Housing reconstruction after
Bam earthquake in Iran

How accessible are bushfire
plans in NSW?

Niue's recovery from
Cyclone Heta

Tort liability for
fire damage

historical snapshot

At around 08:10 on 18 January 1977 a peak hour Blue Mountains electric commuter train, travelling into Sydney, crashed after derailing on an approach curve to Granville Station. The train careered off the tracks for 46 metres before striking concrete supports of a road overpass, demolishing all 8 steel stanchions and coming to rest 67 metres from the derailment. Carriage one became detached and split open after sheering off a steel electricity mast. Eight died and 34 were injured in this carriage. Carriage two also derailed and passed to the north of carriage one, coming to a halt hard up against the concrete retaining wall lining the track. It was relatively unscathed and there were no fatalities in this carriage.

Carriages three and four were not so lucky. The four lane concrete bridge, with a weight of 570 tonnes, collapsed onto them, squashing them almost flat and trapping the passengers. 44 of carriage three's 77 passengers died, along with 31 of carriage four's complement of 64. The massive response by police, civil and emergency services was complicated by the dangerous environment in which rescuers were working.

Ultimately 83 died and 213 were injured in the incident. Rescuers performed extraordinary feats of bravery to stay with some injured passengers in areas of the wrecked carriages considered too dangerous.

The Coroner found the train driver and fireman were not to blame, finding that the accident was caused by poor maintenance.

Cover shot: Austrian Red Cross rescue workers search the rubble for survivors with their sniffer dogs in the devastated south-eastern Iranian city of Bam, 28 December 2003. © Newspix/AFP/Behrouz Mehri

Contents

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Please note that contributions to the *Australian Journal of Emergency Management* are reviewed. Academic papers (denoted by ⓡ) are peer reviewed to appropriate academic standards by independent, qualified experts.

FOREWORD

Success of the Working Together to Manage Emergencies initiative managed by EMA
By Tony Pearce

There is general acceptance that the threat of terrorism and the likely effects of climatic variation can be considered as enduring features of Australia's 21st century hazardscape. Effects may include an increase in frequency and severity of drought, severe storms, floods, tropical cyclones and indirectly, serious bush fire. Not only do these events have political and economic consequences but, most importantly, they also have the potential to adversely impact vulnerable communities.

This changing hazards profile has highlighted the importance of ensuring that all levels of government and the community work cooperatively in the shared responsibility of reducing vulnerability and managing the impacts of these events in the most effective way possible. We are all in this together.

Local government, in conjunction with State and Territory governments, is a critical component and has a key role in the prevention of, response to and recovery from emergencies and disasters, both natural and human caused, including terrorism. It is at the frontline of emergency management and is often best placed to determine and respond to local needs and priorities. Local government remains to pick up the pieces long after the initial response operation has been completed.

Of increasing and vital importance is our national pool of emergency management volunteers who represent another critical element of emergency management and who play a significant role in assisting communities in response and recovery from the impact of hazards. Some 500,000 people in Australia volunteer their services in some emergency management capacity, and 350,000 of those are directly involved in emergency first response, principally through the various rural fire services and State Emergency Services. It is critical that these volunteer agencies maintain their current staffing level and attracting new volunteers in the current sociological environment is a significant challenge.

In recognition of the importance of the roles of local government and the national emergency volunteer pool the Australian Government, in the context of the 2004 election, announced its policy initiative *"Working Together to Manage Emergencies"*. It committed $49 million to establish a *Local Grants Scheme* to institute a local government security partnership program to enhance the capability of communities to prepare for, respond to and recover from emergencies and disasters of all types including terrorist attacks and to create a *National Emergency Volunteer Support Fund* to assist in recruiting, retention and training of emergency management volunteers over a broad range of agencies.

The initiative has been strongly supported and has proved to be very successful in meeting its objectives. It has provided grants that have encouraged innovative ideas from local communities aimed at reducing their vulnerability and developing their self-reliance and resilience.

To date, more than $28 million has funded nearly 850 projects through the Local Grants Scheme and the National Emergency Volunteer Support Fund. The final year of this four year initiative is 2007-08.

Local Grants Scheme projects have included emergency risk management studies and development of plans and implementation of measures to address identified risks. National Emergency Volunteer Support Fund projects have focussed on development of public education programs, volunteer recruitment campaigns, establishment and upgrade of facilities and introduction of specialised training and equipment for volunteers. Collectively, the range of projects represents a significant addition to the capability of local government and volunteer agencies.

The initiative represents a successful partnership between all levels of government and the community working together to manage emergencies. Based on the successful outcomes to date there has been unequivocal support from stakeholders for its continuation.

Tony Pearce

Niue after Cyclone Heta

Jon Barnett and Heidi Ellemor report on Niue's recovery from Cyclone Heta.
This report is based on 8 months of fieldwork in Niue in 2006

Introduction

Nearly three years after Cyclone Heta struck Niue on January 5, 2004 the island is still recovering. Cyclone Heta caused peak wind gusts of 296 kms/hour, and waves in excess of 50 meters in height. These waves washed away whole buildings situated on the Alofi terrace, more than 25 metres above sea level.

Two people were killed by the cyclone, and many people retain a residual level of trauma. Forty-three houses were totally destroyed, and a further 20 have had to be abandoned. The estimated value of these losses is NZ$4.1 million, but this estimate does not include the loss of personal possessions and records that have no market value, but whose loss is keenly felt. The impact on the private sector, arising through lost buildings and equipment – but not including lost income – has been estimated to be NZ$5 million (Government of Niue 2004).

Losses to Government have been estimated to be NZ$25.7 million, reflecting the Government's share of over 50% of GDP, and the fact that the seat of Government and most government departments were based in Alofi, which was the area hardest hit by the cyclone. Included among these losses are the complete destruction of the Huanaki cultural centre, where people would regularly congregate for the cultural displays and dances which are so integral to Niuean culture, and which also included the national museum, which lost 90% of its collection. There were other significant intrinsic losses, such as the loss of many land title and health records, significant (and ongoing) impacts on biodiversity and iconic species such as the native pigeon and fruit bat, damage to sea tracks used for fishing and bush tracks used for hunting, and the loss of the national hospital in which most Niueans were born.

From the 'Golden Mile' to the 'Desert Road': The impact of Cyclone Heta on Niue's administrative and cultural centre

Niue is the world's smallest self-governing country. The 2006 census showed the population to number 1607 people. Because Niueans are New Zealand citizens and have free access to labour markets in that country, there has been large-scale migration from the island

From the 'Golden Mile' to the 'Desert Road': The impact of Cyclone Heta on Niue's administrative and cultural centre.

to New Zealand. There are some 5,300 people born in Niue now living in New Zealand. Its small and declining population, coupled with the magnitude of Cyclone Heta, led many in the international media – and some politicians in New Zealand – to declare that the cyclone would trigger complete abandonment of the island. Like most international reporting about Niue, this was incorrect.

Between the 2001 and 2006 census the population declined by 181 people — little more than a plane load, and less than the number of resident Niueans who are abroad at any time on government travel, for education or medical treatment, or visiting family. It is notable that despite Cyclone Heta this inter-census population change is one of the lowest on record. It is clear from the census data, and even more so from our research, that the Niueans that remain are there to stay; they are, as they define themselves, 'the core' of Niuean society; and they will remain irrespective of cyclones.

Niue is also arguably the world's most aid-dependent country. GDP per capita is approximately NZ$10,000, of which aid accounts for approximately 70%. Almost all of this aid comes from New Zealand. New Zealand has an obligation under Niue's Constitution to provide economic assistance to Niue, and because Niueans are New Zealand citizens they are entitled to minimum standards of living, at least with respect to health care and education.

With this history of aid dependency, Niue's leaders were very quick to turn to the international community, and

New Zealand in particular, for assistance with response and recovery after the cyclone. Despite this, it was Niueans themselves who did the bulk of the work to secure people's basic needs in the weeks after Heta, organised by the island's various formal and informal structures of governance comprised of the overlapping realms of State, Church, village and family. It was with respect to recovery, however, that Niue was dependent on the will of donors, and the Government worked hard to capture the attention of the international community and New Zealand, principally through its Cyclone Heta Recovery Plan, which identified reconstruction needs and has since facilitated donor coordination.

New Zealand assisted recovery in Niue through a NZ$9 million grant, much of which was spent on the construction of a new (relocated) hospital. Perhaps triggered by the cyclone, New Zealand and Niue signed an agreement in October 2004 for strengthened cooperation, which includes an allocation of $20 million over the period 2004–2009. The World Health Organisation and the European Union also assisted with the new hospital. The Government of French Polynesia responded quickly, sending materials for new houses and heavy machinery to assist in clearing of rubble and construction. Australia also contributed, sending supplies and personnel coordinated by Emergency Management Australia. With this international assistance, and the determination of Niueans, Niue is making good progress recovering from Cyclone Heta. There is a new hospital, new houses, a new hall that serves as the administrative centre of the Church and as a new venue for dances and functions (which was 75% funded from private contributions), and a new determination to retain Niue's distinct culture and way of life.

However, much more remains to be done, particularly in relation to disaster management. Disaster management arrangements have improved slightly since Cyclone Heta, largely because of the efforts of the new Chief of Police. The 2006–07 budget for disaster management is small — only NZ$4,000. Institutional arrangements for warnings and preparedness remain untested and for the most part unchanged since 2004.

The disaster management plan is not available in the Niuean language. Key infrastructure such as the wharf and derrick, sea tracks, and power, water and communications infrastructure remain vulnerable to cyclones, and land use planning — such as it is — does little to mitigate vulnerability to cyclones. There is a pressing need for training in disaster management and dedicated emergency stores. After Cyclone Heta both Australia and New Zealand committed further support for disaster management in Niue. As the 2006–07 cyclone season shapes up to be particularly risky for Niue, Niueans are again worrying and wondering how well prepared they are, and the need for further assistance seems more pressing than ever.

About the authors

Dr Jon Barnett is an Australian Research Council Fellow in the School of Social and Environmental Enquiry, University of Melbourne. He is a member of the Scientific Steering Committee of the Global Environmental Change and Human Security (GECHS) Project. Email: jbarn@unimelb.edu.au

Dr Heidi Ellemor is Manager, Education and Training at Emergency Management Australia, Mt Macedon. She has a PhD in Resource Management and Environmental Science from the Australian National University. Email: heidi.ellemor@ema.gov.au

No time to de(con)struct: the accessibility of bush fire risk management plans in New South Wales, Australia

Prue Laidlaw, Dirk HR Spennemann and Catherine Allan discuss the accessibility of bush fire risk management plans in NSW

Abstract

Cultural heritage assets define our culture, providing a sense of place and emotional anchorage in space and time. As such they are regarded as assets worth protecting during disasters, including bush fires. Fire can damage cultural heritage assets through flames and radiant heat and via inappropriate fire suppression activities during and immediately after a fire. Good planning can provide for the protection of cultural heritage assets during bush fires, but the information within the plans must be easily understood.

This paper considers the accessibility of the information related to cultural heritage assets in all available NSW district bush fire risk management plans. Reading ease and reading age formulae were applied to each plan, and content analysis was used to explore the terminologies used, and the style in which the information was presented. The information regarding cultural assets in the plans was found to be difficult to read, replete with obscure terminology, and sometimes rambling and irrelevant; in short very inaccessible, especially in the high stress environment of a bush fire. The paper concludes with advice on improving the accessibility of bush fire risk management plans, advice which will be equally applicable to other disaster plans which consider the protection of cultural heritage assets.

Introduction

Southeastern Australia is the greatest bush fire prone area in the world (EMA 2003). Fire has always been part of the Australian environment, and has played a pivotal role in shaping the biota, and human societies (Kershaw et al. 2002; Gill, Bradstock and Williams 2002). It is both during and after a bush fire event that cultural heritage, Indigenous and historic, is at its most vulnerable, as fire and fire suppression has the potential to greatly reduce the historic character and fabric of the asset (Look and Spennemann 2000). Cultural heritage assets define our culture in space and time; they are part of the context that makes us human (Person and Sullivan 1995). They provide a sense of place and are emotional anchors in space and time (Lowenthal 1985) and thus are regarded as assets worth protecting for the benefit of community recovery (Spennemann and Graham 2007).

Fire does not distinguish between different types of cultural assets, their associated values and their constituent materials, but rather has the ability to obliterate all in its path as long as there is combustible material to fuel the fire (Look and Spennemann 2000). The effect of fire upon cultural assets is three-fold, as damage can emanate from the impact of the direct flame, from the indirect impact of radiant heat (NIFC n.d.) and from inappropriate fire suppression activities by disaster managers during and immediately after such events (Spennemann 1999a).

The paper forms part of a larger and ongoing research programme into the current state, level and nature of planning for the protection of cultural heritage places in the face of the ever-present natural hazards. Earlier research looked into issues of salinity (Spennemann 1998a; 1999b; 2001; Spennemann and Marcar 1999) and storms/wave action (Spennemann 1998b, O'Halloran and Spennemann 2002). Recent work examined the attitudes towards heritage protection held by NSW staff of the Rural Fire Service (Graham and Spennemann 2006a) and the State Emergency

Service (Graham and Spennemann 2006b) as well as the attitude of NSW heritage managers towards natural disasters (Graham and Spennemann 2006c). A study of the risk assessments in heritage planning augmented the research (Spennemann 2005). This paper is derived from an examination of the way the protection of cultural heritage assets is addressed in 111 bush fire risk management plans. Elsewhere we have reported on the comprehensiveness of the provisions in these plans (Laidlaw, Spennemann and Allan 2007) and the extent of uncritical replication of text passages and provisions from other plans (Laidlaw, Allan and Spennemann *in preparation*).

Bush Fire Risk Management Plans

The management of fire events in New South Wales is legally mandated under the *Rural Fires Act* (NSW) 1997, which establishes the NSW Rural Fire Service and makes provisions for the prevention, mitigation and suppression of rural fires. Part 3 of the Act provides for the establishment of the Bush Fire Coordinating Committee, which plans for bush fire prevention, for coordinated bush fire fighting, and is empowered to review Bush Fire Risk Management Plans (Farrier, Lyster and Pearson 1999).

The NSW State Disaster Plan (Displan) is a requirement under the provisions of the *State Emergency and Rescue Management Act* (NSW) 1989, and details the emergency planning, preparedness, response and initial recovery arrangements for NSW to ensure the coordinated response to emergencies by all agencies responsible for emergency situations. In its guidelines, the Displan recommends that during an emergency situation appropriate consultation, wherever practical, should occur with the responsible agencies, and that environmental, historical and cultural conservation concerns should be considered (SEMC 2000).

To assist in the development of district bush fire risk management plans, the Rural Fire Service of New South Wales provides a model plan (New South Wales Bush Fire Coordinating Committee 1998), which sets out the recommended structure of a bush fire risk management plan and provides guidance on what the plan document should include. While some sections provide quite detailed sample text, such as the section on the protection of threatened species, the guidance provided on cultural heritage is very limited. The instructions provided are nearly identical for places of Aboriginal Significance and Historic Heritage (New South Wales Bush Fire Coordinating Committee 1998):

(a) *Places of Aboriginal Significance*

   Instructions (delete from Committee's plan)

   Identify whether places of Aboriginal significance occur in the Bush Fire District. If appropriate, identify areas with concentrations of significant sites that may be damaged by fire. If area references are used they should be broad (eg. Kinchega NP, Mt Belmore SF etc).

(b) *Historic Heritage*

   Instructions (delete from Committee's plan)

   Identify whether places of historic heritage importance exist in the District. If appropriate, identify areas with concentrations of significant items (eg. Villages of Hill End, Sofala etc) identify only those where the occurrence of fire (wildfire or prescribed fire) has the potential to cause damage to the heritage items.

The wording of these formulations implies that content, complexity and language of the individual bush fire risk management plans has been solely left to the discretion of the respective bush fire management committee authoring the plans. There is an unstated assumption in the bush fire risk management planning process that a plan that has been written by a committee of local authorities will be locally 'owned' and will reflect the special local needs and conditions. It is also assumed by those requiring that such plans be written, that the plan content is intelligible to the intended user during situations of emergency. But are those assumptions a reflection of reality?

While all plans are purportedly written for the local situation, a review of all available bush fire risk management plans (n=111) for the state of New South Wales revealed that copying and often indiscriminate adoption of sections content from other bush fire risk management plans is not uncommon (Laidlaw 2004). Thus much, or at least some, of the wording of the plans has been borrowed and does not necessarily reflect the language ability of the plan authors (Laidlaw, Allan and Spennemann *in preparation*).

This paper will focus on the cultural heritage related sections of all available NSW bush fire risk management plans, and will consider how accessible these plans are for the average user and lay reader. It will do so by addressing two aspects: the overall readability of the plans in terms of language and sentence complexity; and the jargon and technical terminology used in the plans.

Readability and Reading Age

A significant part of the planning process involves anticipating the stress and psychological dislocation that accompany a disaster (Nelson 1991). During a disaster situation clear-headed thinking is likely to be impaired, and for this reason it is important that the disaster plan in place be easily understandable and clear in its intentions.

While *legibility* indicates that the text can be read (that letters and words can be recognised), readability is a measure of the accessibility of a legible piece of writing. It describes the ease with which a text can be read and thus indicating how wide an audience it may reach. In addition to the complexity of the language, presentation factors unrelated to the language of the text also affect readability: for example, choice of typeface, text size, layout and colours. The *comprehensibility* of a text is an interaction between the reader (drawing on prior knowledge of the content and the text features of the material read) and aspects of the text itself. It assesses to what extent users actually understand the messages conveyed in the text.

A number of studies have been carried out looking at the readability of documents and public information material, such as consent forms for research projects (Mathew and McGrath 2002), questionnaires (Winzenberg *et al* 2003); Australian Legislation (Richardson and Smith 2002), privacy policies (Graber *et al* 2002); computer journals (Lemos 1985) and computer documentation (Klare 2000). It is particularly prevalent in the fields of medicine and allied health, where the conveyance of unequivocal and easily understood information is critical. Studies looked at patient information leaflets (cf. Adepu and Nagavi 2004), drug information (Koo *et al* 2003), information hand outs (Griffin *et al* 2003) and other health education materials on the World-Wide Web (D'Alessandro *et al* 2001; Smart and Burling 2001; Gottlieb and Rogers 2004).

A readability test is a technique for predicting the reading grade level required of the average reader in order to understand the written material (Flesch 1949; 1951; 1962). Commonly used tests are the Flesch Reading Ease Score and Flesch-Kincaid Grade Level tests, both of which are provided as a tool by the popular word processing packages Microsoft Word™ and WordPerfect™. Other tests exist, such as Gunning's Fog Index (Gunning 1952), the Simplified Measure of Gobbledygook (SMOG) Grading (McLaughlin 1969), and the Fry Readability Graph (Fry 1977, p.217), but none of these dramatically improve on the outcome. Although most formulas have acceptable validity and reliability, they are often criticised for their limitations (Fry 1997, p. 218). While taking into account sentence length, syllable count, or vocabulary index, they tend to be insensitive to word order or grammatical complexity. Thus, if anything, the Flesch tests used in this paper underestimate the level of reading ability required by a user.

The Flesch Reading Ease equation uses a measure of the average sentence length in words (ASW), and the average number of syllables per word (ASL), with the assumption that the fewer syllables a word possesses, and the fewer words a sentence contains, the easier they are read and comprehend. The Flesch Reading Ease Score is based on the following empirically derived formula:

$$206.835 - (1.015 \times ASL) - (84.6 \times ASW)$$

The formula results in a reproducible and predictable score in between 0 and 100, with higher scores signifying greater reading ease.

The Flesch-Kincaid Grade Level test is directly related to the Flesch Reading Ease test as the Flesch-Kincaid score mathematically converts the Flesch score into a grade level estimate. Grade level estimates range from 5th to college post-graduate grade. Although the grade level estimates are based on the 12-grade American school system, for the purpose of this study they are deemed appropriate to be used as investigative tool in the Australian context, which also has a 12-year school structure. A more limiting problem is inherent in the way Microsoft Word™ calculates the Flesch-Kincaid Grade Level, as it does not calculate beyond grade 12.

Readability and Reading Age of Bush Fire Risk Management Plans

An analysis of the readability of the bush fire risk management plans was carried out on that segment of content relating to cultural heritage assets.

