The Australian Journal of
Emergency Management

Australian Government
Attorney-General's Department
Emergency Management Australia

EMA *'safer sustainable communities'*

Vol 20 | No 1 | **February** 2005

Learning from emergencies

Australia's vulnerability to tsunamis and storm surges

The use of archaeology in recovery at disaster scenes

Queensland's integrated surf life saving program

historical snapshot

Christmas day 2004 was the 30th anniversary of Australia's most infamous cyclone

Cyclone Tracy started at 10am on 21 December 1974, when it lay out to sea north of Darwin. On 24 December 1974 *Tracy* rounded Cape Fourcroy, Bathurst Island's western tip, and moved along an east-south-easterly course toward Darwin.

By late afternoon on 24 December 1974, the city of Darwin was cloaked with heavy, low cloud and was experiencing strong rain squalls and wind gusts. By 10pm the winds were causing physical damage. By midnight the damage was becoming more serious, and it was apparent that *Cyclone Tracy* was about to pass across the city. Over the next six hours ***Tracy*** substantially destroyed most of Darwin. The human toll was heavy with 65 people killed—49 on land, and 16 at sea.

There are many varying accounts of how the news of the cyclone first reached the outside world from a Darwin that, by daylight on Christmas morning, had no internal or external communications. Gradually the news was transmitted from several points by a series of improvisations. By midday on Christmas Day the broad details of the disaster were known to officials in Canberra and later that afternoon the Australian public had become aware that a cyclone had struck Darwin and that the city's plight was "grave".

Cover photo: An Italian volunteer carrying donated tents, assisted by Sri Lankans and other volunteers, at a refugee camp Galle, southern Sri Lanka, 17 January 2005. Photo by Paula Bronstein.

EMA
'safer sustainable communities'

The Australian Journal of Emergency Management

Vol 20, No 1, February 2005 ISSN: 1324 1540

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

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

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

The Australian Journal of Emergency Management
Main Road MT MACEDON VIC 3441
Tel: (02) 6295 3662
Email: ajem@ema.gov.au or fax 03 5421 5272
Or visit us online at www.ema.gov.au/ajem
For your free subscription
contact us on the above email.

Contents

Vol 20 | No 1 | **February** 2005

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

FOREWORD
Operation Tsunami Assist

by David Templeman, Director General, Emergency Management Australia

Seldom does an organisation like Emergency Management Australia (EMA) have the extraordinary, though unfortunate opportunity, to contribute on a national basis to a truly international response to a catastrophe as the Indian Ocean tsunami tragedy that touched the world.

EMA was challenged and tested more than at any time since its creation and its first major disaster response 30 years ago when *Cyclone Tracy* devastated Darwin on Christmas Day in 1974.

EMA was first alerted to the massive earthquake off the north-west coast of Sumatra just 16 minutes after it occurred on 26 December 2004. At that time, the advice was benign in terms of a tsunami warning. However, by sundown that day EMA had been alerted the event had caused a tsunami and, as a result, our National Emergency Management Co-ordination Centre (NEMCC) was activated to 24/7. Within 48 hours, some 35 staff had been recalled from holidays across the country.

The NEMCC subsequently become pivotal in its role of co-ordinating the Australian Government's assistance for communities in Indonesia, Thailand, Sri Lanka and the Maldives.

Under the Australian Government Overseas Assistance Plan (AUSASSISTPLAN), humanitarian relief supplies, specialist medical and public health teams, and even engineers, were sent to affected communities. A great deal was learned in the weeks that followed that will certainly enhance the way Australian authorities and our diverse communities respond to a large-scale disaster in the future.

Operation Tsunami Assist involved more than half of EMA's staff who used their emergency management skills in the NEMCC in liaison officer positions in the affected regions overseas. They provided pre-departure briefings for medical and public health teams from jurisdictions, and were involved in multi-agency taskforce planning meetings.

Mark Hilgert, Steven Riley, Donovan Croucamp, Joanne Laurence

This photo, taken by EMA's emergency recovery adviser Don Patterson, who spent two weeks in Jakarta, shows the devastation caused by the Indonesian tsunami in Banda Aceh

Attorney-General Philip Ruddock with Paul Keegan from EMA's Mt Macedon office in the operations centre

Our Attorney-General, Philip Ruddock, also played a major role in approving 19 requests for assistance, made through Australia's Agency for International Development (AusAID).

Through all this intense activity – both at the very highest governmental level and on the ground in the affected regions – what impressed me the most has been the willingness of everyone to commit to co-operation, and to work tirelessly and selflessly to find solutions for the massive problems caused by the tsunami.

This is most encouraging for those of us operating at the core of Australia's emergency management effort.

Not everything has gone as smoothly as we would have wished. Our biggest lesson is likely to be that no plan can ever be so completely devised for such a significant natural disaster. Daily we have had to adapt procedures and protocols and work through tasks assigned with little knowledge of their eventual satisfactory conclusion.

Take the example of the apparently simple request to supply water containers. While all of EMA's humanitarian supplies were assigned on the first two C130 Hercules to fly into Indonesia, we could not have envisaged the difficulty of trying to locate further large supplies of collapsible plastic water containers. Eventually, the containers were located in Europe and at the same time, a large quantity of full two litre bottles of water were donated in Melbourne and shipped out of Hobart on a brand new catamaran on its delivery voyage to France. That's what I call initiative and co-ordination.

For me, the most satisfying of all the elements that EMA had to work through in the first month since the tsunami has been the level of collaborative collegiate effort by our friends in the States and Territories. All, including the EMA team, have responded magnificently to the priorities presented by the calls for help from our Indian Ocean neighbours.

David Templeman
Director General
Emergency Management Australia

After the Wave: a wake up warning for Australian coastal locations

King and Gurtner consider Australia's vulnerability to tsunamis and storm surges

Abstract

In common with much of Asia, most Australians live close to the sea, with a significant portion living in the immediate coastal hazard zone. In Queensland for example 87 percent of the population, over 2.8 million people, live in census collection districts within 30 kilometres of the coast. Of these people, over 400 000 are within one kilometre of the sea (ABS CData2001). It was the one kilometre coastal zone adjacent to the Indian Ocean that bore the impact of the tsunami of the 26th December 2004. The coasts of Asia are as variable as those of Australia, but in all places there is a greater concentration of population, settlements and infrastructure on the flattest and lowest land. This paper looks at the Phuket experience of the tsunami to draw some initial observations and lessons that should influence hazard mitigation in Australia and more generally, in coastal hazardous locations elsewhere in the region. There are four significant sets of issues that will be presented.

1. Critical infrastructure and lifelines in relation to response and recovery.
2. Land use and coastal built structures.
3. Tourists and the tourism industry.
4. Hazard education.

Introduction

In Australia we are as vulnerable as the people of Asia to the sea and its hazards. Tsunamis have occurred on both the western and eastern coasts of Australia, with some major events in the prehistoric past (Bryant 2001). While the west is the most likely coast to experience future tsunamis, our more densely settled eastern coasts could be impacted by tectonic events in the Pacific (Bryant 2001). While we are probably less vulnerable to tsunamis as such, we are by no means exempt from similar impacts from cyclone generated killer waves and storm surges.

Storm surges associated with tropical cyclones can be as destructive as a tsunami. Fortunately the more gradual onset and modern forecasting of a cyclone allows for evacuation of most vulnerable populations and their treasured possessions. However, the buildings and belongings of people living in a storm surge zone (consistent with a tsunami impact zone) would be destroyed as totally as those of the Asian tsunami victims. In many places the tsunami wrought enormous damage and death from one or two waves that were around three metres in height. A storm surge can reach or surpass that height in a severe cyclone, with further wave set up on top of the surge level. Furthermore a storm surge may last for a few hours, when it will continue to batter, erode and undermine, unlike the relative minutes of the tsunami (although informants in Phuket reported that large waves continued to batter the coast and flood the beach roads throughout the rest of Sunday 26th)[1]. While a storm surge rises more slowly than a tsunami it is still a powerful, rapidly rising inundation.

Both tsunamis and storm surges cause enormous damage from the debris they carry as they destroy buildings and vegetation. In the recent tsunami almost twice as many people were injured compared to fatalities as they were battered and swept along in debris-filled waters. The sheer quantity of debris seen in media images, as well as our own journeys to the tsunami affected region, underscore both the turbulent destructive power of water combining with the material projectiles of human structures, furniture, vehicles, vegetation, sand and stones. The tsunami piled cars on top of one another, twisted them into sculptures and carried them hundreds of metres. Fishing boats and

1. David King & Yetta Gurtner visited tsunami impacted areas of Thailand between 30th December and 8th January where they visited tourist locations and gathered information from a range of Thai and foreign informants who represented tourists, business people, volunteers and local residents.

PHOTO BY YETTA GURTNER

The Sofitel Magic Lagoon Resort in the Khao Lak region

even a Thai patrol vessel were deposited far inland. Buildings were demolished and pounded into heaps of rubble. Such images of the tsunami are no different from the images of cyclone, surge and even severe flood.

Thus, what we can learn from the tsunami is not simply about our own exposure and vulnerability to tsunamis in Australia. The much more probable and predictable hazards of cyclone, surge and severe flood can wreak just as much damage to our settlements, structures, infrastructure and livelihoods. In the face of more gradual onset disasters we will hopefully avoid loss of life through timely evacuation from the hazard impact zone.

Many of the lessons that are being learned from this tsunami are concerned with the tsunami warning system itself, the organisation of relief and response in the face of such massive multi-national disasters, and the issues of recovery, reconstruction, rehabilitation and development. Although the current focus and efforts are specific to South Asia and the Indian Ocean it will also influence the way nations and organisations deal with future severe disasters. There are lessons to be learned from this disaster that may be applied to mitigation of hazards in Australia. It may seem slightly insensitive and opportunistic to transfer experience of disaster in a poorer part of the world to mitigation in a developed nation; however, we all have a broader responsibility of mitigation. It is plausible to believe that these lessons we may absorb – primarily from Thailand's experience – are applicable to many parts of the world, especially coastal locations with strong tourist industries.

Members of the Centre for Disaster Studies visited Thailand, South India and the Maldives immediately after the tsunami in an attempt to understand the hazard, its impact, and the response and recovery of affected communities. Phuket and its surrounding tourist dependant provinces of Phang Nga and Krabi, is perhaps the most developed part of the tsunami impact zone. Although its population is much poorer than Australia, the level of development, infrastructure, services and facilities is comparable in many ways to a much more developed country. The Phuket region had a well developed infrastructure on which to draw in the aftermath of the disaster. Also, like many locations in Australia it has developed a high dependence on tourism, principally from developed countries.

Critical infrastructure and lifelines

In Thailand the tsunami waves had a varying impact on coastlines facing west towards the Andaman Sea. Phuket Island is mountainous having small bays on its west coast where the tourist industry has boomed. The tsunami waves behaved differently in each of these bays. People reported and indicated heights of inundation between two and five metres above the beach high water mark. It was also high tide when the tsunami struck the region. The pattern and differing extent of damage served to reinforce the influence and implications of pure physical geography. Some of

PHOTO BY YETTA GURTNER

The beach clean up a week after the tsunami at Patong Beach in Phuket

these beaches sloped upwards steadily from the beach, especially at Patong, although Khamala further north had a greater area of flatland, and thus increased inundation behind the beachside tourist facilities.

At each of the exposed beaches furniture, equipment and personal possessions including beach umbrellas, chairs and even jet skis were destroyed or washed away. Small tourist hotels and guesthouses as well as shops, bars, restaurants and tour operations along the beach roads were severely impacted by the wave. Further back, within as little as 50 to 100 metres inland, especially at Patong, the gently rising land reduced the destructive impact. Larger resorts and especially hotels and businesses away from the beach, experienced much less direct force. The worst effects suffered by many of these places included disruption of electricity and telephone services, possible water contamination and the build up of debris deposits.

North of Phuket in Phang Nga province, the shallow, gently sloping beaches of Khao Lak, experienced a far more severe impact as the waves were much larger—up to 10 metres in height. The extensive flat coastal plain in this region, in some parts over a kilometre to the foot of the hills, resulted in a far greater inundation with an equally increased destructive backwash. Fatalities at the large modern resorts of Khao Lak were very high, both among tourists, resort workers and local residents. Similarly the relatively exposed island of Phi Phi Don and parts of the Krabi coastline experienced devastating impact with high death rates and extensive destruction of buildings.

