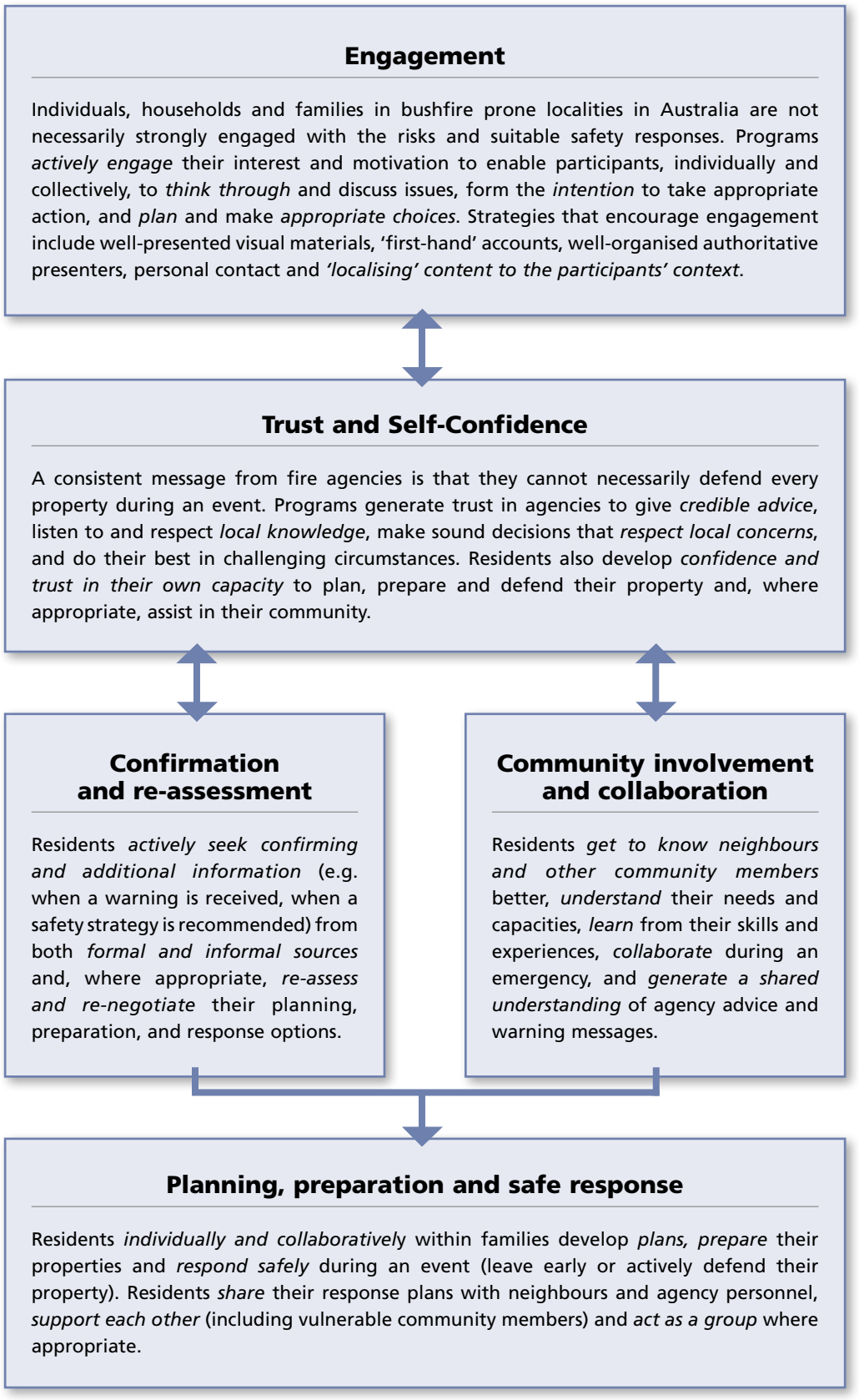
Context

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)

1. The full report of the synthesis and the theoretical perspectives that informed it is available from the first author (gerald.elsworth@rmit.edu.au).

Figure 1. A preliminary theory model of community engagement/education initiatives.



An explicit aim of realist research synthesis and review is the generation of preliminary configurations of contexts, causal processes (mechanisms) and outcomes for the general kind of initiative being studied. Thus:

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 for bushfire EAE asctivities and programs is presented in Figure 1. The model is based on those aspects of the individual theory models reconstructed for each initiative that were judged to be the more consistent across the studies reviewed in (potentially) generating the desired outcomes of the community safety approach. Overall, there appeared to be a very high level of agreement and coherence between the results and discussion of the available studies, and with the values and principles that underpin the community safety approach in Australia (Stevens, 2007). This was particularly the case in relation to the processes and outcomes for individuals, households and communities. Two initiatives, however, involved explicit agency-agency and agency-community partnerships (the Ferny Creek Fire Alert Siren and the Moondarrah Fire Information Unit - FIU) 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 Fire Information Unit).

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 (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 it 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 program (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 suggested that 'during event' community engagement initiatives that are built around a number of separate activities including community meetings, street walks, information points, school visits etc. are better 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, importantly, 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 presentations, materials and activities should be: (a) localised, that is to say, carefully and explicitly adapted or tailored for the locality and community; and (b) attractively presented, for e.g. using simple explanatory images not overburdened by text. Engagement is also likely to be easier to generate if the locality has had a recent history of fire.

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" (Drumond, 2007) - 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 of media-based approaches (Rohrmann, 2000, 2002, 2007) and Bushfire Blitz (Rhodes, 2001) 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 effective planning, 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 and discussion 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 briefings (Drumond, 2007).

A number of programs and activities, 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, 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 in the NSW Blue mountains 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

An expert consultation conducted by Rhodes and Reinholtd prior to a series of evaluation studies of Bushfire Blitz 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 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 defense 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".

Conclusion

Contrary to the skeptical view that very little in community education, awareness and engagement initiatives for natural hazards 'works', this preliminary synthesis of evaluation studies clearly suggests that programs across the broad spectrum of 'top-down' to 'bottom-up' activities have the clear 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 has been, perhaps, a tendency for community EAE activities for bushfire to be 'one size fits all' activities. Some recent initiatives 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 is generated and accepted - as stressed, for example, in the CFU program (Lowe et al., 2008). 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 central importance that both agency and community groups accorded the concept Greater Community Ownership and Responsibility for Bushfire Safety in a related concept mapping study (Elsworth, Anthony-Harvey-Beavis, & Rhodes, 2008) 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.

Thirdly, 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 embedded in the community safety approach. This suggests that the careful selection and integration of a suite of activities and programs 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.

Acknowledgements

The research described in this report was supported by the Bushfire Co-operative Research Centre (Project C7 – Evaluating bushfire community education programs). The review and synthesis of the education, awareness and engagement program evaluations and development of the summary theory-model was also supported by a grant from the Australian Emergency Management Committee (National Community Safety Working Group).

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About the authors

Gerald Elsworth, PhD recently retired as Associate Professor in the School of Global Studies, Social Science and Planning (GSSSP) at RMIT University. He was project leader of the National Review of Community Education, Awareness and Engagement for Natural Hazards and Project C7 of the Bushfire CRC.

John Gilbert is a researcher in GSSSP at RMIT University. He is part of the Project C7 research team (Bushfire CRC) and the National Review of Community Education, Awareness and Engagement for Natural Hazards.

Alan Rhodes is the CFA Manager, Community Safety Research and Evaluation. He is also completing a PhD at RMIT University as part of the Bushfire CRC.

Helen Goodman, PhD is a Research Fellow in GSSSP at RMIT University working on Project C7 of the Bushfire CRC.

John Gilbert is the contact on this paper. His email address is john.gilbert@rmit.edu.au.

The value of volunteers in State Emergency Services

Gaminda Ganewatta & John Handmer present their research on the value of SES volunteers to Australian society.

Abstract

This paper presents estimates of the economic value of volunteers in the State Emergency Services (SES) of NSW, Victoria and South Australia. The value is based on the value of the time provided by volunteers. The estimates are based on a detailed survey conducted on volunteer time allocation, and data on the activities of SES volunteers over several years in NSW, Victoria and South Australia. We used two methods for valuing time: the "global substitution" method where an average wage rate is used to value all activities, and the "task specific substitution" method where each task is valued at its market wage rate. The value of volunteer time given for community services, operational response, training and unit management averaged around $ 52, 19 and 12 million a year in NSW, Victoria and South Australia respectively. We also extended the analysis by counting the standby time of volunteers to present complete picture of the value of time volunteers contributed to the State Emergency Services. The addition of standby time greatly increases the value of the time provided.

Introduction

State Emergency Services (SES) are organisations dedicated to assisting communities prepare for and respond to unexpected events and play a vital role in confronting the effects of natural and human made emergencies in all states and territories. In the absence of institutions like the SES, governments would need to provide similar services either by increasing the size of existing non-volunteer emergency services, establishing full-time specialised career institutions or by purchasing the services commercially. Such actions would require considerable resources and highlight the value of SES volunteers to communities. This paper examines the value of SES volunteers to Australian society by valuing the time they make available.

Volunteers make direct economic contributions to society in a number of ways, and these contributions can be expensive and difficult to replace. Assigning economic value to volunteer activities gives an opportunity to make valid comparisons with other fee-for-service or market activities. An economic value for the contribution of volunteers can justify the cost of training and equipping volunteer organisations (Rhenborg and DeSpain 2003), and may help boost the recognition of the contribution of volunteers to society thereby enhancing the idea of volunteerism (Goulbourne and Embuldeniya 2002, Smith and Ellis 2003). An economic value may also be useful in public relations, in funding bids and in contract negotiations. Despite the benefits of valuing volunteer time, there are also pitfalls associated with the process. Valuing volunteer time fails to include many of the benefits of volunteering such as the contingent capacity that fire and emergency service volunteers bring to their communities, and the formation of community bonds, and empathy between volunteers and those who received volunteer service (Karn, 1982 & 1983).

We present the economic value of volunteer time for the State Emergency Services of NSW, Victoria and South Australia using two approaches to valuing. The analysis captures the time provided by volunteers for response and recovery as well as prevention and preparation for emergencies using different sources of information. The paper is organised as follows. First, valuing of volunteer time is discussed and details of the methodology used in the study are presented. Then the results of the analysis are presented in several steps to show the value of the time volunteers make available.

The value of volunteers study

The work reported here is drawn from a report prepared for ACSES (Australian Council of State/Territory Emergency Services), AFAC (Australian Council of Fire and Emergency Services Authorities) and the Bushfire CRC (Cooperative Research Centre) (Ganewatta, Bennett and Handmer, 2008), which in turn drew on earlier work reported in Percovich and Handmer (2004) undertaken for EMA and the NSW and Victorian SESs.

Research methods were developed and refined in consultation with SES Headquarters and regional staff in NSW and Victoria, and then with ACSES. We also examined approaches used by two fire agencies in similar work. Our project ran over several years in two phases. In the first phase, detailed mail surveys were sent to all NSW and Victorian SES units for completion over two two-week periods; one period was quiet and one period busy. These provided a snapshot of all activities, including support activities undertaken by the volunteers. About 40% of NSW & Victorian SES units completed the survey. The survey was supplemented by 19 detailed activity diaries completed by participating units, other SES activity data and two case studies. This enabled the development of a preliminary model of time and value. The second phase added long-run SES activity datasets from NSW, Victoria and South Australia, to the model developed in the first phase. A dataset was also available from Tasmania but it has not been included in this paper as the data were collected over a different period. Note that as the project went over several years in distinct phases, some of the dollar values for wages are for earlier years. The result is that final values are conservative and would increase if all values were updated.

Measuring the economic value of volunteering

In the literature, there are two main approaches used to value the work of volunteers. The "output approach" to valuing volunteer work is based on the imputation of market prices to the goods and services produced by volunteer activities. The "input approach" of valuing volunteer work measures the value of the time volunteers make available for SES activities. The basic attributes of the approaches are reviewed here very briefly.

Output Approach

The output method is conceptually based on the approach used to value production of marketable goods and services (de Vaus et al. 2003; Gray and Stanton, 2003). This method relies on the availability of a market value for a comparable service. Usually this requires for comparison the existence of a profit-driven company that sells (and hence provides a market value for) a similar service to that of volunteers.

The use of the output method for valuing certain volunteer activities is problematic as there are often no organisations that offer the same service for a fee (Ziemec, 2002). The use of market prices for outputs may also be challenging for a volunteer organisation that performs a wide variety of tasks due to a lack of data on the specifics of the various activities. Volunteers use equipment provided from public funds. The estimates from an output approach to value volunteer time need to be corrected for the value of publicly funded inputs. Collection of data on the outputs produced by volunteers, and costs of other inputs used, requires both high level capabilities in information management and the time to undertake a task that for many volunteer groups will be a low priority. Percovich and Handmer (2004) found that data collected by SESs covered response activities reasonably well, but that generally other activities were not documented. There are professional organisations that perform some of the tasks of the SES (for example, metropolitan fire brigades perform road crash rescue), but this is in a metropolitan rather than rural and remote context. However, in Australia at least, there are no commercial organisations carrying out the broad suite of work undertaken by the state emergency services. Thus the output method is of limited use in valuing SES volunteers. Nevertheless, the economic value of volunteer outputs may be of use in justifying the resources provided for SES activities.

Input Approaches

Input approaches are based on an imputation of value to time worked by volunteers. There are three methods to achieving a value for volunteer time under the input approach as outlined below.

Opportunity cost method: this method is based on the value of activities foregone by individual volunteers when donating time. Individuals from different socioeconomic backgrounds volunteer for emergency services. Thus, each volunteer has a specific opportunity cost for time at emergency service work even when engaged in similar tasks. Accurate calculations would need detail on each individuals' opportunity costs, or estimates based on individual socioeconomic circumstances and activities forgone at each volunteering exercise. This would potentially yield a wide range of estimates depending on the skills of and opportunities foregone by individual volunteers, as well as the socio-economic circumstances of each volunteer. Thus it is impractical to use the opportunity cost approach for valuing volunteer contributions in large organisations like the SESs that have a very diverse group of volunteers. The Australian Bureau of Statistics (ABS) has argued that the opportunity cost should not be based on the forgone wage but on the value individuals place on leisure since individuals may contribute for volunteer activities only in their leisure time (ABS 2002). However, this proposition does not hold with emergency services as volunteers often respond during work hours and when they would normally be asleep.

Global substitution method: here a 'global' hourly rate is attributed to all volunteer activities by using the cost of hiring a paid (non-specialised) worker to complete a volunteer's tasks. This method is widely used because of its simplicity and typically employs an average wage figure. As a result estimates of value may be low in the absence of allowance for specialised skills and activities. The method needs estimates of the total time provided by volunteers.

Specialised substitution method: this approach uses the relevant wage of a specialist with appropriate skills for the task. It is important to find an appropriate wage-rate for both this and the "global" methods. Both Dalsimer (1989) and Goulbourne and Embuldnyia (2002) particularly emphasised the need to avoid minimum wages for the valuing exercise, as this is likely to result in substantial underestimates of the value of volunteers' contributions. The approach requires detailed data on how volunteers spend their time so specialised tasks can be identified and valued.

In summary: the global substitution approach is convenient in practice but provides lower bound estimates compared to specialised substitution approaches that generate a more complete picture, albeit with much more effort for the analysis and more detailed data requirements. The global substitution and specialised substitution approaches trade accuracy for practicality and therefore the choice should be to match the objective of the valuing exercise. Accuracy may be desirable for valuing volunteer contributions, but achieving this accuracy may not be practicable within the resources available, particularly for larger volunteer organisations.

The approach used in this study

Researchers are in favour of non-opportunity cost based input approaches for empirical work on valuing volunteer time. As mentioned above and set out in Dalsimer (1989) and Goulbourne and Embuldniya (2002), there are theoretical and practical problems with the opportunity-cost and the input approaches. For empirical studies, input approaches have advantages compared to the more extrapolative output method. Accordingly, we employ two input based approaches to value volunteer time for the present study with the purpose of presenting a comprehensive picture of the value of SES volunteer activities.

Task-specific substitution method: This method is a modification of the specialised substitution method described in the literature. It allows us to achieve a reasonably accurate estimate while avoiding the computational difficulties of using specific wage rates for every volunteer task. Task specific substitution method first identifies a number of different tasks volunteers perform based on the similarities of the work and skills required to perform the job. Then a position description for each task is established and an appropriate wage rate is approximated from paid positions with similar position descriptions for the task. It provides a simplified computational process as fewer wage rates are used in the analysis. For example, time spent on road crash rescue will be valued at a specialist (fire fighter) wage rate while time spent catering will be valued at a different (caterer's) rate even though these activities may be performed by the same volunteer.

This approach has two advantages over the other input methods discussed above. Firstly it accounts for the diverse range of activities of volunteers, but avoids attempting to attribute job descriptions to all volunteer activity. Secondly, it uses readily available wage-rates and established existing professional position descriptions avoiding the need to classify the diverse activities of individual volunteers into more specific position descriptions. Central to this method is the assumption that volunteers with different professional backgrounds and different paid work could perform a diverse range of activities in the SES. We contend that this assumption is valid for the SES due to the large size of the organisations and the diverse backgrounds of its volunteers. In the approach, it is assumed that volunteers are equally as productive in performing a particular task as those paid to do similar tasks outside the SES.

Global substitution method: this approach is used as second input method in this study with the aim of further simplifying the process of volunteer valuation. The method simply tallies all volunteer hours recorded and multiplies by the average Australian wage. The method provides a lower bound estimate with relatively little effort.

The value of SES volunteers

The use of appropriate wage rates and the capture of the actual time volunteers make available for emergency services are key factors in calculating an estimate of the economic value of volunteer time. Collecting detailed information on volunteer time remains a difficult task in contrast to the conceptual complexity of identifying the appropriate wage rates for assigning value. Thus we present the value of SES volunteer time in several stages capturing the diversity of the commitment volunteers make. In these stages, we combined data provided by the SESs on the time spent by volunteers on operations with survey information from a previous study (Percovich and Handmer, 2004), to generate a comprehensive picture of the actual time volunteers make available. The Percovich and Handmer study surveyed all SES units in NSW and Victoria collecting very detailed information on the time provided by volunteers for SES activities. A follow up study developed the task specific method (Ganewatta, Bennett and Handmer, 2008).

Choice of Wage Rates

The integrity of the task specific substitution method relies on the accurate matching of professional position descriptions and wages to volunteer tasks. In the present study, we follow the approach used in the previous report of the Centre for Risk and Community Safety (Percovich and Handmer 2004) and use the same wage rates selected for each position description using the relevant industrial awards and agreements effective in Victoria in 2004. The wage rates used in the analysis are shown in Table 1. There are differences in wage rates among states and territories. The authors choose wage rates from Victoria to simplify computation and to provide consistency when comparing the value of different tasks. For the global substitution method, the relevant wage rate is the 2004 Australian average hourly rate of just under $ 24. No allowance has been made for shift or weekend loadings. These would increase the value of volunteer time.

Table 1: Position description and wage rate equivalents of SES volunteer tasks.

Volunteer Task/ Activity	Position Description	Wage Rate (A$/hr)
Response / Operations		
Storm	Construction Worker 3	35.05
Flood	Qualified Lead Fire Fighter	35.05
Road Crash rescue	Qualified Lead Fire Fighter (special rates)	38.04
Search and Rescue	Qualified Lead Fire Fighter	35.05
Fire Support	Qualified Lead Fire Fighter	35.05
Other	Qualified Lead Fire Fighter	35.05
Training	Qualified Lead Fire Fighter	35.05
Community Service	Community Development Worker (Class II)	24.30
Unit Management & Associated Activities	Victorian Public Service (Non Executive Band 1)	20.69

Source: The Social Value of Volunteerism in the State Emergency Services, Centre for Risk and Community Safety, RMIT University (2004).