The Flesch reading ease scores obtained ranged from 3.9 (Lismore BFMP) to 58.1 (Crookwell BFMP). The average Flesch reading ease score for the current bush fire risk management plans was 35.1±7.7 (median 35.2). The distribution of scores shows that the majority of plans scored between 30 and 45 (figure 2). Table 1 sets these scores into context by showing both Flesch's original magazine categories and contemporary Australian examples.[1]

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1   Sources: Wilmoth, Peter (2004) Babes in arms. The Age (Melbourne) 24 October 2004. On-line. FRES: 71.8/FKGL: 6.8.—Peter Carey 'Parcel 1' from 'True History of The Kelly Gang' St. Lucia: University of Queensland Press, 2001. FRES: 74.8/FKGL: 7.8.—Gerangelos, Peter (2002) The Separation of Powers and Legislative Interference with Judicial Functions in Pending Cases. Federal Law Review 30(1): 1–38. FRES: 28.0/ FKGL: 12.0+.—Weinberger, Norman M. (2004) Music and the Brain. Scientific American. November 2004. On-line version. FRES: 38.7/ FKGL: 12.0+.—Parker, Jim (2004) Tame CPI eases interest rate fears. Australian Financial Review 27 October 2004. On-line version. FRES: 44.6/ FKGL: 12.0+.— Peter Carter Brown, Extract from 'No Law Against Angels.' Sydney: Horwitz, 1957: FRES: 87.4/ FKGL: 4.3.— Jane Downing, chapters 1 and 2 from 'The Trickster,' Canberra: Pandanus Press, 2003. FRES: 66.9 / FKGL: 8.0

Table 1. Reading Ease Score of the Bush fire risk management plans (adapted from Flesch 1949, p.164 with Australian equivalents)

Flesch Reading Ease Score	Flesch-Kincaid Grade Level	Flesch Magazine Category	Australian Examples	% of Bush fire risk management plans
91-100	5th	Comics	Comics	0
81-90	6th	Pulp fiction	Peter Carter Brown, 'No Law Against Angels'	0
71-80	7th	Slick fiction	Peter Carey 'True History of The Kelly Gang' Feature Story in "The Age"	0
61-70	8th–9th	Digests	Jane Downing, 'The Trickster'	0
51-60	10th–12th	Quality		2
41-50	College	Academic	Australian Financial Review	26
31-40			Scientific American	50
16-30	Graduate	Scientific	Federal Law Review	20
0-15	Post Grad		Traditional insurance policies	2

Incidentally, the reading age for the cultural heritage instructions in the model plan is FRES: 37.1/FKGL: 11.3

Figure 1: Distribution of Flesch reading ease scores of NSW Bush Fire Risk Management Plans (in %; n=111)
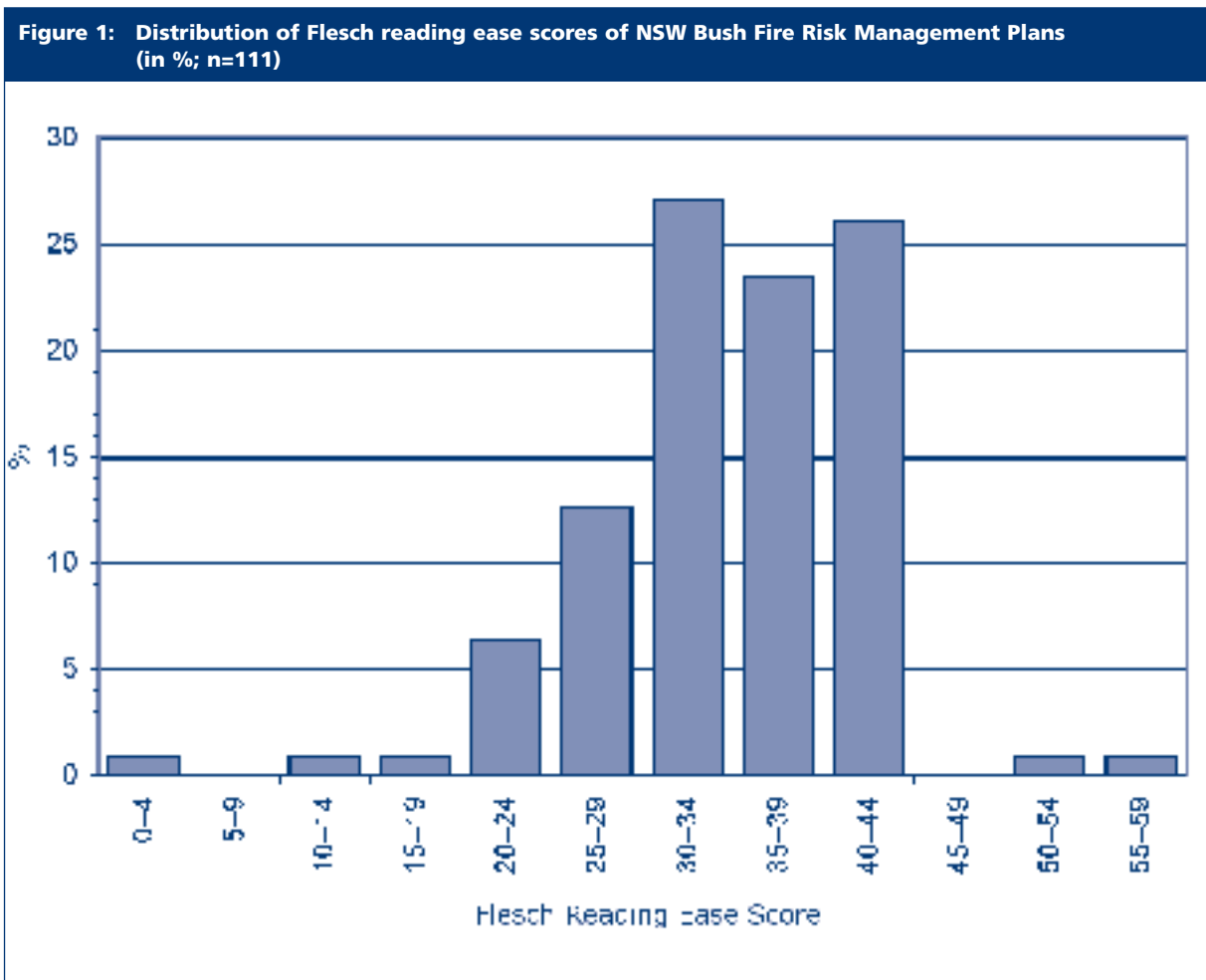
The low reading ease scores mean that sentences within the bush fire risk management plans are long, and the words long and complex, as exemplified by the following text sample:

There is evidence to suggest that the absence of fire and changing land use patterns since white settlement in some areas, has led to the proliferation of woody weed species and a resultant loss in grazing land

extract from Central Darling bush fire risk management plan. Flesch Reading Ease Score 43.5, Flesch-Kincaid Grade Level 12+.

The longer a sentence, the more ideas the mind has to hold in suspense until a final decision can be made as to what the words mean all together. When this is combined with unfamiliar terminology and jargon, increased mental work is needed by the user to understand the meaning of the content (Flesch 1949).

Using the Flesch-Kincaid formula, to be clear in intent and easy to understand a document should be written for a grade 8 education level. The majority of the bush fire risk management plans (82.9 per cent), however, was only easily understandable to a person who has had at least 12 years of continuous education, or is at the minimum 12th grade (U.S) standard (figure 1). The lowest grade level exhibited was 9.6, while the remaining 17 bush fire risk management plans (15.3 per cent) ranged between grade levels 10.4 and 11.9, all having very high (ie difficult) readability scores. The clustering of the results at a maximum grade level 12

reflects the shortcoming of the MS Word feature, which does not compute higher grade levels.

The readability scores of the bush fire risk management plans may have grim consequences for the effective implementation of the content during a disaster situation. Stress and strain, compounded with the need for immediate action can impair judgements and compromise decision-making (Rohrmann 1996; Moran 1998). For this reason, the bush fire risk management plans should be relatively easy to understand and be clear and concise. It is recommended that the optimum Flesch reading ease score is between 60 and 70 (Flesch 1949), resulting in a Flesch-Kincaid grade level score of 8 (Figure 1). At this level, the average reader is not struggling with or skipping over the content, and can easily understand the bush fire risk management plans without having to re-read sections.

The clientele

The question to be asked is whether a Flesch Reading Ease Score of 30-45 is taxing the average reader of the bush fire risk management plans? The main users of the bush fire risk management plans are the New South Wales Rural Fire Service. The Rural Fire Service has a membership of over 69,000 volunteer fire fighters, providing emergency services to over 90 per cent of New South Wales (RFS 2003). Volunteer fire fighters come from a wide variety of occupational backgrounds. A recent study of RFS Brigade Captains by Graham

Figure 2: Flesch reading ease scores and Flesch-Kincaid grade level scores for all 111 Bush Fire Risk Management Plans. The large circle represents the ideal position for the Bush Fire Risk management Plans to be positioned for ease of readability in disaster situations.
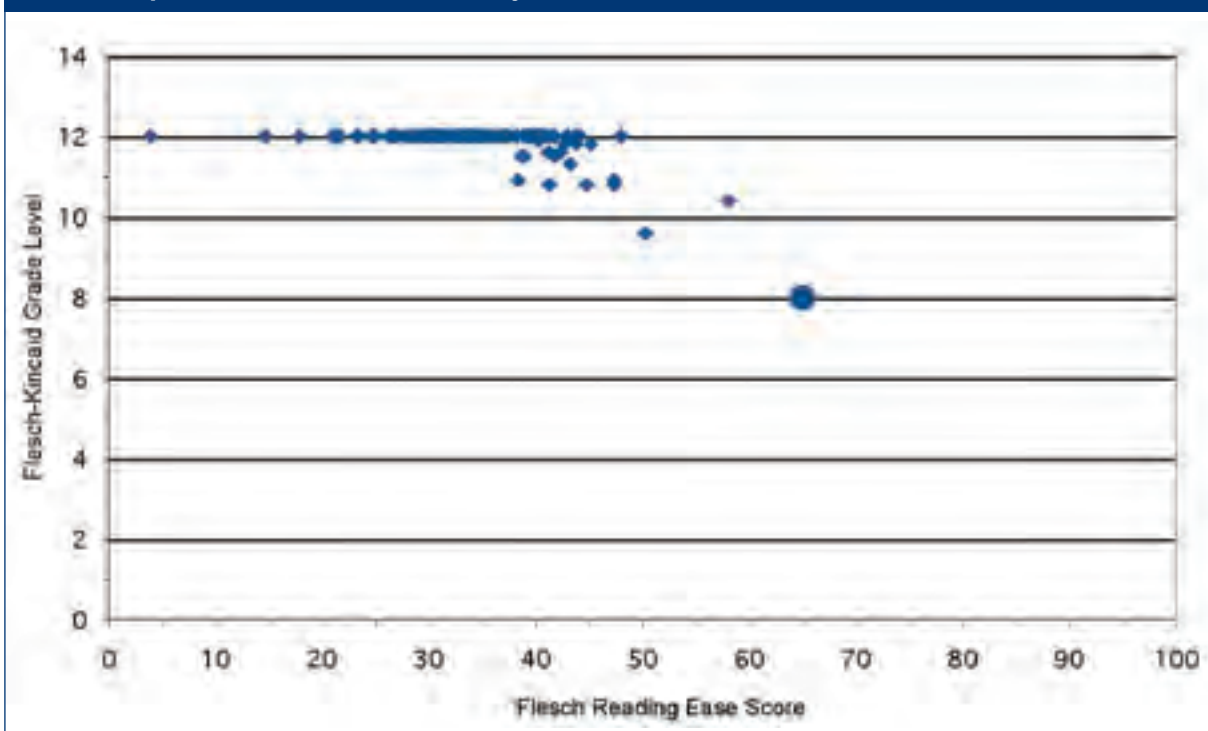
(2002) found that the prominent occupations were that of *primary producer* (48.4 per cent), and *tradesman* (12.6 per cent), thus reflecting the voluntary nature of the organisation. Although these people may be skilled in their various fields, they cannot be expected to be experts in cultural heritage management. Other users of the bush fire risk management plans are the New South Wales National Parks and Wildlife Service, Forests New South Wales and New South Wales Fire Brigades, under provisions made for coordinated bush fire fighting in the *Rural Fires Act 1997* (NSW).

A recent survey by Ryan (2001) found that 26 per cent of 154 RFS volunteer fire fighter respondents, had reached secondary school level (non-specific), 18 per cent had completed a short course, 34 per cent had reached a diploma or certificate level, and 16 per cent had completed a tertiary degree. These results, when combined with the readability of the current bush fire risk management plans, raise some interesting issues. If the results of Ryan's (2001) survey are extrapolated to represent the entire 69 000 RFS volunteer fire fighters, using the Flesch (1949) formula approximately one-third could be expected to clearly understand the bush fire risk management plans under 'normal' circumstances. The additional 34 per cent that had completed a diploma or certificate level may also be able to easily understand the bush fire risk management plans, however entry into these levels of education do not necessarily require the completion of secondary school.

Is a Flesch Reading Ease Score of 30–45 taxing the average reader of the bush fire risk management plans *under normal circumstances*? Probably not; however, 22 per cent of the plans require an 'academic' reading level which is taxing for the average reader.

Now consider the reading environment in a fire control room, where fire fighters are dealing with complex, changing situations, and where each decision made may have long-reaching impacts on the district. In such situations the recommended optimum Flesch reading ease score of between 60 and 70 becomes even more important. If the information contained in the bush fire risk management plans is held to be a necessity in a disaster situation, there is little time for the user to be struggling with the content. The bush fire risk management plans as currently written certainly appear to fail the user.

Terminology

The general readability of the bush fire risk management plans is only one consideration. To be effective in its application during a disaster event, a bush fire risk management plan should be free of complex terminology and jargon. Content analysis was chosen as the research method, as it uses a set of procedures to make sound inferences from text, in relation to the sender of the message, the message itself, or the audience of the message (Weber 1990; Babbie 2001; Neuman 2003). A systematic content analysis method was used to identify (i) terms within the bush fire risk management plan that were deemed to be technical jargon, and (ii) potentially confusing clusters of terms that represented one asset type.

The range of terminology used within and between the 111 bush fire risk management plans analysed is diverse to say the least. Many similar terms have been used to describe one asset type, while confusing jargon has been applied to situations where it is not needed.

Within the Model Plan, the overarching term *cultural assets*, defined as "areas of prehistoric or historic significance dating from Aboriginal and European occupation", has been used to signify both historic heritage and Indigenous heritage assets. This term is further broken down in the Model Plan into Places of Aboriginal Significance and Historic Heritage (see above). However, many Bush Fire Risk Management Plans have used different terms to distinguish between the two heritage types. In regard to the Historic Heritage component for example, the title has been changed to read: *Areas of non-Aboriginal Heritage; Historical Sites of post European occupancy; Other historically significant sites; European Heritage*; or even, the more generic *Cultural Heritage.*

The Places of Aboriginal Significance component has also been given a range of alternative titles such as *Aboriginal cultural heritage, places of significance for Indigenous Australians* and *Areas of Aboriginal significance*. Also of interest here is the use by 28 bush fire risk management plans of the term *aboriginal* with the lower case letter 'a'. When used in this way, the common noun refers to an original inhabitant of the land. Although the plan authors may not have intended this, and it is used through ignorance rather than denigration, the word should be used in the form of a proper noun. In this form, an upper case letter 'A' is used to signify that the term refers to Indigenous Australians, a matter about which many Indigenous Australians are quite sensitive.

This divergence from the text as set out in the Model Plan, although exhibiting individuality between the plans, may cause confusion for the user as to the meanings of the terms used.

The small variety of alternative titles used for the components of the bush fire risk management plans stands in direct contrast to the copious variety of terms used to describe the diversity of both Indigenous heritage assets and historic heritage assets within the plans. The overwhelming use of jargon is apparent in the 39 different terms used to describe specific Indigenous heritage assets. An example of this

abundance can be found in the description of scarred and carved trees, where the terms *marked tree, sacred tree* and *significant tree* have also been used in other plans.

A further example can be found in the terms used to describe Indigenous art, such as *rock art, stencil paintings, drilled and abraded outline figures* and *cave paintings.* Although the terms provide greater detail than an all encompassing term such as Indigenous art, without the addition of a clear definition describing the asset, the terms are all but meaningless; providing confusing jargon at a time when specific content is needed. One exception to this can be found in the Inverell bush fire risk management plan where the term s*carred and carved trees* is accompanied by a clear description of the assets:

Scarred and Carved Trees

The Shire contains numerous scarred trees which are trees that have had their bark/wood removed for the making of coolamons (carrying containers), shields, shelters and canoes. These types of trees can be found anywhere throughout the Shire with the exception of canoe trees that would only be found in close proximity to permanent water.

Carved trees are very rare in this area. These trees were used as burial markers and ceremonial areas. The bark was removed from the tree and markings such as diamonds and straight and curved lines were carved into its timber. Any fire may be a danger to this type of tree

<div align="right">extract from Inverell bush fire risk management plan (BFMP)</div>

In describing Indigenous heritage assets that relate to camp sites and occupation sites, a wide variety of terminologies has again been used within the plans. Terms such as *artefacts, artefact scatters, occupational deposits, isolated finds, hearths* and *shell middens* have been used interchangeably to describe much the same Indigenous heritage assets. Some confusion surrounds the use of the nonsensical term *oven mould* within two bush fire risk management plans (Albury-Hume BFMP; Corowa Berrigan BFMP), although the possible link to a third document's use of the term *oven mound* (Culcairn BFMP) suggests a possible typing mistake while copying from one plan to another, a scenario made more likely as the districts involved are geographically closely connected. Other terms such as *camp sites, food gathering localities, open campsites, fish traps, wooden Aboriginal implements, quarries* and *axe/spear grinding grooves* have also been used. Again, the majority of these terms are not accompanied by a further description of the asset, resulting in possible confusion and perplexity at the array of terms used.

When it is considered that during bush fire events, fire fighters often move between districts in cooperative efforts to control a fire, the variation of terms used within the bush fire risk management plans becomes even more important. Consistent and familiar terminology throughout the state would reduce the potential for confusion.

Perhaps the greatest variety of terminology in relation to *Indigenous heritage assets* was in regard to Indigenous association with the asset. The user of each bush fire risk management plan is bombarded with many different terms that do not result in a clear picture of the asset. Terms that seem to be influenced by archaeological assessments are common. These include *ancient human association, Aboriginal occupation, archaeological record, archaeological relics, archaeological sites, potential sites, recorded sites, known sites* and *unrecorded sites.* Although these terms may have been clear to archaeologists at the time, they are not entirely appropriate to be used within bush fire risk management plans, as the accompanying level of description of the asset is extremely low. The use of the seemingly interchangeable terms of *place, item, relic, asset* and *site* could cause another problem, as the terms may have different meanings attached to them, but are used for the same purpose within the bush fire risk management plans. With no description as to the difference between the terms, the situation is problematic at best. Terms such as *sensitive cultural site, spiritual site* and *traditional spiritual link* are complex concepts at the best of times and not appropriate in bush fire risk management plans without elaborate explanation.

The wide range of terminology used in relation to Indigenous heritage assets, is mirrored in *historic heritage assets.* Again, there is an overwhelming amount of terminology and jargon used within the current bush fire risk management plans that has potential to cause great confusion during a disaster situation. For example, a large variety of terms have been used to describe historic heritage building types. In the simplest form, terms such as *house, cottage, building, homestead, dwelling, structure* and *terrace* have been used. In regard to *hotels,* the terms *pub* and *tavern* have been used interchangeably, while specific references to building design types include terms such as *interwar, Federation, Victorian,* while other refer to the construction method, such as *slab hut, wattle and daub,* and *pisè* to name a few.

Further excessive use of terminology can be found within the Wollongong bush fire risk management plan in relation to a description of mining heritage assets.