With the exception of fishing villages at the north and south ends of Khao Lak and Phuket Island, most of the wave's impact zone in Phuket, Phang Nga and Krabi provinces was almost exclusively developed for tourism, accommodation, entertainment and related businesses. The tsunami has severely destabilized the tourist economy of the region, despite the fact that more tourist infrastructure has survived than was damaged. With the majority of the wave's intensity sustained by the structures closest to the coastline, over 80 percent of tourism service providers have remained operational. In the more developed tourist areas of the island, access to drinking water, food and basic services was never seriously jeopardised. While mobile phone services were heavily burdened, they still remained operational.

Official Thai figures almost four weeks after the event recorded 5246 confirmed deaths, 8457 injuries and 4499 people still missing (Wikipedia January 22, 2005). The permanent population of this region is over 820,000 with most of the settlement, services, industry and, in particular, the critical infrastructure, outside the tourist dominated tsunami zone. The immediate post disaster response came from an intact urban infrastructure that included heavy machinery like backhoes, bulldozers and large dump trucks, as well as a vibrant building industry with all of its resources and workers. Additionally there were 19 hospitals in the

region, an international airport, and a fully functioning provincial government that took on the co-ordinating role. The main highways out of Phuket were relatively undamaged by the waves although the tsunami had crossed the highway in several places at Khao Lak that resulted in many deaths.

The local government in Phuket was able to respond rapidly because it was outside the coastal hazard zone. This would not be the case in many Australian tourist centres, particularly the Gold Coast, Hervey Bay, Cairns, Darwin and Broome. In towns such as these, critical infrastructure for response and recovery is directly in the coastal hazard zone (where each of these locations is vulnerable to cyclone and storm surge). Apart from losing critical tourist facilities, local governments would be severely constrained in efforts to provide relief and to lead recovery. The coastline is an essential resource for the tourist industry, but it is an inappropriate zone for health and education buildings, local government offices and facilities, power, community structures and emergency services. The lesson for all places that are reliant on a coastal resource is to begin the long strategic process of moving critical infrastructure and lifelines out of the hazard zone.

Land use planning

Part of the process of relocation of lifelines and infrastructure involves planning decisions and changes in land use. Other problems include the types of tourist structures and their proximity to the beach. The Phuket tourist industry rapidly grew from small cottages, hotels and guesthouses built along the edge of the beach. At the time of the tsunami these appeared to be gradually evolving into larger resorts along the beach roads. The disaster will probably speed up that evolutionary process, as most of the beachfront operations will be uninsured and many will be unable to rebuild. Inevitably people will sell to larger resort operators, while smaller businesses will concentrate where they already are, a block back from the beach.

At Khao Lak Beach many of the large multi-room resort buildings were at direct right angles to the beach. Thus, although first and second floor rooms were flooded and damaged, with people trapped and drowned, the buildings themselves survived largely intact. Between these larger structures and the beach, many of the Khao Lak resorts had also constructed restaurants, bars, and single suited separate cottages and bungalows. These buildings were devastated, in some cases reduced to piles of rubble, slabs tipped on their sides and piles snapped, despite being constructed of block and concrete. Similarly many of the smaller beach front buildings on Phuket had been completely wrecked.

A few days after the disaster, the Thai government released a number of statements regarding the redevelopment of the devastated tourist areas. Together with a greater commitment to environmental preservation and an enforced legislative compliance to accepted building standards—accommodation structures would be required to be 100 metres inland from the beach. The concept is of an open recreational landscaped zone existing between high water and residential buildings, possibly between the beach roads and beach itself. Whether or not that zone will contain restaurants will depend upon the evolving land use plan.

The problem of tourist and residential buildings encroaching too close to a coastal hazard zone is not unique to Phuket. As in Phuket, tourist locations in Australia are rapidly evolving and experience pressure to provide accommodation as close to the beach as possible. As with relocating critical infrastructure, hazard mitigation and reform through land use is inevitably going to be a slow process. Substantially constructed buildings with strong foundations may survive storm surge or even a tsunami, but the majority of beach front residential development or construction of single storey tourist accommodation is not hazard proof. Beach zone recreational areas will not only enhance community amenity, but will also mitigate against coastal hazards. In cyclone prone areas, as on tsunami coasts, we have to back away from the beach, or in heavily urbanised sectors ensure that buildings are substantially hazard proof.

PHOTO BY YETTA GURTNER

Beach front bungalows at Orchid Beach Resort in the Khao Lak area—these types of structures fared particularly badly in the tsunami

Tourism and hazards

Tourist fatalities and ensuing media attention are detrimental to any tourist destination. Phuket's tourist industry has been devastated by both a loss of tourist capacity and a loss of tourist confidence. Risk, whether real or perceived, is a strong deterrent to any traveller. After the terrorist bombing, Bali has taken years to rebuild tourist confidence towards its former economic success. Phuket will face a similar struggle to re-attract tourists, although numerous people (Thais and tourists) expressed an attitude that it was better to deal with a natural disaster or "act of God", rather than the horror of an intentional act of terrorism.

History has consistently demonstrated that the tourist industry is robust and resilient. An adverse perception or problem in any specific destination simply results in a substitution with another destination. The impact of any disaster generally falls on the affected destination rather than the industry as a whole. Thus, for Phuket, there was not just the problem of dealing with the deceased, injured, displaced, and their friends and relatives. There was also the necessity of restoring the tourist location to operational capacity, catering for the remaining tourists and the challenge of attracting back potential visitors.

Much of the recovery of this local tourism sector will depend on the level of lost business. To further intensify the situation, the disaster occurred at what is traditionally the pinnacle of Thailand's peak season. Long-term recovery is dependant on Phuket's tourist industry remaining viable until the mid year low season.

Within days of the disaster a massive clean up of the beaches and beach areas of Phuket had begun to restore the tourist zones. A concerted effort from government, private enterprise (on contract), and businesses renovating their own premises, as well as teams of volunteers had restored most beachside areas to a functional level within eight days. This reinforces the earlier point about the importance of critical infrastructure remaining intact after the hazard. More difficult was the task of countering the media images of horror, disaster and loss, that in the first days after the tsunami, gave the impression to the outside world that all of Phuket was an uninhabitable catastrophe zone with secondary health crises and destroyed infrastructure. In stark contrast to this impression, within two days the hotels association had published – both in print and on the Internet – a comprehensive list of all local hotels and their operational status. By the second week, with most immediate concerns under control on Phuket, Thais were able to persuade media representatives present, as well as the second wave media, to portray more positive stories, including the ongoing tourist industry and the need for potential tourists to maintain their holiday plans.

Education

Clearing up the tourist destination after adversity is only one part of the duty towards tourists. In much of the world, the tourism industry, its operators and service providers, avoid the issue of natural hazard risk to tourists. To a large extent the suddenness and speed of the tsunami made disaster inevitable, but if there had been a warning, and if people had known how to react, perhaps more lives would have been saved. The immediate political and popular response to the tsunami is the need for a warning system similar to that which exists in the Pacific. This is achievable and was endorsed by the UN World Conference on Disaster Reduction in its otherwise vague and general Hyogo Declaration (January 2005). Yet in the week after the tsunami, as we walked around the streets of Phuket and the ruined resorts of Khao Lak, we were faced with the grassroots reality of how to get the warning down to that complex and dynamic level. That problem is a process that is to be determined in each country, province and city that is involved in the warning system.

Even if all of such levels and processes of a warning system are successfully put in place, there still remains the primary issue of how people will respond. Perhaps the most disheartening stories of the tsunami disaster were accounts throughout the region of multitudes of people flooding back onto the beaches after the initial wave retreated and the seas rapidly withdrew. This did not happen in all places. In some locations the tsunami simply rushed in with little or no warning. In Phuket however, people described the sea retreating with a gap of 15 to 20 minutes before the second, larger and most destructive wave hit. If people, both local Thais and tourists, had recognised this as a warning sign, safe evacuation of many people could have occurred. This is exemplified in the story of Tilly, the 10 year old British girl who saved hundreds of lives on a Phuket beach by recognising the warning signs of a tsunami as learnt in school geography.

A warning system only really works if the people, adults and children, are all aware of the meaning of the warning. Research carried out by the Centre for Disaster Studies on people's perceptions of cyclone warnings in North Queensland, and of backpacker tourist knowledge of the cyclone risk (King 2004, Hoogenraad et al 2004), has shown that the population is neither fully knowledgeable of local hazards nor prepared for appropriate behaviour in the event of a natural hazard. Tourists are particularly vulnerable because they are out of their familiar environment, are having fun and trusting in the knowledge and hospitality of their hosts, accommodation and service providers. Such vulnerability is increased where language difficulties exist.

The basic and most fundamental lesson to be learned from the tsunami tragedy is that everyone must be educated and informed about natural hazards. Only if the whole population is aware can the risk be mitigated, warnings understood and appropriately acted upon, and lives ultimately protected and saved. The most fundamental starting point is for local hazard education to occur in all primary schools throughout the world, as a compulsory component of the curriculum. Children will carry some of that knowledge for life, but they also involve and inform their parents, siblings, extended family and community. The importance of education, especially of children, was stressed in both the Hyogo Declaration and the statement of the Special Session on the Indian Ocean Disaster at the UN World Conference on Disaster Reduction, held in Kobe, Japan at the end of January (UN 2005 a & b). Tourists also need to be educated to take greater awareness of the different hazards in the places they visit, while tourism operators and service providers must take responsibility to supplement and reinforce that knowledge, thereby extending their duty of care without liability. At the final level of any warning system local government must accept the responsibility for educating, informing and communicating with its own local population, working in conjunction with them to bring about effective disaster resilient communities.

Conclusion

As the final human, economic, social and psychological costs of this disaster are yet to be determined it is hoped that the world never again experiences such devastation. The reality however, is that as long as people continue to build and develop along the coastline they remain vulnerable to sea related hazards. While tsunamis are currently a topical issue, severe cyclones, storm surges and flooding are just as serious and can be equally destructive. Many of the lessons and experiences of this disaster are pertinent to Australia. The increasing emphasis on disaster reduction through mitigation and preparedness has put greater responsibility on local government and relevant authorities to ensure that such lessons are understood and used to mitigate future contingencies. The tsunami is a warning that reinforces current mitigation efforts, and in particular, the long-term goals of education and the planning of coastal land use.

PHOTO BY YETTA GURTNER

The clean up – a week after the tsunami at Patong Beach on Phuket

References

Australian Bureau of Statistics. 2003. CData 2001. ABS, Canberra.

Bryant, E.A. 2001 Tsunami: The underrated hazard. Cambridge University Press, Cambridge, 320p

United Nations. 2005a. Draft Hyogo Declaration. World Conference on Disaster Reduction, January 2005, Kobe. http://www.unisdr.org/wcdr/

United Nations. 2005b. Draft common statement of the Special Session on the Indian Ocean Disaster: Risk Reduction for a Safer Future. World Conference on Disaster Reduction, January 2005, Kobe. http://www.unisdr.org/wcdr/

Hoogenraad, Wouter, van Eden Ronald & King David. 2004. "Cyclone Awareness Amongst Backpackers in Northern Australia." *Australian Journal of Emergency Management,* Vol 19 No 2.

King D. 2004. "Understanding the Message: Social and Cultural Constraints to Interpreting Weather Generated Natural Hazards". *International Journal of Mass Emergencies and Disasters.* Vol 22 No 1 pp 57–74

Wikipedia. January 22, 2005. Internet Interactive Encyclopaedia. http://en.wikipedia.org/wiki/Main_Page

Authors

Associate Professor David King is Director of the Centre for Disaster Studies and Director of the Centre for Tropical Urban and Regional Planning at James Cook University. The Centre for Disaster Studies has carried out 15 recent post disaster appraisals and carries out research on disaster mitigation and hazard knowledge.

Yetta Gurtner is a postgraduate student with the Centre for Disaster Studies at James Cook University, Townsville. Using Bali, and now also tsunami affected Phuket, as case studies, her current research project is investigating the process of recovery and crisis management in tourist-reliant destinations afflicted by negative perceptions

Towards a consistent approach to disaster loss assessment across Australia

Handmer, Abrahams, Betts and Dawson consider some implications of disaster economics

Abstract

This paper sets out the case for a nationally consistent approach to disaster loss assessment in Australia. Advantages of a consistent approach include the provision of a basis for analysing and comparing disaster events and for evaluating alternative risk management and mitigation proposals. Guides exist but are generally not based on economic principles. Economics in this context is not limited to goods and services conventionally valued in dollars. It includes items of social and environmental value which are not normally bought and sold. The Queensland Department of Emergency Services, other Queensland agencies, Emergency Management Australia (EMA) and the Bureau of Meteorology collaborated with the Centre for Risk and Community Safety at RMIT to produce a set of guidelines and an illustrative case study on loss assessment. The *Guidelines* are being implemented in Queensland and agencies in some other states are examining their utility. Originally developed for inundation hazards within a generic framework, they are now being extended to cover other hazards such as bushfires. The paper describes the *Guidelines,* experience with initial implementation, some issues raised by bushfire loss assessment in Victoria, and suggestions for further development of an approach based on economics.