Volunteer Time

SES agencies provided data on the time spent on response activities. Importantly, these data do not cover the time spent on unit management, training, community programs and stand-by arrangements. Alternative approaches are needed to derive estimates of the time volunteers contribute to agencies for these activities and the overall smooth operation of their organisations. In order to do so, we combine the actual data on time given for operational activities (from a ten year period for NSW and Victoria and seven years for South Australia) with results obtained from the survey conducted previously in NSW and Victoria to study SES volunteer time allocation (Percovich and Handmer 2004). This study established the proportion of time volunteers spend on community services, training, unit management and standby arrangements as well as on emergency response. We used these findings to estimate the volunteer time spent on SES unit management and training in NSW and Victoria. We also estimated the time volunteers spent on community education program in Victoria using the same approach. By following this approach, we treated non-response activities as a function of operational time whereby more operational activity is assumed to generate additional training through the year and vice versa. Given the importance of this assumption, we tested the result for sensitivity by using a fixed time allocation for training and unit management generated using average response time from the dataset. The overall result is relatively insensitive to changes in training based on response activity level. This can be attributed to the relatively large proportion of time spend on training and unit management compared to response time. The details of the data sets and their preparation for analysis are contained in the two reports.

We next present the economic value assigned for volunteers' time in the state emergency services of NSW, Victoria and South Australia using the two approaches identified above: the task specific and global substitution approaches. Table 2 gives information on the average value of volunteer time allocated for different activities in the three states.

Table 2: Value of volunteer time for various activities of the State Emergency Service using Task Specific Substitution Method*

Activity	NSW**	Victoria**	South Australia#
Fire Support	1034386	138686	104664
Flood	775319	148924	160043
Other Emergency Services	727084	448726	205143
Road Rescue	358874	503576	337719
Search and Rescue	967388	520543	434865
Storm	4479741	1084562	624821
Community Service	1309602	1584058	547378
Training	35610627	12079208	7929216
Unit Management Activities	7507478	2546554	1671647
Total Value	52,770,499	19,054,838	12,015,498

* valued at 2004 wage rate
** average from 1994/95 to 2004/05
# average for 2000 - 06

The estimates shown in Table 2 indicate that the time SES volunteers provide is quite significant in terms of money value. Total value of volunteer time given is worth $ 52, 19 and 12 million in 2004 dollars to SESs in NSW, Victoria and South Australia respectively. It shows that volunteers spend most of their time on training programs followed by operational and unit management activities. They also give significant time for community services as well. In terms of response, SES volunteers in NSW contributed most for storm related emergency operations followed by bushfire related operations in a typical year. In Victoria, the value of volunteer time given for storm operations is the highest among operational activities although road crash rescue is also important. Volunteers in South Australia also contributed their time primarily for storm related activities followed by search and rescue operations.

Table 3 reports the value of volunteer time for NSW, Victoria and South Australia Using the global substitution method. This method results in a lower value as expected given that the wage rate used is significantly lower for many of the tasks performed, and for most of the hours contributed, by volunteers.

Table 3: Value of volunteer time for SES activities using the Global Substitution Method*

	NSW**	Victoria**	South Australia#
Value of Volunteer Time	41,982,368	14,240,518	9,347,975

* valued at 2004 wage rate
** average from 1994/95 to 2004/05
# average for 2000 - 2006

Stand-by time

The ability of State Emergency Services to respond to an emergency is largely related to the rapid availability of volunteers – in other words volunteers on stand-by. Some functions, such as road crash rescue, would not be possible without stand-by arrangements. Nevertheless, neither the global substitution nor task specific methods take account of stand-by time, and volunteer time valued so far does not include any allowance for stand-by arrangements. Since no specific data were collected by SESs concerning the amount of time spent on stand-by by volunteers, we established the volunteers stand by time for our valuation exercise using the findings of the Percovich and Handmer (2004) study. The estimate of stand by time is based on the average stand by time per volunteer from the survey and the number of active volunteers of SES in the year that survey was implemented. Percovich and Handmer (2004) showed that 61 per cent of active volunteers were involved in stand-by arrangements. It was estimated (in consultation with the NSW and Victorian SESs) that 61 percent of all active SES volunteers were on stand-by at all times outside hours of normal employment and the four hours a week the survey showed the average SES volunteer spent on SES activities. Under the assumption that the empirical data recorded in the surveys were representative of all SES units throughout the year, 61 percent of active volunteers spend 120 hours a week on stand-by arrangement.

Some emergency services practitioners contend that 'stand-by' time should be valued through comparison with emergency service professionals' wages; that is, volunteer 'stand-by' time is considered equivalent to, for example, having fire fighters present at a fire station in readiness for an emergency, and hence should be valued at the wage-rate of fire fighters. This valuing method was rejected as it appeared to overvalue 'stand-by' time, as there is a clear distinction between opportunity costs incurred on stand-by time spent at a place of work (such as a fire station) and stand-by time carried out at a location of the volunteer's choosing.

In a report completed by management consulting firm KPMG, 'on-call' time of professional paramedics was valued at $ 1.68 per hour based on an 'on-call' allowance made by the Tasmanian Ambulance Service (KPMG, 2001). This method is in keeping with the substitution of market wage rates with volunteer tasks, and hence is favoured in this report. This rate of pay was directly comparable to emergency services work carried out by SES volunteers and we used $ 1.73 per hour after being adjusted for changes in wages. Thus, the pecuniary contribution of each volunteer on stand-by was $ 207.60 per week, or $ 10,795.20 per year in 2004.

Table 4: Value of volunteer time for SES including stand-by arrangement – NSW and Victoria* ($)

Activity	NSW	Victoria
Community Service	1,309,602 (2%)	1,584,057 (4%)
Response & Recovery	8,342,791 (10%)	2,845,017 (7%)
Time Available for Response (Stand-by time)	33,266,663 (39%)	21,969,548 (54%)
Training	35,610,627 (40%)	12,079,208 (29%)
Unit Mgt. & Other Activities	7,507,478 (9%)	2,546,554 (6%)
Total	86,037,161	41,024,384

* valued at 2004 wage rate

In 2004, there were 5410 and 2710 active volunteers in State Emergency Services of NSW and Victoria (Percovich and Handmer, 2004) – based on advice from the respective SESs. Combining the value of standby time for the 61 percent of volunteers involved with the ten year average value of active volunteer time presented in Table 2, gives the total value of the time volunteers made available to SESs in NSW and Victoria (Table 4). We did not extend this analysis to South Australia as we do not have the necessary information on volunteer membership. The volunteer time from stand-by arrangements constitutes the largest proportion of volunteer time of the total time. As a result of the large time commitment of volunteers for stand-by arrangement, the economic value of the time provided increases markedly even though only a nominal value is used per hour of stand-by. When stand-by time in included, the value of the time provided by SES volunteers in NSW increases by about 65 per cent while the change in Victoria is more than 100 per cent. Table 4 shows that the total time volunteers made available for the NSW and Victorian SESs is worth more than $86 million a year and more than $ 41 million a year respectively.

Figure 1(a):Total activity time by volunteers.

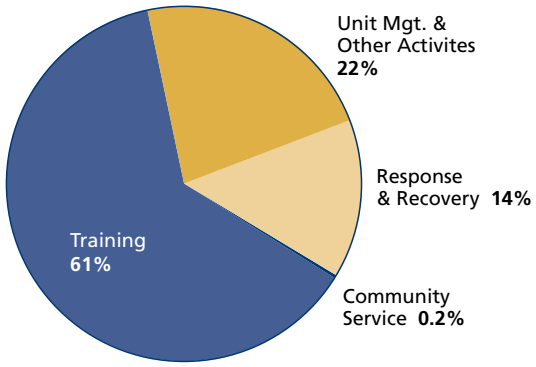


Figure 1 illustrates the allocation of time and money value for SES volunteers in the state of NSW. Figure 1(a) shows the time allocation of all SES activities including training and other associated SES tasks demonstrating that training consumes most the time actually spent by SES volunteers. Figure 1(b) adds stand-by time, while Figure 1(c) shows the value of the time, and shows the overwhelming importance of stand-by both in terms of time made available as well as the value of volunteers.

Figure 1(b): Total time provided by volunteers including stand-by time.

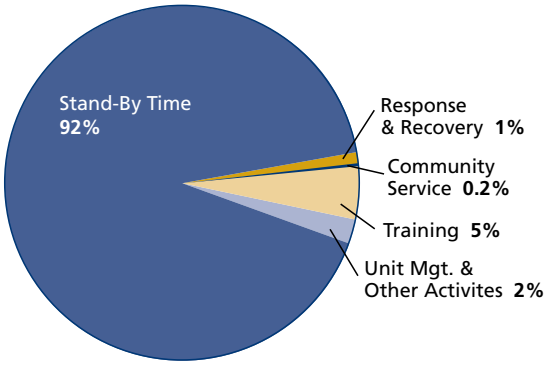
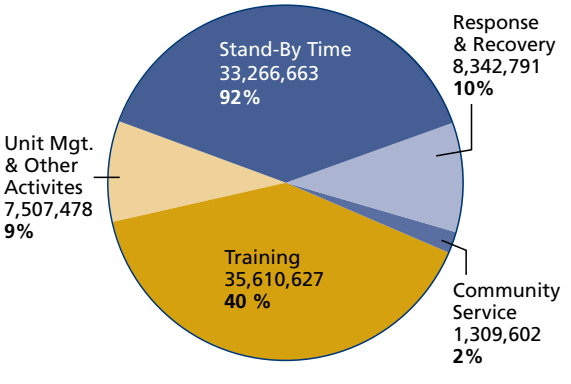


Figure 1(c):Distribution of the money value of time made available by volunteers including stand-by time.



Concluding Remarks

This report presents estimates of the economic value of volunteer activities of the State Emergency Services to communities in NSW, Victoria and South Australia. In the absence of institutions like the SES that sources its human resources through volunteers, government needs to provide equivalent services through paid staff or private contractors – both approaches require significant resources. This raised the issue of estimating the value of the SES volunteers. Assigning economic value to volunteers' activities also gives the opportunity to make valid comparisons with other services. We use two basic approaches "global substitution method" and "task specific substitution method" to estimate the economic value of SES volunteer time for NSW, Victoria and South Australia. In addition, estimates of the value of stand-by time are included. Nevertheless, this work does not look at the indirect or secondary benefits that may arise through volunteerism as explained through social capital theory. This analysis reveals that the time volunteers provided for operational activities and community programs is quite small compared with the time allocated for training and unit administration. More significantly, the stand-by time of SES volunteers is the largest component of the total time spent by volunteers.

Acknowledgments

Our appreciation goes to Emergency Management Australia (EMA), the NSW and Victorian SESs, the Australian Council of State Emergency Services (ACSES), and Bushfire CRC for funding this work. The School of Mathematics and Geospatial Sciences at RMIT University provided office and administrative support.

The work reported here builds on earlier work undertaken for EMA and the NSW and Victorian SESs: *The social value of volunteerism in the state emergency services*. That study was undertaken and report prepared by Oliver Percovich and John Handmer of the Centre for Risk and Community Safety, with the assistance of Chas Keys of NSW SES, Paul Jerome of VICSES, and James Bennett of the Centre for Risk and Community Safety. Mike Tarrant of EMA, and Neil Gentle formerly of the Bureau of Transport and Regional Economics, provided valuable input. An extension of this work is reported in Ganewatta, G., Bennett, J. and J. Handmer, (2008) *The value of volunteers in State Emergency Services*, prepared for ACSES and AFAC.

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About the authors

Gaminda Ganewatta serves as Research Fellow in the Economics of Community Safety at the Centre for Risk and Community Safety of RMIT University in Melbourne. His current research interests are related to the economics of disasters and public policies in community safety.

John Handmer is Innovation Professor in Risk and Sustainability at RMIT University in Melbourne where he is head of the Centre for Risk and Community Safety and Human Security Program. He is also a Research Leader in the Bushfire CRC. He holds adjunct professorships at the Australian National University, and at Macquarie and Middlesex Universities. His most recent books are *Community Bushfire Safety* (Edited with Kat Haynes) (CSIRO Publishing) and *The Handbook of Disaster & Emergency Policies & Institutions* (co-authored with Steve Dovers) (Earthscan).

Levels of Risk: Perspectives from the Lost Creek Fire

Kulig, Edge, Reimer, Townshend and Lightfoot's research findings say perceptions of risk are just as important as more objective measures of risk.

Abstract

Risk has been considered as the probability of experiencing adverse events. Understanding risk and vulnerability is essential to disaster management and recovery. Through qualitative interviews in a community that experienced a wildfire, 'at-risk' and 'feeling at-risk' themes were identified for both the individuals and community in this study. Internal and external circumstances along with varying levels of dependence influenced the reports of risk. Individual and community risk during a major wildfire is discussed in order to explain links to community resiliency. Such understandings can aid in the development of appropriate measures to reduce short- and long-term impacts from natural disasters.

Levels of Risk: Perspectives from the Lost Creek Fire

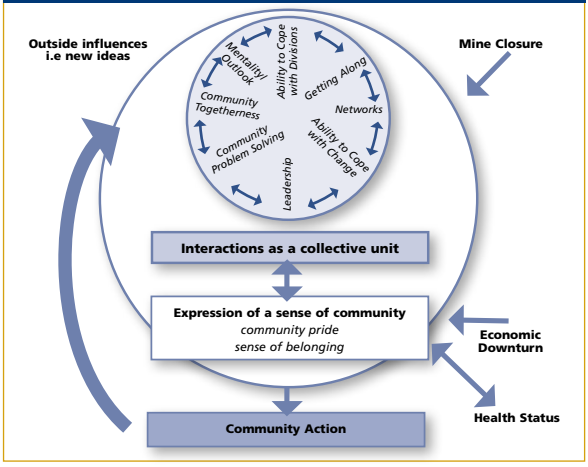
The rising frequency of natural disasters in Canada is generally attributed to global climate change (Public Safety & Emergency Preparedness Canada, 2005a & b). Rural communities in Canada are particularly at-risk for wildfires. Over the last 10 years, for example, 250 communities and 700,000 people have been threatened by wildfires (Public Safety & Emergency Preparedness Canada, 2005b). Following the suggestion of the Red Cross that resiliency be used as a framework for disaster management (Walter, 2004), this article describes individual and community perception and experiences of risk following a major wildfire that occurred in Southern Alberta, Canada in the summer of 2003.

Background to the Study

Resiliency is suggested as a useful framework to understand community responses to disaster (Buckle, Marsh & Smale, 2002). High community resiliency is the ability of a community to deal with adversity and develop an improved level of functioning in the process (Brown & Kulig, 1996/97; Kulig, 1996; 1998; 1999; 2000). It is a process through which the community continually adjusts to the dynamic conditions they face (Kulig & Hanson, 1996) whereby residents' interactions as a collective unit ("getting along") lead to a "sense of community" (community togetherness and sense of belonging), finally producing community action, through visionary leadership and conflict-resolution (Figure 1) (Brown & Kulig, 1996/7; Kulig, 2000; Kulig, Edge & Joyce, under review).

Assuming that a more resilient community provides a cushion against risks associated with disasters, many agencies have advocated for increased resiliency as a means of humanitarian, development and risk reduction (Walter, 2004). Yet, seldom is this assumption investigated. Therefore, a primary focus of this project is to investigate whether community resiliency provides such protection. Four key community risks served as initial points of reference: risks to economic security, risks to property, risks to health, and risks to social exclusion (Rakow, et al, 2003). In these instances, risk refers to the possibility of experiencing an adverse event (Bradbury, 1989; Renn, 1998).

Figure 1. Updated Community Resiliency Model (2007). From: Kulig, Edge & Joyce (under review).



Study Purpose

The purpose of this study was to examine the nature of risk within a rural community that experienced a wildfire disaster and to consider its relationship to community resiliency. We focused on identifying individuals at-risk, during and immediately after, the disaster, the reasons persons were at-risk and the relationship between the level of risk and individual characteristics. For this study, rural was defined as communities under 10,000 population that are outside the commuting zone of urban areas (duPlessis, Beshiri, Bollman & Clemenson, 2001).

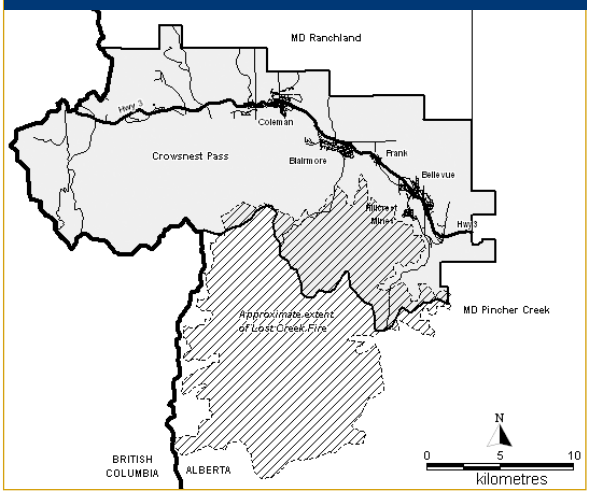
Methods

Two methodological approaches were conducted concurrently in order to maximize their complementary strengths (Johnson & Turner, 2003). Qualitative interviews using an interview guide were completed while quantitative data was collected and analyzed from available census, surveys, historical and local administrative data. This article focuses on the data generated from the qualitative interviews.

Study Setting

The Crowsnest Pass, in Southern Alberta, Canada was chosen as the study site because it experienced the devastating Lost Creek Fire[1] in 2003 (See Figure 2). The "Pass," as it is commonly known, originally consisted of two individual towns (Coleman, Blairmore) two hamlets (Bellevue and Frank) and parts of an improvement district (Hillcrest Mines) before amalgamation to one municipal government in 1979. The amalgamation was publicly and privately debated, but ultimately passed because it was perceived as the more economically viable option. Despite the amalgamation, individual town names and postal codes remained, although other aspects of the previous administrations, such as the school system, were integrated across towns.
At one time, the Pass was an underground coal mining community but the mines closed, requiring local workers to commute to the neighboring province of British Columbia and work in the coal strip mines. Individually, and collectively, the area has dealt with a number of significant historical events including the Frank Slide in 1903 (i.e., fall of Turtle Mountain which buried part of one town) and the 1914 Hillcrest Mine Disaster, the worst mine disaster in Canadian history. Both of these events led to the loss of lives and the rebuilding of families and the physical structures of the communities.

Figure 2 Map of Crowsnest Pass.



Situated in the Rocky Mountains, the Pass offers outdoor recreation. It has become a tourist destination with many part-time residents who reside there only on weekends and in the summer months. In 2007, absentee landowners made up nearly 31% of home-owners. Similar to many rural communities, the Pass struggles with the loss of youth, closing of schools, and a lack of economic opportunities for local individuals.

The Summer of 2003

The Pass has become well known for Rum Runner Days® (http://www.rumrunnerdays.com/), a weekend of activities that acknowledges the community's early involvement with the clandestine shipment of alcohol during the period of prohibition when alcohol was not legally available. The event is supported by the entire municipality; the community population swells from just over 6,000 to more than 40,000 and is a major economic boost for the community.

In 2003, Rum Runners Weekend ended on July 20. A few days later, July 23, the Lost Creek Fire started (see Box 1). On July 26, a State of Emergency was called that lasted for 31 days (until August 25). Some of the participants talked about how the community as a whole did not have sufficient time to recuperate from the Rum Runners Weekend prior to the outbreak of the worst wildfire in the community's history.