Evidence of adits, portals, spoil dumps, machinery, tramways, ventilation shafts, pony stables, trails and inclines still remain at their original locations, particularly within the escarpment

<div align="right">extract from Wollongong BFMP</div>

The same problem is also apparent in the Kyogle bush fire risk management plan through the use of terms describing historic heritage assets from the early timber

industry. The use of the terms is again accompanied by no descriptive text other than the terms themselves, which may be of little meaning to some users of the bush fire risk management plan.

Examples of historical sites which may be damaged by fire include; stepped tree stumps remaining from early timber industry, signature trees and associated abandoned ruins, old bridges and examples of early bush craft (post and rail fence sections etc)

extract from Kyogle BFMP

Although the terms used are specific in nature, there is no additional descriptive content that better informs the user as to the meaning of the terms, and no supplementary glossary. Consequently, these terms may have no meaning to some users of the plan, and will be of no assistance in locating the assets in a bush fire situation.

An interesting variety of terms have been used in relation to the seemingly simple description of regional towns. Terms such as *village, hamlet, abandoned ruin, settlement* and *township* have been used. It is not possible to ascertain whether there is a specific difference between the terms in relation to town size or location, or whether the terms are used interchangeable and have the same meaning.

Given the plethora of terms used both between various plans and within plans, there is a need for a standard terminology that is self evident to the user, and that contains the correct level of detail required to engage in protective and preventative measures during high stress situations.

Discursiveness

The matter of accessibility of plans to the average user, however, extends beyond readability of sentence structure and the level of jargon used. Emergency management plans should be concise and to the point. There is no room for extraneous information, irrelevant content or information that is detailed beyond the requirements of the situation the plan addresses; all of this merely further complicates the already high level of readability of the bush fire risk management plans.

The content analysis of the bush fire risk management plans exposed text that was considered to be generally incomprehensible and/or discursive in its descriptions.

Any terms used to describe cultural heritage assets need to be accompanied by a description of the asset. However, the extensive use of terminology and the low reading ease of the bush fire risk management plans are further compounded by instances of discursive description and content of doubtful appropriateness:

To the south of Cessnock City, the Great North Road represents one of the greatest feats accomplished by the early settlers in opening up the Hunter region. This road shows early construction method and the hardship endured by convicts in forced labour situations. It is now a popular tourist and educational facility passing on the knowledge of NSW's early heritage. There are a number of historic buildings associated with the Great North Road such as Laguna House and the historic village of Wollombi

extract from Cessnock BFMP

The heritage of the Blue Mountains closely reflects the unique qualities and grandeur of the natural landscape. Important associations and items of heritage value lie with its role as an aboriginal meeting ground, the constraints it presented to the early settlers and in the eventual traversal of the mountains by explorers (1813), road (1814) then rail (1860's)

extract from Blue Mountains BFMP

Disaster plans should be concise and succinct in conveying information, and should not include large amounts of extraneous information, as this can serve only to intimidate the user (Gordon 2002). Of the 111 bush fire risk management plans, nine used discursive, or rambling, content when describing cultural heritage assets. Much of the content related to non-Indigenous history, settlement and use of the region, Indigenous occupation of the region, and descriptions of the geology and topography of the region. Although the supplementary content may provide background information on the development of the region and add to the understanding of significance, it is inappropriate in this section of the bush fire risk management plan. The extraneous nature of the content does not lend itself to being read and retained by the user with an immediate emergency response to organise or implement.

Perhaps more important than the presence of discursive content in the bush fire risk management plans, is the incomprehensibility of some of the text relating to cultural heritage assets. Of the 111 bush fire risk management plans, nine contained obscure content that could not be easily understood. The majority of this obscure content was in regard to risk management, planning boundaries, and Indigenous heritage asset location and management:

The less residual nature of grass fires will hopefully infer a reduced vulnerability of these sites to serious damage in a wildfire event

extract from Bega Valley BFMP

It is on Shalimar Station which is leased land in Moree Plains Shire. It is, however, geographically more closely tied to Bingara Shire and should therefore be noted and planned for by the Rocky Creek Rural Fire Brigade

extract from Bingara BFMP

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The main users of bush fire risk management plans in New South Wales are the Rural Fire Service.

Obscure content again serves as an inhibitor to the user in retaining important information. Other quite irrelevant content that is only poised to contribute to confusion and misunderstanding by the user includes references to numbers of cultural heritage assets in the region:

There are currently 42 archaeological sites registered with the NSW National Parks and Wildlife Service along the coastal strip between the south bank of the Tweed and the north bank of the Brunswick River. Of these, 26 (62 per cent) are shell middens, 8 (19%) are open campsites, 5 (12 per cent) are Bora/ceremonial grounds, 2 (5 per cent) are burials and 1 (2 per cent) is a sacred tree. Twelve additional middens and seven open campsites have been recorded at Terranora immediately north of the Tweed River

extract from Tweed BFMP

When this is compounded by the specific terms used and the absence of accompanying descriptions of the assets, the abundance of detail obscuring the message can become daunting to the user, and difficult to retain for future reference.

The need for information in disaster plans to be clear and concise cannot be overemphasised if emergency personal are to read, retain and put into practice the message the text is conveying. This is even more important when directions are given to fire brigades to reach a house fire:

A number of other pastoral station homesteads have historical importance and every effort is made to preserve them from bush fires. However, fires that start within the buildings are quite often terminal as the length of time taken by either NSW Fire Brigades or the Rural fire Service Brigades to attend the fire usually is in excess of 15 minutes due to the distances involved in travelling from the fire station to the fire

extract from Warren BFMP

The dismissive tone of the content and the use of the word however seems to imply that the responsibilities of the user are relinquished in this situation. If clear headed thinking is a requirement during a disaster situation, the content of bush fire risk management plans should not compound the situation by being ambiguous in its intent.

Implications

The observed low reading ease of the current bush fire risk management plans, the variety and use of different terms and jargon used within and between plans, and the occurrence of discursive and incomprehensible content are compounding factors which give rise to serious concern as to whether the bush fire risk management plans are actually usable documents in emergency situations. If not, then this could signify a bleak future for the protection of cultural heritage assets in disaster situations.

What is unknown at this stage, however, is whether the information contained in an individual bush fire risk management plan is clear and concise to the user of that particular bush fire risk management plan. While the bush fire risk management plans exhibit a diversity of terms and seemingly intimidating content, the content may well be regionally specific, and thus easily understandable to the user. Yet the variety of content may become problematic in situations where fire fighters from different districts, or even different states of Australia, are cooperating together.

This unfamiliarity can be overcome by the use of training, drills and mock scenarios. A brief review of current RFS training modules (RFS 2001; 2002a–d) indicates that specific information regarding cultural heritage assets is not contained in any of the modules. While practical training not reliant on training modules could

well involve cultural heritage assets, not one of the total 111 bush fire risk management plans incorporated a prescribed drill or mock scenarios with respect to cultural heritage asset protection into the framework of the planning process. This is despite the knowledge that exercising a disaster plan in the form of a prescribed drill assists in refining the information it contains, and reviews any lack of knowledge on the part of the users (Gordon 2002; Nelson 1991). In the absence of drills and 'dry runs', any shortcomings the plans may contain, and any incomprehensibility inherent in the documents, will not be detected until such time that a real event occurs.

Under the *State Emergency Service and Rescue Management Act 1989* (NSW) (as amended) training is an integral part of the operation of disaster plans. The New South Wales State Disaster Plan (Displan) (SEMC 2000) requires that emergency agencies, in developing and conducting training, are to consult with the relevant agencies and authorities with a responsibility for environmental, historical, heritage or cultural conservation, and where appropriate incorporate the agencies' concerns into training programs. The current state of information contained within the bush fire risk management plans indicate that there is clear need for training and exercising of plan stipulation if cultural heritage assets are to be adequately protected.

If bush fire risk management plans are the only source of information regarding the protection of cultural heritage assets as provided to the RFS volunteers, NPWS, State Forests and other users, then the information must be clear, concise and easily understood. Bush fire risk management plans must be easy to read and understand, so that the user is not struggling and skipping over important content. The use of familiar terms in place of technical jargon is essential if the user is to effectively retain and apply the information given. Furthermore, the information must not be extraneous or ambiguous in nature as this can only compound upon a stressful situation, when clear headed thinking is imperative to the effective implementation of the bush fire risk management plans.

Where to from here?

This paper has shown that current bush fire risk management plans exhibit a difficult level of readability, which is compounded by the use of unfamiliar and technical terms, and the presence of ambiguous, discursive and incomprehensible content. The current bush fire risk management plans are up for review, with new documents to be drawn up from 2005 onwards. This gives an opportunity to address a number of issues.

It is highly desirable that systematic process is implemented which evaluates the quality, detail and depth of plan content necessary for the implementation of bush fire risk management plans in emergency

situations. This would alleviate the issue of unnecessary and discursive content. Any discursive text and other contextual information that is not central to the bush fire risk management plan, but that fire fighting staff should know or be aware of, should be included in a separate training and background document. This document can be used by the fire services during training sessions and in sessions leading up to drills and scenarios.

The terminology needs to be uniform across the state and ideally uniform across Australia. The NSW Local Government Planning literature, for example, uses a standard set of terms that are deemed to be understood without specific need of glossaries (NSW 1980). It is desirable that the bush fire risk management plans use a similar standardised set. Any terms not included in that set, but which are deemed essential, should be explained in a glossary.

Finally, attention should be given to the level of language and the complexity of sentences used. Before plans are finalised, some measure of readability should be calculated. Moreover, it would be desirable to test the readability of a plan by exposing untrained staff to an unfamiliar document in a simulated pressure situation, querying comprehension and retention of information.

Bush fires in Australia are an inevitable natural hazard; their impacts can be minimised but never totally removed. That, however, does not provide justification for putting cultural heritage assets at risk by developing bush fire risk management plans that fall short of their potential.

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About the authors:

Prue Laidlaw is from the School of Environmental Sciences, Charles Sturt University, P.O. Box 789, Albury, NSW 2640, Australia. E-mail: plaidlaw@csu.edu.au

Dirk HR Spennemann is from the Institute for Land, Water and Society, Charles Sturt University, P.O. Box 789, Albury, NSW 2640, Australia. E-mail: dspennemann@csu.edu.au and Catherine Allan is from the Institute for Land, Water and Society, Charles Sturt University, P.O. Box 789, Albury, NSW 2640, Australia. E-mail: callan@csu.edu.au.

The main contact is Associate Professor Dirk HR Spennemann, who may be contacted at the Charles Sturt University, P.O. Box 789, Albury, NSW 2640, Australia. E-mail: dspennemann@csu.edu.au; Phone: +61–2–6051 9947; Facsimile: +61–2–6051 9897.

Relocalising disaster risk reduction in Boulder, Colorado

Ilan Kelman and Eric Karnes discuss the lessons learned in a disaster risk reduction relocalisation program in Boulder, Colorado, USA

Abstract

Relocalisation aims to return communities to a more local basis from their current, relatively centralised and transport-dependent systems, in sectors such as food, energy, and manufacturing. Disaster risk reduction can also be relocalised, in line with practices which involve local residents in disaster-related activities, pre-disaster such as mitigation and prevention and post-disaster such as response and recovery, rather than relying on post-event external assistance. Boulder Valley, Colorado, USA is one example of a community forming a non-profit, non-governmental organisation to prepare a Master Plan for relocalisation. This paper details the process undertaken and the phase 1 results from the Crisis Preparedness Group contributing to the Boulder Valley Relocalisation Master Plan. Lessons for disaster risk reduction within the context of relocalisation are discussed.

Background to Relocalisation

Disaster risk reduction, including pre-disaster activities such as preparedness and mitigation and post-disaster activities such as response and recovery, is best achieved at the local level with community involvement (e.g. Lewis, 1999; Twigg, 1999-2000; Wisner *et al.*, 2004). Top-down guidance is frequently helpful, such as in a codified form (e.g. Australia's *Workplace Relations Amendment (Protection for Emergency Management Volunteers) Act 2003*), as guidelines and a plan (e.g. UNISDR, 2005), for standardising vocabulary (e.g. Thywissen, 2006; UNISDR, 2006), or for providing resources. Nonetheless, the most successful outcomes are seen with broad support and action from local residents, rather than relying on only external specialists or post-disaster assistance.

Examples of strong community involvement in and leadership for disaster risk reduction are Townwatch (Ogawa et al., 2005), Community Fireguard (Boura, 1998), Future Search (Mitchell, 2006), and the Safe Living Program (Hennessy, 1998). Even for post-

disaster activities, many manuals suggest that people should take care of themselves for at least 72 hours without outside assistance (e.g. EMA, 2003; FEMA, 2004) although recent discussions have considered 1–2 weeks. Community teams are increasingly being trained for such purposes, such as the Community Disaster Volunteer Training Program in Turkey (http://www.ahep.org/ev/egitim5_0e.htm) and Community Emergency Response Teams in the USA (Simpson, 2001 and https://www.citizencorps.gov/cert).

To add to this portfolio of options, another approach has been developed for engaging local residents in disaster risk reduction: relocalisation. Relocalisation aims to return communities to a more local basis from their current, relatively centralised and transport-dependent systems, so that sectors such as food, energy, manufacturing, and disaster risk reduction would be minimally affected during events or conditions which reduce external links.

As with other forms of community-based disaster risk reduction, relocalisation accepts the premise that communities must be directly involved in disaster risk reduction, not relying on external assistance. Yet community-based disaster risk reduction including relocalisation does not imply excluding all external interventions. The focus, as noted above, is strong community involvement in and leadership for disaster risk reduction, not cutting off anyone and everything outside the community.

Relocalisation originated in concerns about "peak oil" and the ensuing crises from limited oil-based energy supplies. Peak oil refers to the time when the extraction rate of oil reaches its maximum and starts declining, leading to an increasingly restricted supply of oil-based energy products including petrol (e.g. Campbell and Laherrère, 1998 and Hubbert, 1956, but see Aleklett and Campbell, 2003 and Cavallo, 2004 for more recent analyses).

Consequences envisioned include reduced food supplies because lorries have limited petrol to transport supplies to supermarkets; blackouts during hot and cold temperature extremes because electricity generating plants fired by oil-based products must shut down; and emergency services being unable to respond promptly due to petrol restrictions. Social disruption is likely, as witnessed in the UK to some extent during September 2000 when fuel depots were blockaded leading to

a nationwide petrol shortage (Noland et al., 2003; Robinson, 2003). Because peak oil refers to a steadily more restricted supply, it will appear less dramatically than the fuel blockades, manifesting as a creeping change which might provide some time to adjust if warning signs are heeded.

In addition to peak oil and fuel blockades, similar energy and electricity restrictions could occur for other reasons. Examples are the four major blackouts in Europe and North America in August-September 2003, Auckland's blackout in February-March 1998, the ice storm across eastern North America in January 1998, and Hurricane Rita reducing oil supplies from the Gulf of Mexico in September 2005.

A technological breakthrough which overcomes dependence on oil-based energy products is feasible, although it would be naïve to assume that this breakthrough must happen – or that it must happen before the limitations cause crises. Relocalisation started with peak oil, but applies beyond that, to any energy-restricted society as well as to non-energy-related events and conditions.

Some commentators have criticised relocalisation as being anti-globalisation within the context of increasingly global disaster impacts and responses. This criticism contradicts the proven effectiveness of community-based disaster risk reduction efforts as referenced above. As well, the argument of increasing global disaster impacts and responses is somewhat circular in that an international disaster response and relief culture exists because comparative resources have not been invested in community-based disaster risk reduction. As one example, an Indian Ocean tsunami warning system, which would have to involved local communities to be effective, was deemed to be too expensive and of lower priority compared to addressing other threats until after the 26 December 2004 disaster (Kelman, 2006).

Relocalisation does not deny advantages of global input, such as the top-down guidance mentioned above or a perspective based on universal human rights (e.g. Kent, 2001). Relocalisation does assert, and support other complementary work, that the trend towards dependence on international response mechanisms ought to be reversed without losing the global sharing of ideas, information, and approaches for community-based endeavours.

To implement these ideas, a Relocalisation Network has started (http://www.relocalize.net) and some local groups are pursuing relocalisation plans. For example, in Kinsale, Ireland, a college project produced an "Energy Descent Action Plan" (Hopkins, 2005) while in Tompkins County, New York (Bosak, 2006) residents are developing a relocalisation plan. Neither report addresses the emergency services or disaster risk

reduction in detail, suggesting a gap remaining to be filled for relocalisation.

Relocalising in Boulder Valley, USA

In August 2005, in Colorado, USA, Boulder Valley Relocalization[1] (BVR) [sic] was founded as a local residents' non-profit group to relocalise the Boulder Valley community (http://www.boulderrelocalization.org). Boulder Valley is a loosely-defined area northwest of Denver with approximately 300,000 people scattered over approximately 2,000 km^2 of the Rocky Mountains and plains of Colorado. The largest settlement is the university city of Boulder (Figure 1) with a resident population of 95,000 (U.S. Census Bureau, 2000).

Figure 1: Boulder, Colorado.

To tackle relocalisation in Boulder Valley, BVR has undertaken five sequential tasks, which were mandated at BVR's formation:

1. Define the current reality by listing the challenges faced and by inventorying resources available for tackling those challenges.

2. Consider potential scenarios and solutions for addressing those scenarios.

3. Define an achievable vision with goals to achieve that vision.

4. Develop recommendations and pathways for pursuing those recommendations.

5. Write an open source Master Plan for independent review.

The timeframe remains flexible, but the Master Plan is expected to be completed during 2008.

BVR subgroups were formed to tackle different aspects of relocalisation, including food, energy and transport, manufacturing and employment, and crisis preparedness. Each BVR subgroup is undertaking the five tasks autonomously, but regularly reporting back to each other to enable coordination and idea sharing.

1   Being based in the USA, the group's official name uses American spelling.

The work of the Crisis Preparedness Group (CPG) to relocalise disaster risk reduction is reported here. CPG defined its mandate as "providing information on and recommending actions for preparing for crises which could result from peak oil as illustrative of relocalising general disaster risk reduction". This mandate has three advantages. First, it defines a manageable task by focusing on peak oil. Second, it highlights the dependence of many disaster risk reduction activities on oil-based energy products. Third, by using peak oil as an illustrative example of wider concerns, connections with other disaster risk reduction efforts are highlighted, indicating similarities amongst solutions.

CPG thus embraces wider disaster risk reduction (see UNISDR, 2005) and adopts UNISDR's (2006) broad definition of "disaster" as "A serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources". This definition is appropriate for longer time scales—for disaster conditions such as desertification and poverty—alongside traditional shorter time scales applying to disaster events such as from earthquakes and tornadoes (see Glantz, 1999; Lewis, 1999; Pelling, 2001; Wisner et al., 2004).

For CPG, Boulder Valley is defined as Boulder County because the existing disaster risk reduction structures are delineated by that boundary. This definition must be accepted loosely since other BVR subgroups have different definitions based on existing structures relevant to their subgroup; yet the Master Plan must integrate all aspects of relocalisation. For example, the official Boulder Valley School District encompasses a small part of neighbouring Gilpin County which could be included for school-related information campaigns. This loose definition is unsatisfactory, but must be accepted as the reality of Boulder Valley.

Crisis Preparedness Group: Phase 1 Results

Task 1: Understanding the Current Reality

The first of BVR CPG's five tasks was to understand the current reality, achieved for Boulder Valley through three actions: 1. inventorying disaster risk reduction resources, 2. identifying possible disaster events and conditions, and 3. describing disaster events and conditions which would be particularly affected by peak oil as illustrative of wider contexts and considerations. This section summarises the work completed.

For the first part of task 1, disaster risk reduction resources were inventoried. The City of Boulder and Boulder County Office of Emergency Management's primary responsibility is disaster response and recovery. Its pre-disaster activities are focused on training and

preparing for disasters, although some overlap with mitigation and prevention is seen, such as an annual public symposium on disaster awareness. Other pre-disaster activities are scattered amongst mainly government agencies. Illustrative examples from the inventory are:

- For floods, the City of Boulder's flood management program conducts flood mitigation through activities such as awareness programmes and planning regulations.

- Municipal public health departments try to prevent disease outbreaks, for example through education programmes and disease surveillance.

- Local and regional offices of the USA's National Weather Service run awareness workshops, involve local residents in weather watching, and issue weather-related warnings across Boulder Valley.