Disaster loss assessment

Disaster loss assessment is the estimation of losses that have occurred or that could occur as a result of some specified event defined in space and time. It is a critical element of disaster management, as the techniques and estimates of loss assessment support the risk management process. They do this by evaluating risk management strategies and determining relief and recovery needs. Assessment enables a better understanding of the impact of disasters and the type and extent of losses that communities experience. Understanding the causal factors that underlie losses allows synthesis of losses for given risks and assists in evaluation of alternative mitigation strategies. Another important aim is to support the process of resource allocation between places, communities, hazards, and approaches to management. Resource allocation and comparisons across Australia have been hampered by the absence of a standard, agreed approach. As interest in a national approach to disaster mitigation grows – demonstrated by the recent COAG (Council of Australian Governments) agreement on natural disaster management in Australia (COAG 2003) – the need for consistency in loss assessment becomes more urgent.

This paper sets out the limitations of existing guides, and therefore the requirements that a new guide needs to satisfy to constitute a significant improvement. Special attention is given to the importance of an approach based on economics. Economics is not limited to goods and services conventionally valued in dollars; it includes items of social and environmental value which are not normally bought and sold. These requirements form the basis of flood loss assessment guidelines developed in Queensland with a view to wider application across Australia (Queensland Government, 2002a). The development and contents of these *Guidelines* are outlined. Initial reactions by potential users to the *Guidelines* are analysed. To highlight some of the issues that arise in extending the assessment principles to bushfire losses, the 2002–03 Victorian bushfires are examined. Suggestions for further development and extending the application of a nationally consistent approach to loss assessment conclude the paper.

Existing loss assessment guides

There are many guides and approaches to loss assessments in use worldwide but they generally have a number of limitations. In particular, most ignore economic principles, and with some exceptions, are weak on comparability (some commercially available and in-house approaches to assessment may satisfy the comparability requirements). In this context

comparability means that assessments for one location, hazard or mitigation strategy are based on similar assumptions, methodology, data quality and effort.

Existing guides:

- focus on measurement issues only—ignoring the overall process of loss assessment;
- focus on a single hazard;
- often don't consider data quality;
- often ignore intangibles (items not normally bought and sold) and may ignore important losses. Such losses are occasionally the losses of greatest concern to many people. Items which are normally bought and sold and have market prices are known as "tangibles";
- require a high level of specialist knowledge to use;
- usually ignore the principles of economics; and
- are – where they are based on economics – concerned with national rather than sub-national regional and local economies (in this paper "regional" refers to sub-national areas determined by the needs of a particular loss assessment analysis). This becomes important when we are concerned with areas other than the nation, and State and local governments are usually concerned with sub-national areas.

Any new guide needs to address these shortcomings to ensure that it presents a clear improvement.

There is not the space here to examine the principles of risk management or the details of flood loss assessment and how these differ from appropriate practice for other hazards. The key issues with risk management from our perspective are the emphasis on transparency, replicability, consistency, participation and documentation (EMA, 2000; Zamecka and Buchanan, 1999). The relevant distinguishing features of flood loss assessment are set out in the *Guidelines* as well as the two recent BTE[1] reports (BTE, 2001; BTRE, 2002) and are the subject of a vast literature, much of it published by the engineering industry (for example, the US Corps of Engineers), development banks and the project appraisal sector. Flood loss assessment manuals include those by Parker et al.,1987, Penning-Rowsell et al., 1992 and 2003, Thompson and Handmer, 1996, FEMA through HAZUS in the United States, and UK government departments like DEFRA (formerly MAFF). Reviews and critiques include Cochrane (1995), and for developing countries Benson and Clay (2004). Here we comment only on economics and consistency.

In loss assessments *economics* is frequently confused with any analysis based on money. However, an economic analysis is based on a particular set of principles. In defining economics we follow long established UK practice and include intangible losses, such as social or environmental items.

Damage to buildings and infrastructures are only a part of disaster loss assessment

An economic analysis is concerned with the impact of an event on the economy of the area selected for analysis (see the references on flood loss assessment listed above)—also sometimes referred to as a macro economic analysis. Defining this economy in space and time is a key step. For example, we might want to know the impact of a cyclone on the economy of North Queensland. After initial analysis the study area could be defined by a number of local government areas and we would examine the impact on the economy in these areas for the year after the cyclone hit (see Queensland Government, 2002b). (However, in some circumstances we may be concerned with the performance of a sector of the economy which may not be as well defined). A macro economic analysis is not about distributional effects; nor is it about commercial profit and loss.

In contrast a *financial* analysis is usually undertaken to assess the loss from the perspective of a group of enterprises and households—this is sometimes also referred to as a micro-economic analysis. Note that assessments made on the basis of insurance data or assumptions may be higher for tangible losses than those prepared using economic principles. This is because household insurance policies value many damaged items as new ones, rather than at their market

1. Acronyms in this paragraph: BTE/BTRE = Bureau of Transport Economics/Bureau of Transport and Regional Economics (Australia); FEMA = Federal Emergency Management Agency (US); HAZUS = a US loss assessment methodology; EMA = Emergency Management Australia; DEFRA/MAFF = Dept of Environment, Fisheries, Resources and Agriculture/Ministry of Agriculture, Fisheries and Food. UK;

value which would normally be much less. In the work at the London Flood Hazard Research Centre, new (or replacement) value has been assumed to be around double the depreciated or market value. It is unclear whether such assumptions hold in modern households with much high value electronic equipment. Loss assessments do not generally include the "underground" or "black" economy, nor do they include the household or domestic economy. The importance of these parts of the economy in comparison to the formal economy will vary greatly, providing a challenge for precise comparable loss assessments (eg see Syrett et al, 2004).

In summary economic assessment is about:

- losses and gains for all members of a defined economy, rather than individual commercial entities or households;
- changes to economic activity in the defined economy, rather than to components within it. The defined economy would normally be the economy of a specified region;
- counting all impacts on this defined economy, both positive and negative (based on the principles of cost-benefit analysis);
- depreciated rather than replacement values. The interest here is on the market value of the asset or activity damaged by the disaster, not what it might cost to replace it with a new asset. This is in contrast to some insurance policies that offer new for old.

Use of case studies provided practical information to assess economic impact

The *Guidelines* developed in Queensland

Loss assessment guidelines recently developed in Queensland (Queensland Government 2002a; EMA 2002) are designed to overcome the major limitations of existing approaches, while being generally consistent with existing guides based on economic principles (e.g. BTE, 2001). To do this they:

- deal with the whole process of loss assessment through step by step procedures from identifying the purpose of the assessment through to presenting the results;
- can be applied by people without in-depth specialist training or extensive experience in loss assessment;
- support contemporary emergency management by providing an input to the risk management process;
- are based on economic principles;
- cover all types of loss, including direct, indirect and intangibles;
- are applicable to sub-national (or regional) areas as required, not simply to state or the national economies; and
- can be used for loss assessment after an actual event, as well as for estimating losses for disaster scenarios.

While many guides cover some of these features, a combination of three major features makes the Queensland *Guidelines* distinctive:

- the comprehensive step-by-step process of assessment (Figure 1, page 14);
- the focus on sub-national economies, rather than national economies; and
- the emphasis on producing results which are comparable across space and different mitigation strategies, rather than focusing on accuracy for one specific circumstance.

The last emphasis means that the *Guidelines* favour an "averaging" approach where possible rather than pursuing precision – which may be an illusion in any case (Handmer, 2002; Blong, 2002). Not all existing approaches concentrate on precision; the Victorian RAM (Read, Sturgess and Associates, 2000) approach for flood losses is based on an averaging method.

Unique or unusual to the *Guidelines* are:

- its three approaches to assessment;
- its discussion of the actual to potential issue;
- the acknowledgement of the importance of the time dimension in assessment; and
- its option of an analysis fully based on economic principles. All other guides neglect the full implications of economics at the sub-national level (see following "Critical issues and initial feedback").

The *Guidelines* are accompanied by a case study of inundation losses associated with *Cyclone Sid* (January

The principles of economics includes items of social and environmental value not normally bought and sold

1998) in North Queensland (Queensland Government, 2002b). This study was undertaken to assist with the development of the *Guidelines*, to provide a practical example, and to assess the economic impact of the floods on the economy and people of the coastal region from Townsville to Cairns.

The process of developing the *Guidelines*

The development of the *Guidelines* and accompanying case study were supervised by a Project Management Board which represented a range of stakeholder viewpoints including the Queensland Department of Emergency Services, Emergency Management Australia, Queensland Departments of Natural Resources and Mines, Main Roads, Transport, Treasury, and State Development, and the Bureau of Meteorology. The Disaster Mitigation Unit of the Queensland Department of Emergency Services maintained close supervision of all aspects of the project. As the *Guidelines* developed draft manuscripts were examined twice by several external reviewers with specialist expertise. The case study involved extensive consultation with government and non-government stakeholders throughout Queensland.

The principles underlying the *Guidelines*

To satisfy the requirements set out above, the *Guidelines* are underpinned by the following:

- the context is set by the principles of risk management adopted by contemporary disaster management in Australia (EMA, 2000; Zamecka and Buchanan, 1999);
- the principles of economics, including those from cost-benefit analysis where comparisons are to be made, underpin the loss assessment process;
- the *Guidelines* are consistent with other disaster loss assessment guides based on economic principles; and
- the step-by-step procedures in the *Guidelines* are for flood loss assessment. But the economic and other principles of assessment are generic and can be applied to most rapid onset hazards. However, there are important differences between hazards that need to be addressed before the method can be extended to other hazards with confidence.

As far as possible the *Guidelines* are consistent with other disaster loss assessment guides and reports based on economic principles, including the BTE report (2001) *Economic Costs of Natural Disasters in Australia,* and the manuals from the UK's Flood Hazard Research Centre at Middlesex University. The *Guidelines* are generally consistent with, and in places draw on, the Victorian Rapid Appraisal Method (RAM) (Read, Sturgess and Associates, 2000). This approach forms the basis of the "averaging method" set out in the *Guidelines*. They are broadly compatible with the HAZUS methodologies being developed by the US Federal Emergency Management Agency and they can be used in conjunction with computer-based methodologies such as ANUFLOOD (now superseded).

The contents of the *Guidelines*

In addition to much supporting material – some of which are outlined above – the *Guidelines* set out the process of flood loss assessment in 12 steps (Figure 1, page14), with aims and procedures for each step. These steps can be thought of in terms of five broad tasks:

1. Define the purpose, identify the stakeholders and resources available, define the area and time frame (Steps 1–3);
2. Select the type of assessment – averaging, synthetic or survey (Step 4);
3. Establish the information base about the hazard, people, assets and activities, and types of loss (Steps 5–7);
4. Measure the loss (Step 8); and

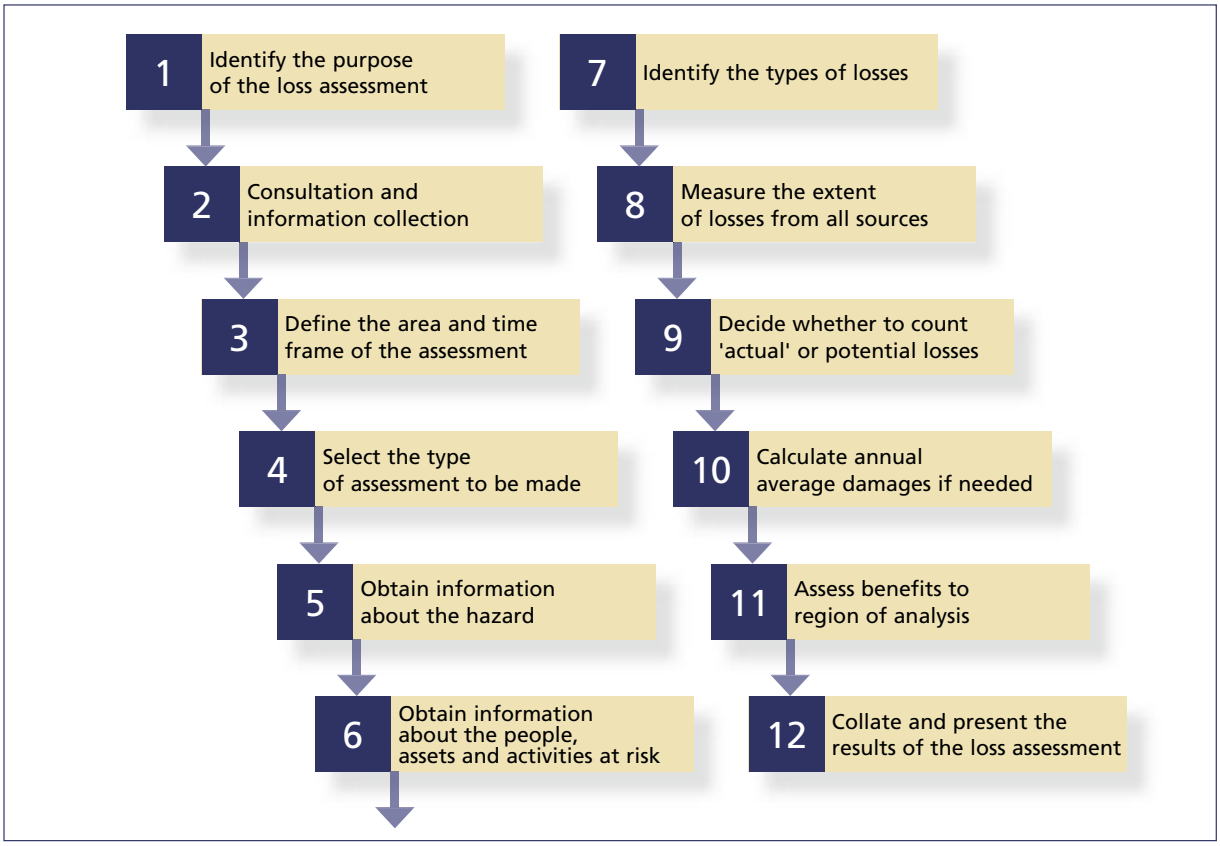


Figure 1. Step-by-step loss assessment process. (From Queensland Government 2002a.)