How the fire started is still open to debate. However, the conditions were ripe for a major wildfire. The temperatures were hot and remained so for several weeks, an unusual occurrence in the community. On the day the fire began, the temperature reached 34.7°C. In subsequent days temperatures as high as 33.9°C (August 2) were attained. At its height, the Lost Creek Fire travelled at close to 89 feet per minute and required over 800 Sustainable Resource Development (SRD)

1. In Canada, forest fires are given specific names based upon geographical locations of the fire.

firefighters and personnel and a coordinated team of over 868 identified workers including all local 104 fire and rescue personnel plus equipment (21 helicopters, 8 water bombers, over 30 dozers and more than 20 water trucks) to contain it. Over 2,000 residents were evacuated from Hillcrest Mines and the southern part of Blairmore; approximately 100 residents used the local evacuation centre as their primary residence during their evacuation. By the time the fire was under control, 21,000 hectares (51,800 acres) had been burned. The cost, to the municipality, which was fully reimbursed by the Provincial government, was $2,394,180 and the SRD cost was approximately $38 million.

Lost Creek Fire Timeline

- July 23, 2003. Fire started.
- July 26. State of Emergency declared (31 days)
- July 27. Adanac Road and East Hillcrest evacuated; all others in Hillcrest received 1hour alerts.
- August 2. All of Hillcrest evacuated.
- August 3. South of the tracks in Blairmore evacuated.
- August 6. Return of Hillcrest residents.
- August 8. Return of Blairmore residents.
- August 11. Evacuated same area of Blairmore.
- August 17. Return of Blairmore residents.
- August 25. State of Emergency removed.

Study Population

In order to ensure a broad coverage of key personnel, four groups were targeted for inclusion in the interviews: (1) participants who were directly involved in dealing with the fire, either as fire fighters, volunteers or administrators; (2) participants who were directly involved with the fire and were simultaneously evacuated; (3) participants who were evacuated; and, (4) participants who were not involved in the fire and were not evacuated.

Data Collection & Analysis

Data were collected from September, 2006 to January, 2007 until data saturation was achieved. Other investigations have noted that recall is not an issue with sentinel events such as the wildfire discussed in this study (Berney & Blane, 1997; Nadalin, Bentvelson & Kreiger, 2004). In total, 30 tape-recorded interviews were conducted with the interviews focusing on: the participant's experience in the fire, their perceptions of those at-risk and how the fire affected their community's resiliency. Data collection and analysis occurred simultaneously in an iterative process; to ensure that all aspects of the fire were addressed. Data analysis included frequent reading of the transcripts, and identification of themes and categories (Creswell, 2003).

The first author is from the community and has many family members and friends who reside there. She conducted the qualitative interviews while a local transcriber confidentially transcribed the information from the tapes. A local community advisor arranged community meetings and recruited participants. The municipal government provided support and access to information and available data. A student research assistant (RA) worked with the first author to assist with data collection, analysis and report preparation. Credibility was improved by discussing the emerging themes with the student RA and working with the local community advisor who read drafts of the final report.

Results

Participant Characteristics

Most of the 30 participants were male (n = 17), aged 41 to 50 years, married (n = 13) and claimed the Pass as their birthplace (n = 13) and primary residence (n = 27). The majority (n = 23, 77%) had always lived in a rural community.

The Experience of the Lost Creek Fire

Most of the participants talked about seeing the smoke in the region of Lost Creek on July 23, 2003 before they were aware that a major fire was brewing. Local individuals (Fire and Rescue Squad) notified the Mayor who then contacted the Chief Administrative Officer (CAO). Local personnel from SRD met with the Mayor and CAO to advise them about the fire and the potential impact on the community. Once the state of emergency was declared on July 26, 2003, the Mayor and CAO met to develop a plan of action. All regular work at the Municipal Office was suspended and all vacations cancelled while the disaster was being handled according to the mandated provincial disaster plan.

The Municipal Office handled communications through the local radio station that announced evacuations and general information to the public. Communication was also guaranteed through the 24-hour telephone line that was administered at the Municipal Office. The staff dealt with a variety of calls related to the fire including addressing general questions, advice about evacuation and even assuring individuals from other provinces or countries that their relatives in the Pass were safe. Another source of communication was the SRD fire information booths that were set up throughout the community.

Judith Kulig.

Fire on the Crowsnest pass.

Perspectives on the Fire

Despite the three-year gap between the time of the Lost Creek Fire and the interviews, the participants all described vivid memories of the experience. The following quote from a female participant exemplifies this recall while also illustrating that the participant was feeling emotionally at-risk:

I was walking down main street in Blairmore, and I looked at the skies and just the colours, and I was just sobbing, I was crying and I could not believe that this was my community and it was going up in flames.

Participants varied in their reaction to the fire. In the interviews, wives of the local volunteer firefighters spoke of the concerns they had for their husbands' safety. Evacuees talked about the challenges of living away from their primary residence combined with their concerns about the possible loss of property. One female participant said: "I never thought that it would get to the point that we would be evacuated, and then once they tied the blue ribbon to your door, well then you knew it was a possibility, but when they said, you guys had to get out, it was like, pow. It was a panicky feeling."

Local administrators, business owners and SRD personnel focused on the larger collective issues of handling a large-scale community disaster as a result of the wildfire. The impact of the fire upon children was described by their mothers in a variety of ways, ranging from seeing the fire as an adventure, particularly if they had to evacuate and live somewhere else to a stressful time when their children worried about their belongings that had to be left behind.

Several local groups were involved in the evacuations since they required considerable organization and coordination. One of the groups, the "Quad Squad," is a community group comprised of individuals who enjoy riding their all-terrain vehicles (ATV) in the back country. During the Lost Creek Fire, this group assisted with evacuations by going to residents' homes to notify them of the evacuation order and then patrolled the streets to secure the area. In more than one instance, they provided emotional support for the evacuees--particularly with the elderly who were alone and frightened. The local Royal Canadian Mountain Police (RCMP) detachment, provided assistance with the evacuation of individuals who refused to leave or who demonstrated behaviors (i.e., intoxication) that were not conducive to an orderly evacuation.

Most of the evacuees relocated to family or friends' homes in the other Pass communities that were not evacuated (Coleman, Bellevue and parts of Blairmore). This is one example of the extent of informal social support in the Pass—where—the family and friendship relationships were facilitated by the relatively close geographic locations of the communities.
Those who were evacuated to the Learning Centre were given a private room and had all meals provided.

Some of the participants talked about not having a choice to evacuate and did not always agree that they should be forced from their homes. All of them indicated that they had sufficient insurance coverage but added that some seniors did not have insurance. The participants were also asked if they made any changes in personal habits regarding disaster preparation for the future. The majority did not check their insurance coverage and did not have a permanently packed bag of extra clothing or other necessities. Only one participant noted that their family has always had a bag ready in case they had to leave their home quickly.

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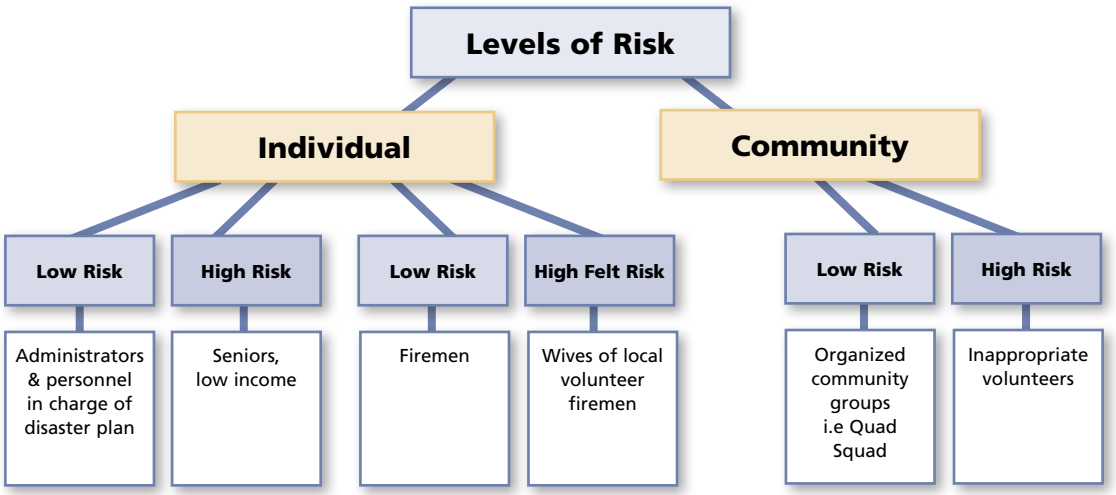
Safety of firefighters was a major concern of their families.

Figure 3. Perceptions of Being and Feeling At-Risk.



The Lost Creek Fire was a physically and emotionally demanding experience for the municipal staff, Learning Centre staff and volunteers, local firemen, local SRD personnel and local elected officials. Long days that often stretched into 18 to 20 hours of solid work were commonplace among those responsible for addressing all aspects of the fire. Local social workers offered on-the-spot counseling to fire fighters as needed. Participants in these roles talked about feeling physically and emotionally drained afterwards. After the fire was contained, most took several days off to recuperate, although they reported not feeling fully recovered for months afterwards. During the fire, some of the local fire fighters became so fatigued that they needed to leave the community to obtain enough sleep to resume their duties. Critical incident team members from a nearby city offered to come to the community and help local staff deal with the stress of the fire.

When asked, the participants noted that the Pass demonstrated resiliency during the fire. This was shown through the volunteers available to assist with evacuations, and how the community took the event in stride. Stories about family members and friends working together to serve meals for the evacuees supported components of the resiliency model (i.e., getting along).

Who is At-Risk?

Participants were asked about being at-risk due to the wildfire. The comments in the interviews indicate that both individuals and the community were vulnerable but in different ways (Figure 3). Individual vulnerability was further differentiated as being at-risk and feeling at-risk. Being at-risk then divided on the basis of the source of stress; circumstances that were internal or external to the individual.

Internal circumstances include their age, development status, income level, available support systems, lifestyle behaviors such as substance abuse, health status, or primary residence. Some of these individuals were perceived as relatively independent since they had support systems and access to other resources. However, individuals were identified as dependent upon others to help them perform their activities of daily living. One participant described this group as: "the shut-ins, the disabled folks that require extra assistance, you know whether they be wheel chair bound having to use a walker, just generally need assistance to do their regular course of life activities."

Individuals also faced external circumstances that led to their vulnerability, including: those who did not have house insurance; and people like business owners or who were unable to work during the fire. Since the Pass is a "weekend home" to many individuals, property sales are common occurrences. However, when a state of emergency is declared, insurance coverage on existing policies cannot be altered and new policies cannot be negotiated. Individuals who had purchased homes in the evacuated areas had to wait and hope that the wildfire would be contained without the loss of their new property. Some of the participants felt that those people who could afford a second property did not have financial concerns. Of greater concern were the seniors who had never had insurance and faced losing their only property. The other group considered at-risk was local individuals unable to work at their regular job because of the wildfire, including the local firefighters.

The wives of the fire fighters felt at-risk because their husbands' volunteer work was physically demanding and dangerous. The fire fighters, however, did not personally acknowledge feeling at-risk but instead felt an obligation to assist in helping to control the wildfire.

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One of the 8 fire bombers employed to help fight the fire.

There was also a community level of being at-risk. Economic risks included the decline of retail sales for local businesses. Tourism suffered during the wildfires with the closure of campgrounds and bans on open fires. Thus, local business owners who normally sold retail items including groceries and gasoline, restaurant owners and independent operators who offered local tours did not fare as well during this time. The trees that were destroyed in the fire reduced the logging operations, and subsequently, the income of individual operators and residents who were logging their land. However, during and after the fire, there were some economic benefits to the community including the sale of t-shirts advertising the Lost Creek Fire and a year later the high volume of morel mushrooms that provided income to the local pickers.

Another source of risk for the community was the selection of volunteers with the assumption that all were appropriate in this role. During a wildfire, for example, criminal record checks are not possible due to the lengthy time they take in addition to their cost. A number of respondents felt that some individuals would not be suitable for security or other related activities because of their past record.

Conclusions

The Lost Creek Fire provides a valuable source of information regarding the people, conditions, and responses relating to risk, vulnerability, and resiliency in the face of wildfires. Further research is required to elaborate the nature of these relationships, but our initial examination provides some insights regarding strategic foci for that research.

Among the participants there was an appreciation that events such as wildfires can lead to both individual and community vulnerability. Individual vulnerability was experienced by specific groups who were at-risk (i.e., seniors) or felt at-risk (i.e., firefighters' wives) from either internal or external circumstances. Furthermore, there were different ranges of independence and interdependence. Rural community's firefighters and their partners/families may both need support and counseling at the time of the event, but also during the aftermath. The firefighters may also need follow-up for any long-term impacts on their physical or mental health. /Both of these actions will enhance individual and community resiliency.

Community vulnerability was identified as the immediate loss of employment and the potential future economic losses within the community due to the loss of logging. Rural communities already struggle with economic challenges and limited employment opportunities. Wildfires jeopardize these circumstances further and need consideration when disaster recovery is underway.

We concluded that vulnerability and risk must be considered separately for individuals and communities. Individuals may be vulnerable in communities which are reasonably resilient, just as vulnerable communities may contain many low-risk individuals. We also found that individual vulnerability dynamics are likely to be different with respect to the personal characteristics and social support networks of the person from those that are more 'external'—arising from the economic situation of the individual. Community members respond differently to residents which are vulnerable because of alcohol abuse, for example, as compared to those who are vulnerable because their business is at risk.In addition, the perception of risk is likely to vary considerably by individuals. This makes the perception of risk an important focus for social support independent from more objective measures of risk.

Finally, experiences of individual and community vulnerability also challenge how the community deals with adversity and ultimately its level of resiliency (Brown & Kulig, 1997/97; Kulig, 2000). Future studies in other communities that have experienced wildfires can incorporate specific questions that link individual and community vulnerability to resiliency adding to our understanding of these concepts.

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About the authors

Judith C Kulig is a Professor in the Faculty of Health Sciences, University of Lethbridge where she conducts a research program related to rural health issues including community resiliency within rural settings.

Dana Edge is an Associate Professor in the School of Nursing, Queen's University.

William (Bill) Reimer is a Professor in the Department of Sociology, Concordia University. For 10 years he was the Director of the New Rural Economy Project in Canada (http://nre.concordia.ca).

Ivan Townshend is Chair of the Department of Geography, University of Lethbridge.

Nancy Lightfoot is Director of the School of Rural and Northern Health at Laurentian University.

Judith Kulig is the corresponding author on this paper and can be contacted at Kulig@uleth.ca

Maintaining volunteer firefighter numbers: Adding value to the retention coin

McLennan, Birch, Cowlishaw & Hayes investigate how volunteer-based fire agencies could boost retention of their volunteers

Abstract

Annual resignation rates for Australian volunteer-based fire agencies range from about 6.7% to 8.3% of total volunteer firefighter memberships. We report two studies investigating aspects of volunteer retention. (1) Analysis of 396 exit survey returns from former volunteers found that reasons contributing to resigning were: Work/Family needs, 51%; Moved from the area, 38%; Age/Health issues, 28%; Dissatisfaction with the volunteer role, 25%. A major contributor to Dissatisfaction was poor brigade leadership. (2) A survey of 514 second-year volunteers found that higher levels of volunteer satisfaction, and thus intention to remain, were associated strongly with being a member of a well-led, inclusive, and harmonious brigade. Overall, the findings indicated the need for agencies to: (a) distinguish unavoidable reasons for resigning (Moved; Age/Health issues) from potentially avoidable reasons (Work/family needs; Dissatisfaction); (b) endeavour to balance the demands on volunteers and the needs of their volunteers' work and family life; and (c) enhance the quality of brigade leadership and management.

Introduction

With its dry climate, flammable vegetation characteristics, and land use and settlement patterns, much of Australia—including urban/rural fringes of major cities—is vulnerable to bushfires. Sparse human settlement outside capital cities and major regional centres means that Australian communities rely heavily for fire protection on approximately 220,000 volunteer firefighters (McLennan, 2008) in eight state and territory volunteer-based fire services.

During the period 1995-2003, total volunteer firefighter numbers across Australia declined appreciably, because of complex economic and demographic changes in Australian society (McLennan & Birch, 2005). While most agencies report that previous declines in total numbers appear to have been halted, and in some cases reversed, there is little room for complacency. Concerns have been expressed about possible negative impacts of climate change on future volunteer numbers in south eastern Australia (Office of the Emergency Services Commissioner, 2008): an increase in the frequency of severe weather events plus generally drier summer conditions will likely result in more frequent large fires, and thus greater demands on volunteers' time. Furthermore, it seems likely that economic uncertainties and concerns (such as rising fuel costs) may deter many from volunteering with fire agencies in the future (McLennan, 2008).

There are indications that most agencies have reviewed and improved their approaches to recruiting new volunteers (e.g., McLennan, Birch, King & O'Loghlin, 2007). However, in order to maintain adequate numbers of volunteers to meet community protection needs agencies must not only recruit, but also **retain**, their volunteers. In 2007 resignation rates for Australia's volunteer-based fire agencies ranged from 6.7% to 8.3%, with a weighted mean resignation rate for all agencies of 7.7% (Note 1). In 2003, the corresponding figures were: 6.3% to 10.4%, with a weighted mean of 8.1% (Note 2). Based on information supplied by agencies, McLennan (2004a) estimated that in 2003, the direct annual cost to Australian volunteer-based fire agencies stemming from volunteer resignations was approximately $13 million. This figure does not take into account possible productivity and performance costs to fire agencies and the communities they protect stemming from: (a) absenteeism prior to departure (Griffeth, Hom, & Gaertner, 2000); and (b) possible reduced brigade effectiveness pending availability of a trained replacement volunteer (Mobley, 1982).

Photograph courtesy of Queensland Fire & Rescue Service, Rural Operations.

Queensland Rural Fire Service volunteers getting ready for the next fire season.

The general organisational and human resources literature has devoted considerable attention to problems associated with employee turnover, and especially turnover stemming from voluntary (as distinct from involuntary) resignations (Evans, Christopher, and Stoffel, 2000; Hom & Griffeth, 1995; Mobley, 1982). Voluntary resignations are considered by most researchers to be a negative indicator of organisational effectiveness (Cascio, 1991; Griffeth & Hom, 2001; Staw, 1980). Numerous research studies have been reported concerning causes of employee turnover. For example, Abassi and Hollman (2000) concluded that there were five major contributors to staff resignations:

1. Faulty hiring practices.
2. Inappropriate styles of management.
3. Lack of recognition.
4. Poor wage policies and non-competitive salaries and benefits.
5. Toxic workplace environments.

Other aspects of the workplace identified as determinants of staff turnover levels include: degree of satisfaction with supervisors; satisfaction with co-workers; role ambiguity; role conflict; organisational culture; and job demands-resources imbalance (Evans et al., 2000; Griffeth et al. 2000; Price, 2001; Schaufeli & Bakker, 2004; Udechukwu & Mujtabu, 2007). Employee (dis)satisfaction and (lack of) organisational commitment have both been found to be linked strongly to resignations (Currivan, 1999; Hom & Kiniki, 2001; Price, 2001; Udechukwu & Mujtabu, 2006).

It is likely that many research findings and conclusions from this general literature on employee turnover can be applied usefully to the volunteer-based fire services. However, the fact that: (a) volunteers are not remunerated, and (b) most incur significant financial costs as a consequence of their volunteering (McLennan, 2008), probably imposes limits on how reliably some findings and conclusions can be generalised from a paid employment context to a volunteer-based fire agency.