For emergency services, law enforcement is a local responsibility, although state police patrol state and federal roads plus state and federal law enforcement services can be requested for major crises. In addition to municipal police services, university land and parkland are each patrolled by its own police. Fire services are provided municipally by paid staff for city services and by volunteers or a volunteer-staff mix for rural services. State and federal forest services are involved in tackling wildfires on land which they own. Most fire services teach fire prevention as a contribution to pre-disaster activities.

Figure 2: The Boulder Fire-Rescue Dive Team is an example of the combination of volunteer and paid groups that provide search, rescue and recovery services.

For emergency medical services, Boulder Valley is served principally by a private ambulance company and government medical centres, but other services such as private medical centres also exist. Search, rescue, and recovery services are provided by a combination of volunteer and paid groups covering technical rescue specialties. The Boulder Fire-Rescue Dive Team (Figure 2), Rocky Mountain Rescue Group, and Front Range Rescue Dogs are examples. Other non-governmental organisations involved in disaster-related activities include the local chapter of the American Red Cross and the Amateur Radio Relay League.

Information on the salaries of emergency services personnel was collected. Most salaries would make it difficult to own property in Boulder Valley's relatively affluent areas, especially the City of Boulder. A challenge exists in relocalising emergency management activities, and using those resources for relocalising all disaster risk reduction, when skilled personnel cannot afford to live in the community which they serve.

In most cases, personnel rely on private vehicles to commute to work and other vehicles for work. Exceptions to vehicle dependence occur only when essential, such as parkland police and forest firefighters operating on foot because vehicles cannot reach the locations. Bicycle-based paramedics, such as in Ohio and at London's Heathrow Airport, or bicycle-based police officers, as exemplified by the Law Enforcement Bicycle Association (http://www.leba.org), are not considered to be routine[2]; however, the City of Boulder does use a few bicycle-based law enforcement officers. As well, the back-up power system for Boulder's emergency operations centre currently uses a diesel generator rather than considering non-oil-based energy supplies.

For the second part of task 1, possible disaster events and conditions which could affect Boulder Valley were listed followed by a judgment of each disaster's estimated probability (low, medium, high) and estimated consequences (low, medium, or high). This comprehensive list proved useful for extracting the disasters which would be most affected by peak oil as illustrative of wider contexts, the third part of task 1.

In the short-term, peak oil would substantially increase the cost of using motorised vehicles while in the long-term, lack of petrol and oil would limit their use. Examples are snow ploughs, ambulances, police cars, fire trucks, and aircraft. Driver and pilot training time, along with other training such as deploying rescuers from aircraft, will also have increased expense and then become infeasible. Diesel generators for hospitals, emergency operations centres, and residences could be impacted along with lack of electricity inhibiting water supplies, indoor temperature control in hot and cold weather, and communications.

Disaster events which would be particularly exacerbated by peak oil consequences were identified as blackouts/brownouts, disease outbreaks because response relies on energy-intensive health care infrastructure, drought because that would reduce the capacity of hydroelectric systems, temperature extremes, and wildfires. Disaster conditions which would be particularly exacerbated by peak oil consequences were focused on civil disorder, economic decline, and increasing poverty.

Task 2: Considering the Options

The second of BVR CPG's five tasks was to consider scenarios and solutions to the possible disasters identified. Specific scenarios based on the inventory from task 1 were summarised (Box 1). The list is illustrative, not comprehensive.

Box 1: Illustrative scenarios to consider for relocalising disaster risk reduction

- All Events Scenario 1: Fuel and oil become increasingly rationed. How should the government prioritise who gets it?
- All Events Scenario 2: No fuel or oil is available, including for snow ploughs, ambulances, fire trucks, and diesel generators.
- Event Scenario 1: Continued, lengthy blackouts or brownouts, most likely occurring during heat and cold waves.
- Event Scenario 2: An infectious disease outbreak incapacitates or quarantines more than 20% of Boulder Valley's population for more than three days.
- Condition Scenario 1: Due to reduced precipitation, water resources in Boulder Valley are half their current amount by 2050.
- Condition Scenario 2: An energy crisis is used as a basis for eroding civil liberties, especially trying to undermine Boulder Valley's referendum-mandated "home rule" status which gives some Colorado state powers to the municipality.

The illustrative scenarios helped to identify solutions. Solutions (Table 1) were more generic than the scenarios, as they need to provide a portfolio from which possibilities could be selected, rather than implying that

every solution would work for everyone all the time. Different sectors were considered for applying solutions as shown in Table 1's framework.

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2   Bicycle-based firefighting could be done, but would be less realistic due to the equipment required for firefighting and fire-related rescue operations.

Table 1: Illustrative solutions to consider for relocalising disaster risk reduction		
#	**Category**	**Solutions**
1A	Households	- Each family could be prepared to be on their own following an emergency for at least one week, plus considering contingencies such as their cache being put out of use or family members being separated at the time of the emergency. - Each family could be involved in prevention activities, such as making homes safer and relocalising their own food, water, and energy. - Community volunteerism which contributes to relocalisation could be increased, both by individuals making that choice to spend their time and by society including workplace support for that choice of increased volunteerism. - Local businesses and industries could be supported rather than, for example, multinational companies.
1B 1C	Neighbourhoods Local NGOs	- All neighbourhoods could have an effective Neighbourhood Association which is actively involved in relocalisation. - Community teams could be created and maintained which are modelled on Community Emergency Response Teams and Neighbourhood Watch, but which address relocalisation. - Neighbourhood communication networks could be developed and tested, for example a knock-on-door tree and designated amateur radio and satphone operators in each neighbourhood with appropriate spare equipment including spare batteries. - Emergency shelters could be established, stocked with supplies, maintained, and promoted in case housing is ruined. Examples are government buildings, businesses, schools, libraries, religious buildings, host programs to take in families, and temporary structures, such as tents and mobile homes (see also Corsellis and Vitale, 2005). - Neighbourhood caches of emergency kits could be established and maintained in locations such as government buildings, schools, libraries, and religious buildings. Contingencies would be needed in case those caches are put out of use.
2A	Local industries and businesses.	- Local industries and businesses could be better integrated into the community. Examples are providing volunteer resources in terms of staff time, goods, and services and/or donating a percentage of profits to relocalisation initiatives.
3A 3B	City County	- Building, land use, and planning regulations relevant to relocalisation could be promulgated, monitored, enforced, and evaluated. Examples are more stringent energy efficiency rules for buildings, denying access to many roads for private motor vehicles, and increased use of green space for growing food. - Disaster-related systems, such as emergency services, which address relocalisation could be maintained. Issues to tackle include ensuring that skilled personnel can live locally and considering alternative transportation modes such as bicycle- and foot-based emergency services in neighbourhoods. - School programmes could introduce students to relocalisation. - "Home rule" could be reinforced and strengthened.
All	All	- Public awareness messages could be increased, both in the media and in public areas such as parks, libraries, and recreation centres. - An annual Relocalisation Day could be enacted in offices, schools, and public places to reinforce messages and to provide a focus for newcomers to become involved. - Product and service dependency on the non-local energy and transport sectors could be reduced. - Supporting locally-based independent media could provide opportunities for engaging the community in relocalisation. - Off-grid energy supplies for buildings could be implemented, in particular active and passive solar and small-scale wind turbines. - Other communities around Boulder Valley and beyond could be encouraged to implement these solutions too so that they would not try to depend on Boulder Valley during a crisis.

Categories 3A and 3B are officially separate, but act together for all the disaster risk reduction activities undertaken by the City of Boulder and Boulder County Office of Emergency Management. As well, since BVR's scope is Boulder Valley, encompassing the city and county, public sector tasks should be completed at both levels in a coordinated manner. Therefore, although these categories are legally separate, they are combined for Table 1. Similarly, 1B and 1C could be separated, but neighbourhoods have limited options for acting without some form of organisation which has led to Neighbourhood Associations acting as local NGOs.

Scope exists for non-local levels to be added to Table 1, namely non-local NGOs, non-local industries and businesses, and state, federal, and international organisations. Since the tenet of relocalisation is that solutions should be implemented at the local level, non-local contributions should be implemented by Boulder Valley without fostering reliance on non-local groups, especially reliance during and after a disaster. To encourage and emphasise local solutions, appropriate non-local support should be channelled through a local category from Table 1.

Many of the solutions in Table 1 have a well-established basis to draw upon if that solution were selected. As one example, if volunteerism were chosen as a focus, then Fahey et al. (2002), Millican (1997), Howard (1999), and Reinholtd (1999-2000) provide helpful background along with special volunteer-related issues of the *Australian Journal of Emergency Management* (vol. 18, no. 4 and vol. 20, no. 4).

Task 3: Vision and Goals

The third of BVR CPG's five tasks was to articulate visions and goals for which to strive, completed by describing what should ideally be reached along with parallel, realistic statements which have a good possibility of being reached. Reaching even the achievable visions and goals will not be simple and will require detailed plans.

The ideal visions are:

- No external help is needed in a crisis.

- No reliance is placed on top-down approaches for disaster risk reduction. Instead, it starts with individuals and households and moves up, requesting top-level support when needed.

- All disaster risk reduction actions are initiated and completed within Boulder Valley, requesting external support when needed.

The achievable visions are:

- No external assistance is needed in a crisis for at least one week.

- An adequately staffed and resourced mixture of volunteers and professionals exists for disaster risk reduction including emergency response.

- All Neighbourhood Associations, including Neighbourhood Watch groups, are connected and are addressing disaster risk reduction.

- A Boulder Valley Relocalization Team Program is created, including identifying all skills and skill gaps within each neighbourhood along with a plan to fulfil needs.

The ideal goals are:

- 100% of households have an adequate emergency cache and emergency training.

- 100% of the population is trained in relocalising disaster risk reduction and implements those skills for pre-disaster activities.

- 100% of newcomers are ready for a crisis within two months of arrival.

The achievable goals are:

- 75% of households have an adequate emergency cache and emergency training.

- 75% of the population is trained in relocalising disaster risk reduction and implements those skills for pre-disaster activities.

- 75% of newcomers are ready for a crisis within two months of arrival.

- People with disaster risk reduction skills can afford to live in Boulder Valley where those skills are needed.

- Normal installation and maintenance activities factor in disaster risk reduction.

Lessons and Conclusions

Three main lessons are evident from this work. First, in Boulder Valley, disaster risk reduction activities appear to assume the availability of unlimited oil-based energy products, especially petrol and oil for vehicles but including oil-based fossil fuels used for electricity generation. This assumption should be revisited and disaster risk reduction should explicitly tackle peak oil related events.

An example is from the Boulder Valley emergency services who, in informal interviews, indicated that their operational plans include the ability to adjust their response depending on resource availability. The interviewees stated that if personnel or equipment are unable to reach a site, for any reason which could include oil restrictions, then the incident commander should reassess the resources available and adapt operations based on that assessment.

From a wider disaster risk reduction perspective, such plans are a commendable start, but it would be equally important to anticipate reasons why resources might not be available and, if possible, to counter those reasons before the emergency strikes. As illustrated by CPG's task 2 results, solutions exist to contribute towards reducing the impacts of expected disasters. Task 3 demonstrates that visions and goals can be developed to implement those solutions. These results are useful for removing the assumption of unlimited oil-based energy products from disaster risk reduction activities without losing focus on wider disaster risk reduction.

The second lesson is that implementing more generic solutions, rather than focusing on specific perils or single scenarios, can be advantageous for relocalising disaster risk reduction. Examining scenarios related to or exacerbated by peak oil led to solutions which would be helpful for, and which have been promoted for, scenarios not related to peak oil. Yet peak oil should not be abandoned. Starting from that basis, BVR has prompted more Boulder Valley residents to contribute to disaster risk reduction efforts. These contributions apply to disaster risk reduction beyond peak oil. Relocalisation is one more approach to be added to already-successful techniques of community-based disaster risk reduction.

Third, principal advantages and disadvantages of relocalisation are evident. The main advantage of relocalising disaster risk reduction is noted in the second lesson, that it reinforces the already-established approach of developing local skills and capabilities for disaster risk reduction. Relocalisation should complement, not supplant, other approaches. As also noted for the second lesson, relocalisation engages residents concerned about an energy-restricted society, placing those concerns in the context of all disaster risk reduction activities—a useful technique for motivating support for community-based approaches.

The initial focus on peak oil, though, could become a disadvantage. Disaster risk reduction and community-based disaster risk reduction are not just fossil fuel issues. A danger exists that temporarily falling oil prices, or a technological discovery overcoming some energy concerns, could cause interest to wane in relocalising disaster risk reduction if it were based on only peak oil. While peak oil is useful for initially engaging some residents, it should not be relied on to retain that interest. Instead, a wider perspective of relocalising disaster risk reduction irrespective of peak oil should be promoted.

Another potential disadvantage of relocalisation is becoming too caught up in the local community and neglecting positive external influences. As noted from experience with other community-based disaster risk reduction efforts, relying on only post-event external assistance is unhelpful, but top-down external guidance can be useful for pre-disaster activities. As well, it would be difficult for all communities to provide all forms of highly specialised medical services, so collaboration with key centralised medical centres would need to be maintained if a high standard of these specialised medical services were deemed to be important. Relocalisation must be careful not to become isolationist, exclusionist, or survivalist.

Nonetheless, an advantage to consider from relocalisation is the longer-term results of increased orientation towards one's community. Community-based tasks apply not only to disaster risk reduction, but also to other sustainability aspects. Any links forged through relocalising disaster risk reduction, even if focused on peak oil, help to lay the foundation for increased relocalisation in other sectors and thus to contribute over the long-term to more sustainable communities.

Acknowledgements

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About the authors

Ilan Kelman researches disasters, with a particular emphasis on building safe and healthy communities on small islands and in other isolated locations. He also works on disaster diplomacy, examining how disaster-related activities do and do not bring together enemy states. Center for Capacity Building, National Center for Atmospheric Research (supported by the National Science Foundation), PO Box 3000, Boulder, Colorado, 80307, USA, phone +1-303-497-8122, fax +1-303-497-8125, Website: http://www.ilankelman.org Email: ilan_kelman@hotmail.com

Eric Karnes is a writer and retired businessman. He has over 25 years of involvement as a volunteer in emergency services, specifically with a search and rescue team in North Carolina and a technical rescue squad in Colorado. In recent years he has specialized in incident command, especially in the plans and operations sections. Eric Karnes may be contacted at, 500 Mohawk Drive, Apt. 401, Boulder, Colorado 80303 USA, phone +1-303-320-9144, ektriangle@aol.com

Lessons learned from the housing reconstruction following the Bam earthquake in Iran

Dr. Alireza Fallahi recounts some of the highlights and pitfalls of Iran's participatory model of providing permanent housing for survivors of the 2003 Bam earthquake

Abstract

The worst earthquake in the last decade, hit the ancient city of Bam, in southeastern Iran, on 26th December 2003, resulting in 30,000 dead, 20,000 injured and over 60,000 homeless. The devastating 6.6 magnitude quake struck at 5.28 am local time; an hour at which almost all of the city's 80,000 residents were in bed on the Muslim day of rest. The catastrophe razed more than 80 per cent of the city to the ground. In addition, Bam's historical landmark—a giant medieval fortress complex of towers, domes and walls, all made of mud-brick—was totally destroyed. This Citadel, (Arg-e Bam), was one of the wonders of Iran's cultural heritage.

According to the *Bam Sustainable Development Manifesto*, the aim of providing permanent shelter for survivors during the reconstruction phase was to make them as independent of government aid as possible. Householders were encouraged to take an active part in the relief process. During the reconstruction period the Housing Foundation and a number of private engineering and architectural firms announced that 'the responsibility for rebuilding was for the homeless'. Each firm established processes of consultation with householders and implemented specific approaches to reconstruction based on these consultations. This method of providing shelter increased survivors' abilities to actively participate in the process of reconstruction. However, the bureaucratic paperwork process was a major obstacle to the success of these operations.

This paper is a condensed and edited version of a larger study on the relief and reconstruction process after the Bam earthquake.

Introduction

Earthquakes have been part of the world since the dawn of time. Their occurrence is inevitable. However, in contrast to the natural environment, the man-made environment needs specific disaster management in response to earthquakes. The Iranian Government is responsible for disaster management at local, state and regional levels. Disaster management is divided into two sections—pre-disaster planning and post-disaster recovery. *The Continuum from Relief to Development* (Habitat, 1994) defines the phases of these two sections as: preparedness, mitigation, prevention, relief and rescue, rehabilitation and reconstruction.

Earthquake response includes activities that take place during or after an earthquake and is designed to provide emergency assistance for victims, providing shelter and repairing lifeline infrastructure and networks to stabilise the situation and reduce the probability of secondary damage (for instance, preventing secondary damage to the gas supply or shutting off a contaminated water supply, etc.) (Blaikie 1994). In the rehabilitation and reconstruction phases, shelter provision is the most important activity in helping the homeless population.

Iran is an earthquake-prone country and has experienced a number of devastating earthquakes over the past decades. The Iranian Government has developed a strategy to meet the needs of disaster victims by undertaking a participatory approach to rebuilding damaged areas. This community based approach is used to respond to community shelter needs in a more effective way.

Methodology

A review of the past four decades of implemented housing reconstruction projects in Iran reveals that the houses provided in new settlements have only been partially successful in meeting peoples' rebuilding needs (Razani 1984, Parsa 1985, Rafyie and Niroomand 1986, Zargar 1988, Fallahi 1996).

Analytically-based social studies of the housing of affected communities after earthquakes have generally been less studied than technical issues. This deficiency is consistent with the view of several scholars, who have stressed the importance of periodical assessments of the impact of post-disaster reconstructions and of monitoring the occupiers' attitudes towards their dynamic reconstructed environments (Aysan 1987).

A preliminary review of the literature raises a number of important questions about post-earthquake housing programs, including:

- How successful are the investigations into safe buildings?

- How suitable are the permanent houses that are provided by the government or other agencies for the accommodation of the homeless?

- To what extent are the resettlement projects acceptable to the people they house?

- Do the houses provided meet the needs of their occupiers?

- If they are built to be safe in future disasters do they remain safe?

(Aysan 1987: 4-5)

The importance of these issues continues to be discussed, with an emphasis on community involvement in post-earthquake housing as *a central element in recovery* (Habitat 1994: 2, Kronenburg 1995: 19).

This study analyses the process of providing shelter in a zone with 100 per cent damage around the City of Bam in Kerman Province. Access to all reconstructed settlements was somewhat limited due to restrictions of time, cost, and climatic conditions; however, outcomes deemed to be significant were attained.

To obtain information for analysis and examination, the following methods were used:

- a review of bibliographical sources and documents;

- the undertaking of unstructured interviews with policy makers and researchers involved in the process of providing shelter after the earthquake;

- conduct of a field survey; and

- direct personal observation and informal communication.

National disaster management system in Iran

Under the Ministry of Interior, there are three organisations that play important roles in disaster management and reconstruction: the Bureau for Research and Coordination of Safety and Rehabilitation Activities (BRCSR), the National Disaster Task Force (NDTF) and the Housing Foundation (HF). The BRCSR conducts research on safety measures; formulates preparedness and mitigation plans; and collects, analyses and disseminates information on disaster management. The NDTF is an inter-organisational body chaired by the Ministry of Interior, whose activities vary during different phases following disasters. The Housing Foundation (HF) is a revolutionary council and semi-autonomous agency. Amongst its legal responsibilities, reconstruction after disasters and rural development are predominant.

The Housing Foundation is the government's implementing arm for the construction and reconstruction of damaged houses. With its headquarters in Tehran and more than 100 branches in the country, it maintains rural development activities consisting of planning and implementation, regional planning, research and development, post-disaster reconstructions and the improvement of buildings. Due to past earthquake reconstruction experiences, rebuilding of housing in Bam was to be carried out as a collaborative effort, with the participation of the owners, community assistance, support of banks and free technical and engineering services from the government through the Housing Foundation.

Bam earthquake

The ancient City of Bam, in Kerman Province, is said to be the doorway to Iran from its eastern border. The weather in the region is hot in summer and cold in winter. Most houses are of mud and dried brick construction and are vulnerable to earthquakes (Fig 1). However, in recent years, a number of so called 'urban buildings' have been constructed using metal, brick and reinforced concrete.