5. Analyse and present the results to be consistent with the purpose of the assessment. As appropriate consider actual and potential losses, average annual losses, and net economic loss (Steps 9–12).

An additional step not included in the published *Guidelines*, which should be added, is that of dataset improvement and methodological enhancement.

Three general approaches to measurement are set out:

- The *averaging approach,* based largely on pre-existing average data on losses for example an average loss per flooded property is the least expensive and quickest method (e.g. Read Sturgess and Associates, 2000);
- The *synthetic approach,* a detailed assessment based on pre-existing databases covering a range of average building types and contents. Loss tables are often developed theoretically or synthetically as opposed to being based on experience (eg the UK approach as set out in Penning-Rowsell et al., 1992; or the ANUFLOOD computer program); and
- The *survey* or *historical approach,* based on detailed surveys of a recent event to establish the actual loss. A characteristic of this approach is that it incorporates all the unique attributes of the event in question including the details of the response and people's preparedness which includes the time of day etc, making it less suited for comparisons. It is also very sensitive to the resources and expertise used to collect the data. This approach is difficult to use without a recent disaster to generate losses.

The details of applying the approaches are set out in the *Guidelines* which recommend the use of an averaging approach for reasons of comparability, cost and the limited expertise needed to use the approach well. A key issue is obtaining the needed data. For the averaging approach the *Guidelines* set out some data (which may now require updating), and suggest sources for other data. For example, information on Natural Disaster Relief Arrangements (NDRA) payments and insurance payouts provide useful data on certain types of losses provided the limitations of these sources are recognised.

An assessment of the 2003 Victorian bushfires on regional economic activity

A whole-of-government project managed by the Office of the Emergency Services Commissioner (OESC) was tasked with identifying the economic impact of the 2003 north-east Victorian bushfires on regional areas. Calculating a total economic cost should document the magnitude of such a major emergency, which in this case led to 1.3 million hectares being burnt over 59 days (Esplin, 2003). Initial discussions with State and local government personnel showed that the process to provide a final economic loss assessment would be complex. This complexity was due to the varied quality and quantity of available cost and impact assessment data, and to the size and nature of the fire itself. What we discuss here, however, are the processes and

activities involved in the loss and impact assessment itself. The assessment process has the potential for evaluating the mitigation, preparedness and recovery measures undertaken within the event.

The Victorian State Government has a range of financial assistance packages within the State Emergency Recovery Plan for both municipal councils and the public. The Australian Government assists the State Government to provide approved financial assistance to eligible persons and organisations following natural disasters. This arrangement is known as the Natural Disaster Relief Arrangement (NDRA) and is administered through the State Department of Treasury and Finance. While the NDRA has reporting requirements it does not currently provide a framework that would enable an economic impact of a bushfire to be calculated.

Initial reports of the losses resulting from the Victorian bushfires were based on the compilation of cost receipts associated with tangible losses and the cost of services provided within the response and recovery phases. The damage to environmental elements has been measured by the cost attributed to clean-up or recovery rather than on their value to the region's economy.

In each of the local government districts affected directly by the bushfires, the economic value of livestock losses and of tourism activities varied according to the importance of that particular element within a district. Research has documented the negative effects of bushfire smoke on the viticulture industry and local information suggests that tourists who had to change their holiday destinations because of the bushfire have not made a decision to return. The recovery process, which has included the use of available financial grants and support, appears to have relied on the knowledge and preparedness of small business and farm owners. There has been only anecdotal information about the impact of intangible losses such as community event sponsorship, family lifestyle and health.

The nature of the bushfire in certain areas also influenced the type of impact. The slow path of the bushfire toward the east of the State meant that the community, businesses, and industry were on 'stand-by' for lengthy periods of time. During this time the business and agriculture activities of some townships just stopped, waiting for the bushfire to arrive. It appears that the mitigation measures used by emergency services managed to reduce losses significantly in the agriculture sector (fencing, grazing land, livestock and commercial timber).

When the bushfire arrived at a town, most of the economic activity of the town was put on hold while small business and farming personnel took up the tasks of fire fighting. Some businesses continued to operate, particularly those servicing the welfare and accommodation requirements of the emergency service organisations.

The *Disaster Loss Assessment Guidelines* (EMA, 2002) were used to assemble the data and information

Many local businesses and farming activities come to a standstill to allow people to respond to the emergency

The Guidelines *suggest that flood loss assessments are not adjusted for local circumstances*

submitted to the Victorian Ministerial Task Force on Bushfire Recovery 2003. A sector map has been developed to identify both the tangible and intangible economic losses resulting from the bushfire. This map aims to clarify at which level of government, community and agency the impact might be experienced. A whole-of-government approach to this project has also provided access to the loss assessment data collected to date, and has helped the identification of gaps and questions still to be resolved.

The continuing challenge in the development of an economic methodology for bushfire loss assessment which incorporates a cost/benefit analysis, is the inclusion of the following factors:

- the *'recovery over time'* influence;
- the simultaneous impact of events such as drought and soil erosion;
- the State and Australian Government provision of funding and services; and
- the insurance claims made by householders, businesses and farmers.

Critical issues and initial feedback on the *Guidelines*

Feedback and comments on the *Guidelines* have been primarily in two areas:

- the methodology, and
- apparent gaps in assessment knowledge.

Some aspects of the methodology are challenging in the sense that they challenge usual practice. These aspects include the full application of economic principles, the recommended approach to "actual" losses and use of an averaging approach. Any criticisms of the *Guidelines* should be seen in the context of the inherent limitations of all loss assessments (Handmer, 2002).

Full economic loss assessment involves measurement of the net change in the economy under consideration. So an assessment should count the losses to the local economy as well as the benefits from the event being assessed. Benefits to the economy would include insurance and disaster relief funds that flow into the economy from outside. (Note this type of assessment is not interested in benefits and losses to individual firms and households. The interest is on the economy as a whole). To obtain "net economic loss", any benefits to the economy need to be subtracted from the assessed losses. This is the full economic measure of the regional impact of disaster. Also important distributional issues might be ignored. The US General Accounting Office (GAO) examined studies of the economic cost of the September 11 attacks in New York. The GAO endorsed a report that estimated the loss to New York City at about US$83 billion, offset by US$67billion of benefits, for a net loss of about US$16billion (US General Accounting Office 2003). This study included amounts for loss of life.

However, care is needed in the application of net economic loss and it may not be appropriate as an indicator of what should be spent on mitigation. For example, even though the losses from an event may be very large, the net losses may be small, suggesting that mitigation might not be worthwhile and highlighting that economics should be only one component of decision-making. Another issue is that the jurisdiction from which some of the benefits come may be meeting part of the cost of the mitigation. Note that the *Guidelines* do not include intangible losses and benefits as part of the calculation of "net economic loss". This is because the current state of knowledge about

intangibles does not support the level of quantification necessary for this calculation. We suggest that any assessment should calculate the total and net economic losses and then set out why one approach is selected for use. This transparency would highlight local economic circumstances and assist with comparability.

In Australia flood loss assessments are often adjusted for specific local circumstances. The resultant estimates are termed "actual losses" as opposed to "potential" losses. The use of "actual" losses is not recommended by the *Guidelines* in general loss assessments, as they may discriminate against certain groups, and because of a range of methodological issues. However, where the mitigation measure being assessed is a warning system, preparedness, education programs and the like, at the current state of knowledge, the techniques used for assessment may be similar to those for "actual" losses.

Loss assessment methodologies are weakest when grappling with the "intangible" losses of anxiety, health, heritage and cultural losses, environmental damage and so on. Even though the *Guidelines* set out approaches for assessing intangibles where possible, there are many gaps. Filling these gaps is a long-term aim by drawing on relevant research and practice across areas such as health, heritage and transport.

Another important lesson from the Queensland case study concerns the quality and availability of data. Data quality is a universal issue so it is not surprising that some problems were identified. Some information was not located in space making it difficult to be sure that it was tied to particular events or waterways. Data sets held by different groups sometimes used quite different start and end dates for the same flood event. Some losses were presented for an event as a lump sum, making it impossible to determine the components of loss or to verify the loss estimates. Some loss estimates provided to us used doubtful assumptions and procedures. Improved documentation of data sources and calculations would help this situation.

Conclusions—broadening the application of the *Guidelines* across Australia

The disaster loss assessment *Guidelines* are designed to help achieve consistency, comparability, rigour in terms of economics, and accessibility. They have been drawn up to be consistent with – while being quite different from – the main existing or emerging loss assessment approaches based on economic principles in Australia, the UK and the USA. As a whole they set out a distinctive approach in attempting to overcome the main shortcomings of existing guides. However, they are far from fully developed.

Further progress with loss assessment in Australia depends on developments in three main areas:

- *Extending the methodology to other hazards.* Although the published *Guidelines* are based on principles which are generic across most hazards, they deal primarily with flood loss assessment. To make the approach useful across Australia, hazards important in different parts of the country need to be included. Work has started on extending the approach to bushfires through the Bushfire CRC (www.bushfirecrc.com), as well as through the work of the Victorian OESC and other organisations.
- *Filling in the knowledge gaps for intangible losses.* Proper inclusion and assessment of intangibles depends on their identification and estimation. Improvements in assessment will require research in the areas of health, environment, heritage and so on. Work on other types of hazards such as wildfire, may help with some areas of intangibles.
- *Achieving consistency across Australia.* This does not mean achieving a detailed uniform approach, but one that produces comparable results. Most effort however needs to be directed at working with authorities across Australia to gain acceptance of the idea of loss assessment based on economic principles, and on the need to collect appropriate data.

Other issues are also important such as attention to data quality, consistency and availability—but these are subsidiary to the areas listed above in that much can be done now through the averaging approach. One important cross-cutting issue concerns a perception by some officials that application of the *Guidelines* and other approaches to disaster loss assessment based on economics is unnecessarily complex, difficult and resource intensive. This may argue for a more straightforward approach that preserves the essence of the principles set out here, while work continues on the development of more comprehensive loss assessment procedures.

Acknowledgements

An earlier version of this paper was presented at: *Safer sustainable communities: The 2003 Australian Disaster Conference,* 9–12 September in Canberra. Thanks to Oliver Percovich of the Centre for Risk and Community Safety, RMIT, who helped write that version. Our appreciation goes to the several conference participants who provided useful suggestions, and to the AJEM referees.

The development of the *Disaster Loss Assessment Guidelines* and the accompanying case study were funded by the Queensland Department of Emergency Services, Emergency Management Australia and a number of Queensland Government Departments. John Handmer was engaged to lead the work. The authors of the *Guidelines* and case study received assistance from many individuals and organisations.

They would like to extend special thanks to the then Disaster Mitigation Unit, Department of Emergency Services, Queensland, the members of the Project Management Board, James Cook University's Centre for Disaster Studies, those who reviewed the draft *Guidelines*, Mike Tarrant of EMA, and Oliver Percovich and Cassia Read of the Centre for Risk and Community Safety.