Apparently, very little research has been undertaken concerning resignations by volunteer firefighters. Only one study has been reported previously into reasons why Australian volunteer firefighters resign. Woodward and Kallman (2001) mailed exit survey questionnaires to former CFA Victoria volunteers and analysed 166 returns (24% return rate). Their data suggested that about one third of resignations resulted from volunteers leaving the area. Woodward and Kallman concluded that three major reasons for resigning, apart from leaving the area, were (a) time demands (26%)—including work, family and personal commitments; (b) negative brigade and organisational issues (18%)—such as demands of meetings and call-outs; lack of recognition by the organisation; interpersonal conflict; lack of leadership opportunities; and nepotism; and (c) training demands (12%)—including time, and limited access to training opportunities and resources.

Seeking to boost volunteer retention resembles examining a coin; there are two sides: one is concerned with identifying, and minimising, factors likely to lead to resignation; the other side is concerned with identifying, and maximising, factors which make volunteers want to remain. In this paper we report two studies; each investigated a different side of the volunteer firefighter retention coin. The first was based on an analysis of exit surveys returned by former volunteers who had resigned. The aim was to identify the major reasons why the volunteers had resigned, distinguishing between 'avoidable' and 'unavoidable' reasons (Hom & Griffeth, 1995). The second study investigated determinants of volunteers' reported intentions to remain with the agency (cf., Tett & Meyer, 1993). The purpose of the research was to identify possible means by which volunteer-based fire agencies might boost retention of their volunteers.

Study 1: Reasons for resigning

Method

At the request of the South Australian Country Fire Service (CFS) and the South Australian Fire and Emergency Services Commission (SAFECOM), the Bushfire Cooperative Research Centre (CRC) Volunteerism Project team analysed 394 exit survey returns from 2,438 exit surveys (return rate 19%) mailed by CFS to former volunteers who resigned during the period December 2005 – December 2007. Those who responded comprised 306 men (78%) and 88 women (22%); their median ages were 46 and 37 years, respectively. Median length of volunteer service was 10 years for men and 5.5 years for women. These gender percentages and median ages and lengths of service of respondents approximated those of the overall CFS volunteer membership. The exit survey questionnaire was designed by CFS staff and a consultant. The questionnaire requested demographic information from the former volunteers, and asked to them to rate up to 5 of 12 listed possible reasons for resigning, on a 5-point scale: 1 = most important, 5 = least important. Former volunteers were also asked to describe any negative aspects of their experiences as volunteers.

Results and discussion

Because of the large number of missing values resulting from the questionnaire response format, hierarchical cluster analysis using (a) squared Euclidian distances; and (b) Ward's linkage method was employed to identify associations among reasons given for resigning. Four clusters were identified (Figure 1):

I. Dissatisfactions with CFS volunteering: 25% nominated these as contributing reasons for resigning.

II. Age/Health Concerns: 28% of respondents nominated these as contributing reasons for resigning.

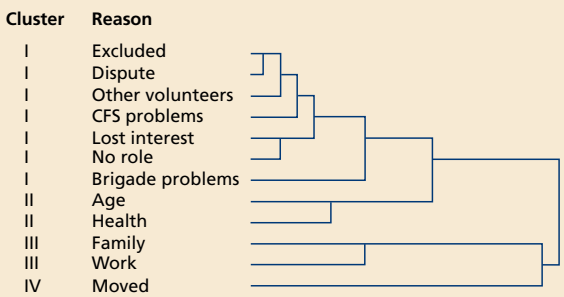
III. Work/Family Commitments: 51% of respondents endorsed these as contributing reasons for resigning.

IV. Moved away from the district: 38% of respondents endorsed this as a contributing reason for resigning.

There is probably little that any agency can do meaningfully to counter the largely unavoidable factors involved in clusters II (Age/Health) and IV (Moved). Cluster III (Work/Family) will prove difficult to address, requiring attention to a range of volunteer issues, including: workload (both responding to incidents, and training); income and costs of volunteering concerns; and socioeconomic pressures on families. Agencies' capacities to intervene in these areas are likely to be somewhat limited in the absence of Commonwealth or state government policy initiatives. However, the makeup of Cluster I (Dissatisfaction with CFS volunteering) suggests that many resignations are potentially avoidable by improving brigade climate through better management and leadership. The specific contributing reasons for resigning making up this cluster were:

- Felt excluded from brigade activities.
- Dispute with another member.
- Problems with other volunteers
- Unhappy with the direction of CFS as an organisation.
- Lost interest in the CFS.
- Didn't feel there was a role for me in the brigade.
- Unhappy with brigade (or higher level) management.

Figure 1: Hierarchical cluster dendrogram; using squared Euclidian distances and Ward's method.



Respondents were also asked "What did you enjoy least about volunteering with CFS?" There were 286 written text responses describing sources of dissatisfaction. Some former volunteers described more than one source of dissatisfaction. The responses were inspected and assigned to one of seven major categories. These are tabulated below.

1. Dissatisfaction with brigade life (34%):

- Poor brigade climate: conflicts, factionalism, exclusion, bullying (n = 64).
- Poor brigade leadership: autocratic, favouritism, incompetence (n = 23).
- Negative impacts of other volunteers: lazy, unsafe, troublemakers (n = 9)

2. Time demands of volunteering (22%):

- Time required: (n = 32).
- Time wasted: operations, training (n = 30.

3. The nature of the work of a CFS volunteer (14%):

- Risks and stressors: mostly anxieties associated with attending vehicle accidents (n = 32).
- Physical conditions: heat, smoke, fatigue, dirt, climbing ladders (n = 10).

4. Bureaucracy, red tape, rules, forms (12%):

5. CFS structures, staff, and processes (9%):

- Locals not consulted, ignored, over-ruled (n = 15).
- Negative behaviours/attitudes of paid staff to volunteers (n = 8).
- Inadequate resources/equipment (n = 4).
- Lack of communication with brigades (n = 2).

6. Training (6%):

- Excessive demands (n = 13)
- Inadequate/poor quality (n = 3).

7. Local community: lack of interest, support, recognition (3%):

The negative aspects of volunteering listed above suggest that poor brigade climate, brigade leadership failures, and organisational shortcomings outweigh negative aspects of the actual work of a CFS volunteer (including stresses and time conflicts) as primary sources of dissatisfaction with volunteering leading to resignation.

Study 2: Volunteers' Intentions to Remain

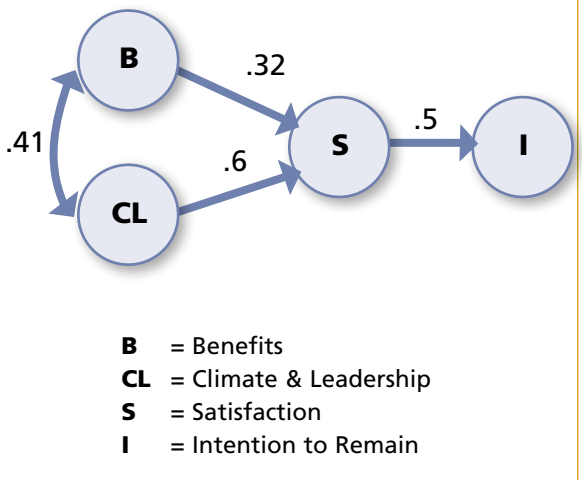
Method

As part of CFA's New Member Tracking Project (McLennan, Birch, & King, 2006) 514 survey returns from CFA volunteers, who had been members for 12 months, were analysed. Respondents were 345 men (67%) and 176 women (33%). Their median age was 38 years. The survey questionnaire asked the volunteers about their experiences in their brigade, time conflicts, perceived risks, limitations on activities, constraints and frustrations, benefits derived from their volunteering, overall satisfaction with being a CFA volunteer, and strength of intention to remain a CFA volunteer. Associations among these various aspects of volunteers' experiences were examined, focussing on predictors of level of intention to remain a CFA volunteer.

Results and discussion

Perceived risks, time conflicts, limitations on activities, and constraints and frustrations, were not related to either level of satisfaction with volunteering, nor with intention to remain. Brigade climate and leadership, and benefits of being a CFA volunteer, were found to be related strongly to satisfaction with volunteering, and level of satisfaction with volunteering was, in turn, linked strongly with intention to remain a CFA volunteer (Figure 2 and Table 1). The indirect effects latent variable path model depicted in Figure 2 was found to be a good fit to the data on the basis of structural equation modelling (SEM) analyses using the AMOS program (Note 3).

Figure 2: Path model: coefficients (range -1 to +1) show the relative strengths of association (for all, p <.001).



What is of considerable interest is that for these current volunteers in their second year of service, notionally 'negative' aspects of volunteering (risks, time conflicts, limitations, constraints and frustrations) were, apparently, unrelated to reported levels of satisfaction with being a CFA volunteer. However, brigade climate and leadership was a major determinant of satisfaction with volunteering (along with benefits derived from volunteering). This latter finding is consistent with both common sense observations, and implications of much of the research on employee turnover: being a member of a well-led, inclusive, and harmonious volunteer brigade is associated strongly with higher levels of both satisfaction and reported intention to remain a volunteer.

Table 1. Items making up the scales depicted in Figure 2.

Intention to remain
(internal consistency scale reliability, = .86)
(response options: Very unlikely; Somewhat unlikely; Don't know; Somewhat likely; Very likely).

- How likely is it that you will still be a CFA volunteer in 12 months?
- How likely is it that you will still be a CFA volunteer in 3 years?
- If you moved to another area served by CFA, would you apply for a transfer to the local brigade?

Satisfaction with being a CFA volunteer (= .85)
(response options: Strongly disagree; Somewhat disagree; Don't know; Somewhat agree; Strongly agree).

- I feel that I have been fully accepted into the brigade
- I feel as though I have a significant role to play in my brigade
- CFA constantly offers new experiences and presents new challenges
- I feel that my social life is more enjoyable since joining CFA
- I would recommend other suitable people to join the CFA

Benefits gained from joining CFA (ά= .87)
(response options: Strongly disagree; Somewhat disagree; Don't know; Somewhat agree; Strongly agree).

- As a CFA volunteer I can contribute to protecting the members of my community
- Being a CFA volunteer adds to my career options
- Being a CFA volunteer allows me to learn new things and apply new skills
- Being a CFA volunteer makes me feel I am a valued member of the community
- Being a CFA volunteer allows me to help others instead of dwelling on my own concerns
- My friends place a high value on me being a CFA volunteer
- Being a CFA volunteer broadens my networks in the community
- Being a CFA volunteer helps meet my sense of obligation to my community

Brigade climate and leadership (ά= .88)
(response options: Not at all true; Not very true; Don't know; Somewhat true; Very true).

- My brigade keeps me well informed about what's going on
- The brigade leaders are always fair-minded
- Brigade officers are good leaders
- I have never experienced bullying in CFA
- CFA training sessions are always well delivered
- CFA accredited drivers always drive CFA vehicles safely and responsibly
- After doing an assessment, the certificate of accreditation comes quickly
- Brigade officers are skilled and knowledgeable
- My brigade gets along well with all other agencies like the Department of Sustainability and Environment and the State Emergency Service
- My brigade gets along well with all other brigades
- I always feel safe when working with other CFA members
- I'm given responsibilities appropriate to my level of skill & experience
- I have had opportunities to meet other brigades through CFA activities
- I have never experienced harassment or discrimination in CFA
- My brigade and CFA deal with troublesome members promptly

General discussion

It is acknowledged that the research described comes from only two of Australia's eight volunteer-based agencies, and that the data were provided by a minority of those surveyed. Thus, the findings should be regarded as suggestive rather than definitive, they are the findings we have at present.

Adding value to the retention 'coin' involves first, choosing and implementing initiatives which promise a return on investment of resources; and second, looking at both sides of the coin—why volunteers leave, and why they stay.

In considering initiatives, agencies must distinguish between reasons for resigning which are, to a greater or lesser extent, unavoidable, and those which are potentially avoidable. Given that any decision by a volunteer to resign almost certainly has multiple inputs, it is impossible to be prescriptive about an 'unavoidable' resignation rate. Perhaps a conservative estimate might be that between 30% and 50% of annual volunteer resignations from an agency are unavoidable. In an ageing Australian population, a significant percentage of resignations each year due to age, infirmity, and ill-health is to be expected. Agencies may want to examine ways in which the knowledge and experience of valued long-serving volunteers can be retained in brigades for as long as practicable. One option might involve (a) raising the profile, by greater recognition (both within agencies and within communities), of volunteers in support roles; and, (b) formalising roles for mentors to pass on their knowledge and experience to younger volunteers, notwithstanding being unable to undertake operational activities.

Similarly, in times of both economic uncertainties and changing employment opportunities and constraints, a significant percentage of volunteers will resign because they believe that they have no choice but to move elsewhere for financial and family reasons. Agencies could, perhaps, review how they process resignations, with a view to making it easier to link former volunteers to brigades in their new places of abode, where these brigades exist. However, many such moves are likely to be to locations in capital cities or large regional centres where there are no volunteer brigades. One idea worth considering might be to establish 'headquarters brigades' or similar. This concept, which is by no means new, could involve setting up 'virtual brigades', comprising members who want to remain affiliated with their fire agency despite being unable to be a member of a local brigade. There would be opportunities to meet, to retain or learn new skills, and take part in exercises; and these volunteers could provide so-called surge-capacity to reinforce firefighting efforts during times of high demand—for example, by providing personnel to fill roles in incident management teams and staging area teams. Of course, the economics of such an initiative would need careful evaluation.

Of the (notionally) avoidable reasons why volunteers resign, the most pervasive seems to be imbalance between the demands of volunteering on one hand, and needs associated with volunteers' work and families on the other. This is not an easy problem to address. There are obviously several facets of the problem. But the returns are potentially very great. Perhaps agencies could best proceed along two parallel paths. The first would involve assisting brigade management or leadership groups in: (a) being as economical as possible in making calls on volunteers' time for incidents, training, and meetings; (b) informing employers of their volunteers what volunteering entails, and the benefits accruing to the community from the protection provided by the brigade and its volunteer members (Birch & McLennan, 2006)—note that NSW Rural Fire Service (RFS) has developed information kits for employers of RFS volunteers; and (c) providing induction programs and information kits to families of new volunteers focussing on what being a fire service volunteer entails, and the provisions the agency has in place to mitigate risks for volunteers and to support volunteers and their families (Cowlishaw, McLennan, & Evans, 2008). The second path would involve making representations to governments (in collaboration with peak bodies such as the Australasian Fire and Emergency Services Authorities Council, Emergency Management Australia's Australian Emergency Management Volunteer Forum, and Volunteering Australia) to develop policy initiatives which ease those financial imposts on volunteers, their families and employers, associated directly with emergency services volunteering.

The key role of the volunteer brigade as analogous to a work environment for volunteers emerged clearly from both the studies. A poor brigade climate serves as a potent source of dissatisfaction contributing to the resignation process. A good brigade climate is a source of positive experiences and promotes commitment to remaining a fire service volunteer in spite of the discomforts, frustrations, and stresses which are the inevitable lot of volunteers on occasions. It is puzzling that agencies generally appear to have paid relatively little attention to the problem of how to assist more brigades to be better organisational environments in which to be a volunteer. Training in leadership and people management skills, such as basic supervision principles, conflict resolution, negotiation, and goal setting, does not appear to be a very high priority in most agencies—neither for career staff who supervise volunteers, nor for volunteers who manage and lead other volunteers.

Agencies could begin by determining what organisational structures and processes are required to support good leadership by both career staff and volunteers (Motowidlo, 2003), then implementing effective staff development programs to improve the skills of their career staff in managing and supervising volunteers (there would seem to be little point in endeavouring to train volunteers to be better brigade leaders if career staff members have not first been trained in how to consistently model effective leadership behaviours). Then, effective training programs would need to be developed to equip volunteers who aspire to brigade leadership role, and to up-skill volunteers who already occupy leadership positions.

By way of concluding comment, it appears that many of the insights derived from research on turnover of employees, touched upon in the introduction to this paper, can inform agencies in boosting retention of their volunteers by both minimising avoidable contributors to resignations, and maximising experiences at the brigade level likely to foster commitment to remaining a fire service volunteer.

Acknowledgements

We are grateful to Adaire Palmer and Eileen Dunlop (SAFECOM Volunteer Management Branch) and to Charles King and Fiona O'Loghlin (CFA Human Resources) for their assistance. The research was approved by the La Trobe University Human Ethics Committee. The research was funded by the Bushfire CRC, SAFECOM, and CFA. However, the views expressed in this paper are those of the authors, and do not necessarily reflect the views of the Boards of the funding agencies.

Note1: Figures provided by CFA, NSW RFS, QFRS, SA CFS, FESA WA.

Note 2: These figures are based on those in McLennan (2004b), but only figures for the larger (not ACT or Tasmania) agencies have been reported here.

Note 3: Figure 2 path model fit indices: 2(2: N =485) = 0.886, p. = .642; adjusted goodness of fit index (AGFI) = .995; comparative fit index (CFI) = 1.000; root mean square error of approximation (RMSEA) = .000; standardised root mean square residual (SRMR) = .01 (see Weston and Gore, 2006).

Note 4: This paper refers predominantly to volunteers in the fire sector but the information could easily include other emergency management sector volunteer agencies.

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About the authors

Jim McLennan is an Adjunct Professor in the School of Psychological Science at La Trobe University. He was previously Manager of the Bushfire Cooperative Research Centre (CRC) Volunteerism Project.

Adrian Birch is a Research Officer in the School of Psychological Science at La Trobe University, where he works on the Bushfire CRC Volunteerism Project. He is a long serving CFA volunteer.

Sean Cowlishaw is a PhD candidate in the School of Psychological Science at La Trobe University. He is a recipient of a Bushfire CRC Scholarship and is researching the effects of fire service volunteering on the families of volunteers.

Peter Hayes is a PhD candidate in the School of Psychological Science at La Trobe University. He is a recipient of a Bushfire CRC Scholarship and is researching the effects of team member familiarity on performance of Incident Management Teams.

Jim McLennan is the primary contact for this paper. He may be contacted at j.mclennan@latrobe.edu.au

Flood emergency management decision support system on the Gold Coast, Australia

Mirfenderesk discusses the effects of climate change on flood risk on the Gold Coast and a system that has been developed to support decision-making in the area.

Abstract

Gold Coast has long been rated as the most vulnerable area subject to flooding in Australia (Smith, Handmer 2002). In recent years there has been a growing concern worldwide about climate change impacts including sea level rise, increased frequency and severity of storms and changes in rainfall patterns. Implications resulting from these changes include increase in the risk of flooding. Therefore, future floods are more likely to overwhelm existing protection measures more frequently, exposing us to more residual risks. Addressing the issue of an increase in residual flood risk, Gold Coast City Council has been developing a flood emergency decision support system as part of a 10 year flooding and drainage plan. This system integrates Council's flood modelling capacity, properties, infrastructure and population data into a single easy-to-use package. Using this system, emergency managers are able to have access to valuable forecasted flood information. The Decision Support System (DSS) is designed mainly to assist in a post-disaster situation; although currently it is being used for pre-disaster flood emergency planning. As a post-disaster measure it can identify vulnerable population and assist in the evacuation of the population at risk. Its availability on the Internet allows it to be potentially used for implementation of flood emergency procedures by vulnerable places such as child and aged-care centres. This paper provides a description of the elements of the system that has been developed or implemented so far, provides a brief description of the elements that are planned to be developed in future, make recommendations on how such systems can be improved and how their improvements can contribute to better flood emergency management.