The main source of income of the population is administrative and small business. However, most of the people are engaged in agricultural activities. Dates and oranges are the most well-known agricultural products in Iran and date trees are scattered throughout the city (Fig 2). Bam residents believe that "Bam is nothing without its date orchards". The residents value land ownership as part of their family heritage. This means that land is not only a source of income but also a part of family identity and characteristic. As a result, many inhabitants consider land more important than housing.

'New Bam' has been developed over the recent years as an industrial zone, 10 kilometers away from the City of Bam. There are a number of automobile and packaging factories in this new area.

In terms of socio-cultural aspects, the people of Bam are mainly well educated. However, many of younger generations have already migrated to nearby cities or abroad.

The Bam earthquake with a magnitude of 6.6 on the Richter Scale occurred at 5.28 am on 26th December 2003 and caused considerable human and financial loss in the region. More than 30,000 people were killed, 20,000 were injured and over 60,000 left homeless. Almost 80 per cent of Bam was ruined. It also caused considerable loss to lifeline infrastructures, such as the water supply network, power lines and also health care centres, educational buildings, cultural centres, and other cultural heritage (Fig 3). The epicentre was approximately 10 km to south-west of Bam. Damage was concentrated in a 16 km radius around the city, which is famed for its 2,500 year old citadel *Arg-i-Bam*. In terms of human cost, the Bam earthquake ranks as the worst recorded disaster in Iranian history.

Fig 1: Bam before the Earthquake.

Fig 2: Residents believe that Bam is nothing without its date palms.

Fig 3: Epicentre of the Bam Earthquake and examples of the devastation.

Response to the earthquake

Despite the enormous devastation caused by the earthquake, the response of and cooperation between the Iranian authorities, Iranian Red Crescent Society (IRCS) and the international community was swift and exemplary (United Nations 2004). Various government agencies including the Ministry of Interior, Ministry of Health, the Army and the IRCS launched a massive rescue and relief operation. Nearly 12,000 people were airlifted and taken to hospitals in other provinces. The IRCS mobilised 8,500 relief volunteers. The provincial government set up a six-member committee chaired by the Governor-General of Kerman to coordinate the relief efforts. In addition, all sections of Iranian society came together to help the affected people. (National Report of the Islamic Republic of Iran 2005).

More than 1,600 search and rescue, health and relief personnel from 44 countries arrived in Iran to assist in the rescue and relief operations. Within hours of the earthquake, the UN dispatched its Disaster Assessment and Coordination Team (UNDAC) to support the Iranian Government in coordinating this enormous international response. The UN Country Team and UN agencies provided relief items as well as technical support. The International Federation of Red Cross and Red Crescent Societies (IFRC) and various Non-Governmental Organisations (NGOs) set up field hospitals and distributed food items and blankets (United Nations, 2004). Tents, as emergency shelters, were distributed among the homeless right from the early days (Fig 4).

Fig 4: The IFRC and various NGOs set up field hospitals, distributed food items, tents and blankets in the emergency phase.

Classification of building damage was done using aerial photography. By using a pre-earthquake image, the location of individual buildings was registered on a GIS and city blocks surrounded by major roads were marked. This was then compared with a post-earthquake image. Then visual inspection of building damage was conducted. By this method, buildings were classified from Grade 1–5.

A total 12 063 buildings were classified:

- 1,597 Grade 1 and 2;
- 3,815 Grade 3 – buildings surrounded by debris;
- 1,700 Grade 4 – partially collapsed buildings, and
- 4,951 Grade 5 – totally collapsed buildings (Fig 5).

Fig 5: Damaged houses such as this one were classified on a grading system from 1-5.

Rehabilitation and reconstruction phases

In an immediate response to the needs of the earthquake stricken people of Bam, the Housing Foundation (HF) took action to provide temporary shelters for the homeless. Some 16 Assisting Headquarters from provinces around the country were established in Bam. Ten of these Headquarters were situated in the City of Bam and six were located in rural areas. The HF started a program for removing debris of about 19,000 houses in the city and 4,000 in rural areas. Until the end of April 2004, most of the survivors received temporary accommodation consisting of prefabricated units with an area of 18–20 square meters, equipped with water heater and air conditioning. (Fig. 6) (Havaii and Hosseini 2004: 229).

The reconstruction strategy

The Iranian Government set up a Guiding Office for the Recovery of Bam (GO), consisting of 11 members and with the Minister of Housing and Urban Development as its head. One of the most important decisions made by the GO was to appoint consulting architects to review and analyse a comprehensive urban design and planning of the City of Bam.

Fig 6: Temporary shelters on individually-owned plots of land (top) and pre-fabricated camp cities (bottom).

The priorities that they identified for the Bam reconstruction program are as follows:

1. Removing the debris in the city and suburban villages

2. Reconstructing the city in its original location, observing local architecture

3. Reconstructing damaged residential and commercial units through:

   - Householders participation in rebuilding

   - Providing people with the necessary facilities and information about construction technology

   - Promoting regional construction quality

   - Inviting academics, consulting engineers and contractors to render technical services, including design and implementation

   - Inviting construction material suppliers to set up plants to meet the material needs and supervision

   - Establishing a workshop and exhibition area for offering technical and engineering advice and services to householders

   - Preparing the sites for mass residential construction complexes in areas where individual units cannot be built due to technical reasons

   - Employing local people for reconstruction with the aim of creating job opportunities

   - Setting up a Bam Council of Architecture and Urban Development to lead architectural and urban development process

4. Inviting appropriate organisations to offer proposals on reconstruction with the aim of regional development

5. Utilising international aid (foreign loans) for implementing development plans on infrastructure and public services

6. Authorising the Ministries of Agriculture, Energy and Industries and Mines, to reconstruct their own sectors

7. Introducing qualified people to banks through the Housing Foundation to receive financial facilities

Government responsibilities	Affected people responsibilities
Free of charge and long-term bank loan	Construction management
Technical assistance	Design, consultation, implementation
Preparing plans and designs	Participation in the process of decision making and planning
Construction materials and other resources	Choice to accept or reject the proposed plans
Supporting of vulnerable families	Training programs

The table above summarises the responsibilities of the affected people and the government.

Council of architecture and urban development

The Council of Architecture and Urban Development (CAUD) consisted of eight distinguished members, including businessmen, academics, architects, engineers and members of the Housing Foundation. This Council outlined the measures and guidelines for rebuilding houses as well as the urban design of the City of Bam.

The CAUD approved the amount of credits and bank loans for each individual household and business unit. They also made decisions regarding the allocation of loans for the fencing of gardens, surrounding walls, and the reconstruction of schools that had already been approved. In terms of temporary housing, some 30,000 units were built in Bam. These houses initially were supposed to be built in camps. However, by consulting with survivors, most units were erected on the sites of damaged houses or within the same plots of land where houses were located prior to the earthquake. Most of newly reconstructed units were reinforced steel structures.

Bam sustainable reconstruction manifesto

One of the policies proposed by the CAUD was the Bam Sustainable Reconstruction Manifesto. A Committee on Sustainable Development consisting of academics and experts in reconstruction was set up to develop the manifesto. Three of the principles in this master plan for sustainable reconstruction and development in Bam were:

a) preserving the city identity in urban design,

b) strengthening the new houses against the national building code, and

c) householder participation in the process of rebuilding.

Community participation was suggested in various aspects of physical, environmental, social and economic issues, as well as, improving living quality in Bam without affecting later generations (The Committee on Sustainable Development 2004).

It was decreed that survivors and householders should not be looked upon as "desperate condemned people" but "cooperative active actors" in the process of designing, planning and implementing their own houses. In other words, local people should be involved in the process of reconstruction planning and its execution. Such integration would pave the way for training people to acquire new skills and reviving their spirits.

Community, designers and contractors interaction

In the City of Bam, community active participation in the process of designing, planning and constructing units was strongly encouraged. This approach provided a great relief to peoples' pain and suffering and helped to mitigate their psychological pressures (Fig 7). In addition, research has shown that the lower the level of participation rates of recipient individuals in the reconstruction process, the lower the level of satisfaction rates of the resultant relocation and shelter (Fallahi 1996). In the case of Bam, householders were given the ability to choose their own plans and layouts and act as the supervisors of their own projects, thus paving the way to establish a line of cooperation between designers and contractors. This approach also ensured that government loans resulted in the desired houses being built for the people.

The HF invited designers, practitioners, and contractors to Bam and provided them with construction materials and an allocated site. These private enterprises erected

Fig 7: Community, designers and contractors in consultation inside the mosque of Bam.

and displayed their designs as life-size exhibition units and shared their technical knowledge of safe building with the people. Their building designs were approved and certified by the HF against a number of criteria, including that the design:

- should be resistant against future earthquakes,

- must be economically viable,

- must be suitable for the climatic and environmental situation,

- should be culturally familiar to the local people, and

Fig 8: Exhibition of proposed new houses.

- should be easy to repair and construct with available local expertise and materials (Fig 8).

This established an interaction between the community, designers and contractors. People expressed their needs and designers attempted to sketch plans for these requirements. This process continued until the householders were satisfied with the plans. Although householders were free to select their designers and contractors, a framework agreement form was developed between the contractors and the reconstruction committee within the Housing Foundation branches. The reconstruction committee supervised the process of technical and legal agreements between communities, designers and contractors.

In this process, people were encouraged to fully participate in all stages of rebuilding their houses. In addition, the Civil Engineering Society Organisation of the Province was tasked to supervise the process by sending architects and engineers to the areas of reconstruction. At the same time, the Building Materials Quality Control Committee had the responsibility of making available soil mechanics laboratory and building material testing equipment (Fig 9).

Survey results

Most disaster research is conducted by outside scholars from industrial communities, while most disasters occur in developing countries (Cuny 1992). It is accepted that direct objective observations will often be required; however, 'intimate local knowledge is essential' (Casley and Lury 1987: 2). Aysan and Davis (1993:9) acknowledge this limitation of an 'academic view', and suggest that to 'balance this bias' work needs to be carried out with local counterparts, for 'virtually all fieldwork and consultancy'.

In the case of Bam, both qualitative and quantitative analysis techniques were employed with benefits flowing from the advantages of each method. Opposite is a summary of findings and survey results:

Fig 9: Exhibition site for construction materials and architects offices in Bam.

A summary of survey results	
General characteristics of householders	Most of the householders were over 35 years old, and more than half of them were farmers or shepherds holding areas of land on their own. Nuclear families were the highest percentage of households. The average number of people in a dwelling was 5. More than half of the respondents were literate.
Pre-earthquake housing condition	Housing was often planned by family members and built by a local builder. Materials were mud brick, metal beam, and some concrete and cement. Most houses were connected to electricity and piped water.
Process of providing emergency and temporary shelter	**1 – Emergency shelter:** A high percentage of the respondents received tents and lived in them for more than three months. These shelters created a number of problems. More than half of the respondents erected their emergency shelters on a plot of land. **2 – Temporary shelter:** A high percentage of householders built temporary shelters with financial and material assistance on their land. The average area of these units was 18 sq. m. However, a number of families who owned no house were located in pre-fabricated units in camp cities.
Process of providing permanent shelter	**1 – Design:** A high percentage of householders designed and planned their permanent shelters with free advice from architectural firms. **2 – Technical advice:** More than half of the householders participated in providing their permanent shelters, however all plans were checked to the building code **3 – Construction materials:** Most householders used concrete ceilings and metal structures. **4 – Community participation:** The task of reconstruction was carried out mainly by cooperation between householders, contractors and designers. The Housing Foundation supervised this interaction **5 – Administrative process:** Administrative paper-work was a major obstacle to rapid construction and active householder participation. For instance, householders needed to fill out nine sets of documentation to approve the quality of the building foundation. **6 – Priorities in reconstruction:** The urgent priorities for reconstruction were seen differently by survivors and interveners. For example, to the intervener, the priorities were, respectively: 1) house, 2) school, 3) water for land and drink. However, it soon emerged that watering date orchards was the most urgent task in the recovery phase. In addition, while providing permanent houses took a great amount of the reconstruction budget, a number of people lived in their temporary shelters for more than two years. In fact, a number of families found the temporary units much better than their damaged units and thus were not very interested in building a 'permanent' house. It seems that the amount of investment on temporary units was too high. Lessons learned from this are that the authorities should consider the pre-earthquake housing situation and spend less for intermediate units, as they are only temporary shelters.
Degree of householders satisfaction	In general, householders who rebuilt their houses on their own land were more satisfied than those who were relocated.
Physical aspects of the new houses	**1 – Strength of house:** More than 90 per cent of the householders were happy with the solidity of their new houses. **2 – Quality of materials:** Most of the survivors were satisfied with the materials used in their new buildings.

Conclusion

The reconstruction of Bam was seen by the Housing Foundation as a social task rather than merely a physical operation. This official view was a major advance in disaster reconstruction policy in Iran. In addition, the Committee on Sustainable Development which was appointed to develop the reconstruction program proposed three principles in the master plan for sustainable reconstruction and development in Bam, including: a) preserving the city identity in urban design, b) strengthening the new houses against the national building code, and, c) active householders participation in various aspects of physical, environmental, social and economic issues (Fig 10). This approach differed from previous programs in that it incorporated a number of lessons from the past.

More time and research will be needed to fully evaluate the Bam housing reconstruction program (Maskrey 1994: 120). While there are many reasons why the current investigation of the householders' attitudes towards the reconstruction has validity, it should be perceived as a first evaluation and the initial step toward future research, particularly in the same area and about the same concerns.

The data analysis shows that the financial and construction material aid from the Housing Foundation on the one hand, and the survivors' participation in the process of rebuilding on the other, were two important factors contributing to the success of the Bam reconstruction program. However, although the local people were the main resource for any reconstruction operation, their importance was often overlooked by interveners. For example, while the householders were free to design their houses, training in the acquisition of new building and design skills was not generally available.

The critical importance of offering training in building safety techniques has been emphasised for both mitigation and reconstruction programs. However, an important factor is the improvement of overall local

construction techniques. In this sense, the objectives of disaster operations and innovation should be linked through community participation. Active survivor participation in housing leads to operational cost and time reduction, and can reduce the negative psychological impact of earthquakes. However, analysis of the field survey and on-site observations at Bam have also shown that, although the survivors were involved in the process of reconstruction, the program was deficient in providing householders with training in new forms of building safety. In other words, while evidence indicates a positive relationship between the degree of householders' participation and the general success of the program, the actual improvement of local building knowledge was limited.

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Fig 10: Reconstructed houses in Bam after less than two years.

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About the Author

Dr Alireza Fallahi gained a PhD degree from Sydney University in 1996 and for five years, worked in the disaster area in Australia. He now heads the Research Department in the Faculty of Architecture and Urban Planning at the University of Shahid Beheshti, Tehran-Iran. The university has recently established two post-graduate courses within the Faculty entitled Post-Disaster Reconstruction and Disaster Management. Dr Fallahi is currently directing the joint *Earthquake Risk Preparedness in Historical Districts of Bam* project with UNESCO in Tehran.

For a full copy of the report, Dr Fallahi may be contacted by e-mailing a_fallahi@yahoo.com

Strengthening linkages between land-use planning and emergency management in New Zealand

Saunders, Forsyth, Johnston and Becker highlight the importance of the CDEM Act in New Zealand in promoting natural hazard risk reduction

Abstract

Fifteen years on from the inception of the Resource Management Act 1991 (RMA) in New Zealand, many councils are now, or will be, undertaking a review of their plans and policies. This review time, which results in second-generation plans, allows for policies to be reviewed and amended, deleted, or added as required. In 2002 the Civil Defence Emergency Management Act (CDEM Act) was enacted, and supports natural hazard reduction measures, primarily through the RMA framework. With many legislative requirements for planners to consider during the plan review process, this paper highlights to planners how important the CDEM Act is in promoting natural hazard risk reduction, and how measures under the CDEM Act need to be supported under the RMA planning framework. When CDEM Group Plans are reviewed in a couple of years' time, it is equally important that RMA planners are involved, and that policies under the two pieces of legislation complement, rather than contradict, each other.

This paper provides a brief overview of the RMA and CDEM Act. A framework is introduced showing how the CDEM Act and RMA can work together in supporting policies to reduce the risks from natural hazards. Several case studies provide examples of how linkages can be strengthened, and the importance of strengthening the relationships between policy planners and the emergency management profession.

Introduction

As natural hazards continue to inflict disastrous impacts on society, there is a new focus from government to community level to find better ways to manage these risks. Research has shown that disaster losses can be reduced in communities that have sound planning and decision-making (Lindell and Prater, 2003). Tools available to communities include: 1) risk assessments; 2) building codes and standards; 3) land use planning; 4) land and property acquisitions; 5) taxation and fiscal policies; 6) emergency management measures; and 7) public education (Burby et al., 2000). These tools are most effective when all stakeholders are engaged in the decision-making processes (Ronan and Johnston, 2005). Britton and Lindsay (1995) describe *"a compelling need for a closer integration between disaster and city planning"*. Burby (1998) takes this point further, stating that collaboration must extend beyond government to embrace professional groups, non-governmental citizen groups, and private citizens. He goes on to say: *"Critical to all of this is fuller understanding of sustainability so that the concerns about the use of land in hazardous areas … are shared widely … so that consensus begins to form about appropriate courses of public and private action"* (Burby, 1998).

The purpose of this paper is to highlight how the philosophies of the New Zealand Civil Defence Emergency Management Act 2002 (CDEM Act), in particular reduction measures, can be transferred into the resource management planning context, with the ultimate goal of reducing the effects of natural hazard events on communities. The strengthening of these linkages will result in increased community resilience, as the risk to communities from hazard events is reduced. Within the existing resource management climate in New Zealand, many Regional Councils are, or will be, reviewing their Regional Policy Statements (RPS). This review process provides an opportunity for stronger linkages with CDEM measures to be incorporated into planning practice.

The Resource Management Act 1991

The RMA is the key piece of environmental legislation in New Zealand. Effects-based, its purpose is to promote the sustainable management of natural and physical resources.

Under the RMA, both regional councils and territorial authorities have responsibilities associated with natural hazards. Sections 30 and 31 (functions of regional councils and territorial authorities) reflect that natural hazards are best managed at a regional council level, with the actual or potential effects managed at a territorial authority level.

The RMA does not prescribe how development in hazard-prone areas is to be managed. Rather, the intention is to allow for the development and adoption of a mixture of measures to support the RMA's single purpose — the sustainable management of natural and physical resources. Therefore territorial authorities may manage natural hazards by using the following tools (Ericksen et al., 2002):

- Subdivision and building consents (through the RMA and Building Act 2004);

- The district plan (through identifying hazards as required by s35, educating people as to the risks, provision of financial incentives, land use controls, and engineering works);

- The implementation and maintenance of hazard registers; and

- Resource consent applications.

At the top of the regional planning hierarchy is the Regional Policy Statement (RPS). The RPS provides an overview of the resource management issues facing the region, sets region-wide objectives and policies, and identifies the methods to be used across the region to address the objectives and implement the policies. As the RMA was legislated in 1991, RPS's do not take into account the CDEM Act requirements at this stage. However, with many councils reviewing their plans in the coming year, there is an opportunity for CDEM requirements to be incorporated into these second-generation RPS's.

District and regional plans are one of the most important aspects of the RMA. The RMA states that councils have to prepare plans to help them manage the environment in their area. These plans tell citizens what they can or cannot do, or whether consent is required. Regional plans tend to concentrate on particular parts of the environment, such as the coast, soil, a river or the air. They set out the management of discharges or activities to prevent the resources being degraded or polluted. District plans concern the use and development of land and set out the policies and rules a council will use to manage land use in its area. By looking at these plans, landowners are able to find out whether they need to get a resource consent for the activity they want to do.

When central government wants to give local councils direction on environmental issues, it can issue National Policy Statements or set National Environmental Standards. This planning framework is shown in Figure 1 below. To date there is no National Policy Statement or Environmental Standards for natural hazards.

Figure 1: Planning framework under the RMA 1991 (Ministry for the Environment, 2006).

The Civil Defence and Emergency Management Act 2002

The Civil Defence Emergency Management Act 2002 (CDEM Act):

- promotes sustainable management of hazards

- encourages and enables communities to achieve acceptable levels of risk

- provides for planning and preparation for emergencies (readiness and reduction), and for response and recovery

- requires local authorities to coordinate planning and activities

- provides a basis for the integration of national and local civil defence emergency management

- encourages coordination across a wide range of agencies, recognising that emergencies are multi-agency events.