References

Benson, C. and Clay, E. (2004) *Understanding the economic and financial impacts of natural disasters.* Washington DC: World Bank.

Blong, R. (2002) Estimating residential flood damage. In Smith, D.I. and Handmer, J. (eds) *Residential flood insurance: the implications for floodplain management policy.* Canberra: Water Research Foundation: 175–200.

BTE (Bureau of Transport Economics) (2001) *Economic Costs of Natural Disasters in Australia.* Report 103. Canberra: Bureau of Transport Economics (Now BTRE).

BTRE (Bureau of Transport and Regional Economics) (2002) *Benefits of flood mitigation in Australia.* Report 106. Canberra: Bureau of Transport and Regional Economics.

COAG (Council of Australian Governments) (2003) Natural Disasters in Australia: reforming mitigation, relief and recovery. Canberra: Department of Transport and Regional Services.

Cochrane, H. (1995) The Economic Impact of Earthquake Disasters. Presented at the conference: *Wellington After the Quake: The Challenge of Rebuilding Cities.* Wellington, New Zealand. March 27-29.

EMA (Emergency Management Australia) (2000) *The Australian Emergency Risk Management Applications Guide, Part II, Approaches to Emergency Management, Volume I, Risk Management,* Emergency Management Australia, Canberra

EMA (2002) Australian Emergency Manuals Series. Part III Emergency Management Practice. Volume 2 – Guidelines. Guide 11. *Disaster loss assessment Guidelines.* Qld-Department of Emergency Services and Emergency Management Australia. (Written by Handmer, J. Read, C. and Percovich, O.)

Esplin, B. (2003) *Report of the inquiry into the 2002–2003 Victorian bushfires.* Department of Premier and Cabinet, Victoria.

FEMA - HAZUS, Natural Hazard Loss Estimation Methodology, Federal Emergency Management Agency, URL http://www.fema.gov/hazus/hazus4a.htm (last accessed 6/5/02)

Handmer, J. (2002) The chimera of precision. *International Journal of Mass Emergencies and Disasters.* 20(3): 325-346.

Parker, D.J., Green, C.H., and Thompson, P.M. (1987) *Urban Flood Protection Benefits: A Project Appraisal Guide,* Gower Technical Press, Aldershot.

Penning-Rowsell, E.C., Green, C.H., Thompson, P.M., Coker, A.M., Tunstall, S.M., Richards, C., and Parker, D.J. (1992) *The Economics of Coastal Management: A manual of assessment techniques.* Gower Technical Press, Farnborough

Penning-Rowsell, E.C., Johnson, C., Tunstall, S.M., Tapsell, S., Morris, J., Chatterton, J., ., Coker, A.M., Green, C.H. (2003) *The benefits of coastal defence: techniques and data for 2003.* Flood Hazard Research Centre, Middlesex University.

Queensland Government (2002a) *Disaster loss assessment Guidelines.* Qld-Department of Emergency Services and Emergency Management Australia. (Written by Handmer, J. Read, C. and Percovich, O.)

Queensland Government (2002b) *Disaster loss assessment case study.* Qld-Department of Emergency Services and Emergency Management Australia. (Written by Percovich, O. and Handmer, J.)

Read, Sturgess and Associates (2000) *Victorian Rapid Appraisal Method* (RAM).

Syrett S, Evans M, and Williams C. (2004) Report on the black economy for the UK Office of the Deputy Prime Minister. Reported on 19 August 2004 in http://news.bbc.co.uk/go/pr/fr/-/1/hi/uk_politics

Thompson, P. and Handmer J. (1996) *Economic Assessment of Disaster Mitigation: An Australian Guide,* Centre for Resource Environmental Studies, ANU and Flood Hazard Research Centre, Middlesex University, for the Australian IDNDR Committee

US GAO (General Accounting Office) (2003) *Review of Sept 11 loss assessments.* Washington DC: US GAO.

Zamecka, A. and Buchanan, G. (1999) *Disaster risk management.* Brisbane: Department of Emergency Services.

Authors

John Handmer is Innovation Professor of Risk and Sustainability, and Director of the Centre for Risk and Community Safety at RMIT University. He is an Adjunct Professor at the Australian National University and holds a research position at Middlesex University, London. He works on social, economic, legal and policy aspects of disaster, risk and vulnerability management.

Jonathan Abrahams previously worked as Manager, Emergency Response and Disaster Management, Humanitarian and Emergencies Section, AusAID, and held various positions in Emergency Management Australia. He specialises in disaster reduction and disaster health aspects of emergency risk management. Jonathon's current position is in Preparedness for Deliberate Epidemics, World Health Organisation, Geneva.

Robyn Betts is Manager Research Projects Unit, Office of the Emergency Services Commissioner in Victoria. Robyn has been with the OESC for five years in areas of research and evaluation of community warning systems, tourism and emergency management and socio-economic impact assessment of emergencies for local government.

Mark Dawson holds postgraduate qualifications in science, planning, and management. He's co-authored two books and published over 30 refereed papers in international journals. Mark is Manager Strategic Development Services, SA Fire and Emergency Services Commission.

One chance only: advocating the use of archaeology in search, location and recovery at disaster scenes

Soren Blau argues for the inclusion of forensic archaeologists in emergency situations

Abstract

The public has traditionally perceived the discipline of archaeology as being concerned with ancient ruins, treasure hunting and Egyptian mummies. While archaeology may have suffered from a perception problem, there is no doubt that the discipline plays a valuable role in providing evidence about both recent and distant past cultures. In the last decade archaeology has extended its utility into forensic, human rights, and mass disaster scene investigations. Archaeology has proven itself to be an effective investigative tool both nationally (particularly in North America and the UK) and internationally (in the investigation of war crimes in, for example, Bosnia and Croatia). To date however, there has been limited use of archaeological techniques in these areas in Australia. As with archaeology, the key issues in the investigation of disaster scenes are response and recovery. This paper examines the ways in which archaeologists can potentially contribute to an effective disaster scene response in Australia. The paper highlights the need for the formation of a professional body of forensic archaeologists who can be called upon to work with emergency services. Efforts to establish such a group are outlined.

Introduction

It is obvious that crime and disaster scene investigators are well experienced and equipped to undertake the necessary recording of such scenes. The aim of this paper is to discuss the relatively new discipline of forensic archaeology and illustrate how the forensic archaeologist may potentially augment the collection and recovery of evidence. Enhancing collection and recovery procedures complements the Australian concept of disaster management which calls for a comprehensive approach, embracing prevention, preparedness, response and recovery (Anon 1996: 11).

Archaeology has been defined as the study of the past from its material remains. The discipline of archaeology has been overwhelmed by a perceptual problem, often being associated with ancient ruins, the exploits of Indiana Jones or Lara Croft, treasure hunting, tomb raiding and Egyptian mummies. Despite these popular (mis)conceptions, archaeology is a professional occupation for which you require a university degree and develop a suite of specialised skills. The professional archaeologist has research skills, is competent in survey, excavation, recording techniques and report writing, and often offers a specialist analysis such as that of human remains.

It is perhaps ironic that the excavation (or pillaging) of monuments to the dead in antiquity was the basis for the development of the discipline of archaeology. Today, archaeology is being employed to investigate death in the relatively new, yet rapidly expanding discipline of forensic archaeology. Forensic archaeology (distinct from forensic anthropology) (Skinner et al., 2003: 82–83) is defined as the application of archaeological field techniques within a legal context, and is concerned with the understanding, recognition, control and interpretation of space, site history, site formation and the context and attributes of (usually) buried features and evidence (artefacts) within a defined area (Connor and Scott 2001: 5; Hunter 1994: 758; Skinner 1987: 272).

Archaeology has been of interest to disaster and crime scene investigators because forensic science, crime scene investigation and archaeology have similar aims and objectives: that is, to reconstruct previous human actions by searching for, recovering and preserving physical remains, whether they be objects, corpses or residues. Although the time periods may be different, the philosophy and procedures are much the same (Dirkmaat and Adovasio 1997: 40).

History of forensic archaeology

Forensic archaeology developed in the United States of America (USA) under the wing of forensic anthropology, where the utility of human skeletal remains for personal identification was recognised as early as the 19th century (Davis 1992; Ubelaker 2000: 41). It was not until the early 1970's that anthropologists advocated the need for contextual information that could be provided by archaeologists about where and how the remains were recovered in order to aid personal identification (Morse et al., 1976; Skinner and Lazenby 1983; Haglund 2001). The need for controlled excavation by trained professionals became obvious as a result of the increasing number of cases involving buried remains that did not get to court due to poor recovery through excavation of evidence by unskilled personnel (Hunter 1999: 210; Morse et al., 1984: 53). While forensic anthropology has a well-established history and has become increasingly popularised as a result of the media (Black 2000: 491; Crist 2001: 38), forensic archaeology has only relatively recently emerged as a distinct discipline (cf. Hunter 2002: xxv) with increasing options for professional training in North America and Britain.

Archaeology has proven itself to be an effective forensic sciences tool both domestically and internationally in North America, Britain and other parts of Europe. Archaeologists have assisted in the investigation of local domestic murder cases (Hunter et al., 1996; Sauer et al., 2003; Spenneman and Frank 1995) and multiple fatalities resulting from natural disasters such as floods, forest fires, and earthquakes (Sledik and Rodriguez 2002), and human induced events such as transportation accidents (Rhine 1998: 236-237), building fires (Sweeney 2003), or terrorist incidents (Gould 2002).

Since the mid-1980s archaeologists have also been employed to investigate genocide and human rights abuses (e.g., Connor and Scott 2001: 1-6; Doretti and Snow 2003; Morse et al., 1976; Schmitt 2002; Skinner 1987; Skinner et al., 2003; Wright 1995). Over the past 15 years the United Nations (UN) and human rights organisations such as the Physicians for Human Rights (PHR) have recruited archaeologists to exhume individual and mass graves associated with investigations of political killings, war crimes and genocide in over a dozen countries worldwide (Stover and Ryan 2001: 7). These include Argentina, Bolivia, Brazil, Colombia, East Timor, El Salvador, Ethiopia, Guatemala, Haiti, Iraqi Kurdistan, French Polynesia, Peru, Rwanda, the Republic of South Africa, the Solomon Islands and the former Yugoslavia (Connor and Scott 2001: 11).

While archaeologists are increasingly becoming part of the crime/disaster scene investigation team in North America and Britain, their potential to enhance investigations has not yet been fully recognised in Australia. A number of professionals with expertise in biological anthropology (many of whom have archaeological skills) have assisted police in forensic-related work involving identification of human remains in Australia or its near neighbours (Blau 2004). Apart from sporadic cases (McDonald and Ross 1990), little use has been made of archaeologists in the investigation of forensic or disaster scenes in Australia.

In an attempt to improve this practice, the author co-ordinated the Australian-Forensic Archaeology Recovery (Aus-FAR) Foundation Workshop in August 2003 at the University of Adelaide. This workshop brought together professional archaeologists and representatives from emergency and forensic services to discuss the ways in which forensic archaeologists can contribute to the search, location and recovery of human remains and other evidence from disaster and crime scenes in Australia. A total of 26 people attended the workshop over the two days. The first day consisted of a series of formal presentations, followed by an informal discussion group on the second day. Apart from Tasmania, Queensland and the ACT, all States and Territories were represented. The following disciplines and agencies were represented at the meeting:

Profession/Agency	Number	Paper presented
Archaeologist (some with anthropological expertise)	16	Yes x 3
Anthropologist	2	Yes
Soil scientist	1	No
Fire Service	1	Yes
South Australia Police (Physical evidence)	3	Yes
Australian Federal Police (Physical evidence)	2	No
Emergency Management Australia	1	Yes
Total	**26**	**7**

The workshop created a forum, which for the first time in Australia, allowed different yet overlapping disciplines dealing with forensic excavations to come together to augment their practice. The workshop resulted in a decision to develop a formalised database of names of professional archaeologists, which has been circulated to some forensic and emergency services. This register provides emergency and forensic services with a list of qualified professional archaeologists, who, in the event of an emergency, can be called upon for their expertise. The aim is to expand the database and make it available to as many emergency and forensic services in Australia as possible.

What can the archaeologist offer?

Archaeologists are able to contribute to three (overlapping) areas of an investigation: search and location, recovery and excavation and, consequently, identification.

Search and location

The search for, and location of evidence (buried or otherwise) is often aided by remote prospection. The basic techniques employed are:

- field craft which lies at the core of the archaeologists experience and training (Briggs and Wood 1988: 268);
- understanding of geology, landscape and environment; and
- identification of buried sites from topographical, vegetational and shadow anomalies for which innovative search pattern systems have been devised for forensic work (Hunter 1994: 763; Hunter 2002: xxx).