Introduction

It is not possible to protect everyone, everywhere against flooding eventuality. Extreme or unpredictable events can happen. While physical defences may provide a level of protection they may be breached. Once flooding overwhelms existing mitigation and protection measures, flood emergency management is the main tool for providing safety to the community. An effective flood emergency management needs to be informed by a robust Decision Support System for being effective. Flood emergency Decision Support Systems (DSS) have been used by emergency managers for a long time. In the 1980's and 1990's these systems were usually in the form of hard copy flood maps, graphs, tables and other hard copy documents. With recent advances in computer and communication technologies, these systems have been morphing into more sophisticated forms; providing much needed real time flood information in more detail, in significantly less time-frame and with much higher quantity and quality. These systems are similar in some of the basic principles, such as computerisation of the flood prediction operations and usage of GIS as a platform for interaction with the users. The dissimilarities among these systems come from the fact that the nature and consequence of flooding vary substantially in different locations. Flooding can happen in different forms and, in a sense, it can be categorised into two main groups, namely, regional and flash floods.

1. Regional floods occur when water spills over rivers, creeks, man-made canals, lakes, ocean (in general receiving waters) and result in inundation of surrounding lands. Regional floods can be sub-grouped based on the source of water spillage. Water could spill as a result of:
    - 1.1 heavy rainfall (generally long-duration),
    - 1.2 storm tide (as a result of cyclonic activities),
    - 1.3 sea level rise; and
    - 1.4 Tsunami.

2. Flash floods occur when overland flow (resulting from heavy short-duration rainfalls) cannot be effectively drained (generally through man-made drainage system) into receiving waters (including rivers, creeks, man-make canals, lakes and ocean).

Although, from a resident perspective, there may not be much difference between being flooded by various types of regional or flash floods, there are substantial differences on how the emergency efforts associated with each type of flood should be informed (by a DSS) and what level of sophistication a DSS should possess to be able to address a specific type of flooding. In addition to the nature of a flood, the consequences of potential flooding in an area influence decision making on the sophistication of a DSS.

A review of existing Flood Emergency DSS' in South East Queensland shows that local authorities have chosen different approaches towards the type of DSS that they use for flood emergency management. A common element of the flood emergency DSS in south east Queensland that is shared between all local authorities is the FloodWise (Moris and Galletly, 2007) tool. This system provides users with a range of flood information to take appropriate action during a flood emergency situation. This system is potentially applicable to regional and flash flooding (mainly as a result of rain). The system interrogates existing rainfall and water level measurement stations across the region every 5 minutes (round the clock) and posts the results on the Internet. This system has been enhanced by the Brisbane City Council to provide a range of flood information such as (but not limited to):

- Rainfall summary maps,
- Flood levels,
- Flooded roads and locations, and
- Flooded areas.

This information can be accessed via the Internet. No real time hydrological or hydrodynamic modelling is embedded in this system. The relationship between the measured data and flood information is basically achieved through empirical relations.

Some of the local authorities have developed new elements of DSS for flood emergency management. For instance, Logan City Council has developed a GIS-based DSS that operates on Water Ride (http://www.waterride.net/) software platform. This system converts a predicted peak flood level at a gauge in the catchment into surface showing the likely flood extent. An extensive library of pre-cooked flood map library is used for interpolation of flood surface. This system is very fast but does not contain any real time hydrological or hydraulic modelling element for prediction of water level and routing of flood wave across the floodplain. Moreton Bay Regional Council has extended its DSS to include real time hydrological modelling (Druery et al, 2009). This system is an extension of a system similar to the one that operates at Logan City Council. This system uses a continuous hydrological model to estimate water level at the gauging stations. A shortcoming of the system is that it does not have any embedded real time hydraulic modelling. Hydrological models are reliable on simulating discharge, but for water level prediction and flood wave routing, a hydrodynamic model is superior. Despite this drawback (that in the context of flood emergency management may not be critical at all), this system is an excellent progress in DSS development. All the above mentioned systems are mainly engineered to deal with riverine flooding. A general shortcoming of most of the DSS' employed by various local authorities is that they lack an automated rainfall prediction mechanism embedded in their systems.

The Gold Coast has experienced more than 45 floods since 1925 (Bureau of Meteorology web site). Passing cyclones have triggered many of the floods. Historical records indicate that more than 40 cyclones have passed the Gold Coast region over the last 120 years. The last major flood (1974) was triggered by Cyclone Wanda. This led to the evacuation of 1500 people and in many places homes were swamped with 1.2m to 1.5m of water (Gold Coast Bulletin, Tuesday 29, 1974 p3). More recent localized flooding in June 2005 and January 2008 resulted in the inundation of several hundred houses and the loss of two lives. Comprehensive flood studies on the Gold Coast show that more than 5000 properties would experience over-floor flooding during a 1 in 100 year flood event (Mirfenderesk and Abbs, 2008). The damage bill for the Nerang River catchment (Figure 1) that is the most populated catchment on the Gold Coast would exceed $200,000,000, excluding damage to infrastructure and intangible losses.

It is estimated that more than 15,000 people would be directly affected by a city-wide 1 in 100 year flood event on the Gold Coast. From post-event observations and statistical analysis of previous floods, it is recognized that residents affected by flooding are subjected not only to physical problems, but also to serious and prolonged psychological and sociological problems, such as nervousness, anxiety, irritability and obsessive behaviour. The rise in the level of vulnerability is mainly due to the fact that exposure to flood hazard (as a result of population growth in flood affected areas) has been growing faster than adaptive capacity. This pressure is expected to increase over the next 20 years as a result of climate change impacts (Mirfenderesk, Abbs (2008)). Gold Coast comprises of 7 major catchments. Some of these catchments such as Tallebudgera, Currumbin and Broadwater have time

Figure 1. An overview of main catchments on the Gold Coast.

of concentrations as low as 3 hours, making them highly susceptible to short duration local flooding. Catchments such as Nerang, Coomera and Logan-Albert can have time of concentrations between 3 and 92 hours, making them susceptible to regional scale long duration flooding, in addition to short duration local ones. These facts clearly demonstrate that Gold Coast is prone to long and short duration riverine flooding, and storm tide as well as flush flooding, with significant consequences on the city's community and economy. Addressing such a wide range of flooding types, Gold Coast City Council has been developing a DSS for flood emergency management as part of a 10 year flooding and drainage plan. This DSS comprises of a suite decision support tools, each one of which addressing a specific flooding type (in terms of available response time and source of flooding).

Gold Coast DSS is embedded into a wider strategic approach to address flood risk on the Gold Coast. In this approach, risk is defined in terms of its components, eg hazard, exposure and vulnerability.

Flood risk = hazard x exposure x vulnerability

Exposure to hazard means presence of people/properties in flood risk areas and vulnerability means lack of resistance/preparedness of the community. In this framework, flood emergency management is seen as an important element of reducing community vulnerability to flood risk. With such a mindset, flood emergency management will not be limited to operations only during the flood incidents. It will also cover post flood activities, which are needed, to help the community to recover from the disaster as quickly as possible.

Consequently, the tool set that supports such flood emergency management needs to be able to perform this role in the aftermath of a flood, highlighting the need for a flood recovery DSS. Addressing all types of flooding Gold Coast DSS is planned to be completed in eight stages. Each stage of the system addresses a specific aspect of flooding with different degrees of accuracy and sophistication. This study provides a description of the system with a more detailed explanation of the elements that have been completed.

Decision Support System for Riverine Flood Emergency Management

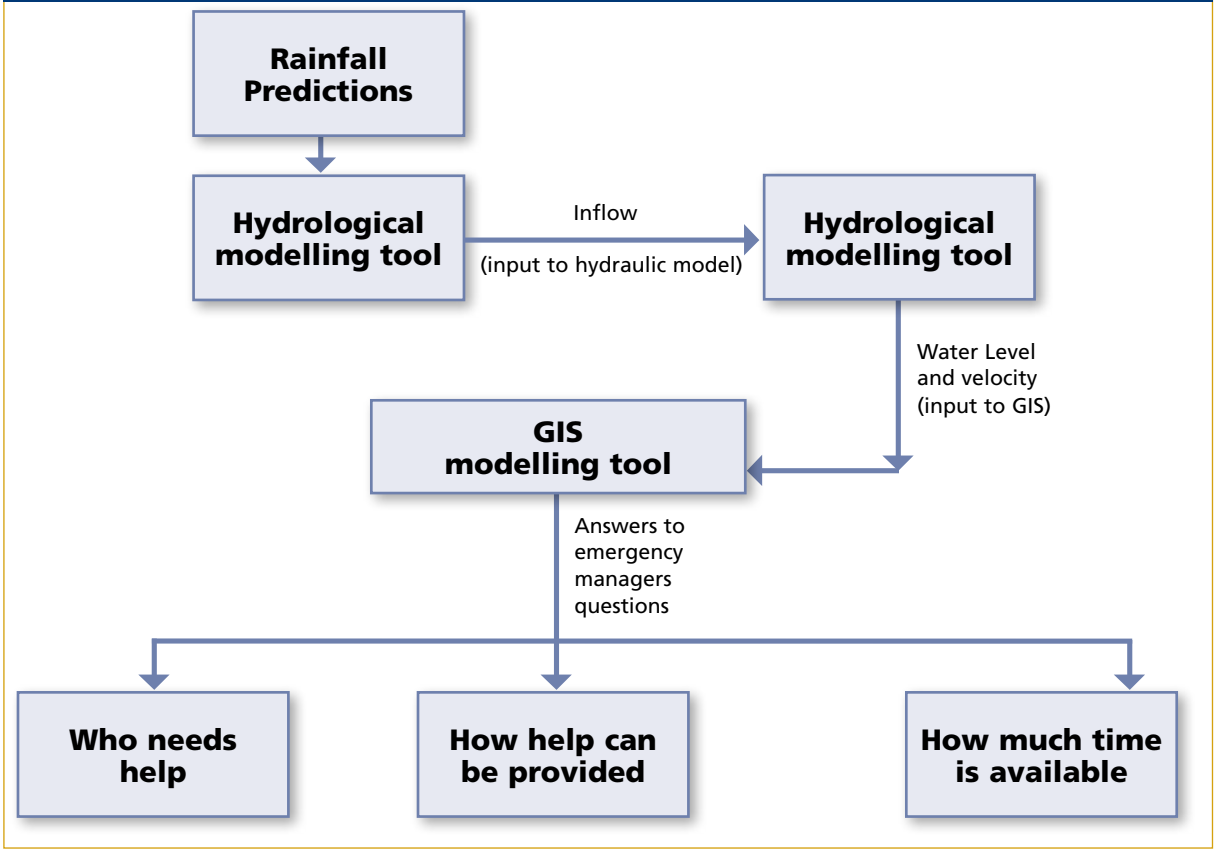
The decision support tools that are embedded in the Gold Coast DSS provide a fully interactive environment where information is presented visually in an easy-to-understand form. Flood affected properties and population can be quickly identified during a flood event. They provide a clear visual presentation of where certain communities may be cut off and isolated, and which evacuation routes may be flooded. The DSS performs real-time flood predictions based on the real-time data provided by the BOM. In general the input to the Decision Support System is predicted BOM river discharges at the input points of the Council's hydraulic models. The Decision Support System runs Council's hydraulic models automatically and produces a multitude of outputs. Figure 2 shows the layout of DSS for riverine flooding emergency management. It comprises of three main elements: Hydrological model, Hydraulic Model and GIS platform.

Hydrological Element – hydrological modelling component of this system is currently undertaken by the Bureau of Meteorology Queensland. The software platform for hydrological modelling is the BoM URBS model. The model uses rainfall predictions as input and generates flow hydrographs that in turn will be used as input to the Council's hydraulic models. These hydrographs are then posted to a webpage so they can be downloaded by the Council's flood emergency officers. These hydrographs are only available for large scale catchments such as Nerang, Coomera and Logan-Albert. For smaller catchments such as Tallebudgera, Currumbin and Broadwater these hydrographs cannot be produced, due to very short response time of these catchments.

GIS Element

Central to the decision support system is a GIS user interface (Patterson & Britton (2007)) based on WaterRide software platform. Input to the GIS tool is flood surface that can be generated in various ways (as explained in the following sections of the paper).

Figure 2. Flood Emergency Decision Support System Layout for Riverine Flooding.



The output of the GIS tool are answers to the flood emergency managers questions, such as who needs help; or what is the best way to access people in need or what is the best evacuation route; or how much time is available for certain actions; etc. To enable these types of questions to be answered, the GIS tool uses Council's data base, simulates flood levels and generates the following information (in the form of map, graph or table) for the forecasted period.

- Flood level map,
- Flood inundation map,
- Evacuation routes map
- Time histories of flood level, flood depth, velocity and hazard at any location
- House-specific flood inundation information (for properties that have been surveyed).
- Hazard and vulnerability maps
- Flood flow velocity maps
- Time histories of flood level, flood depth, velocity and hazard at every location.
- A report containing a list of inundated houses and vulnerable elements (such as age care centres, schools, child care centres, etc).

GIS data that are used for this system are mainly sourced from the Council's data base and 2001 census data for the Gold Coast. Some of the most important elements of this data base are

- A 5 meter digital elevation model of the whole city and its waterways with an accuracy of 100 mm.
- Flood level survey of close to 10,000 properties across the city.
- Location of the important infrastructure and vulnerable elements (such as child & age-care centres).
- Demographic data (obtained) from the 2001 census data.
- Historic flood level information.

Hydrodynamic Element

Hydrodynamic element of the DSS works in two different modes, named DSS1 and DSS2 tools. DHI (http://dhigroup.com) software platform is the main tools for the development of the hydrodynamic element of the Gold Coast DSS.

DSS1 – In this mode the system uses an electronic library of pre-cooked flood maps, which are linked to a number of water level gauges across the city. Based on the predicted water levels at these stations, DSS1 tool interpolates a new flood surface using the above-mentioned library of flood surfaces. This library includes flood maps associated with various storm intensities. The advantage of this system is that it is very fast (less than 5 minutes). In this mode, since there is not any real time hydraulic modelling, velocity and hazard & vulnerability maps cannot be produced.

DSS2 – In this mode a static link is established between the three main elements of the DSS, e.g. hydrological, hydraulic and GIS tools. In this mode the system performs real time hydrological modelling. At this stage the hydrological modelling element of the system is undertaken by the BOM. The results of the hyrological modelling are provided to the flood emergency officers via internet. The input to the system is predicted BOM river discharges at the input points of the Council's hydraulic models. Decision Support System runs the Council's hydraulic models automatically and produces a multitude of outputs through the GIS element of the system (WaterRide softwar). In this mode the outcome of the system is more accurate than the first mode, because it uses real time hydraulic modelling to generate flood information. For this reason and unlike the first mode the system is capable of producing velocity and hazard & vulnerability maps. In this mode the system takes longer to produce flood information. It generally takes up to two hours to complete hydraulic and mapping exercise for a catchment. It is worth mentioning that both the above-mentioned operation modes need to be triggered by Council officers once the Disaster Coordination Centre (DCC) is mobilised. The operation times that have been mentioned (5 minutes for the DSS1 and 2 hours for the DSS2) do not include the required time for the DCC mobilization. Given the fact that mobilization can take several hours, the above mentioned operation modes are generally unsuitable for small catchments and storm conditions with very small warning time.

Internet-Based Decision Support System

DSS3 – This Web-Based Decision Support tool is designed to address the shortcomings of the two above-mentioned operational modes (in relation to warning time) by offering the following features:

- The system is fully automated, creating flood forecasts every two hours, 7 days a week. This allows forecasts without any mobilization of the Disaster Coordination Centre which gives increased warning times. This is particularly important for short duration floods which can be common on the Gold Coast.
- This system includes a feedback mechanism for automatic correction of forecasts. This method uses real time water level observations as feed back and then adjusts flood level predictions so that the predicted and observed levels match each other.

This provides a practical method of reducing the sensitivity of the hydrological model to uncertainties in rainfall data and calibration accuracy.

- The system publishes the forecasts onto the internet which can be viewed from anywhere in the world and at any time. This can result in decentralized decision-making processes which can be critical in the case of local floods.
- The system operation can be modified over the internet if required. This allows GCCC officers to make basic changes to the system configuration remotely which can be useful during emergency situations.

This system is currently in operation for the Nerang River floodplain. The system publishes three-day flood forecasts every two hours at 12 locations across the Nerang floodplain in the Internet. The main elements in the system are as follows:

- **Gauge Stations:** For the Nerang River catchment two water level gauging stations provide real time data to the system for automatic update of MIKE11 forecasts,
- **BOM Server:** This server is maintained by BOM and is used for posting the forecasted flow hydrographs at the input points of the Council's hydraulic models,
- **Environmen PC:** This is a computer located at the Disaster Coordination Centre. The Environmen software on this machine continuously interrogates telemetry stations (including the two above-mentioned gauging stations) across the Gold Coast. The software produces a report every two hours and put it in an ftp site to be downloaded by the system,
- **FTP Server:** The purpose is to make gauge stations data available over the Internet,
- **FLOODWATCH Server:** this server hosts the FLOODWATCH, MIKE11 and Windows Virtual Server. It collects data, runs MIKE11, implements MIKE11 real time updates and posts the flood forecasts across the floodplain on a dedicated Web Server.
- **Web Server:** This server displays flood forecasts on internet.

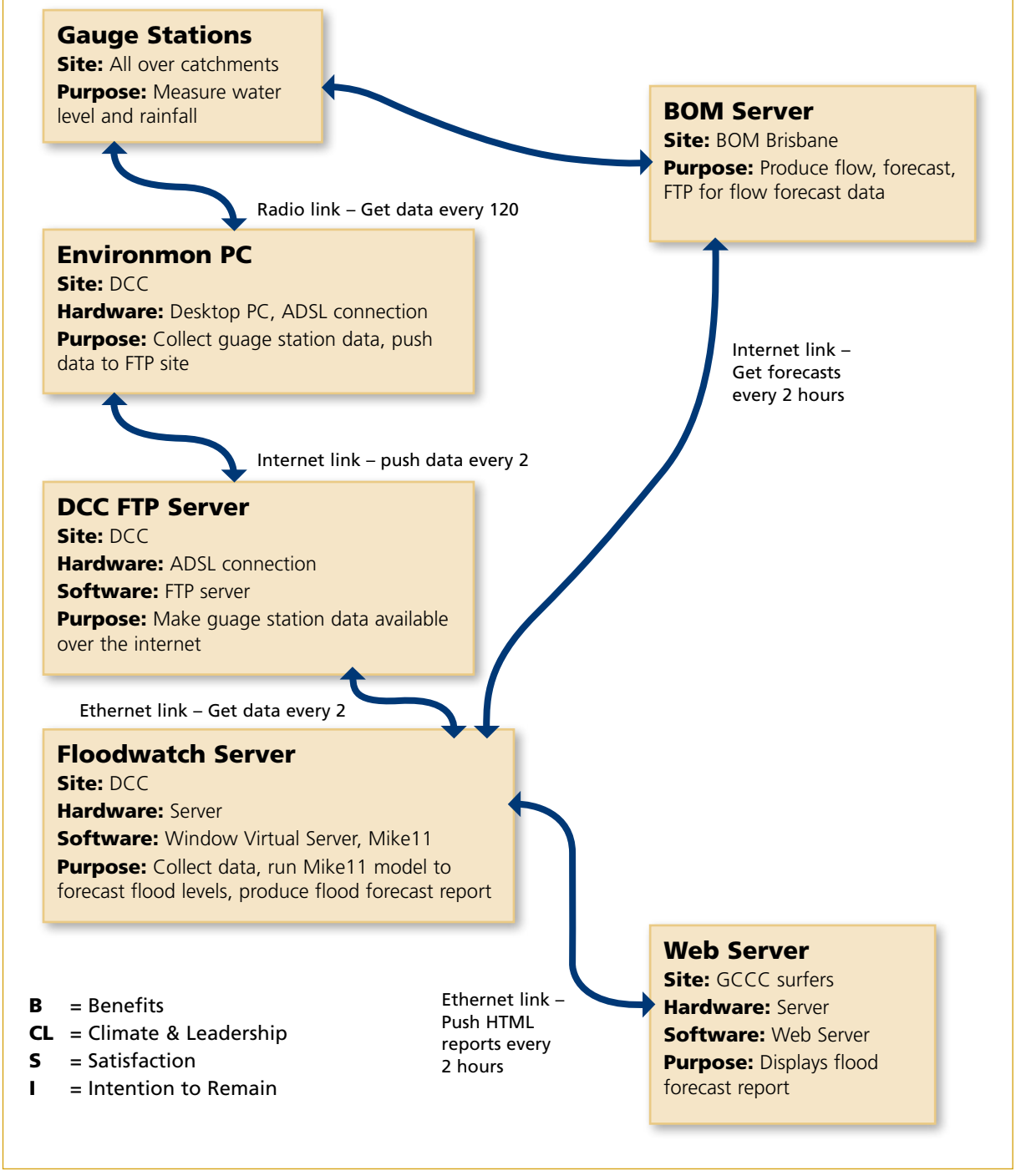
Figure 3 shows how this system works. The system automatically interrogates the BOM website and Enivronmon PC and downloads predicted flow hydrograph and measured water level at the gauging stations. It runs the hydraulic model for the study area and makes a three-day forecast of flood level. The system compares its previous forecast with the measured water level. In the case of a discrepancy it changes the hydraulic model parameters and produces a new prediction, ensuring that predicted water level will be consistent with measured water level for the hind-cast period. Then it publishes the flood levels on a dedicated server. The whole process takes 2 hours and will be repeated round the clock and seven days a week. A shortcoming of this system is that it has to rely on BOM flood forecast as input to the system. These forecasts are generally only available for medium to large size catchments. Therefore this system is only suitable for large scale catchments such as Nerang and Logan Albert.