The CDEM Act requires that a risk management approach be taken when dealing with hazards. In considering the risks associated with a particular hazard, both the likelihood of the event occurring and its consequences must be considered. As part of the comprehensive approach to civil defence emergency management (CDEM), all hazards, not only natural hazards, must be taken into consideration. The primary goal for communities is to be self-reliant. Communities should aim to reduce the likely impact from, prepare for, and be able to respond effectively to, emergency events on their own. To encourage this, regional cooperation and coordination are paramount and form one of the cornerstones of the Act.

Under the current CDEM philosophy, the '4-R's' (reduction, readiness, response, recovery,) are critical components of the comprehensive emergency management approach (MCDEM, 2002):

Reduction

- Identifying and analysing long-term risks to human life and property from natural or man-made hazards;

- taking steps to eliminate these risks where practicable and, where not, reducing the likelihood and the magnitude of their impact.

Readiness

- Developing operational systems and capabilities before an emergency happens. These include self-help and response programmes for the general public, as well as specific programmes for emergency services, utilities, and other agencies.

Response

- Actions taken immediately before, during or directly after an emergency, to save lives and property, as well as help communities to recover.

Recovery

- Activities beginning after initial impact has been stabilised and extending until the community's capacity for self-help has been restored.

For the purpose of this paper, the focus is on those land use reduction measures that can be achieved through the RMA framework. Reduction considerations are included within the CDEM Act, the National Strategy, National Plan, and some CDEM Group Plans. The National Strategy consists of Goals, Objectives, Targets and Outcomes, and Actions. Goal 2 of the Strategy is "To reduce the risks from hazards to New Zealand". There are four objectives (A-D) under this goal, two of which are directly relevant to land use planning. Objective C is to "Encourage all CDEM Stakeholders to reduce the risks from hazards to acceptable levels". The objective acknowledges that land use planning does play a role, and the reader is directed to the Quality Planning website managed by the Ministry for the Environment for planning issues and best practice techniques. Objective D is to "Improve the coordination of government policy relevant to CDEM". It does not state what policy or legislation should be considered, or which central government agencies should be working together.

While reduction is included in the National Strategy, the National Plan is predominantly an operational plan, with comparatively little guidance on reduction compared with the other 3 R's. The Guide to the National Plan acknowledges this, and does provide some guidance on where reduction measures can be incorporated outside the CDEM framework. An example of this is shown in Figure 2 over page, which presents the operational side of the National Plan framework, with the linkages to reduction on the left hand side.

Reduction is shown to be included in other central government policies and local RMA plans, however these links need to be strengthened. There is no further guidance provided on how reduction is included through the RMA; how it is implemented through the Building Code, GeoNet[1] and hazards research; nor how regional or district plans can play a role.

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1 GeoNet is New Zealand's geological monitoring project, which provides real-time monitoring and data collection for rapid response and research into earthquake, volcano, landslide and tsunami hazards (www.geonet.co.nz).

Figure 2: Relationship of the National CDEM Plan to the CDEM Act, National CDEM Strategy, CDEM Group plans, and other agencies' operational plans. Readiness, response and recovery planning and activities also link to more broadly based risk reduction policies and programmes at the national and local levels (MCDEM, 2006).

Reduction measures are incorporated within the Guide to the National CDEM Plan again when it presents the structure for CDEM Groups (see Figure 3). While reduction is mentioned on the right, the diagram does not explain who is responsible for hazard and risk reduction, or how this risk reduction is achieved.

To promote reduction measures, the authors propose a framework to show how reduction measures can be incorporated into the RMA planning framework.

A framework for strengthening linkages

From anecdotal evidence, it appears that the planning processes of both the RMA and CDEM Act regarding reduction measures currently work somewhat in isolation to each other, or in 'silos'. Resource management planners have little understanding of the reduction requirements under the CDEM Act, how they have a part to play under the RMA, and vice versa. To strengthen the linkages, a framework has been developed to show where linkages between the RMA and CDEM Act processes can occur (see Figure 4). It outlines the legislative framework of both pieces of legislation, with key statutory and non statutory documents included.

Colour-coded, it shows the hierarchical role of central government documents, regional council/regional CDEM group documents, and district council documents. At the bottom of the framework are non-statutory planning tools, which include plans made at both regional and district level. These plans, while being produced under the RMA and CDEM Act to fulfil responsibilities, also serve to improve statutory documents by informing the future direction of land use and mitigation measures. Therefore the double arrows indicate information flowing between documents – each influencing the other.

From the framework it can be seen that the key reduction linkage between the two pieces of legislation is from CDEM Group Plans to Regional Policy Statements. The inclusion of reduction measures in a RPS ensures that those policies will be included in regional and district plans, as these plans must give effect to RPS's, and district plans must not be inconsistent with regional plans. From CDEM Group Plans, reduction measures are influenced by research and associated reports. These fall into the category of non- statutory planning tools, and can link into other plans (for example, hazard mitigation plans can influence growth strategies) by highlighting specific hazard areas, such as flood zones.
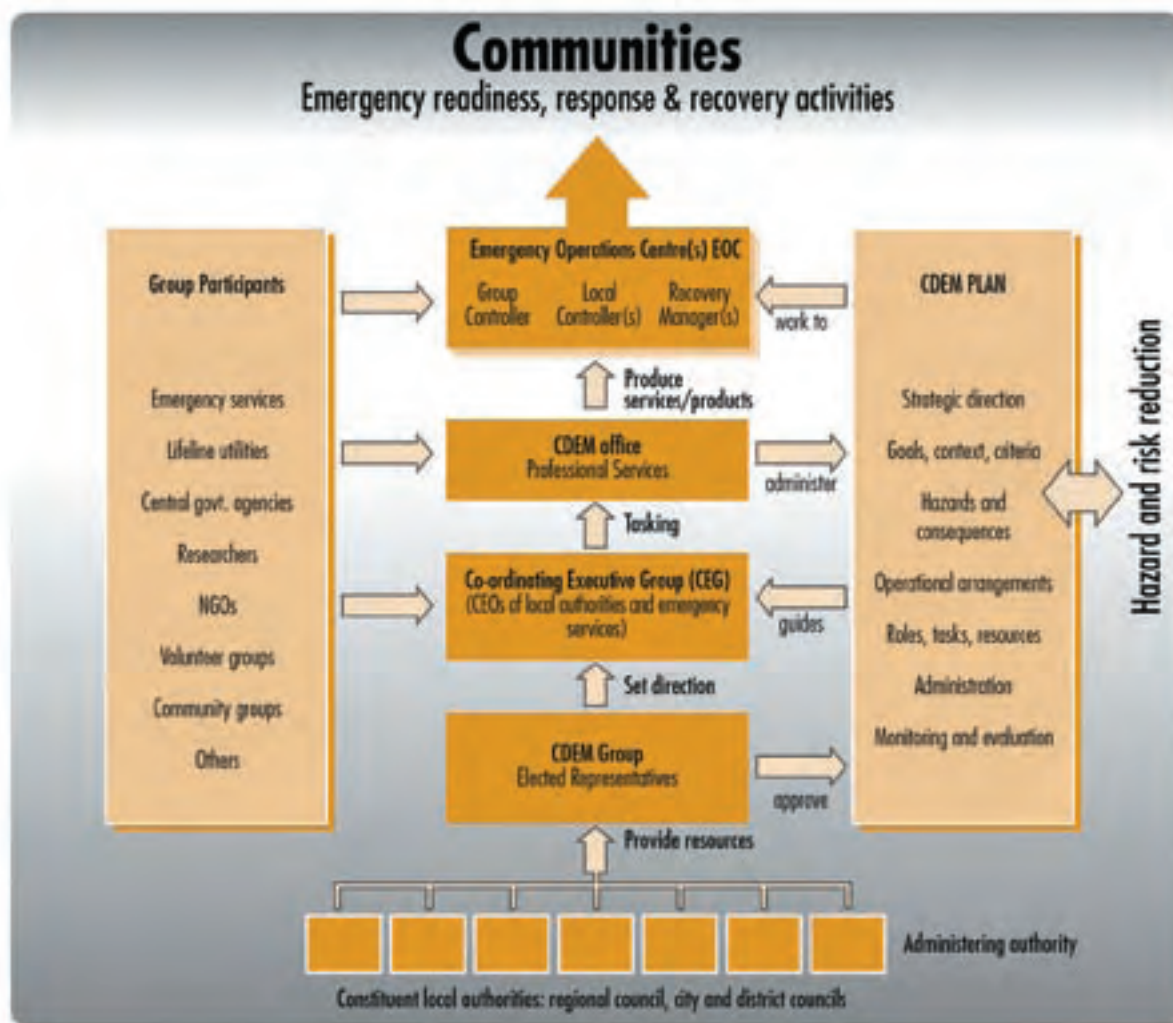
Figure 3: CDEM Group Structure (MCDEM, 2006).

The relationship between the Group Plans and RPSs is extremely important, as it is through this level of planning documents that successful reduction policy can be achieved. While not all Group Plans have reduction measures included, those that do can influence RPS reviews to incorporate more reduction measures. This also works in the other direction – CDEM Group Plans are due to be reviewed in approximately two years time, and planners/emergency management officers can ensure that policies in the RPS are incorporated into the CDEM Group Plan. This linkage allows for reduction policies to be incorporated under two legislative tools, which in turn will provide stronger defence of land use planning decisions.

While the purpose of this paper is to explore linkages between the CDEM Act and the RMA, it is acknowledged that there are many other pieces of legislation and associated documents which link into the RMA planning framework, as shown in Figure 5.

The following linkages to reduction measures have been identified:

Building Act 2002 – under Section 35 of the Building Act, a Project Information Memorandum (PIM) is a report prepared by a council prior to the construction of a building. As well as other information, it provides information on special land features, which may include potential: erosion, avulsion (removal of land by water action), falling debris, subsidence, slippage, alluvium (deposition of silt from flooding), inundation (flooding), sea spray zones, soft ground, and the presence of hazardous contaminants. Ideally these land features should be included in some way in the district plan, by locating areas on planning maps as hazard overlays, and/ or having associated policy for activities in these areas.

Also, under section 71 of the Act a territorial authority (TA) must refuse to grant a building consent on land subject to natural hazards, unless it considers the building work or land can be protected from the natural hazard risk. Natural hazards are defined as erosion, falling debris, subsidence, inundation and slippage. Under section 72, if the TA considers the work will not worsen or accelerate the natural hazard, and that it is reasonable to grant a waiver, then the TA must grant a
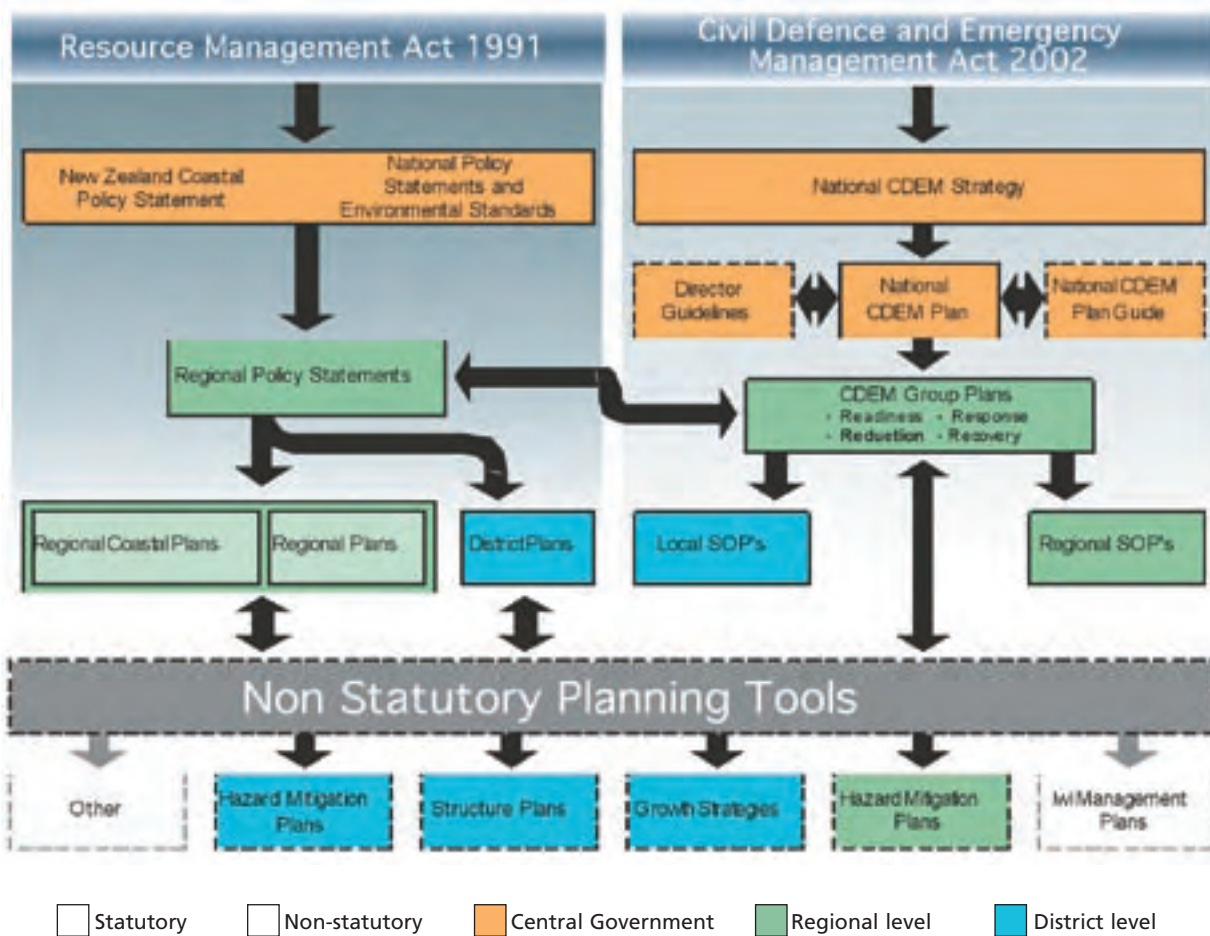
Figure 4: Hazard reduction linkages between the RMA and CDEM Acts.

building consent. Any consent granted under section 72 must notify the Registrar-General of Land, who will note the hazard concerned on the certificate of title. This is often referred to as 'tagging' the title.

The combined management of hazard through section 35 and sections 71-74 of the Building Act, can be linked through good policy at territorial authority level.

Local Government and Official Information Act 1987 – a Land Information Memorandum (LIM) is similar to a PIM, in that information can be requested on a parcel of land, which includes the above listed hazards for a PIM. Those considering purchasing a property are recommended to obtain a LIM before finalising the purchase. The LIM is often very useful in assisting potential landowners in deciding whether the land is worth purchasing, free from any restrictions, and whether the intended use of the land is feasible.

Local Government Act 2003 (LGA) – The LGA requires the creation of long term council community plans (LTCCP). The purpose of a LTCCP is to:

(a) describe the activities of the local authority; and

(b) describe the community outcomes of the local authority's district or region; and

(c) provide integrated decision-making and co-ordination of the resources of the local authority; and

(d) provide a long-term focus for the decisions and activities of the local authority; and

(e) provide a basis for accountability of the local authority to the community; and

(f) provide an opportunity for participation by the public in decision-making processes on activities to be undertaken by the local authority.

LTCCPs contain community outcomes, proposed budgets and performance measures looking ahead for 10 years. The document looks at the first three years in detail and the next seven years are indicative. The plan is revised once every three years and an Annual Plan is produced as part of this process.

Soil Conservation and Rivers Control Act 1991 – includes provisions for the prevention of damage by erosion and the protection of property from damage by floods.
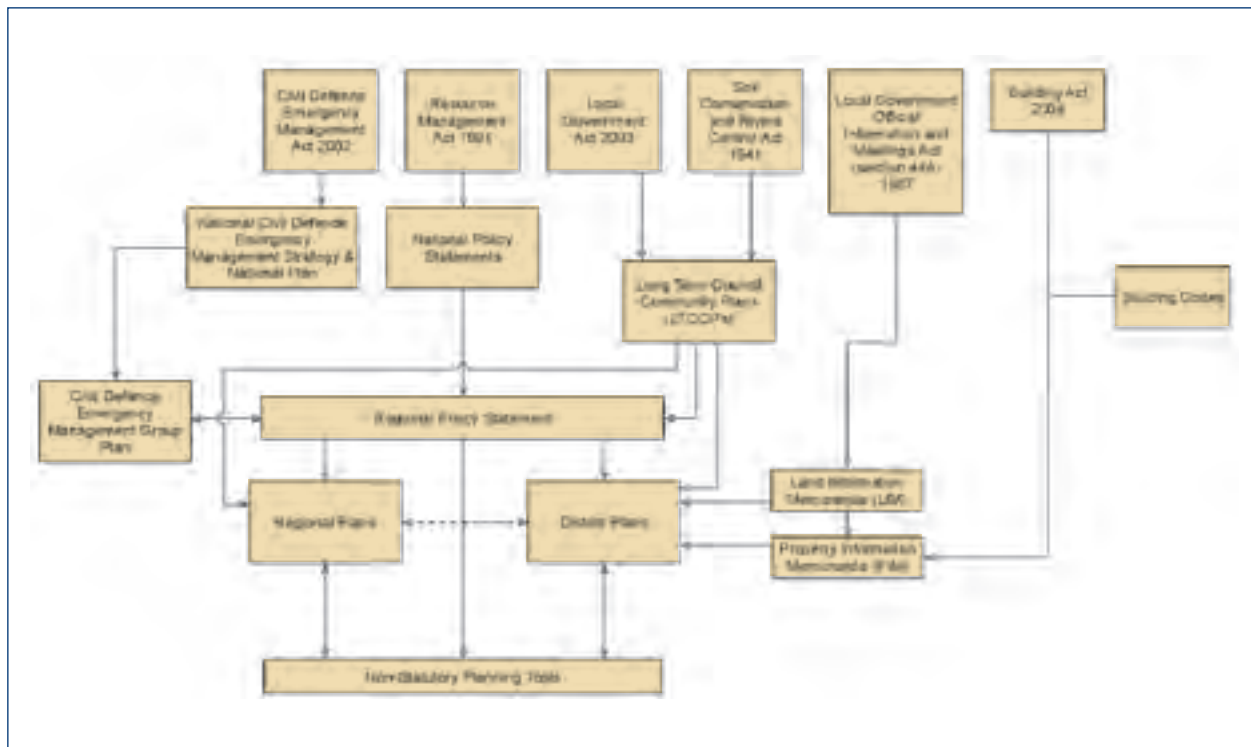
Figure 5: Legislative linkages (adopted from ALAHLG, 2003).

Examples of how linkages can be strengthened

The following three examples show how linkages can be strengthened between the RMA and CDEM Act:

Horizons Regional Council

Horizons Regional Council (covering the Manawatu-Wanganui region) is replacing its seven current resource management plans with one easy-to-use document, a combined Regional Policy Statement and Regional Plan. Meanwhile, the local CDEM Group Plan considers hazard reduction measures, which include planning tools (Horizons Regional Council, 2005). During the One Plan process, Horizons intends to strengthen hazard reduction policies, which in turn can be adopted by the next update of the CDEM Group Plan.

Queenstown Lakes District Council

The centre of Queenstown, a major tourist destination, is flooded periodically. Since the last major flood in 1999, several types of physical works have been proposed and discarded (Forsyth et al. 2004). A new Flood Strategy (ORC/QLDC, 2006) changes tack, emphasising the responsibility of individual citizens in "Learning to live with flooding" and improving public guidelines about the risk and recommended actions. Although the new strategy is still conceptually isolated from the CDEM Group Plan and the Regional Policy Statement, this new philosophy will no doubt be incorporated during forthcoming reviews of both documents.

Review of the New Zealand Coastal Policy Statement (NZCPS)

The NZCPS, in effect since 1994, is currently under review. A section on coastal hazards acknowledges the need for coordination between the CDEM Act and the RMA (DoC, 2006, p52). This is a good example of integration between the two pieces of legislation, which will enable consistency of approaches, reduction measures that satisfy the legislative requirements, and ultimately enhance sustainable development and communities.