The investigation of the so-called Moors Murders provides a good example of the way in which archaeological techniques enhanced the search and location of evidence. In the early 1960s Ian Brady and Myra Hindley abused, tortured and ultimately murdered at least five children in the Manchester area of northern London. Despite extensive searching and digging by police on Saddleworth Moor, only three of the five victims were recovered in 1965. It was not until the re-investigation of the murders between1986-1988 that archaeological methods were employed (Hunter 1994: 758) resulting in the recovery of another victim.

Recovery and excavation

The use of archaeological techniques in the recovery and excavation phase of an investigation ensures that maximum evidence (with limited contamination) is recovered from a scene. All evidence (fragmentary or otherwise) and their association with other evidence are recovered and recorded. This includes recording important environmental data that is later used in the analysis of the remains or by entomologists, botanists, and other specialists. The archaeologist provides the ability to disclose and record spatio-temporal relationships within a site and relocate the site and features within the site for future investigation. Such approaches have enormous significance for the reconstruction of peri and post-mortem events and ultimately to the identification of the victim(s) (Dirkmaat 2002). It should be stressed that the process of excavation is essentially controlled destruction and is therefore an unrepeatable experience. If excavation at a scene or site is to be undertaken trained archaeologists should be present.

'Clean up' efforts following disasters can sometimes hamper identification processes

A good example of the utility of the archaeologist at a disaster or crime scene is the investigation of the site of the World Trade Centre in New York, following the act of terrorism on September 11th 2001. Archaeologists were not included as part of the initial investigation process and consequently bodies and body parts were scooped up resulting in huge commingling. Once archaeologists were permitted to work (which was not until March 2002 well after the substantial "cleanup" efforts), they contributed through their recognition and recording using a GPS of highly fragmentary skeletal remains well beyond the boundaries of "ground zero" (Gould 2002: 11). This recognition not only provided evidence as to the extent of the devastation, but also contributed evidence important to the final victim identification.

Similarly, the involvement of an archaeologist in the examination of a fire scene can significantly enhance the investigation (Dirkmaat and Adovasio 1997: 48). Much information can be garnered from the in-situ identification of charred and modified human remains including:

- the location and orientation of the body during the fire;
- an accurate and efficient identification and collection of fragmentary cremated human (and animal) skeletal elements;
- field identification and documentation of observed pre-cremation trauma; and
- evidence of the fire intensity or duration from effects on bones.

Archaeologists were able to contribute to victim identification after the World Trade Centre disaster in 2001

Post-mortem damage that may occur as part of the recovery process (and complicate the determination of peri vs. post-mortem damage) is avoided using archaeological techniques (ibid). This is particularly important when interpreting (or proving) factors such as:

- Coercion: through the employment of meticulous excavation it is possible to recover evidence such as in-situ ligatures indicating that the hands were tied behind the victim's back. Without archaeological recovery, ligatures may be lost or slip. A loose rope, out of context, cannot necessarily be considered a ligature.
- Violence: for example, high velocity gunshot wounds often result in extreme bone fragmentation. Without recovery of all bone fragments, reconstruction of the wound defect would be impossible (ibid).
- Mode of approach to the scene: meticulous excavation can reveal, for example, tyre tracks which can be linked to the vehicle used to deposit the body/ies.
- Mode of digging the grave: archaeological techniques can determine where, for example, the perpetrator stood, when disposing of the body/ies.

Employment of basic archaeological principles of stratigraphy (the study of the layers of the earth known as strata) in the recovery process also provides the ability to assess the relative timing of events, that is, the *terminus ante quem:* time before which an event must have occurred and the *terminus post quem:* time after which an event must have occurred. For example, during the resurfacing of a road a skeleton was uncovered. The grave was cut into an existing ditch dug for a drain system. Using archaeological principles and knowledge about the dates of the digging of the ditch for the drain (1958) and the construction of the road (1962), it was possible to narrow down the search for missing persons to dates between 1958 and 1962 (P. Cheetham pers. comm 2002).

Archaeologists are also familiar with scientific techniques that are useful in determining the timing of events. A good example is the work of the Australian forensic archaeologist Emeritus Richard Wright (see also Hunter 1994: 762). In 1990 Professor Wright archaeologically investigated WWII mass graves in the Ukraine on behalf of the Australian Government's prosecution of war criminals (Wright 1995). He was able to radiocarbon date surviving human hair to test if it showed effects of the hydrogen bomb. Combined with evidence from bullet cases with the year of manufacture imprinted on them, Wright was able to demonstrate that the event was prior to 1952 but after 1941.

Identification

The ultimate aim in both a disaster and crime scene investigation is the personal identification of the victim(s). The success of identifying an individual based on badly decomposed or skeletonised human remains depends largely on the completeness of the material. It is therefore fundamentally important that complete and accurate recovery of skeletal parts is undertaken and information about their associations with one another and other items recorded. Such recovery relies on an appreciation of the notion of the context of the evidence and controlled excavation employing archaeological techniques (Dirkmaat and Adovasio 1997: 39). Excavation is controlled destruction and is

an unrepeatable experience. It is therefore vital that any excavation is undertaken by professionals.

Summary

The ability of the archaeologist to enhance the investigation of a crime or disaster scene can, in summary, be attributed to professional experience. Because of the nature of the discipline of archaeology, professionals are trained to recognise and recover complex features from a wider variety of site types. Consequently, when approaching a crime or disaster scene, archaeologists are adept at appreciating the notion that there is no such thing as a typical scene: each situation is unique (Skinner and Sterenberg in press; Spennemann and Franke 1995). The ability to be flexible in the planning of site investigation impacts on choices about the size of the area excavated and the employment of appropriate equipment. These decisions have the potential to save time (and therefore money) and to ensure that maximum evidence is collected. While police investigators are competent to sketch, photograph and collect evidence on the ground surface, rarely do they employ the same techniques underground.

Further, most archaeologists will have excavated numerous human remains in their career, under different conditions and in different soil environments. The efficiency and effectiveness of a search may therefore be enhanced through the archaeologist's ability to make rapid in-the-field evaluations of any potentially significant bone (complete or fragmentary/human or non-human), and to determine the forensic significance of human remains by establishing the type and association of artefacts and physical evidence (including human bones) to depositional environment (i.e. context).

Conclusion

Clearly, "the practice of archaeology is applicable beyond its traditional role" (Davis 1992: 152). It is hoped that this paper has shown the clear benefits law enforcement and emergency service agencies can gain from the use of forensic archaeology. While North America, Britain and parts of Europe actively include archaeologists in the investigation of crime and disaster scenes, and substantial literature on the benefits of such an inclusion exist (Briggs and Wood 1988; Dirkmaat and Adovasio 1997; Hunter 1994; Morse et al., 1984; Skinner and Lazenby 1983; Ubelaker 1989), Australia is yet to realise the potential of consolidating forensic archaeology as a discipline. Unlike Scotland which has a six-hour custody law that potentially impacts on the time taken to undertake an excavation (and therefore the employment of professional excavators—Hunter 2002: xxviii), Australia does not have these time constraints. The inclusion of a qualified and skilled professional archaeologist in the investigation of a crime/disaster scene is therefore possible and has the potential to improve the accuracy in evidence collection, increase the probability of collecting all physical evidence, and prevent post-mortem damage to the evidence (including human remains) (Dirkmaat and Adovasio 1997: 57).

The forensic archaeologist must, however, participate in an investigation in a reliable, ethical and lawful manner, appreciating that the work of any specialist is complementary to that of another. Archaeologists have an obligation to understand and work within the protocols and methodologies of disaster and crime scene investigation (Hunter 1994: 759). Forensic archaeology is not therefore, simply the transferral of archaeological skills into the forensic arena (Cox 1998: 21–22). For this reason formal training for archaeologists interested in contributing to the forensic field is necessary. The development of forensic archaeology is therefore, a two-way exercise. Forensic and emergency service agencies need to be aware of the benefits archaeology can offer, and archaeologists need to understand the objectives and constraints which govern forensic and emergency practices (Hunter 1999: 211). Education and training are required so that mutual trust can be developed between the expert and the investigatory agencies. It is hoped that through the formation and future expansion of Aus-FAR, archaeologists will begin to be more readily included in forensic and emergency investigations.

References

Anon. (1996). *Disaster Recovery.* The Australian Emergency Manual Series. Department of Defence, Canberra.

Black, S. (2000). Forensic osteology in the United Kingdom. In: Cox, M. and Mays, S. (Eds.) *Human Osteology in Archaeology and Forensic Science.* Greenwich Medical Media, London, pp: 491–503.

Blau, S. (2004). Forensic archaeology in Australia: Current situations, future possibilities, *Australian Archaeology* 58: 11–14.

Briggs, CA. and Wood, WB. (1988). Recovery of remains. In: Clement, JG. and Ranson, DL. (Eds.) *Craniofacial Identification in Forensic Medicine.* Arnold, London, pp: 267–271.

Connor, M. and Scott, DD. (2001). Paradigms and perpetrators, *Historical Archaeology* 35(1): 1–6.

Cox, M. (1998). Criminal concerns: a plethora of forensic archaeologist. *The Archaeologist* 33: 21–22.

Crist, TAJ. (2001). Bad to the bone? Historical archaeologist in the practice of forensic science. *Historical Archaeology* 35(1): 39–56.

Davis, J. (1992). Forensic archaeology. *Archaeological Reviews from Cambridge* 11(1): 152–156.

Dirkmaat, DC. (2002). Recovery and interpretation of the fatal fire victim: The role of forensic anthropology. In: Haglund, WD and Sorg, MH. (Eds.) *Advances in Forensic Taphonomy: Method, Theory and Archaeological Perspectives.* CRC Press, Baca Raton, pp: 451–472.

Dirkmaat, DC. and Adovasio, JM. (1997) The role of archaeology in the recovery and interpretation of human remains from an outdoor forensic setting. In: Haglund, WD.

Forensic archaeology students excavating mock grave. Forensic archaeology field school, UK

and Sorg, MH. (Eds.) *Forensic Taphonomy: The Post-Mortem Fate of Human Remains.* CRC Press, London, pp: 39–64.

Doretti, M. and Snow, CC. (2003). Forensic anthropology and human rights: The Argentine Experience. In: Steadman DW. (Ed.) *Hard Evidence: Case Studies in Forensic Anthropology.* Upper Saddle River, New Jersey, pp: 290–310.

Gould, RA. (2002). WTC Archaeology: what we saw, what we learned, and what we did about it. *The SAA Archaeological* Record, November: 11-17.

Haglund, WD. (2001). Archaeology and forensic death investigations. *Historical Archaeology* 35(1): 26–34.

Hunter, J. (1994). Forensic archaeology in Britain. *Antiquity* 68: 758-769.

Hunter, J. (1999). The excavation of modern murder. In: Downes, J. and Pollard, T. (Eds.) *The Loved Body's Corruption: Archaeological Contributions to the Study of Human Mortality.* Cruithne Press, Glasgow, pp: 209–223.

Hunter, J. (2002). Foreword: A pilgrim in archaeology – a personal view. In: Haglund, WD and Sorg, MH. (Eds.). *Advances in Forensic Taphonomy: Method, Theory and Archaeological Perspectives.* CRC Press, Baca Raton, pp: xxv–xxxii.

Hunter, J., Roberts, C. and Martin, A. (1996). *Studies in Crime: An introduction to Forensic Archaeology.* Batsford, London.

Kirschner, RH. (1989). The role of forensic scientists in the documentation of human rights abuses. *Legal Medicine:* 59–91.

McDonald, JJ. and Ross, AC. (1990). Helping the police with their inquiries: archaeology and politics at Angophora reserve rockshelter, N.S.W. *Archaeology in Oceania* 25(2): 114–121.

Morse, D., Crusoe, D. and Smith, HG. (1976). Forensic archaeology. *Journal of Forensic Science,* 21(2): 323–332.

Morse, D., Dailey, RC., Stoutamire, J. and Duncan, J. (1984). Forensic archaeology. In: Rathburn, TA. and Buikstra, JE. (Eds.) *Human Identification: Case Studies in Forensic Anthropology* Illinois, Springfield, pp: 53–63.

Rhine, S. (1998). *Bone Voyage: A Journey in Forensic Anthropology.* University of New Mexico Press, Albuquerque.