DSS4 – This tool is designed to address the shortcomings of the Internet-based DSS3 tool. DSS3 is suitable for large catchments such as Nerang, Coomera and Logan-Albert (with relatively long concentration time and therefore long warning time). To apply the concept that has been used in DSS3 to smaller catchments or for short duration floods in large catchments, DSS4 has embedded continuous hydrological modelling within the system. In doing so, it is able to do flood flow forecasting automatically and internally. This forecast system, similar to DSS3 runs automatically and frequently (in the case of Tallebudgera Creek, it is planned to run every 15 minutes), interrogates water level measurement stations periodically and uses them for self correction of its predictions in real time. The results are accessible through the Internet, ensuring that all Council and Emergency response staff can have access to the information even if they are not at the office.

This system is currently being developed for the Tallebudgera Creek catchment with an approximate area of 98km2 and time of concentration of 3 to 9 hours. Input to the system is the rainfall over the catchment. The rainfall is routed through the continuous hydrological model that is embedded in the system. The output of the hydrological model (discharge) is then used as an input to hydraulic model. The hydrodynamic model routs flood wave through the system and provides flood level information as its output. This system has the potential of being extended further by including stormwater drainage system to the hydraulic modelling element. The advantage of this extension is that it can be used for the management of flash flooding. By its very nature, flash flooding occurs quickly. Emergency managers are often caught off guard during a flash flooding situation with little time to implement civil defence measures.

A general shortcoming of this system and indeed all DSS' that are described in this paper or used by various local authorities, is that it does not have an automated rainfall prediction capacity embedded in the system. In general, rainfall prediction is undertaken by the BOM at

Figure 3. Implementation system.



the time of flood. Therefore, reliability of the DSS' heavily depends on robust communication with BOM and the accuracy of predicted rainfall during flood emergency situation. Such predictions basically do not exist for the type of catchments (low concentration time catchments) that are going to be serviced by DSS4, due to short response time of the catchment. As DSS4 does not use BOM rainfall projections, its warning time is therefore limited to the time of concentration of the catchment. On this basis, the warning time for catchments such as Tallebudgera and Currumbin Creeks can be between 3 and 9 hours. This shortcoming is alleviated by automatic publication of flood information on the Internet and therefore saving for the time that would normally be needed to mobilize the Disaster Coordination Centre and to convey flood information to flood managers through the traditional methods. Having said that, this system has the advantage of creating outcomes that are more accurate than the outcome of DSS3 or similar systems (that rely on BOM forecasted rainfall). The reason is that in DSS4 the forecasted flood is based on the measured, and not the forecasted, rainfall.

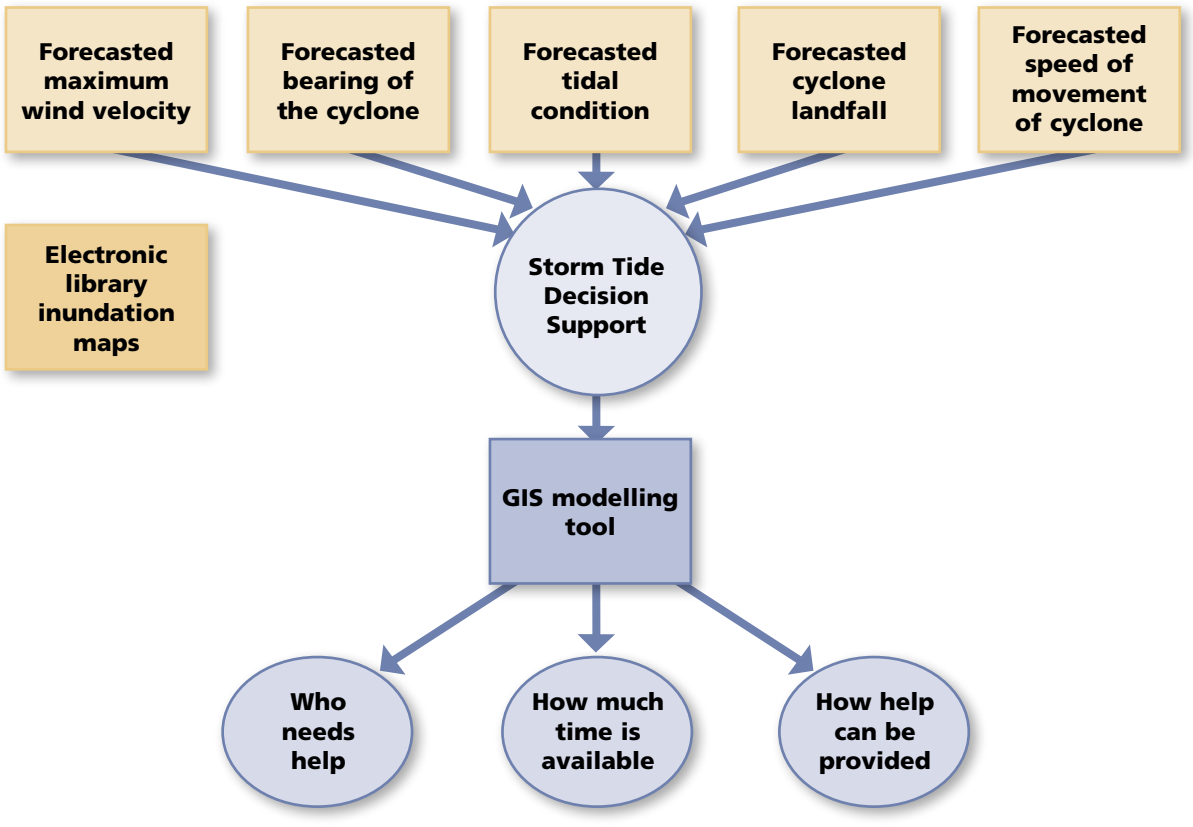
DSS 5 – Flash flooding Decision Support tool (FloodWise)

FloodWise is a DSS tool that allows users to take appropriate action during a flood emergency situation. This system is potentially applicable to regional, local and flash flooding. The system interrogates existing rainfall and water level measurement stations across the region every 5 minutes (round the clock) and provides this information on internet. As the system is fully automated and can be accessed via internet it is effective for flash flooding situations. Once empirical relations between the flooding behaviour of places of interest and surrounding gauging stations established, the system can provide valuable flood information such as the time history of flooding of roads or bridges. This information can be sent to emergency management officers via SMS or similar tools. Through this system the user can gain a synoptic view of flooding in South East Queensland (SEQ), as all the rainfall and water level measurement stations in SEQ can be observed and interrogated in this system. Conversion of the Gold Coast FloodWise tool to a flash flooding DSS tool is currently being undertaken.

Storm Tide Decision Support System (STDSS)

The Storm Tide Decision Support System (STDSS) aims at improving Gold Coast's resilience against likely storm tide conditions. Figure 4 shows a schematic of the STDSS. The system uses five forecasted hydrological parameters, maximum wind velocity, bearing of the cyclone, tidal condition, cyclone landfall and speed of movement as inputs. STDSS interpolates flood surfaces, using an electronic library of flood maps, based on the input parameters. The interpolated map is fed to the GIS modelling tool. Similar to DSS1 and DSS2 the GIS tool can be interrogated to identify those who are at risk and best way to provide help to those who are in need.

Figure 4. Layout of the Storm Tide Decision Support System.



The electronic library that is used in STDSS is a collection of flood maps resulting from the likely storm conditions on the Gold Coast. A storm tide condition is defined as a cyclone with a given maximum wind speed, bearing, tidal condition, landfall and speed of movement. Table 1 provides the range of values that are adopted for the Gold Coast STDSS. A combination of all the values in Table 2 constitutes 108 possible storm tide conditions. These storm tides are simulated by a coupled hydrodynamic-wave model and the resulting flood maps are archived in the electronic library.

Table 2. Selected input parameters for cyclone surge model			
Adopted Maximum Wind Speed (knots)	25	37.5	50
Bearing	N	NE	E
Tide level	Mean Water		High Water
Landfall	North	Centre	South
Speed of movement (km/hour)	8		14

Comparison between Various DSS tools

In this section the above mentioned DSS tools are compared with each other and their advantages and limitations are highlighted in Table 3. The information in table 2 demonstrates that there is no perfect DSS tool that could address all types of flood emergency situations on the Gold Coast alone.

Table 3. Comparison of various DSS tools.

System	Advantage	Limitation
DSS1	The system is very fast. From the time that predicted water levels are available, it takes a few minutes to provide the required flood information.	* There is no real time hydraulic modelling. It relies on BOM for the provision of predicted water levels at the gauging stations. * The system is not accessible via the Internet and therefore there is a need for the officer to go to the Disaster Coordination Centre to perform his duties.
DSS2	The system is far more accurate than DSS1, as flood information comes from real time computer simulation models.	* This system is slower than DSS1. Typically it takes 2 hours to make flood predictions for a typical catchment on the Gold Coast. * The system is not accessible via the Internet. * The system relies on BOM rainfall projections.
DSS3	*…The system provides better accuracy than DSS2, as it has an embedded self calibration mechanism. *…The system is accessible via the Internet. The system is fully automated running round the clock.	* It relies on BOM real time hydrological modelling. If the predicted rainfall is wrong, the system provides erroneous flood information and, as it is fully automated, it is less flexible (compared with DSS2) to be rectified. *… Due to bandwidth limitations the amount of information that can be made available to flood managers via the Internet is substantially less than the amount that can be made available through DSS2.
DSS4	*…It has all the advantages of DSS2 and DSS3, plus it does real time hydrological modelling as well. *…As it uses measured rainfall; its flood predictions are more accurate.	* The system does not use long term rainfall projections, as it uses measured rainfall as input. Therefore warning time for each point within the catchment is as long as the time of concentration at that point.
DSS5	This system can be accessed via the Internet and is very fast; therefore it is potentially suitable for flash flooding situations.	* No real time hydrological or hydraulic modelling is undertaken in this system. *…Flood projections are limited to the time of concentration at each point within the catchment.
STDSS	This system is very fast and in a matter of minutes can provide required flood information.	No real time hydrodynamic modelling is undertaken in this system. Flood information is based on interpolation of an extensive electronic library of cyclone scenarios.

Future Plans

This section of the paper identifies two more elements for the Gold Coast DSS tools that are needed to have all aspects of flooding on the Gold Coast covered. They include Tsunami and flood recovery DSS tools. The below brief descriptions are only an initial assessment of how such tools will look.

Tsunami Decision Support System (TDSS) – The TDSS displays a clear visual presentation of flooding. It shows how a Tsunami-generated tidal wave progresses and evolves across the city. This system is essentially similar to STDSS; the only difference is that a different set of boundary conditions will be used for this system. This set of boundary conditions is the Tsunami-generated tidal wave at 20-meter deep water along the coastline of the Gold Coast. This information is expected to be obtained from BOM global tsunami model for the Australia.

Flood Recovery Decision Support System (FRDSS) – The massive scale of the problems that will be faced in the aftermath of a flood disaster requires a decision support system to help decision makers on time critical issues. Such DSS uses a multi-criteria, risk-ranking approach to allow for careful prioritization and finding a balance between competing needs from a variety of public and private interests. The system focuses on two areas of flood recovery:

- **Debris Removal and Road (waterway) Clearing –** Miscellaneous debris, vessels and cars that are submerged, capsized, or grounded, all create significant transportation, navigation, pollution, health and safety hazards. The FRDSS is aimed at providing a fact-based, participative and rational process for managing this massive effort. The system is designed for a quick evaluation of benefit (risk-reduction) of potential removal alternatives. These alternatives are evaluated in terms of safety, environmental protection, mobility, security, time and efficient equipment usage. In this approach the rational of prioritization of geographic areas and specific targets can be conveyed more effectively to stakeholders, therefore defusing an emotionally charged and highly political environment.
- **Health –** One of the consequences of flood disaster is the possible occurrence of water-borne diseases. This can happen as a result of collection of polluted flood water in low lying areas (in the form of ponds). These ponds may last for a long time until drained and can turn into a suitable habitat for vectors. The real time flood model (as explained in DSS2) will be used to identify the location of flood ponds and the duration of inundation. Based on some basic site measurement the degree of pollution of each pond is estimated and the risk associated with the increase of vector population in each pond is assessed.

  The zone of influence (flight range of vectors) for those ponds that are likely to have an increase in vector population is estimated and population at risk are identified. Such information can be gathered in a short period of time using the FRDSS and proper decisions can be made to protect the population at risk.

Conclusion

A review of the status of flood emergency management shows that this task can benefit significantly from recent advances in computer and communication technologies. Flood management authorities have already started using this technology to develop DSS' that can inform flood emergency operations more effectively. Some of the challenges that existing systems need to overcome in the near future include:

Technical complexity of inclusion of real time hydrological and hydraulic modelling in such systems. Once these technical issues are resolved, these models will be able to replace empirical relationships between measured data and flood information and therefore enhance the accuracy of the existing DSS'.

Development of rainfall forecasting algorithm; and automated rainfall forecasting engines that can be embedded in Decision Support tools.

Making DSS accessible via the Internet to convey flood information faster to flood emergency managers and therefore to increase the available response time (in particular for small catchment).

Continuous enhancement of computing power of computers and the bandwidth of Internet will soon provide an excellent opportunity for the developers of DSS' to meet these challenges at an affordable cost, provided that the technical complexities associated with this exercise have already been resolved thoroughly.

Given the fact that climate change is expected to put more pressure on flood emergency management operations in the future, the recommendation of this study is that flood emergency managers should further support the development of technical knowledge-base for DSS', Building this knowledge base through experimenting with newer DSS' will prepare us ready for the time when fast internet and high computing powers are available at competitive prices.

Acknowledgement

This work was conducted with the support from the Strategic and Environmental Planning and Policy branch of the Gold Coast City Council and in particular the members of the Waterway and Flood Management Team.

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About the authors

Hamid Mirfenderesk is the Team leader of the Waterways and Flood Management Section at the Gold Coast City Council and Adjunct Associated Professor at the Griffith University. He can be contacted on hmirfenderesk@goldcoast.qld.gov.au

USEFUL INFORMATION

Australian Journal of Emergency Management

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Letters must contain a name, address and daytime phone number of the author. Unsigned letters or those submitted without a phone number will not be considered.

Regular contributors should submit letters on varied subjects. Letters by the same author that reiterate opinions previously expressed may not be published. The editor reserves the right to reject or edit any Letter to the Editor.

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Full details of local and international conferences relating to emergency management are available from the EMA website. For information, please visit **www.ema.gov.au**.

So, you want to run an exercise?

Tony Callan introduces the first in a series of articles on exercise management

Abstract

A substantial amount of resources and effort are committed by agencies and organisations at all levels to the design, conduct and evaluation of emergency management exercises. Many of these exercises are heralded as great successes, while others fall open to criticism for a whole range of reasons.

This article looks at the exercise management process and proposes a model for the design, conduct and evaluation of emergency management exercises.

Tony Callan.

Preparing for an exercise.

Introduction

As an emergency manager, who has been involved in the design, conduct and evaluation of exercises for more than 20 years, I am regularly approached by others seeking assistance to 'run an exercise'. Often these people have only participated in or observed an exercise and now fill a role in their organisation that is required to conduct exercises.

My first question to them is usually phrased along the lines of, 'so, you want to run an exercise?' This will almost certainly receive a hesitant 'yes' or other affirmative response.

The second is an open question of 'what did you have in mind?' This receives various types of responses, however, the most common reply will include a detailed description of a well thought out and elaborate scenario. Examples have included planes crashing into harbours, wide spread epidemics or contamination events infecting many states and disastrous natural events wiping out whole communities.

Once I get the scenario off their chest, it is time to get down to what it is that they really want to achieve by running an exercise. Questions like '**why** are you conducting an exercise', 'what is the **purpose or aim** of the exercise?', 'what **objectives** do you hope to achieve?', 'what is the **scope** of the exercise?', 'what **factors** might assist or limit the conduct of the exercise?' and 'who are the **participants**?' need to be clarified before one can truly begin to look at the design, conduct and evaluation of an exercise.

This article will look at what is required to design, conduct and evaluate an exercise. It will provide an overview of an exercise management process and is the first in a series of articles on exercise management. Future articles will take a look at:

- Identifying and analysing why exercises are conducted
- Various types of exercises and their application
- Planning and documenting an exercise
- Conducting an exercise
- Evaluating an exercise
- Why do we exercise?

Exercises by themselves are not the panacea to all emergency management problems. They are, however, a legitimate element of any program of continuous improvement or emergency preparedness.

Continuous improvement within an agency, organisation or group of organisations, such as the emergency management communities, will almost certainly include elements of assessment, planning, training, education, resourcing and evaluation. In the absence of an actual event or response, exercises have proven to be an effective way of evaluating and improving our emergency management arrangements at all levels.