Conclusion

A framework has been developed to assist in strengthening linkages between the CDEM Group Plans and resource management plans — the key link being to the RPS. Many RPSs are due for review, and it is imperative that planners take into consideration at this stage reduction measures and actions in their region's CDEM Group Plan. Only when these linkages are strengthened, can issues, objectives, policies and methods in regional and district plans be improved and focused on reducing the effects of natural hazards on communities. Also, when CDEM Group Plans are reviewed in the next couple of years, an opportunity exists to support the RPS of the region by incorporating reduction measures in the RPS into the Group Plan.

By RMA and CDEM policy and plans supporting each other and integrating reduction measures, the sustainability of communities can ultimately be improved.

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About the authors

Wendy Saunders is a social scientist at GNS Science, New Zealand specialising in natural hazard reduction measures through effective land use planning (w.saunders@gns.cri.nz).

Jane Forsyth is a geologist at GNS Science, New Zealand, specialising in the southern part of New Zealand (j.forsyth@gns.cri.nz).

David Johnston is a social scientist at GNS Science and Massey University. He has recently taken up the role of the Director of the Joint Centre of Disaster Research in the School of Psychology at Massey University in Wellington, New Zealand (david.johnston@gns.cri.nz).

Julia Becker is a social scientist at GNS Science, New Zealand. Her role involves researching aspects of good practice planning and policy for natural hazards, and how to enhance resilience to hazards within communities (j.becker@gns.cri.nz).

A case study of tort liability for fire damage

*Michael Eburn calls for a 'realistic assessment' of rural firefighting*

Abstract

Gardner v The Northern Territory is a rare example of a person suing fire authorities in negligence for their failure to protect his property from bush fire. This article looks at the allegations that were raised and why the Northern Territory Court of Appeal found there was no negligence by the Northern Territory or its fire fighting authorities. The conclusion is that Courts, when dealing with the emergency services and the response to unpredictable phenomena such as fire, are willing to try and understand the realities that decision makers face and take into account the complex context in which those decisions must be made.

"…this Court must be careful not to impose unreasonable expectations and unreasonable duties which are based more on hindsight and a lack of appreciation of the practicalities and difficulties that exist … than a realistic assessment of the care which a reasonably prudent person would exercise in these circumstances". (*Gardner*, 2004, [70])

Gardner v The Northern Territory is a rare case indeed as it is an example of a person suing fire authorities in negligence for their failure to protect his property from bush fire. The decision in this case gives a reassuring message for government authorities, fire services, and fire fighters everywhere. The Northern Territory Supreme Court and then the Northern Territory Court of Appeal found that there had been no negligence by the either the Conservation Land Corporation, the Parks and Wildlife Commission or the Bush Fires Council. The High Court of Australia refused to hear a further appeal (*Gardner*, 2005).

The facts

Mr Gardner was the owner or part owner of three blocks of land (numbered 1742, 1746 and 1747) in a remote part of Australia's Northern Territory. On his northern border was Crown land; that is land that was owned by the Conservation Land Commission but managed by the Parks and Wildlife Commission (*Gardner*, 2004, [5]). A rough map, drawn by the author, shows the relative position of the various blocks of land:
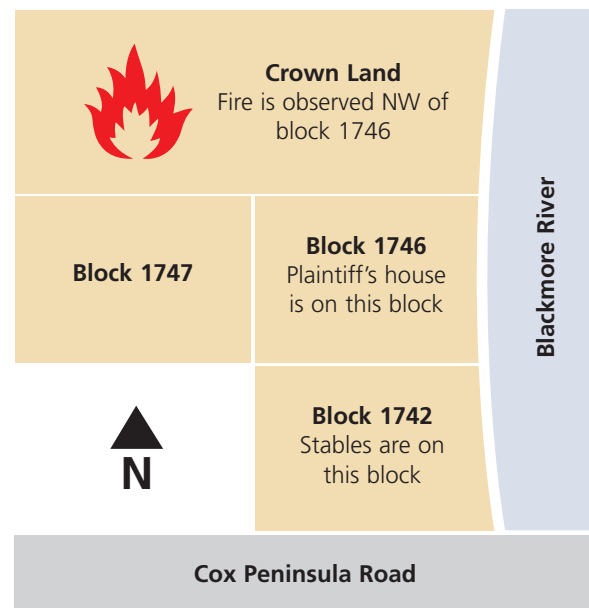
Not to scale. Each of Mr Gardner's blocks had an area of 320 acres.

On the 9th September 1995, a fire was observed to the north-west of Mr Gardner's property. The captain of the local Bush Fire Brigade attended the property and discussed with Mr Gardner, where the fire was and whether there was a risk to his property. The Brigade captain said:

"I spoke to Mr Gardner about the fire, smoke from which I could see to the northwest of Daly's Creek [a creek which ran through Section 1746]. I do not recall Mr Gardner's exact words, but he advised me to the effect "as far as I can see it will stay the other side of the creek". Mr Gardner did not appear to be worried about the fire. I agreed with his assessment. In my opinion it was not then a threat to the Property [the appellant's

property being Sections 1746, 1747 and 1742]". (*Gardner*, 2004, [20]).

The next day, the 10th September 1995, the Brigade captain again attended Mr Gardner's stables on block 1742 and they again discussed the progress of the fire and the risk to Mr Gardner's property. In his evidence the Brigade captain said:

"I do not recall Mr Gardner's exact words, but he advised me to the effect "it'll be right mate, don't worry about it". I replied in words to the effect "if you think it's safe that's fine by me". (*Gardner*, 2004, [27]).

Between midday and 3pm the assessment by Mr Gardner and the Brigade captain proved to be wrong, as the fire did come across to block 1746 and destroyed Mr Gardner's home. There was no evidence as to what the Fire Brigades were doing during that time but the Court accepted that had Mr Gardner rang 000 to ask for Fire Brigade assistance "the Berry Springs Bush Fire Brigade would have immediately abandoned other activities and gone to his assistance". (*Gardner*, 2004, [32]).

The allegation

In order to succeed in an action for negligence, a plaintiff has to show three things, they are:

1. That the defendant had a duty to do, or not do, some particular act;

2. That the defendant, unreasonably, failed to fulfil its duty; and

3. As a result Mr Gardner suffered some sort of loss or damage. (*Donoghue v Stevenson; Wyong Shire v Shirt*).

Mr Gardner's allegation was that between them, the three authorities had duties to:

- Minimise the risk and intensity of fire that might occur on the Crown land and

- Once a fire broke out, take effective steps to stop it spreading from the Crown land onto his property. (Gardner, 2004, [8]).

The Northern Territory admitted the first element of negligence (that is item (1) above). In this context that meant that the Northern Territory admitted that it had a duty to take reasonable precautions to stop fire spreading from the Crown land onto Mr Gardner's property (*Gardner*, 2004, [6]). The issue of damage (that is, item (3) above) was also beyond dispute as Mr Gardner had, indeed, lost his home.

The issue, therefore, was whether the various authorities (all represented by the Northern Territory) had breached their duty of care. To answer this question, the Court had to consider whether there was something else that

a reasonable person, in the position of the defendants would have done, or something the reasonable person would have done differently? If the answer to that question was 'yes' the Court would then have to consider whether or not that would have lead to a different outcome for Mr Gardner?

Mr Gardner argued that the authorities should have reduced the risk of fire, and the intensity of any potential fire, by conducting controlled burns to reduce the fuel load. These burns had occurred in previous years and it was argued that they should have taken place during 1995. The failure to reduce the fuel load, it was argued, contributed to the size and spread of the fire (*Gardner*, 2004, [9]). Mr Gardner also argued that once the fire started, there was an obligation on the various authorities to monitor the fire, to advise him of its location and movement and to stop the spread of the fire onto his property (*Gardner*, 2004, [10]).

In response, the Northern Territory brought evidence to allow the Court to consider the realities of Mr Gardner's position. He lived in the remote Northern Territory on inaccessible land. In the area around him were "bush style residences and associated outbuildings … [but] no other residential buildings and sheds". (*Gardner*, 2004, [11]).

Nearby, however, and within the area that was threatened by fire:

"… was a closely settled rural residential area or conservation and wildlife and park reserves with significant farms, buildings and other public and private infrastructure, throughout which was interspersed land under the control or ownership of the Crown". (*Gardner*, 2004, [11]).

The Northern Territory explained what its authorities did to control fires in the area. They said:

(a) The Bush Fire Council sought to protect lives and property from bush fires in the region and the locality by:

(i) public awareness campaigns directed at landholders having and maintaining fire access tracks along their property boundaries and creating and maintaining fire breaks and removing fuel load material around and adjacent to houses, sheds, orchards and other property infrastructure; and

(ii) in the case of the region installing fire access tracks around the boundaries of Crown land.

(b) Volunteer Bush Fire Brigades provided at a local level:

(i) early dry season burning off programs on Crown Land and road reserves;

Fire fighters are endangered without vehicular escape routes when fighting fires or backburning.

(ii) assistance to landowners at their request for burning off and fuel load reduction on private property;

(iii) on call assistance to property owners in the event of threatening fire to back burn in the face of fire and where necessary fight fires around endangered property;

(c) Volunteer Bush Fire Brigades in the region and the locality attempted to prevent bush fires from burning persons and property by the provision of the services referred to in the immediately [sic] sub-paragraph;

(d) Fire access trails on property boundaries do not and cannot prevent all bush fires. Their purpose is to provide access for fire fighters and fire fighting vehicles and heavy equipment to be placed in the way of approaching fire for grading, back burning and other fire fighting purposes;

(e) It was and remains unrealistic, dangerous to fire fighters and beyond the financial and other resources of the Crown to reduce fuel loads and fight fires on Crown Land because:

(i) of the large areas involved;

(ii) Crown Land in the locality is variously rough, rocky, boggy, swampy and wet and comprised by areas of black soil, open savannah, paperbark or eucalypt woodland and not susceptible to permanent fire access trails of suffivient (sic) number and area coverage;

(iii) fire fighters are endangered without vehicular escape routes when fighting fires or backburning;

(iv) of the uncontrollable nature of fires and in particular a propensity to jump large distances over burnt and cleared area, fire access trials;

(v) of the cost involved relative to the measures referred to in sub-paragraphs (i) and (j) above;

(vi) fire is an integral part of the Northern Territory environment and landscape.

(f) Fire protection and management in the region and the locality depends upon residents having high levels of awareness of the risks of fire and conducting themselves and their property in a way that ensures maximum co-operation with the Bush Fires Council and the Volunteer Bush Fire Brigades and creating the maximum possible protection from fire having regard to all the circumstances prevailing from time to time. In particular, the Bush Fires Council and the Volunteer Bush Fire Brigades depend upon residents to maintain high vigilance at times of fire danger and to call for assistance when it is needed to protect persons and property from loss and damage.

(g) All rural residents in the region and the locality including Mr Gardner as a long time resident thereof know or should know the matters set out in particulars (a) to (f) above. (*Gardner*, 2004, [11]).

In essence, the Northern Territory said that it, via the authorities involved, had done what could be done and that people who chose to live in these remote areas had to accept that fire was part of the environment in which they chose to live and therefore they had to accept some

responsibility for maintaining fire trails, monitoring the progress of fire and taking action to minimise the impact that inevitable fires would have on their homes. As one witness said:

"People choose to live in these areas, they choose to make the distinction between having a fully paid fire service, that press with a triple O on your phone, you'll have lights and sirens come flying down the road and do whatever you do and they'll take the responsibility away from you. In our area they have to have the responsibility, they have to understand the nature of where they live and the fact that fire is part of the natural environment, and at some time quite often, if it's not "if", it's "when" you're going to have to experience it and that's a simple fact of life. If you want a fully paid fire service then live in Darwin". (*Gardner*, 2004, [58]).

Decision

This matter was heard in the Supreme Court of the Northern Territory which found in favour of the Territory. Mr Gardner appealed to the Court of Appeal where Chief Justice Martin delivered the leading judgment, also in favour of the Territory. Justices Angel and Mildren agreed with Chief Justice Martin.

No tort liability for failure to build fire breaks on Crown land

Failure to establish fire breaks at the boundary between the Crown land and Mr Gardner's property was not negligent. Had they been built they would not have stopped the fire so whether there was a duty to build fire breaks or not, the failure to build them did not cause Mr Gardner's damage. (*Gardner*, 2004, [44]).

No tort liability for failure to reduce fuel load via controlled burns

Equally the Court found that failure to reduce the fuel load on the Crown land was not negligent as Mr Gardner had not reduced the fuel on his own land. Even if the authorities had burned off fuel, once the fire got to Gardner's property (and the evidence showed that in the case of this fire no fuel reduction program would have actually stopped the fire spreading) it would have had sufficient fuel to burn out his property and destroy his home. (*Gardner*, 2004, [47]).

No tort liability generally for the response to the fire threat

The Court further found there was no negligence by the Fire Brigade in its response to the fire. The Brigade was under a duty to make sure Mr Gardner was aware of the fire (*Gardner*, 2004, [51]) and that there was a system in place to monitor the spread of the fire (*Gardner*, 2004, [53]). The Brigade met the duty to warn of the presence of the fire when the Brigade captain attended

Mr Gardner's property and spoke to him, thereby ensuring that Mr Gardner was aware of the fire.

With respect to monitoring the fire the court held that it was reasonable for the Fire Brigade to rely on Mr Gardner to monitor the fire and to contact the Brigade if and when he became aware that the fire was in fact spreading onto his land. (*Gardner*, 2004, [69]).

It is this part of the decision that will be of most interest to responders. The court accepted that there was no duty to attempt to extinguish the fire in inaccessible country. Also, given the context of the fire, it was reasonable to rely on the home owner to take responsibility for the monitoring of the progress of the fire. It was not necessary for the Brigade to deploy scarce resources to monitor a fire that, at midday on the 10th September, was believed not to be a threat to the home. The fact that that assessment was wrong did not mean that there was negligence.

In deciding what the reasonable Fire Brigade would do in the circumstances the Chief Justice said that:

"… particular regard must be had to the remoteness of the locality, the community practice and expectations in such situations, the appellant's experience, the duties required of the resources available to the Crown and the limited nature of those resources, namely, the volunteer Fire Brigade". (*Gardner*, 2004, [70]).

The combination of circumstances meant it was reasonable to rely on Gardner to monitor the spread of the fire.

Commentary

The law of negligence involves judging the conduct of a defendant against a hypothetical 'reasonable person' but that reasonable person must have some contact with the reality faced by the defendant in particular circumstances. The question of whether or not a defendant has met the standard of reasonable care required by the law is a legal question and therefore falls to be determined by the Courts (*Rogers v Whitaker*) but the concept of the reasonable person must not be so divorced from the practice of real life as to lose all meaning.

"If negligence law is to serve any useful social purpose, it must ordinarily reflect the foresight, reactions and conduct of ordinary members of the community …. To hold defendants to standards of conduct that do not reflect the common experience of the relevant community can only bring the law of negligence, and with it the administration of justice, into disrepute". (*Dovuro Pty Limited v Wilkins*).

That doesn't mean it will always be reasonable to rely on home owners or others to take what might be considered common sense actions to look after their own interest. In this case the Brigade could have been

expected to be more pro-active if, at midday, they had formed the view that the fire would in due course pose a threat to the home, that it could be accessed for fire fighting purposes or for some reason the home owner would not be competent to monitor the fire.

In trying to determine what a reasonable person in the defendant's position would have done a Court is faced with a common difficulty. When a matter comes to trial they are faced with certain outcomes, in this case with the knowledge that the fire did spread and did burn out Mr Gardner's home. The Court is asked, however, to judge not the outcome but the decision that was made at a time when the outcomes were uncertain. In this case to judge whether the decisions made at midday were reasonable when it could not be known where the fire would go. All that could be done, and all that could be asked for, was a reasonable assessment or prediction. The question is 'was the decision at the time it was made, reasonable?' and the answer to that question does not depend on the ultimate outcome.
Just because a decision or assessment turns out to be wrong, does not mean that, at the time, it was unreasonable. In approaching its task the Court of Appeal gave this warning to itself and to other courts:

"It is in that total context that this Court must be careful not to impose unreasonable expectations and unreasonable duties which are based more on hindsight and a lack of appreciation of the practicalities and difficulties that exist with fires in remote areas during the dry season than a realistic assessment of the care which a reasonably prudent person would exercise in these circumstances". (*Gardner*, 2004, [70])

For emergency services, the relevant circumstances are not only the threat to the property in question, but the resources available, the broader obligation to deploy resources across a wide area and the fact that the responders obligations to extend to people beyond an individual home owner.

In this case the assessment, at midday, that the fire would not pose a risk to the homestead, and that Mr Gardner could be relied upon to keep an eye on the fire and contact the Brigade should the situation change, turned out be to wrong (on both counts) but not negligent.

This case should, again, provide reassurance for fire fighters and other emergency responders. Although it is a case decided in the Northern Territory (and the Northern Territory has its own unique circumstances given its remote and rugged area and very sparse and uniquely independent population), but the principles are consistent with the developing law across Australia. The High Court, in different contexts, has affirmed that when it comes to determining what is to be expected of a reasonable person, it is a legal issue to be determined by the court, but that evidence of commonly accepted

practice will have a significant if not a determinative effect (*Rogers v Whitaker; Rosenberg v Percival*). In this case the Court was willing to put the fire in context and not to require a remote and small Fire Brigade to provide the sort of fire protection that may be expected in an urban environment. The court not only had regard to the reality facing the Fire Brigade, but also the reality of the choices that Mr Gardner made when he chose to live where he did. A city resident might be able to expect the Fire Brigade to '… come flying down the road and … take the responsibility away from you' (*Gardner*, 2004, [58]) but Mr Gardner could not.

The law of negligence is not concerned with developing a 'one size fits all' approach, nor does it require all service providers to provide services equal to the most well resourced service provider. The context is important and defendants can expect that the Courts will hear evidence about the context in which decisions are made, and the limitations that decision makers face (see also, for example, Civil Liability Act 2002 (NSW) s 42(a)).

Again we can see that with respect to the emergency services and a response to unpredictable phenomena, the Courts are willing to try and understand the realities that decision makers are facing. Just because, in the cool atmosphere of a court case (in this case 9 years later) it can be argued that another decision may have produced a different result, it does not mean that the Courts will label the relevant authorities negligent (*Eburn*, 2005, [40-41]).

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About the author

Michael Eburn is a Senior Lecturer at the School of Law, University of New England, Armidale NSW with a particular interest in the law governing the emergency services. He is the author of Emergency Law (2nd ed, 2005, The Federation Press) and a regular speaker at the Emergency Management Australia Institute, Mt Macedon, Victoria. Michael Eburn may be contacted at meburn@enu.edu.au

NOTES FROM THE FIELD

FESA provides USAR canine capability for WA community
Lynne and 'Reg' prove their bark has bite

Support for a canine capability has been strong, right from the inception of the Fire and Emergency Services Authority (FESA) Urban Search and Rescue (USAR) Task Force in Western Australia.

FESA Rescue Manager Rik Lieftink said that early in 2004, WA Fire and Rescue Service Station Officer Peter Sutton accepted the role of Taskforce Canine Liaison Officer.

"Peter's previous dog training experience gave FESA an excellent springboard for developing a suitable capability," he said.

"Initially Michael Rooke, a State Emergency Service Volunteer tracker dog handler and his dog Max (a German shepherd), were recruited. Six months later, Lynne Finch joined the team with her dog Reg (a labradoodle).

"During the development stage the team welcomed Elke Effler from the Australian Swiss Search Dogs Association (REDOG standard) and also Brenda Woolley of New Zealand Search and Rescue Disaster Dogs Standard. Both participated in FESA-coordinated workshops on training standards and assessment guidelines. As senior assessors within their own agencies, Elke and Brenda were a fountain of knowledge and experience.

"A special Memorandum of Understanding with the Singapore Civil Defence Force (SCDF) has also seen the WA USAR Task Force benefit from their generous assistance. Peter, in particular, developed a close working relationship with the SCDF Dog Section which possesses the greatest capability of International Search and Rescue Advisory Group (INSARAG) certified dogs in the

FESA canine trainer, Lynne Finch and her dog 'Reg' searching for victims in a simulated collapsed building rubble pile.

region. In fact, their team has been used in Taiwan, Singapore, Pakistan, Banda Ache, Yogyakarta, Kobe and at other major disasters."