Sauer, NJ., Lovis, W., Blumer, ME. and Fillion, J. (2003). The contributions of archaeology and physical anthropology to the John McRae case. In: Steadman, DW. (Ed.) *Hard Evidence: Case Studies in Forensic Anthropology.* Upper Saddle River,New Jersey, pp: 117–126.

Schmitt, S. (2002). Mass graves and the collection of forensic evidence: genocide, war crimes and crimes against humanity. In: Haglund, WD and Sorg, MH. (Eds.) *Advances in Forensic Taphonomy: Method, Theory and Archaeological Perspectives.* CRC Press, Baca Raton, pp: 277–292.

Skinner, M. (1987). Planning the archaeological recovery of evidence from recent mass graves, *Forensic Science International* 34: 267–287.

Skinner, MF. and Lazenby, RA. (1983). *Found! Human Remains: A Field Manual for the Recovery of the Recent Human Skeleton.* Archaeology Press. Simon Fraser University, Burnaby, B.C.

Skinner, M., Alempijevic, D. and Djuric-Srejic, M. (2003). Guidelines for international forensic bio-archaeology monitors of mass grave exhumations, *Forensic Science International* 134: 81–92.

Skinner, M. and Sterenberg, J. (In press). Turf wars: authority and responsibility for the investigation of mass graves. *Forensic Science International.*

Sledik, PS. and Rodriguez, WC. (2002) *Damnum fatale:* The taphonomic fate of human remains in mass disasters. In: Haglund, WD and Sorg, MH. (Eds.) *Advances in Forensic Taphonomy: Method, Theory and Archaeological Perspectives.* CRC Press, Baca Raton, pp: 321–330.

Spennemann, DHR. and Franke, B. (1995). Archaeological techniques for exhumations: a unique data source for crime scene investigations. *Forensic Science International* 74: 5–15.

Stover, E. and Ryan, M. (2001). Breaking bread with the dead", *Historical Archaeology* 35(1): 7–25.

Sweeney, T. (2003). Brunonians involved in nightclub fire investigation, *George Street Journal* http://www.brown.edu/Administration/George_Street_Journal/vol27/27GSJ26b.html (accessed 10/07/03).

Ubelaker, DH. (2000). Methodological considerations in the forensic applications of human skeletal biology. In: Katzenburg, MA. and Shelley, R. (Eds.) *Biological Anthropology of the Human Skeleton.* Wiley-Liss, New York, pp: 41–67.

Wright, R. (1995). Investigating war crimes: The archaeological evidence. The Sydney Papers 7(3): 39–44.

Acknowledgements

I am grateful to Superintendent Andy Telfer (Forensic Services Branch, SA Police) for providing me with the opportunity to present a version of this paper in the session on Disaster Victim Identification at the Australian Disaster Conference, National Convention Centre, Canberra in September 2003. I am also grateful to the reviewers for comments on the content of this paper.

Author
Dr Soren Blau has recently taken up a position as a forensic anthropologist with the Victorian Institute of Forensic Medicine (Dept of Forensic Medicine, Monash University. She previously held an Australian Research Council Postdoctoral Research Fellowship (Flinders University) where she applied a range of osteological analytical techniques to investigate subsistence patterns of past populations from Central Asia. Blau is also involved in the development of forensic archaeology in Australia, and has lectured in a Master of Science programme in forensic archaeology and forensic anthropology (Bournemouth University UK).

When good intentions turn bad: promoting natural hazard preparedness

Paton, Smith and Johnson examine indicators of personal emergency preparedness and present a model for conceptualising the implications

Abstract

Despite considerable expenditure on public hazard education, levels of natural preparedness remain low. Building on natural hazard and health research about protective behaviour, a social cognitive model of hazard preparedness is proposed. The model commences with factors that motivate people to prepare, progresses through the formation of intentions, and ends in decisions to prepare or not prepare. Variables implicated at each stage are identified and their role described. The model was tested by examining earthquake preparedness. Analysis suggests that the reasoning process that leads to preparing or not preparing represent discrete processes. The implications of the model for conceptualising and assessing preparedness are discussed, as are implications for risk reduction and communication.

Introduction

Central to contemporary emergency planning is the use of risk management principles to promote resilience to natural hazards. At the individual-community level, resilience describes a capacity to maintain levels of functioning following significant disruption by hazard activity using available resources (Paton, 2000; 2004). Promoting the availability of resources will thus play a key role within a resilience strategy. Being prepared (e.g storing water, securing high furniture, preparing a household emergency plan) minimises the risk of injury and damage within a household. It also facilitates a capability for coping with the temporary disruption associated with hazard activity. Because it represents a significant predictor of the capacity to adapt to unforeseen circumstances, it is important to develop strategies to promote the adoption and maintenance of hazard preparedness measures and activities.

Recognition of the ineffectiveness of public information programs in this regard (Lindell & Whitney, 2000; Paton, Smith & Johnston, 2000) has stimulated more detailed research on preparedness behaviour. One approach that is gaining currency in the literature involves examining the utility of social cognitive models of protective behaviour (Duval & Mulilis, 1999; Grothmann & Reuswig, in press; Paton, 2003) to predict preparedness. This paper describes the testing of a social cognitive model (Paton, 2000; 2003) that argues that preparedness represents the outcome of a three-stage reasoning process: motivation to prepare; forming intentions to prepare, and their conversion into actual preparation (Paton, 2003). This model was tested in regard to preparedness for earthquake hazards.

The motivation phase: precursor variables

Consistent with existing theoretical and empirical work, risk perception (Sjöberg, 2000) was included as a precursor variable. It was assessed with a measure used extensively in New Zealand (Johnston et al, 1999). Two additional precursors were proposed. Research on community response to adversity identified critical awareness (the extent to which people think and talk about hazards) as an important precursor and was assessed using a measure described by Dalton et al. (2001). Anxiety about earthquakes may reduce the likelihood that people will prepare (Duvall & Mulilis, 1999; Lamontagne & LaRochelle, 2000), and a measure specifically developed for this study was included as precursor variable. It is argued that if risk perception, critical awareness and hazard anxiety are present at appropriate levels, people progress to the next phase, with intention formation being influenced by another set of variables (see figure 1, page 27).

Intention formation variables

The model postulates that once motivated, people make judgements regarding whether their actions will mitigate hazard effects (Outcome Expectancy). If the latter judgement is favourable, whether or not a person forms intentions to prepare is a function of the level of their self-efficacy beliefs (beliefs regarding personal capacity to act) (Duval & Mulilis, 1999; Lindell & Whitney, 2000; Paton, Johnston & Houghton, 2001). Self-efficacy also influences the number and quality of

action plans, and the amount of effort and perseverance invested in risk reduction behaviours (Paton, 2003). Given the need to maintain preparedness to deal with infrequently occurring hazards, the latter is a particularly important variable. A role for action coping being linked to preparedness (Duval & Mulilis, 1999; Lindell & Whitney, 2000; Paton et al., 2001) led to its inclusion (figure 1). These variables were assessed as follows:

- outcome expectancy and intentions (Bennett & Murphy, 1997);
- self-efficacy (Schwarzer, 1992); and
- action coping (Carver et al, 1989).

The inclusion of intention also introduces a need to consider whether intent is converted into actual behaviour.

Linking intentions and preparation

According to the model, even if favourable intentions are formed, they may not be acted on if people transfer responsibility for their safety to others (Duval & Mulilis, 1999; Lindell & Whitney, 2000; Paton, Smith & Johnston, 2000), or do not feel a sense of belonging (low sense of community) to their neighbourhood (Paton et al., 2000). It could also be disrupted by a lack of trust in information sources or by the infrequency of hazard activity (Paton, 2003). These variables were assessed as follows:

- trust (Dillon & Phillips, 2001);
- perceived responsibility (Mulilis & Duvall, 1995); and
- sense of community (Bishop et al, 2000).

Travel disruptions and freight transport can be disrupted by rail lines buckled by earthquake

Preparedness measure

Preparedness items were selected from the Mulilis-Lippa Preparedness Scale (Mulilis, Duval, & Lippa, 1990). A decision to use a subset of the items was made for several reasons (Paton at al, 2003). While assisting an ability to cope with disruption, some items may not be indicative of a decision to prepare for earthquakes. For example, while people may have 'three days food', this may reflect their shopping habits (i.e., they purchase groceries every few weeks for convenience) rather than a decision to prepare for earthquakes, and may not be indicative of a belief in the importance of storing food specifically for emergency use. Similarly, people could have a torch in case of power cuts, a battery radio because they like listening to it while gardening, and so on.

Caution must be exercised with regard to assuming the presence of items with multiple functions, or which reflect different decision processes, as indicative of either a capacity to cope with disruption or peoples' beliefs regarding the importance of preparedness. The inclusion of such items could also result in overestimating preparedness and confound analysis of the reasoning processes that underpins it (Paton at al, 2003). For this reason, items that more accurately reflect decisions to specifically safeguard the household from disruption were selected. These were:

- securing cabinet doors with latches;
- securing tall furniture, heavy items, and water heaters;
- preparing and maintaining a household emergency plan; and
- preparing and regularly checking an emergency kit and its contents.

Method

Data were collected from 600 randomly selected homes in each of Gisborne, Pahiatua, Wanganui, and Blenheim (New Zealand). The sample was compiled from rates databases to maximise the number of home owners surveyed. Homeowners were targeted because, irrespective of their attitude to preparedness, renters may be unable to adopt some preparedness measures (e.g., fixing furniture to walls, securing hot water cylinders, making structural changes to chimneys, etc) because their lease precludes such activities. They may also be less inclined to do so if they perceive their tenure in a given property as temporary (e.g., looking for somewhere else to live, temporary employment, etc).

Of 2400 questionnaires distributed in September 2001, 660 were returned (27.5%). In the phase two survey, in February 2002, 640 were returned (27%). The subdivision of data collection into two phases was important. The distribution of the phase one questionnaire could be construed as a form of hazard preparedness education. The two-stage data collection

process represented a more objective analysis of the predictive relationship between intentions (tested at Time One) and subsequent preparedness (tested at Time Two). Matched data from 197 respondents who responded to both surveys provided sufficient numbers to test the predictive capabilities of the model.

Analysis

Structural equation modelling (SEM: using the LISREL 8.5 method of structural modelling Bollen, 1987) was used to determine the dimensional structure of the measures derived and the structure of the relations among them (Bollen & Lennox, 1991; Marcoulides & Schumaker, 1996). For each measure, a structural (dimensional) analysis of the indicators was undertaken. A factor analysis, using maximum likelihood estimation of the structural loadings, was applied to each set of indicators. Confirmatory factors analysis, using phase two data from the 197 respondents who completed both questionnaires, confirmed that the psychometric properties of the scales were sufficient for analyses to proceed. These estimates of scale reliabilities were used to model the relations among the variables.

The model prescribes a set of relations (paths) among variables based on the hypothesised causal ordering of their influences on each other. SEM simultaneously determines the reliability of each item, hence each measure, and the magnitude of the paths specified among the structural variables. The index of fit for the model is affected by the dimensionality of measures and the specification of the paths. SEM provides a statistical means for testing the fit of a proposed path structure to the data and thus provides a plausible account of how the variables affect each other. Collecting data from the same individuals on two separate occasions afforded a more objective test of the preparedness process.

Results

Factor analysis revealed that both the anxiety items and the intention items could be resolved as two separate scales. The former are described as Earthquake Anxiety (1) and Earthquake Anxiety (2). Intentions are described as 'Intention to Prepare' and 'Intention to Seek Information'.

With regard to the phase one analysis (figure 1, phase 1), the model provided a good fit for the data (χ^2 = 20.3, df = 18, p=0.32). The figures adjacent to each arrow represent their independent contribution to the relationship and provide an indication of the relative weighting of each variable within the process. Phase one data supported the conclusion that risk perception, critical awareness and earthquake anxiety motivate preparedness, and that outcome expectancy, self efficacy and action coping mediate its relationship with intentions.

'Intention to Prepare' and 'Intention to Seek Information' differed in regard to the paths supporting their formation. Critical awareness demonstrated direct and indirect relationships with both, reiterating its importance as a motivating factor (see figure 1). The relationship between outcome expectancy and 'Intention to Seek Information' was mediated by self-efficacy. Outcome expectancy had a direct relationship with 'Intention to Prepare', and an indirect relationship mediated by self-efficacy and action coping (see figure 1). The latter is consistent with the hypothesized model. The existence of 'Intention to Seek Information', and the paths from which it is derived, were not predicted.