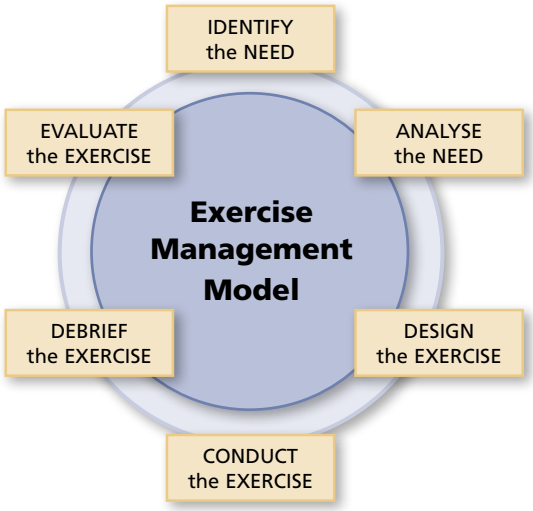
Emergency management exercises have many uses. These include, but are in no way limited to; testing plans, evaluating arrangements, evaluating equipment, practising procedures, training people and/or demonstrating capability. Whatever the purpose of an exercise, it is essential to ensure that those involved at all levels and at all stages through the exercise process are well aware of why we are conducting a particular exercise.

The exercise management model

The success of any exercise will almost certainly be enhanced by the adoption of a structured approach to its design, conduct and evaluation.

The Exercise Management Model provides such an approach. It is taught at the Emergency Management Australia Institute (EMAI) in its Exercise Management Course and has been adopted by a number of Australian agencies as a method for the design, conduct and evaluation of exercises. The Exercise Management Model is consistent with the approach adopted by the Australian Defence Force and the methodology adopted by the US Department of Homeland Security within its Homeland Security Exercise and Evaluation Program (HSEEP).

Figure 1. Exercise Management Model.



This model takes a cyclical approach to exercise management, whereby one phase is dependent upon the substantial completion of the previous and the outcomes of an exercise can contribute to the inputs or development of future exercises.

The elements of the Exercise Management Model are discussed below.

Identifying and analysing the need

The first step in the process is to ask **'why are we conducting an exercise?'**

Exercises should begin with a specific **need** to test, evaluate, assess, practise, train or demonstrate aspects of policy, plans, procedures, systems, training of individuals or group performance. This need may have been identified from past planning, training, exercises, actual responses or as a legislative or regulator requirement, such as with the conduct of airport exercises.

Once it is determined *why* we are conducting an exercise, this can be analysed to determine the aim and objectives to be achieved by the exercise.

The aim should tell us, in a short concise statement, why we are conducting the exercise. An example might be:

The aim of this exercise is to test the effectiveness of the response arrangements documented in the xxx Airport Emergency Plan.

The exercise **objectives** will build on the aim and provide an indication as to the expected outcomes from the exercise. Building on the aim stated above, examples of objectives may include:

- Assess the ability of emergency services to perform their prescribed roles during the response to a large aircraft incident on the xxx Airport.
- Assess the ability of the xxx Airport owners to provide access to emergency services and support their needs during the response to a large aircraft incident on the Airport.

As a rule of thumb, the number of objectives for an exercise should be kept to less than five. In a multi-agency exercise, each agency involved may wish to identify their own agency objectives. If allowed, these must be consistent with the overall objectives of the exercise. For example a response agency wishing to **assess its response times** to the airport, may be outside the scope of the exercise described above.

Exercise managers need to be mindful of how they will identify if the exercise objectives have, or have not, been achieved. An effective way of doing this is to identify a number of actions or tangible outcomes that can be observed or measured which indicate an objective has been met or not met. These **performance measures** or **performance indicators** should be documented and agreed upon, so it is clear what is expected of participants during the exercise.

Design the exercise

Once the aim and objectives have been identified it is time to look at the scope, type and participants for the exercise.

The **scope** will identify what is included in the exercise and may also identify what is not included in the exercise. It is important that this be established early in the design phase, as there is a tendency for other influences to impact on the scope. Any variation to the scope may mean that the aim and objectives need to be reviewed. (This is called "scope creep" and at best should be avoided.) For example:

The scope of the exercise will be limited to:

- The response arrangements documented in the xxx Airport Emergency Plan, and
- Those agencies listed as having responsibilities during the response to an airport emergency.

There are three broad **types** of exercise used by emergency managers. These are discussion, functional and field exercises. Each of these has a number of variations and it is important to select the type of exercise that will best suit the aim, objectives and scope of a particular exercise. For example a discussion exercise would not be suitable for assessing the performance of a particular role. In the airport exercise example, if one of the objectives was to familiarise emergency services with their roles during a response, a discussion exercise may be appropriate.

The **participants** and their level of participation need to be carefully assessed. Exercise managers need to pay particular attention to who should be involved and their particular role during an exercise. Once agreed, details need to be clearly communicated during the design of the exercise and articulated in exercise documentation.

An issue with emergency management exercises is that conflicting commitments can often limit participation. To avoid this, participants need to be engaged at the earliest opportunity and continually informed of developments during the design phase of the exercise.

Once the exercise aim, objectives and scope have been endorsed and the type of exercise and participants agreed, it is time to give consideration to the detailed scenario and look at what needs to be done before conducting an exercise.

The size and complexity of an exercise will indicate how much preparation is required. A simple exercise can be designed by an experienced exercise manager, however, more detailed exercises may require a dedicated team and many months of preparation. Exercise design will also require a range of meetings and detailed documents. One thing is certain, exercises do not occur by osmosis and the amount of time and effort applied to the preparation will almost certainly contribute to the success of the exercise.

Tony Callan.

Public communication of an exercise is essential.

Conduct the exercise

Exercise managers often focus on the exercise itself as the end state. The reality is that the conduct of the exercise includes those activities that involve the participants and exercise staff in the lead up to the exercise, during the exercise and immediately after the exercise.

Before the exercise, it is essential to ensure that all participants and exercise staff are aware of what is required of them during, and immediately after, the exercise. This should occur by way of written information in advance of the exercise and a briefing immediately before the exercise. Suggested topics for the briefing include:

- Exercise aims and objectives
- Roles and responsibilities during the exercise
- Information, communication and/or technology systems
- Action in the event of unforeseen circumstances
- Post exercise requirements
- Appropriate parts of the scenario

In addition to briefing participants, sufficient time should be allowed to establish and test the facilities and the resources required to conduct the exercise.

If careful attention is paid to pre-exercise activities, all will be in place for person appointed to the role of Exercise Director to commence the exercise.

During the exercise, activities should occur in a predetermined way. This will commence with the Exercise Director starting the exercise, right through to its termination. These activities should occur in accordance with a pre-determined script, often referred to as the 'master schedule'. The master schedule should detail when particular activities are expected to take place, when exercise inputs should occur and if appropriate, information about the actions or responses expected from participants.

After the exercise, it is essential to ensure that all participants, directing staff and role players are aware that the exercise has concluded. A typical way to do this is to conduct a 'hot debrief' to wrap up activities and to disengage participants and staff from the exercise activities. A hot debrief should bring the exercise scenario to a logical conclusion and advise those involved of any follow up activities, such as formal debriefs and evaluation activities. In addition to this, any resources, facilities or sites used during the exercise need to be returned to their pre-exercise state.

Debrief the exercise

All exercises benefit from a formal debrief at some stage following the conclusion of the exercise. The aim of such is to identify whether or not the exercise met its aim and objectives. It is also an opportunity to allow participants and participating organisations to reflect on their performance during the exercise.

Debriefs have typically look at what went well, what could be improved and recommendations that should be considered for future activities. More recently, there has been an inclination for agencies to replace debriefs with a process referred to as an After Action Review (AAR). While the concept of an AAR sits well in some circumstances its purpose differs from that of a debrief and those responsible for conducting exercises are encouraged to include some form of formal debrief, as described above, following their exercise.

When conducting debriefs, it is essential that the outcomes are recorded and made available to those involved. These outcomes will contribute to any review or evaluation process applied to an exercise.

Evaluate the exercise

I have been involved in substantial exercises where the only form of evaluation was a quick debrief conducted immediately following the exercise. A written report may or may not have been issued and little or no follow-up action occurred. While this may be appropriate for small scale exercises, there is certainly a need to ensure that the outcomes of exercises are given the due degree of consideration they deserve.

To this end it is recommended that a process for evaluating an exercise be considered right from the very first exercise planning meeting. The evaluation process may run in conjunction with the exercise planning process and those appointed to evaluation positions should wherever possible, work independently of those planning and conducting the exercise. The evaluation process should include both; how the participants respond to the developing scenario and also the way in which the exercise was designed and conducted. The latter point is often overlooked in the evaluation process and requires greater attention by exercise managers.

An evaluation process needs to be useful, accurate, ethical, feasible and cost effective. The Australasian Evaluation Society provides prudent information and guidance on evaluation that should be considered by exercise managers.

The outcomes of the exercise evaluation process should ultimately contribute to the way in which future exercises are conducted and the way in which emergency management agencies manage their responsibilities in the real event.

Conclusion

The amount of time, effort and resources that are required to design, conduct and evaluate an effective exercise should not be underestimated. All but the simplest of exercises will require a team of people dedicated to the tasks required to conduct an exercise. This team needs to work in a cohesive manner and have a common understanding of the requirements of the process adopted, such as the exercise management model described above.

The exercise design needs to be centred around a clearly defined aim, objectives and scope. The exercise manager should make use of the aim, objectives and scope to ensure that their exercise is not derailed by an overly ambitious scenario or other agenda.

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About the authors

Tony Callan has been involved in emergency management for more than 25 years, either as a responder, or in a management role. He currently works with the Australian Government Department of Agriculture, Fisheries and Forestry where he is responsible for ensuring that the Department has arrangements in place for managing its responsibilities during the response to emergencies that impact on primary production industries. Throughout his emergency management career, Tony has also been involved in the design, conduct and evaluation of exercises from a local level, right through to national exercises such as Exercise Minotaur (2002) and Exercise Eleusis '05.

National Security Update

The following are extracts / summaries of news items and media releases that may be of interest to the emergency management sector.

NEW DIRECTOR-GENERAL OF SECURITY – 25 February 2009

Attorney-General Robert McClelland announced the appointment of Mr David Irvine AO as the next Director-General of Security.

"It is with great pleasure that I announce the appointment of Mr David Irvine AO, currently Director-General of the Australian Secret Intelligence Service (ASIS), to head the Australian Security Intelligence Organisation (ASIO)," Mr McClelland said.

Mr Irvine will take up the position from the end of March 2009.

For more information, please visit www.attorneygeneral.gov.au

COMMONWEALTH ASSISTANCE FOR FLOOD VICTIMS ON NEW SOUTH WALES MID-NORTH COAST – 3 April 2009

Attorney-General, Robert McClelland announced that the Commonwealth Government will provide financial assistance for recovery efforts following the recent flooding of communities on the New South Wales mid-north coast.

This assistance will apply to natural disaster declared areas, including Bellingen, Coffs Harbour, Nambucca and Clarence Valley.

Funding will be provided in cooperation with the New South Wales Government through the Natural Disaster Relief and Recovery Arrangements (NDRRA).

For more information, please visit www.attorneygeneral.gov.au

COMMONWEALTH PROVIDES OVER $18 MILLION IN DISASTER MITIGATION FUNDING TO STATES AND TERRITORIES – 7 April 2009

Attorney-General, Robert McClelland, announced that more than $18 million will be provided to the States and Territories this financial year under the Natural Disaster Mitigation Program (NDMP).

The NDMP is a national program, administered by Emergency Management Australia (EMA), which aims to assist communities better withstand the effects of natural disasters and reduce the risk, damage and losses caused by events such as floods, bushfires and tropical cyclones.

Funding will go toward measures such as structural works including flood levees and fire breaks, investment in disaster resilient infrastructure and development of emergency management plans.

Allocations for this financial year, based on submissions received from State and Territory Governments, will be:

- New South Wales: $6.045 million
- Queensland: $5.348 million
- Western Australia: $2.185 million
- South Australia: $1.442 million
- Victoria: $1.426 million
- Tasmania: $0.883 million
- Northern Territory: $0.697 million
- Australian Capital Territory: $0.605 million

Natural disasters cause more than $1 billion damage each year to homes, businesses and the nation's infrastructure, along with serious disruption to communities.

More information on the NDMP and successful 2008-09 projects can be found on the Emergency Management Australia website at: www.ema.gov.au

COMMONWEALTH ASSISTANCE FOR FLOOD VICTIMS IN SOUTH-EAST QUEENSLAND – 8 April 2009

Attorney-General, Robert McClelland announced that the Commonwealth Government will provide financial assistance to communities recently affected by heavy rainfall and flooding in the Sunshine Coast and Gympie regions of South-East Queensland.

Commonwealth assistance is being provided to the Queensland Government through the Natural Disaster Relief and Recovery Arrangements (NDRRA).

"The Commonwealth Government will continue to work with the Queensland Government, Local Government and community organisations to support those that have been affected," Mr McClelland said.

Funding will include assistance for the restoration of essential public infrastructure and relief operations, as well as personal hardship and distress assistance.

Inquiries in relation to this assistance should be made to the Queensland Department of Communities on (07) 5459 8600

ARSON PENALTIES TO BE STRENGTHENED. – 17 April 2009

Attorney-General, Robert McClelland, and State and Territory Attorneys-General agreed on the necessity for strong bushfire and arson offences across Australia.

The Attorney-General presented proposals for new offences carrying penalties of up to 25 years for bushfire arson causing death or serious harm.

State and Territory Attorneys-General have commissioned a report for the next SCAG meeting on incorporating the offences into the Model Criminal Code.

Jurisdictions which have not yet done so will also examine the implementation of existing model bushfire and arson offences that attract up to 15 years imprisonment.

"Given the incredible damage to property and loss of life that can be caused by bushfires, it is critical that offences across Australia are consistent and effective, and those sentences reflect the seriousness of this crime," Mr McClelland said.

While each State and Territory currently has its own laws covering arson and bushfires, there is considerable variation in the scope of those offences and the penalties that apply.

"I am hopeful that the agreed program of work will make it easier to prosecute a person who lights a fire that results in death or causes serious harm to a person," Mr McClelland said.

"People who deliberately light fires must face tougher penalties, particularly when those fires result in loss of life as occurred recently in the Victorian bushfires."

Attorneys-General also agreed to consider enabling courts to order a person convicted of arson to pay compensation for the damage caused by their offence.

For more information, please visit www.attorneygeneral.gov.au

NATIONAL EMERGENCY VOLUNTEER LEADERSHIP PROGRAMME – 20 April

Attorney-General, Robert McClelland, attended the inaugural National Emergency Volunteer Leadership Programme in Mount Macedon, Victoria.

"The events of this summer, including the tragic Victorian bushfires as well as fires in other States, severe storms, cyclones and flooding in Queensland, New South Wales and Western Australia highlight that Australia would not be able to cope with events of this magnitude without volunteers" Mr McClelland said.

"To bring together some of Australia's leading volunteer organisations for a coordinated training programme is a tremendous step forward."

The four day Programme includes representatives from the Red Cross, St John Ambulance, Anglicare, St Vincent de Paul, the Australian Council of State Emergency Services, The SES Volunteers Association, the Australasian Fire Authorities Council, Surf Lifesaving Australia, the Australian Volunteer Coastguard, the Royal Volunteer Coastguard and the Adventist Development and Relief Agency.

"The Programme develops participant skills in areas such as self management, dealing with culturally and linguistically diverse communities, leading and advocating change in the volunteer sector, and media liaison" Mr McClelland said.

"All of these skills are vital to the operation of a modern, effective volunteer organisation."

The National Emergency Volunteer Leadership Programme is organised on behalf of the Australian Emergency Management Volunteer Forum.

The Programme commenced on Friday 17 April and concluded on Monday 20 April.

For more information, please visit www.attorneygeneral.gov.au

IMPROVING DISASTER RESILIENCE – 12 May

The Rudd Government will invest $79.3 million to strengthen efforts to prepare for and combat major natural disasters.

A comprehensive 'Disaster Resilience Australia Package' will integrate a number of existing emergency management grant programs, providing the flexibility to effectively meet the requirements of local communities threatened by disaster. The additional funding will be part of this new package.

"This represents a significant reform of Australia's disaster resilience arrangements," Mr McClelland said.

The package will integrate the current Bushfire Mitigation Program (BMP), Natural Disaster Mitigation Program (NDMP), and the National Emergency Volunteer Support Fund (NEVSF). The funding will:

- support disaster mitigation works including flood levees and fire breaks;
- assist Local Government meet its emergency management responsibilities;
- support the work of volunteers in emergency management; and
- build partnerships with business and community groups to improve their ability to respond to emergencies;

"The Government is not only providing additional funding, but we are also streamlining the administration of various programs to release even more funds for grass roots disaster resilience projects," Mr McClelland said.

In addition, the Commonwealth will also provide more than $12.8 million over the next four years to assist States and Territories lease additional fire fighting aircraft for longer periods during bushfire seasons.

Aircraft will be leased through the cooperative National Aerial Firefighting Arrangements (NAFA) and will help individual States and Territories access a range of specialised aircraft that would otherwise be out of reach.

"Aerial firefighting has emerged as a valuable tool in the fight against bushfires and the national arrangements have proven to be an efficient, collaborative approach that shares the cost of these specialised assets," Mr McClelland said.

This additional funding brings the Government's total contribution to the National Aerial Firefighting Arrangements to $14 million per year from 2009-2010.

Following recommendations of the 2008 Homeland and Border Security Review, the Government will also establish new briefing facilities and establish an enhanced Government Coordination Centre to support decision-making in the event of a national crisis or major natural disaster.

www.attorneygeneral.gov.au

AUSTRALIA AND NEW ZEALAND ENHANCE DISASTER RESILIENCE LINKS – 21 May

Attorney-General, Robert McClelland, welcomed the signing of a cooperation arrangement between the national emergency management organisations of New Zealand and Australia.

"This agreement will enhance cooperation in emergency management by improving information and knowledge sharing between Australia and New Zealand," Mr McClelland said.

"The partnership will produce practical outcomes by building the preparedness and capability of both nations to manage the impact and consequences of disasters."

Australia and New Zealand have a history of working collaboratively in emergency management, providing assistance on a number of occasions during natural disasters in several Pacific nations.

This close relationship was most recently exemplified during the Victorian bushfire disaster, with New Zealand providing significant resources to assist with response efforts.

www.attorneygeneral.gov.au

Interaction and Innovation: Australasian Libraries in the Emergency Sector 2009 Conference

Connie Coniglio and Troy Watson, ALIES Executive Committee

In the current information environment, access to and management of digital information is increasingly important. At the same time, it is essential to collaborate and engage with clients and stakeholders. With this in mind, the theme of the Australasian Libraries In the Emergency Sector (ALIES) 2009 conference was 'Interaction and innovation'. This theme was designed to provide ALIES member librarians with an overview of current and future issues in emergency management, interaction and collaboration, and digital information. The ALIES conference was held 5-9 April 2009, and was attended by 45 representatives from 37 member agencies across Australia and New Zealand.

During the conference, ALIES librarians set out to identify:

- Trends in emergency management – a look at the current and future issues
- Interaction – how to best collaborate and engage with clients and stakeholders
- Digital innovation – strategies for managing and accessing digital information
- Building bridges – how to develop strong partnerships and industry relationships

The following objectives provided a framework for the conference:

- To broaden our focus
- Conduct our Annual General Meeting
- Exchange and gather information and share innovative practices within and between agencies
- Contribute to a better understanding of the resources of other emergency sector libraries by creating improved access to information and people
- Develop strategies for future cooperation between libraries, parent organisations and government bodies involved with emergency management

The conference featured keynote speakers from emergency management, knowledge management and libraries, including: Martin Studdert, AM (Attorney-General's Department), Bruce Esplin (Emergency Services Commissioner, Victoria), Ray Canterford (Bureau of Meteorology), Sue Hutley (Australian Library and Information Association), Peter Schar (South Australia Police), Geoff Dean (Queensland University of Technology) and Frans-Jan Mulschlegel (International Police Expertise Platform, Police Academy of the Netherlands).