FESA made the decision to train to the New Zealand standard, an adaptation of the USA Federal Emergency Management Authority (FEMA) standard.

NZ and FESA have a very similar structure and procedure model and during past USAR Cat II courses good working relationships had been formed. It was hoped that similar could be developed in the canine area.

Dog handlers in NZ, incidentally, are also drawn from within the NZ Civil Defence which is very similar to Australia's State Emergency Service.

REDOG and New Zealand standards as well as the FEMA standard are minimum requirements for USAR Canines to be operational as per the National USAR Working Group and the Australasian Fire Authorities Council (AFAC) USAR committee guidelines.

During the development stage, Peter worked with both handlers to develop a training package and sites

for training and equipment over a six to 12 month period.

A date for assessment for the "Basic" Canine Readiness Evaluation Process (CREP) was chosen for December 2006, consisting of:

- Aggression Test – human and canine

- Heel work

- Vet check

- Down stay

- Focus Bark Indicating Live Human Scent

- Emergency Stop

- Direction and Control

- Agility

- Rubble Pile

Regular training sessions followed during the week and on weekends. On average this amounted to forty hours a month, with each team member doing training at home or at the six rubble pile sites to which the team now had access.

These sites varied from concrete and brick, to green waste. Agility work and direction and control was completed at the Canine Association of WA which allowed the team unlimited access to their venue.

Mike and Max attended a Basic and Advanced CREP near Wellington NZ in 2004. Mike implemented many of the good ideas he received on the program.

In October 2006, Peter took the opportunity to travel to New Zealand to observe their Basic and Advanced CREP. This enabled the team to be prepared for the upcoming CREP and was certainly of great value in removing any anxieties the two handlers faced. He also secured the services of an independent Police Assessor, Paul Beveridge from WA Police K9, and the President of the WA Vet Association, David Kneck, to assist in the assessments.

Peter said that both dog teams were assessed in early December

The Basic Canine Readiness Evaluation Process (CREP) assessment team, Dec, 2006.

by Brenda Woolley (from NZ) and Paul Beveridge.

"Starting at Canine Association, all initial elements were completed successfully," he said.

"The team was now required to move to a local landfill where a purpose-built green waste/concrete pile was used. The handlers were required to clear the pile in twenty minutes and locate two victims buried within the material present.

"On initially searching, the dog was to work independently of the handler and upon finding and alerting the first victim, the handler then had full access to the pile. It transpired that Michael and dog Max were unsuccessful in locating the second victim. It is not unusual for dog teams to do this, however, as the delicate balance of silent cooperation and meeting the assessment criteria is extremely difficult.

"Lynne Finch and her dog 'Reg' then proceeded to successfully search the pile, locating both victims."

Rik said that Lynne and Reg's success was the result of a great team effort as they were ably assisted by Michael Rooke and Peter Sutton, with the support of the FESA Rescue Branch.

"Lynne and Mike belong to a most dynamic SES Unit situated in Rockingham, WA," he said.

"The support of other members of the dog tracker section and the unit

leaders, especially Grant Pipe who is also the USAR Task Force Logistic Assistant, was vital.

"Local SES units provided volunteer casualties that greatly assisted the accelerated training of the dogs. The team now continues to train in preparation for Lynne and Reg's Advanced Assessment in Mid 2008 and they look forward to more handlers joining the team in the future.

"The use of canine capabilities in searching for victims in USAR is highly respected within FESA and everyone is totally delighted and very proud of Lynne and Reg's achievements."

Peter said that the future would increasingly involve Lynne and Reg in operational training and exercises, with the entire USAR Task Force benefiting.

"FESA is producing a training awareness DVD for its own use as well as other agencies involved in USAR canine. In line with the national USAR strategy, this will be available for any jurisdiction that wishes it.

"The end plan is to have at least one canine team for every sector. There is some way to go yet, but the initial obstacle is now breached and we are on our way to better things and improving the level of service to the community."

Emergency management seminar program

2006 Emergency Management Seminar Program participants.

Emergency Management Australia conducts an annual seminar program for the International Policy Division of the Department of Defence that introduces foreign military officers and government officials to the Australian approach to emergency management.

Throughout our region, military forces have a mandate to support civilian governments or lead the coordination of disaster management activities and undertake a key role in disaster response.

The EMS program runs over two weeks and includes exercises, field trips, syndicated work and group discussion covering multiple subjects such as:

- prevention
- preparedness
- response
- recovery
- emergency risk management
- planning
- disaster logistics
- international relief; and
- disaster assessment

The program is designed to encourage input and sharing of ideas and approaches from around the region. This year's participants represented a variety of countries including India, Pakistan, Bangladesh, Indonesia, Malaysia, Philippines, Singapore, Laos, Thailand, Vietnam, Fiji, Papua New Guinea, Tonga and China.

The program was facilitated by a team led by Donovan Croucamp, including presenters; Paul Davis, Christine Jessup and Barry Dean.

Want to tell us how we can improve AJEM?

Keep an eye out for the 2007 readers survey in the May issue of AJEM.

CBR Expert retires from EMA and looks forward to a quieter life

There would be many members of our Australian readership who have spent time at the Emergency Management Institute at Mt Macedon undertaking one of a range of Chemical Biological and Radiological (CBR) training courses. They would be very familiar with Don Patterson, EMA's Assistant Director Specialist Capabilities, who conducted the training with great enthusiasm, imparting his vast reservoir of knowledge to those participating. Don retired from his role in Emergency Management Australia on 11 December 2006 and will undertake a lifestyle change by the coast.

Don joined EMA's civil defence section in 1991, a position that required detailed CBR knowledge which he brought with him from his Army career. He was influential in development of the National Civil Defence Policy and the conduct of the popular, well attended Civil Defence Courses which were held at Mt Macedon until 2001.

After nearly five years in civil defence Don's interests turned to incident management, particularly CBR incidents. He moved to the National Emergency Management Coordination Centre (NEMCC) in 1995 as Assistant Director Emergency Coordination successfully managing the provision of Australian Government support to States and Territories following a number of significant disasters. Don later took over management of the NEMCC while continuing involvement in sponsorship and support of the National Registration and Inquiry System (NRIS) and the Visiting Ships Panel (Nuclear). He established an extensive network of emergency management contacts both nationally and overseas.

In 2003 Don handed over the reins of the NEMCC to concentrate on CBR matters. He established an excellent national and international reputation through detailed involvement in activities such as, chairing the National CBR Working Group; co-chairing the Consequence Management Group, under the AUS/CAN/UK/US Quadrilateral CBR Counter Terrorism and Counter Measures Working Group; his input to the National

Director-General of EMA, Mr Tony Pearce presenting Don Patterson with his commemorative respirator.

Counter Terrorism Plan in the area of consequence management; his activities in identification and addressing of gaps in national CBR capability, including mass fatality management; his detailed input into development of the National CBRN Security Strategy and of course not forgetting his on-going personal involvement with CBR Courses at Mt Macedon. Don's dedicated and passionate contribution to enhancing the national capacity to manage CBR incidents has been a truly outstanding one.

The Director General of EMA, Mr Tony Pearce, hosted a presentation ceremony for Don at an EMA function on 7 December at which he presented Don with a framed, mounted respirator artistically arranged with various EMA insignia representing his 15 years of service.

We wish Don all the very best in his retirement and hope that the skills and knowledge that have been imparted with such commitment and enthusiasm to members of the emergency management community, will continue to flourish and grow.

INTERNATIONAL ASSOCIATION OF EMERGENCY MANAGERS ANNOUNCES OCEANIA REGION XIV

"I strongly urge you to consider joining IAEM as a way of assisting the further development of the emergency management profession in the Oceania region."

Tony Pearce
Director General – Emergency Management Australia
President – Oceania Region XIV IAEM

The International Association of Emergency Managers was founded in 1952 as the U.S. Civil Defence Council, it was also formerly known as the National Coordinating Council on Emergency Management. It is a not-for-profit registered Association that brings together emergency managers and disaster response professionals from all levels of government, the public and private sectors, and volunteer organisations around the world. Since 1998, memberships have grown to over 3000 registrants from over 47 countries.

Unprecedented growth in the non-US membership base over the past 4 years has resulted in endorsement of two new regions by the parent association (ie. Region XIV, Oceania and Region XV, Europa). Of most interest to the readers of AJEM is the development of the Oceania region which is the amalgamation of 121 members across Australia (92) and New Zealand (29).

After a significant membership drive in Australia in October 2006, the national representative (Tony Pearce) canvassed the idea with the membership to apply to IAEM in the US to form an Australian region having surpassed the 75 member minimum requirement. A discussion with the New Zealand national representative (Kristin Hoskin) resulted in both countries' members being canvassed to form an Oceania region that not only includes Australia and New Zealand but facilitates membership of Pacific Island nation colleagues. The countries have been grouped into the following sub regions:

Australia/New Zealand - Australia (AU), Norfolk Island (NF), New Zealand (NZ)

Melanesia – Fiji (FJ), New Caledonia (NC), Papua New Guinea (PG), Solomon Islands (SB), Vanuatu (VU)

Micronesia - Federated States of Micronesia (FM), Guam (GU), Kiribati (KI), Marshall Islands (MH), Nauru (NR), Northern Mariana Islands (MP), Palau (PW)

Polynesia - American Samoa (AS), Cook Islands (CK), French Polynesia (PF), Niue (NU), Pitcairn Island (PN), Samoa (WS), Tokelau (TK), Tonga (TO), Tuvalu (TV), Wallis and Fortuna Islands (WF)

The Australian and New Zealand national representatives have spent the past 4 months progressing creation of Region XIV Oceania. Activities resulted in a live website (see www.oceania-iaem.com), development of: a region structure; by-laws; fee structure options and a call and answer for nominations for Office Bearers (1 nomination for President, 2 for Vice-President, 6 for Secretary and 2 for Treasurer). These results represent 10 per cent of the eligible membership nominating for positions.

The voting period occurred on the web site between 19 and 23 February following which all by-laws, organisation structure, fees and Office Bearers were declared accepted or filled. The results were presented to the IAEM parent body at their March Board meeting and the new region was ratified and endorsed on 14 March 2007. Successful endorsement of Oceania also provides for the President of the region to fill a seat on the US IAEM parent body Board, this in turn will facilitate opportunities for the emergency management membership of this part of the world to input into IAEM's future initiatives in a truly international sense.

Prior to the process of developing the new region, the Australian national representative held initial discussions with IAEM in the US regarding development and implementation of an Australian Certified Emergency Manager (CEM) program that could be an adaptation of the already well regarded IAEM CEM®. These discussions are on-going and now involve discussions with New Zealand on development of an Oceania CEM.

Whilst important, membership growth is not the only focus of the new region. A large membership base is redundant if the members and the broader emergency management sector do not develop and grow in both the individual professional and sector/industry senses. Professional recognition of the emergency management sector (including volunteers and paid staff) and government/community recognition of the service that the sector provides is important if we are to deliver enhanced community safety outcomes.

IAEM Oceania will give the EM profession in this part of the world an opportunity to interact as a professional body with our government structures, with industry and with the community. It will also be an excellent forum to advance the profession through sharing best practices and lessons learned.

To join, please access the membership area at www.iaem.com or contact your national representative (A list of national representatives is located under the Region XI (International) heading on the web site).

EMA Update

PLANNING & COORDINATION

International Engagement

EMA recently managed the Solomon Islands' Disaster Risk Management Institutional Strengthening Project. The project has achieved a range of successes leading to improved capacity and capability across all aspects of PPRR among the community, senior government and NGO levels within the country. Key outcomes were the legislative review highlighted in the Vol. 21, No. 4, November 2006 edition of AJEM; a review of the national disaster plan; improved equipment and facilities; improved disaster management skill levels across a range of sectors and agencies; and the implementation of a number of risk reduction activities at community level.

EMA has entered into a partnership with BAKORNAS PB, the Indonesian national equivalent to EMA, for a twelve month period aimed at raising Indonesia's national and provincial disaster preparedness and response capabilities. Activities to be undertaken through the partnership include developing training packages in the Indonesian context across a range of disaster management skills and delivering these courses, evaluating and advising on Emergency Coordination Centre processes, conducting a range of development workshops and hosting training and learning visits by BAKORNAS officers to Australia.

Medical capability in Turkey

EMA is working with the Department of Health and Ageing (DoHA) and visited Turkey to undertake a medical capability assessment in February 2007. The visit focused on gathering information on the health emergency response management systems in Istanbul and the Gallipoli Peninsula. This information will assist Australian government planning and response in the event of an incident during the ANZAC Day commemorations period.

For further information on the above two initiatives please contact Paul McAlonan
Phone: 02 6256 4613
Email: paul.mcalonan@ema.gov.au

Exercise BIG SPLASH

EMA in partnership with the Australian Maritime Safety Authority (AMSA) conducted Exercise Big Splash in Canberra on the 4–5 Dec 2006. The aim of Exercise Big Splash was to enhance the preparedness of Australian Government agencies to respond to a significant aviation disaster occurring within Australia or its area of responsibility. Twenty-six agencies from the Australian Government, NSW Government and the private sector attended. The exercise scenario was based upon a fictitious commercial airliner ditching in the ocean off Australia's coastline. The first day of the exercise focused on the aviation and maritime resources necessary for the rescue, whilst the second day tested on-shore coordination procedures across many agencies. The organisations involved in the discussion exercise will now evaluate their participation and examine ways of enhancing the current arrangements for any such aviation disaster.

For further information contact Malcolm Purcell
Phone: 02 6256 4609
Email: Malcolm.purcell@ema.gov.au

APEC 2007

The Australian Government is hosting a series of APEC economies meetings in 2007. These meetings will occur in various jurisdictions around Australia with the APEC Economies Leaders' Meeting (AELM) occurring in Sydney in September 2007. Internationally, the APEC Economic Leaders Meeting will be second only to the G8 in significance and profile, and will surpass both the Sydney Olympic Games and the 2002

PLANNING & COORDINATION

Commonwealth Heads of Government Meeting in scope and complexity.

Emergency Management Australia (EMA) is the lead agency for national coordination of the emergency management arrangements, in consultation with the States, Territories and other Australian Government departments. EMA involvement is currently being coordinated through APEC Security Working Groups held monthly in each State and Territory. The official meetings schedule began in the ACT on 15 Jan 07, and will conclude with a Leaders' Week in Sydney on 9 Sep 06. The APEC schedule includes 100 days of senior official and ministerial meetings in all states and territories, excluding Victoria who hosted the G-20 summit in Nov 06.

For further information contact Damien Sanford
Phone: 02 6256 4622
Email: damien.sanford@ema.gov.au

National Emergency Management Coordination Centre (NEMCC)

The NEMCC recently conducted the following activities:

- A COMRECEPLAN 'lessons learned' review

- An Emergency Management Liaison Officers Workshop including attendees from Australian Government Agencies and private sector agencies

- An Emergency Coordination Centre forum including representatives from Australian States and Territories

- Provided Australian Government assistance for the Victorian bush fires

For further information contact Janelle Keyes
Phone: 02 6256 4620
Email: janelle.keyes@ema.gov.au

COMMUNITY DEVELOPMENT BRANCH

Community Education

The Community Development Branch, in conjunction with the Bureau of Meteorology, undertook a review of the existing EMA flood brochure. The revised A3 fold-out colour brochure containing information on floods, and tips on preparing for and recovering from flooding was reprinted.

Copies of the brochure are available from EMA or State and Territory Emergency Services offices.

For further information contact Jenny Trewin
Phone 03 5421 5225;
email jenny.trewin@ema.gov.au

Australian Emergency Manual Series

EMA also recently published the fifth edition of General and Disaster Rescue manual. This manual is part of the skills for emergency services personnel stream and provides emergency service personnel with the foundation skills and underpinning knowledge to perform safe and effective rescues in most situations.

The manual covers basic and general equipment, systems and techniques rather than any specialised skill, and is designed for use by emergency management personnel in planning, training and operations. General and Disaster Rescue also provides the fundamental skills and knowledge for undertaking other specialised skills covered in the skills for emergency services personnel series.

General and Disaster Rescue – fifth edition is available in PDF format on the EMA website, www.ema.gov.au, or through the print-on-demand facility accessed via EMA's website. Limited print copies are also available to emergency service personnel via the State Training Manager for the State Emergency Service in each jurisdiction.

For further information contact Kate Keane
Phone 02 6256 4671;
email kate.keane@ema.gov.au

COMMUNITY DEVELOPMENT BRANCH (CONTD)

EMA Library

Australasian Libraries in the Emergency Sector (ALIES) is a co-operative network of libraries which supports the information requirements of the Australasian emergency management community by promoting and facilitating the sharing of information across the 37 diverse member agencies within Australia and New Zealand. Recent new members include the Queensland Department of Primary Industries and Fisheries.

The annual Australasian Libraries in the Emergency Sector workshop will be held at EMA Mt Macedon from 1-5 April 2007. The theme of the 2007 workshop is "Mapping knowledge: where in the world are we?". Guest speakers will include Luke Naismith (Department of Justice, Victoria), Chris Pigram (Geoscience Australia), and Amanda Credaro, (NSW Department of Education).

For further information contact Troy Watson
Phone 03 5421 5224;
email troy.watson@ema.gov.au

Australian Safer Communities Awards – 2006

The 2006 Australian Safer Communities Awards ceremony was held in the Mural Hall at Parliament House, Canberra on 6 December 2006.

The Awards recognise best practices and innovations that help to build safer communities. They cover organisations and individuals working in risk assessment, research, education and training, information and knowledge management, prevention, preparedness, response and recovery. Details of the awards including information on all entrants and the winners for 2007 are available on the EMA website at www.ema.gov.au

The Attorney General, the Hon Philip Ruddock, announced at the ceremony that EMA would be conducting a 'first principles' review of the Australian Safer Communities Awards during 2007 to ensure that the awards continue to meet their objectives in a changing emergency management environment. The review will be conducted concurrently with the 2007 awards.

For further information contact Chris Jenkinson
Phone 03 5421 5241;
email christine.jenkinson@ema.gov.au

USEFUL INFORMATION

Australian Journal of Emergency Management

The Journal is published quarterly and is disseminated throughout the emergency management community and related disciplines, in Australia and overseas. Articles identifying and discussing issues, policies, planning or procedural concerns, research reports and any other information relevant to the emergency/disaster management community are welcome.

Refer to the EMA website (www.ema.gov.au/ajem) for current and past issues and information on how to subscribe and contribute.

Letters to the Editor

The Journal welcomes Letters to the Editor. Please note that letters should be no more than 300 words. Letters exceeding this limit may be edited or refused. Letters must be in good taste and focus on issues of emergency management or past AJEM content.

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.

Advertising in AJEM

Display and classified advertising may be accepted for publication with the agreement of the Editor-in-Chief. The editor reserves the right to insert the word "Advertisement" above or below any copy.

Conference Diary

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.

interesting websites

Australia's first national emergency information portal

www.ausdin.gov.au

The Australian Disaster Information Network (AusDIN) portal is a multi-agency initiative to establish a national knowledge and information network of people and systems to serve the emergency management community in the Australian region. The AusDIN portal aims to facilitate access to data, information and knowledge for all phases of emergency management. The portal is being delivered through a planned program of updates. Each update will incorporate content, functionality and/or design enhancements.

The portal provides:

- public access to emergency information across Australia
- links to emergency management organisations in every state and territory
- weather reports
- spatial information
- warnings and alerts
- information on preparing for disasters and what to do in times of evacuation
- links to recovery organisations, charity and support groups; and
- international links.

The Attorney-General, Philip Ruddock, launched the site at a meeting of emergency services ministers recently saying AusDIN will assist the Emergency Management community to quickly and easily share vital information on natural disasters.

AusDIN is the outcome of the (multi-jurisdictional, Australian Government funded) Working Together to Manage Emergencies project announced by the Attorney-General late last year.

AusDIN is the first whole-of-government emergency management initiative to use the internet to link and share information relevant to the sector.

The portal can be accessed at http://www.ausdin.gov.au.