So did ALIES members meet the objectives that we set out to achieve? During the five days of the conference, ALIES members: were made aware of trends in emergency management; made decisions on future collaborative actions and resource sharing; agreed to investigate more consortia arrangements; tried and tested new technologies and shared our 'lessons learnt'; formed new committees; recognised the need to position ourselves more prominently as information providers within the emergency management sector; were shown how we contribute to creating resilient communities; and discovered how to access, digitise, disseminate and capture information. The conference was a great opportunity for idea sharing, networking, and professional development. It gave those involved a chance to identify key issues and projects for the next twelve months, and into the future.

For more information on ALIES, or to read the conference papers from the 2009 conference, please visit the ALIES Conference page on the ALIES website at **www.ema.gov.au/alies**.

In Profile:

Duncan Lewis

Appointment of Duncan Lewis as National Security Adviser

On the 4th of December 2008, Prime Minister Kevin Rudd announced the appointment of Duncan Lewis AO to the new position of National Security Adviser (NSA) to the Rudd Government.

The position has been created as the first step in the Rudd Government's new national security structure, and was announced as part of the National Security Statement released in parliament (an extract of this statement was published in the February 2009 edition of this journal).

The NSA will be the source of advice to the Prime Minister on all policy matters relating to the nation's security, and will oversee the implementation of all national security policy arrangements.

Mr Lewis has a long and distinguished career of public service. He served for more than 30 years as an officer in the Australian Army, including three tours with the SAS.

He was awarded the Conspicuous Service Cross for his services as commanding officer of the SAS Regiment, the Distinguished Service Cross for his command of Australian and New Zealand peacekeeping forces on the border in Timor Leste in 2000, and was appointed an Officer of the Order of Australia for his service as the inaugural commander of the Special Forces Command.

Mr Lewis retired from the Regular Army in 2005 as a Major General commanding Australian Special Forces and was appointed to the position of First Assistant Secretary of the National Security Division in the Department of Prime Minister and Cabinet.

In October 2005, he was appointed to his current position as Deputy Secretary, Department of Prime Minister and Cabinet, with responsibility for coordination policy development, and advice to the Prime Minister on national security, defence and intelligence, domestic security and international relations.

Mr Lewis is the co-chair of the National Counter Terrorism Committee, Chair of the Strategic Maritime Management Committee, Chair of the Strategic Policy Coordination Group and chair of the Australian Government Counter Terrorism Policy Committee.

He is an ex-officio member of the Council of the Order of Australia and the National Australia Day Committee.

EMA's Graduate Certificate in Emergency Management

In November 2008, EMA held its last graduation for the currently accredited Graduate Certificate in Emergency Management. The Graduate Certificate was first offered in May 2004 and 68 students have graduated to date.

This qualification was specifically designed to provide training for people working in the emergency management sector who required professional development at postgraduate level. Students examined their management skills especially managing relationships within the multi-agency context; were engaged in debate in relation to emergency management theory and practice; contributed to and analysed innovation and change in emergency management; and contributed to the national emergency management research agenda from a practice base. The Certificate comprised of four modules: Current issues and trends in emergency management, Relationships management in an emergency management context, Research methods and a Research project.

Abstracts from the students' research projects will be included in the next editions of AJEM.

Caravan Park Flood Evacuation Time Line Modelling

Daniela Heubusch

Senior Floodplain Engineer, Shoalhaven City Council, Bridge Road Nowra NSW 2541

Research Aim:

The purpose of this research was to develop a realistic flood evacuation time line model for caravan parks in order to determine the conditions, capacity limits and minimum staff resources required to safely evacuate a park during a flood event.

Modern planning strategies focus on hazard avoidance and mitigation by engineering design (DNR 2005) however, Councils around the State have inherited a large number of existing developments that require evacuation in order to save people's lives. Amongst these historical establishments, caravan parks in flood prone areas are some of the most vulnerable developments and pose significant risk to life and property if not carefully managed.

Flooding is a major hazard within the Shoalhaven area and it has been identified that there are more than 40 flood prone caravan parks within the municipality with some parks potentially being inundated by more than eight metres of fast flowing water. Damage to several caravan parks during flooding has occurred in the past and the problem becomes worse as caravans become older and less able to be moved after the receipt of a flood warning. Recent investment of many owners in semi-permanent vans and ancillary structures has risen significantly, which has increased the value of assets as well as the number of people who could potentially be at risk during flood events.

An issue that is often overlooked is that many caravan or mobile home owners live interstate. It is therefore highly likely that a flood event will happen in their absence leaving the park operators to save their belongings. Complicating the issue more is the fact that although regulations require vans to be moveable (Yeo 2006), many of them are not road worthy and have a high risk of breaking down and blocking access roads to caravan parks. It is therefore vital to develop a user friendly procedure to enable the assessment of evacuation needs for potentially fully occupied existing caravan parks.

To obtain a copy of the full report please contact:
heubusch@shoalhaven.nsw.gov.au

Enhancing Tasmania SES Volunteer Recruitment and Retention

On a research report prepared by Andrew Lea
Director State Emergency Service Hobart, Tasmania
September 2008

Due to a history of declining volunteer numbers, Tasmania State Emergency Service (SES) initiated a research project to consider the research question:

What strategies can be translated from available research and then implemented by Tasmania SES to improve the recruitment and retention of its volunteers?

The analysis of available research literature revealed a number of valuable insights into motivational influences and other factors affecting volunteer recruitment and retention. This analysis informed a Delphi focus group workshop with current and future SES volunteer leaders that resulted in a range of proposed initiatives centred around the following strategies:

Implement Effective Volunteer Recruitment Campaigns:

- Annual blanket and targeted campaigns based on needs, supported by enhanced methods, resources and profile (see below). SES volunteers to have a key role locally.

Enhance Volunteer Recruitment Methods:

- Focus on volunteer word-of-mouth using contact cards and personalised invitations to local people considered suitable to attend unit visits, open days, demonstrations, displays, etc.
- Supported by profile building and greater publicity of volunteering opportunities via TV, radio and an enhanced website, identifying all opportunities including support roles. Feature the main motivating factors.

Enhance Volunteer Recruitment Resources:

- Produce or update/enhance printed recruitment guides and information such as brochures, posters and contact cards. Also, audio-visual recruitment information such as DVDs and CSAs that focus on the main motivators and broadly cover all gender, ages, backgrounds and volunteer roles.
- Implement properly resourced unit volunteer recruitment buddies or mentors for new members and create regional community relations groups of carefully selected and willing volunteers to support volunteer recruitment and retention activities.
- Provide and assess entry questionnaires for ongoing recruitment research.

Enhance Volunteer Retention by Enhancing SES Profile & Visibility:

- Provide general duties uniform for all volunteers at no cost.
- Continue to recognise long service and achievement and improve media engagement to publicise these achievements.

Enhance Volunteer Retention with Enhanced Management & Administrative Practices:

- Assist more with legitimate volunteer out-of-pocket expenses.
- Reintroduce exit questionnaires for ongoing research.
- Introduce a new Operational Support stream of volunteer for those who feel they are no longer suited to physical/heavy tasks (can do admin, training, maintenance, etc).
- Provide enhanced support and development for volunteer Unit Managers, such as annual Unit Management Workshops.
- Implement, in consultation with the units, additional combined unit training.

Volunteer Recruitment and Retention to Remain a Strategic Priority for SES:

- Long term, well resourced and sustainable strategies and goals.

Further Volunteer Recruitment and Retention Research:

- Further research needed to fill knowledge gaps.

Central to many of the preferred options and strategies, is the finding that the best strategic approach a volunteer organisation can adopt is to ensure its volunteers are happy, motivated and able to give something back to, or to help their communities.

To obtain a copy of the full report please contact:

Andrew.Lea@ses.tas.gov.au

Community Education Programs & Vulnerable Groups

By Sally McCarron

A bushfire event is an ever present threat for the residents of Indigo Shire, which is located in north east Victoria, covering an area of 2,016 sq. km, with a population of approximately 15,000 people. Actual occurrence of fires, especially significant fires where the community as a whole is at risk, is, however, infrequent.

As with any community the Indigo Shire community is diverse and has some specific challenges in relation to being informed and prepared for bushfire events including high numbers of visitors during peak bushfire danger periods, proportionally higher numbers of older, frail residents, and a growing population, with people choosing to move into the Shire to live. The paper seeks to explore whether there are specific bushfire community education tools which are targeted to specific population groups which may be applied within the Indigo Shire.

Using a documentary research approach key data was collected to identify the specific characteristics of each of the selected population groups and to identify bushfire community education programs which are targeted to particular community sectors. It was important to explore how community education programs were delivered to the community and what were the preferred methods for each of the selected groups to receive information. In developing an approach to consider the relationship between the tool and the particular population group a matrix that could readily demonstrate the applicability of each type of tool to specific groups was utilised.

The research indicated that the more traditional methods of communication such as newspapers, printed information, radio and word of mouth are more successful in getting the intended message to the selected groups. Emergency response agencies are however increasingly using the internet as a method of communication. This potentially raises issues if other methods are not used in conjunction as key sections of the community are not engaged.

The research also indicated that most of the community education programs that are currently in use have more applicability to the general community than specific population groups who are vulnerable given certain circumstances. The apparent lack of

targeted programs for specific vulnerable groups highlights the need for emergency planners and responders to be aware of such shortcomings and take additional measures to ensure that such groups are supported. Some shortcomings include how newly arrived residents initially learn about the bushfire risk, what specific actions should be taken by short term visitors in bushfire events, and what particular risks are there for those who are more frail and rely on others to assist in emergencies.

The implication of these findings is that the generic bushfire community education programs are valuable for most of the community but there is a need for a variety of strategies to reach diverse audiences. More work is required to assist all sectors of the Indigo Shire community to be educated about and aware of the impact of bushfire events.

To obtain a copy of the full report please contact:

Sally McCarron
smccarron@indigoshire.vic.gov.au

What guidelines can be used to combine the emergency management, business continuity and security components within an organisation to give a unified approach to developing organisational resilience?

By Bill Shiel, submitted October 2008

This paper presents findings from research into aspects of organisational resilience and addresses the question of how to combine the activities of security, emergency management and business continuity into one autonomous entity to build organisational resilience.

My organisation, SA Water, presently has a well established emergency management program in place with well prepared EM plans and exercise schedules. Security plans are also in place and the business continuity program is in the final stages of implementation.

These programs are presently running as three independent entities. Our Security and Emergency Management Business Unit management team has concluded that they should be incorporated into one program to ensure a unified approach. The unification of these plans is referred to in the literature as Organisational Resilience.

I want to investigate this incorporation process to ensure that the integration of the programs is carried out in an efficient and effective manner. More importantly I wanted to research the trends and methods that have been used or recommended by others in order to build an efficient and effective resilience program. It was my intention to create guidelines for building a resilient organisation. It is suggested that a united resilience program will be easier to oversee and manage and will also ensure that issues such as the incorporation of exercises from all three areas will occur, limiting the time that both Security and Emergency Management staff and Operational staff need to spend on exercising and testing the programs. This process is important to me because there is adequate evidence and data available to enable my organisation to establish a resilience program that should become the benchmark within South Australia, perhaps even within Australia.

To investigate the matter I followed two different research avenues. I conducted searches on the Internet and in text books related to the topic. I also investigated several Australian organisations that I believed had already built or were in the process of building an organisational resilience program. The paper concludes by suggesting what issues need to be addressed and what attributes need to be observed to ensure that a good organisational resilience program will be in place.

To obtain a copy of the full report please contact:

Bill Shiel
Security Manager
South Australian Water Corporation
Contact: (08) 7424 1499
bill.shiel@sawater.com.au

Local Government/Local Community Disaster Recovery. Improvisation or Preparedness?

Lewis Winter. CRMT, MRMIA, MAIES

In the paradigm of PPRR (Prevention, Preparation, Response and Recovery), response has always been the high profile area in disaster management attracting funding and media attention. However in recent years the critical importance of assisting communities cope with the aftermath of disaster and return to routine life and sustain a socially healthy condition is taken up in the area of disaster recovery.

The drive for pre-planning for a disaster recovery is fostered by peak agencies and academics of EM, presumably as a flow on from the response perspective. However, in many recent disasters, including study cases, where recovery has been initiated, there has been a total absence of preplanning, yet the recovery effort has been administered effectively. So the question posed would be "is preplanning for disaster recovery really necessary?" Can improvisation on the day suffice for good disaster recovery management? Could there be some valuable lessons leant that will change the way we prepare and engage in disaster recovery?

Another issue that arises from this study is that if preplanning for disaster recovery is important enough to legislate responsibility to local governments,(WA, EM Act 2005), why is it not occurring in the majority

of local government, local community areas? Could the perceived enormity of developing useful pre-plans be beyond the capacity of many local communities? Could the improvisation formulae for recovery offer a more practical application for local communities?

This research addresses these questions by interviewing 6 Local Government Recovery Coordinators who have led disaster recovery at recent disasters in Western Australia. These disasters significantly affected their communities through fatalities and extensive damage to private and public assets.

The research provided excellent insight into the above questions with the benefit of hindsight of people directly involved in disaster recovery at the local community level.

The research explores how understanding a community and how it inter-relates develops a critical pathway that will further embrace community concentric processes into emergency management.

To obtain a copy of the full report please contact:

winteractive@bigpond.com.
Phone 0438 808 913

Critical success Factors for Primary Industry Emergency Preparedness

Meredith Jenner
Emergency Management Planning Officer

Although rare, primary industry emergencies, such as an outbreak of an animal, plant or aquatic animal disease or a pest incursion, have the potential to cause enormous economic and social disruption in Australia. Primary industries agencies, at both national and state/territory level, therefore have a responsibility to ensure that they develop and maintain preparedness to mitigate against and respond to primary industry emergencies.

This paper aims to identify, and validate through research, the critical success factors (CSFs) for achieving a high level of primary industry emergency preparedness. The research focuses on South Australia and further aims to identify the factors that enable or disable primary industry emergency preparedness in this state. It is intended that the findings then be used to drive strategy and practice improvements to enhance primary industry emergency preparedness in the future.

To obtain a copy of the full report please contact:

Emergency Management Coordination Unit
Primary Industries & Resources SA
Level 9, 101 Grenfell St, Adelaide SA 5000
GPO Box 1671, Adelaide SA 5001
Phone: +61 8 8204 9298
Mobile: 0428 112 598
Fax: +61 8 8463 3366
Email: jenner.meredith@saugov.sa.gov.au

Fatigue Management in the Emergency Management Context

By Suzanne Robinson

In this project fatigue management has been evaluated in the emergency management context, particularly in relation to New South Wales Department of Primary Industries (NSW DPI) emergency management activities.

Fatigue is a significant problem in emergencies, and particularly long time frame emergencies like animal and plant pest and disease emergencies. However, much of the fatigue management research has been undertaken in areas other than emergency management, so it is not well known how well this fits into the emergency management context. To investigate this issue, fatigue management policies were accessed directly from emergency agencies across Australia. In the absence of sufficient of these, the focus was broadened to include other related industries whose guidelines were accessed from the web. A content analysis was undertaken to review the documents. The research revealed that the complex interactions between fatigue issues are not well understood and that fatigue management has been developed in other fields and not tested for its appropriateness in the complex emergency management context.

This study showed that a flexible risk management approach, rather than prescriptive management approach, is most appropriate to the often complex, multi-agency, long time framed emergencies that NSW DPI manages. The scarcity of information in the emergency management context highlights the need for future studies in better determining interrelationships and interactions between fatigue factors and testing fatigue management systems in emergencies to evaluate their effectiveness in the emergency management context.

To obtain a copy of the full report please contact:

Suzanne Robinson
Manager General Emergencies Preparedness & Response, and Deputy NSW Drought Coordinator and Deputy NSW Locust Commissioner
Emergencies, Weeds & Pest Animals Branch
NSW Department of Primary Industries
Locked Bag 21, ORANGE NSW 2800
T: (02) 6391 3680, M: 0427 014 200,
F: (02) 6391 3740
email: suzanne.robinson@dpi.nsw.gov.au
website: www.dpi.nsw.gov.au

AJEM BOOK REVIEW

Great Australian Bushfire Stories by Ian Mannix

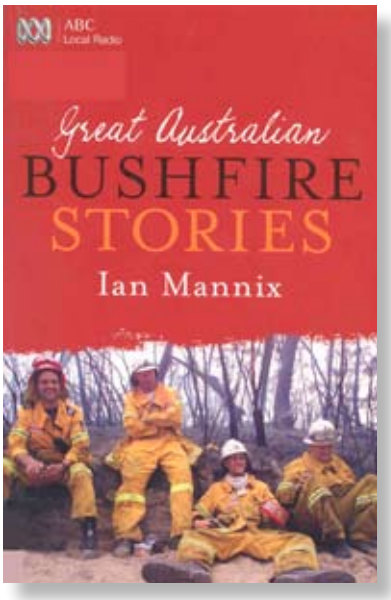
Reviewer: Alastair Wilson, Public Affairs, Emergency Management Australia, Attorney-General's Department.

Published by ABC Books October 2008.

Someone said to me that I was either weird or obsessed to be reading a book about bushfire stories at the very time bushfires were raging across several states of Australia.

The reality is that in reading Ian Mannix's collection of 13 very personal stories was a seriously sobering experience. And having since driven through some of the Victorian communities worst affected in the February 2009 Black Saturday fires I now find that these stories give a strange yet wonderful sense of hope and strong belief in the resilience and courage that Australians have been renowned for over the past two centuries.

It is clear that Ian's substantial expertise as a journalist has come to the fore in writing this collection, not just because the stories are eminently readable but because he has been able to engender in those who tell of their experiences, a sense of quiet trust. Australians, especially those from the bush, don't brag of such exploits as you will read in this book. The quiet determination to face nature's worst, at times of unimaginable life threatening terror, will give a sense of inspiration to anyone interested in understanding what makes the human spirit rise to such occasions.



The various issues of preparation for bushfires, whether for the individual or a whole town; understanding what happens on a fire-ground with regard to the sheer intensity of this natural phenomenon; the stay-and-fight versus the leave-early viewpoint; and how fire warnings are regarded; are all traversed in one way or another through the voices of those who have been through this ordeal.

There are stories from the Canberra suburbs shocked by the bushfires of 2003, as well as from the forest towns outside the Capital; from farmers near the tip of the Eyre Peninsula who fought extraordinary fires in January of 2005; from those who made it through the early summer arsonist lit fires of 2006 in Gippsland and from the Alpine country of Victoria in the same month; then to threatened families in bad fire country southwest of Ballarat earlier in 2006; all stories of fear, passionate determination, and heartbreak. Fires that forced people into the sea on Tasmania's east coast; and ones that tore through the beautiful trees of the Ku-ring-gai Chase on Sydney's northern outskirts in January of 2007; and New Year's Day 2003 in Brisbane Waters north of Sydney known by the understated name of Burning Sunday.

The author rightly gives great credit to the metro, rural and country fire service personnel – especially the volunteer fire fighters – of the several states spanned by these stories, as well as to the professional advisers he has consulted, and to the ABC's Local Radio people who throughout the worst of these terrible ordeals kept residents connected to their supportive communities.

To quote Ian Mannix in his Introduction: "The communities and individuals in this book have all learned from their confrontation with the 'red steer'. By allowing us to see their personal responses to Australia's summer menace, they have allowed us to understand better how to protect ourselves, our families and our communities." Ian was not to know the catastrophic impact of the worst-ever bushfires in recent history in this country that tore through the Victorian hill country in February this year. However we can be certain that when the stories of 2009 are told, the courage and grit, fear, sorrow and relief will again feature as we see Australians stare disaster in the face.