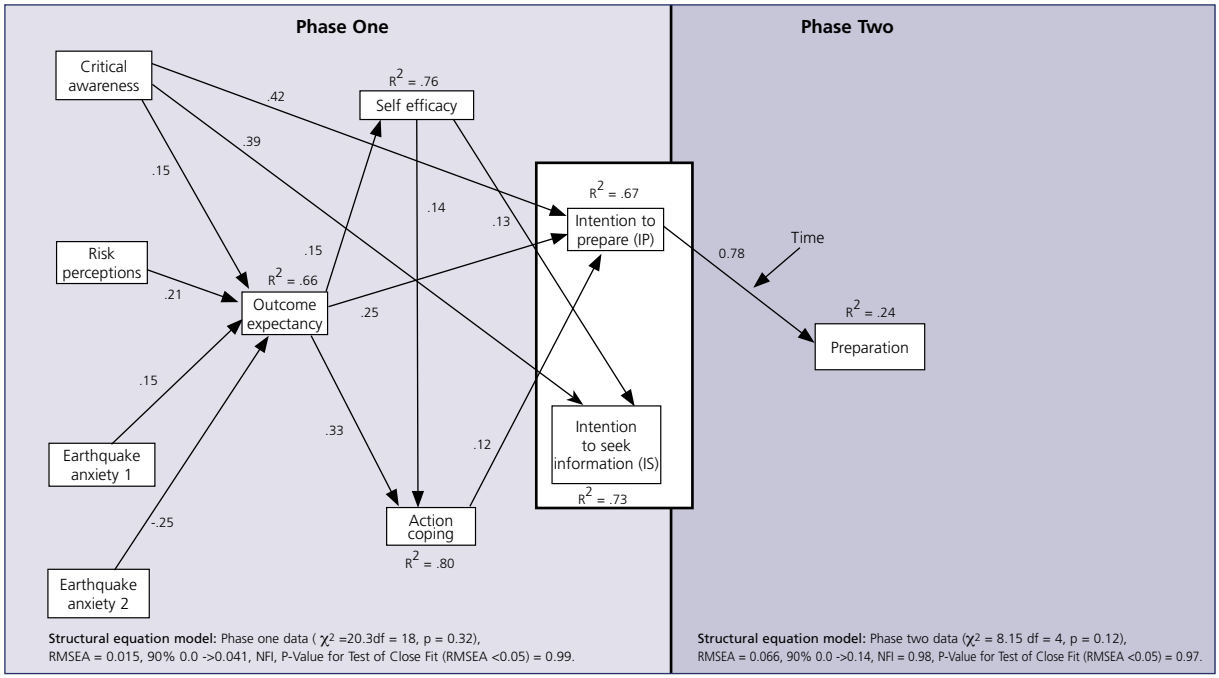


Figure 1: Combined phase one and phase two structural models

While the house at the centre of the photograph has been damaged, those around it have remained relatively intact. Differences in quality of construction or maintenance can help explain the uneven distribution of damage. This highlights the importance of including building checks and regular maintenance in an earthquake preparedness plan and rectifying any problems to minimise damage

In the phase two analysis (figure 1, phase 2), the model provided a good fit for the data (χ^2 = 8.15, df = 4, p=0.12) and confirmed the importance of the distinction between 'Intention to Prepare' and 'Intention to Seek Information'. Only 'Intention to Prepare' predicted earthquake preparedness. In contrast, 'Intention to Seek Information' represented an end point, and did not, either directly or indirectly, predict preparedness.

Moderated regression analyses were used to test for moderators. For 'Intention to Prepare', only 'Time' moderated this relationship (Beta = -0.132, p=0.034). People who anticipate the next damaging earthquake occurring within 12 months were more likely to prepare. Those who anticipate this occurrence within a longer time frame were less likely to prepare even if they had formed intentions to do so.

The analyses failed to confirm a moderating role for sense of community and response efficacy. While not confirmed as a moderator, personal responsibility exercised a direct influence on preparedness, accounting for an additional 5 percent of the variance in preparedness. Similarly, a moderating role for trust was not forthcoming but it may have had a direct impact on 'Intention to Seek Information'.

Discussion

Conceptualising earthquake preparedness as a social-cognitive process can contribute to understanding hazard preparation decisions. The analysis confirmed that preparation should be conceptualised as three separate, but linked, phases: motivation to prepare, formation of intentions, and the conversion of intentions into actions.

Earthquake Anxiety (2) acts to reduce the likelihood that people will begin the preparedness process. That is, it

Having good foundations to your house and ensuring that the house is secured to its foundations can minimise the risk to a house

inhibits the person from embarking on the preparedness process in the first place. The existence of such an overtly inhibitory mechanism has not been considered in previous preparedness research.

Critical awareness, risk perception and anxiety (1) represent outcomes of reasoning processes that result in judgements that motivate people to commence the preparation process. They predict outcome expectancy. Intentions were predicted by outcome expectancy, self-efficacy and action-coping judgements, with outcome expectancy preceding efficacy judgements. However, the process was more complex than originally anticipated. This complexity was attributed to the nature of the intentions evoked within the process.

The finding of a distinction between 'Intention to Prepare' and 'Intention to Seek Information' was significant. They represent discrete variables, are influenced by different pathways in the model, and hold different relationships to preparedness. Only 'Intention to Prepare' predicts actual preparedness. The relationship between 'Intentions to Prepare' and preparing was moderated by the timing of the next damaging earthquake. The relationship between 'Intention to Seek Information' and adjustment adoption was moderated by trust in sources of information.

The discrete nature of these stages suggests that the reasoning that leads to forming 'Intentions to Prepare' and that leading to forming 'Intentions to Seek Information' are qualitatively different. This distinction has significant implications for conceptualising the preparedness process.

The fact that each intention was predicted by different pathways signals a need for additional analysis of the nature of the reasoning and judgements underlying the development of each (Paton at al 2003). This difference indicates that decisions to prepare and decisions not to prepare represent the operation of discrete reasoning processes. These data suggest that it may be inappropriate to conceptualise preparedness in a continuous manner, with 'not preparing' at one end and high levels of preparing at the other. Rather, this finding raised the possibility that each outcome is driven by different decision or reasoning processes. This has implications for risk communication.

Current approaches to promoting preparedness assume it exists on a scale from low to high levels, and that any intervention will result in a movement towards greater preparedness. The present study casts doubt on these assumptions. Firstly, it is important to acknowledge that some people may be inhibited from engaging in the process in the first place. In this study, earthquake anxiety (2) was implicated in this regard. Secondly, the existence of two discrete processes that hold different relationships with preparedness suggests that one set of strategies is required to facilitate

The risk of damage to a house and injury to its inhabitants can be minimised by securing the roof and internal fixtures such as high bookcases and mirrors

hazard preparedness and another to reduce 'not-preparing'. Strategies intended to promote preparing will be rendered ineffective if received by those whose prevailing reasoning supports decisions not to prepare. Thus, a specific set of strategies will be required to counter 'not-preparing' reasoning before it will be possible to actively encourage preparedness.

Differences in the content of each of the three stages have implications for risk communication and preparedness strategies. Strategies should mirror the developmental process described here:

- motivating people to prepare (precursor variables),
- facilitating the formation of intentions (intentions formation variables), and
- promoting the conversion of intentions to preparedness (moderator variables).

No one intervention strategy will be capable of facilitating change in all stages and their constituent variables. For example, providing information, based on sound risk communication principles may facilitate change in risk perception, outcome expectancy, and the timing of hazard events. Simply providing information is less suitable for changing critical awareness, self-efficacy, action coping, or trust, where strategies based on social justice principles, participation and empowerment are more appropriate (Paton, 2000; Paton, 2004). Information based strategies will also be less effective for those for whom earthquakes are a source of anxiety. The management of this anxiety must precede other change strategies. The fact that critical awareness predicts both outcomes calls for more analysis of this variable. Attitudinal and normative influences may prove fruitful in this process (Paton et al, 2003).

A need for additional research into the role of personal responsibility and trust is suggested by the possibility of their direct roles in predicting 'Intention to Prepare' and 'Intention to Seek Information' respectively. Finally, this

model was validated for home owners. Additional work is required to examine this issue for renters who tend to be less well prepared (Burby et al, 2003).

References

Bennett, P. & Murphy, S. (1997) *Psychology and health promotion.* Buckingham, Open University Press.

Bishop, B., Paton, D., Syme, G. & Nancarrow, B (2000) Coping with environmental degradation: Salination as a community stressor. *Network,* Vol. 12, pp 1–15.

Bollen, K. A. (1987). *Structural equation modeling with latent variables.* New York, Wiley.

Bollen, K., & Lennox, R. (1991). Conventional wisdom on measurement: A structural equation perspective. *Psychological Bulletin,* Vol.110, pp 305–314.

Burby, R.J., Steinberg, L.J. & Basolo, V. (2003) The tenure trap: The vulnerability of renters to joint natural and technological disasters. *Urban Affairs Review,* Vol. 39, pp. 32–58.

Carver, C.S., Scheier, M.F., & Weintraub, J.K. (1989) Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology,* Vol. 56, pp. 267–283.

Dalton, J.H., Elias, M.J. & Wandersman, A. (2001). *Community psychology,* Wadsworth, Belmont, CA.

Dillon, J. & Phillips, M. (2001). *Social capital discussion paper,* Unpublished manuscript, Curtin University, Perth, Western Australia.

Duval, T.S. & Mulilis, J.P. (1999). A Person-Relative-to-Event (PrE) Approach to Negative Threat Appeals and Earthquake Preparedness: A field study, *Journal of Applied Social Psychology,* Vol. 29, pp.495–516.

Grothmann, T. & Reussweig, F. (in press) People at risk of flooding: Why some residents take precautionary actions while others don't. Natural Hazards.

Johnston, D.M., Bebbington, M., Lai, C-D, Houghton, B.F., & Paton, D. (1999) Volcanic hazard perceptions: Comparative shifts in knowledge and risk. Disaster Prevention and Management, 8, 118–126.

Lamontaigne, M. & La Rochelle, S. (2000). Earth scientists can help people who fear earthquakes, *Seismological Research Letters,* Vol. 70, pp. 1–4.

Lindell, M.K. & Whitney, D.J. (2000). Correlates of household seismic hazard adjustment adoption, *Risk Analysis.* Vol. 20, pp.13–25.

Marcoulides, G.A., & Schumacker, R.E. (Eds.). (1996). *Advanced structural equation modeling: Issues and techniques.* Mahwah, NJ, LEA.

Mulilis, J-P., and Duval, T.S. (1995), Negative threat appeals and earthquake preparedness: a person-relative-to-event (PrE) model of coping with threat. *Journal of Applied Social Psychology,* Vol. 25, pp. 1319–1339.

Mulilis, J-P., Duval, T.S., & Lippa, R. (1990) The effects of a large, destructive local earthquake on earthquake preparedness as assessed by an earthquake preparedness scale. *Natural hazards,* Vol. 3, pp. 357–371.

Paton, D. (2000). Emergency Planning: Integrating community development, community resilience and hazard mitigation, *Journal of the American Society of Professional Emergency Managers,* Vol. 7, pp.109–118.

Paton, D., (2003) Disaster Preparedness: A social-cognitive perspective. *Disaster Prevention and Management,* Vol. 12, pp. 210–216.

Paton, D. (2004) Preparing for disaster: Integrating risk, resilience and vulnerability perspectives. In T. Pool (Ed) Vulnerable Communities and Emergencies: The Emergency Management Conference 2004. Melbourne: Emergency Services Foundation

Paton, D., Johnston, D., & Houghton, B. (2001). Direct and vicarious experience of volcanic hazards: Implications for risk perception and adjustment adoption, *Australian Journal of Emergency Management,* Vol. 15, pp.58–63.

Paton, D., Smith, L.M. & Johnston, D. (2000). Volcanic hazards: Risk Perception and Preparedness, *New Zealand Journal of Psychology,* Vol. 29, pp.84–88.

Paton, D., Smith, L.M. & Johnston, D. (2003). A Means-End Chain Theory Analysis of Hazard Cognitions and Preparedness. Wellington: New Zealand Earthquake Commission.

Schwarzer, R. (1992) Self-efficacy in the adoption and maintenance of health behaviours: Theoretical approaches and a new model. In R. Schwarzer (ed) *Self-Efficacy: Thought control of action.* Washington: Hemisphere Publishing Company, pp. 217–243.

Sjöberg, L. (2000), Factors in risk perception, *Risk Analysis,* Vol. 20, pp. 1–11.

Authors

Douglas Paton is a Professor in the School of Psychology, University of Tasmania. His research involves modelling resilience to natural hazards and using the outcomes of this work to contribute to developing hazard research policy and planning and hazard readiness and reduction strategies.

Leigh Smith is Head of the School of Psychology, Curtin University. His work focuses on modelling hazard preparedness and readiness measures.

David Johnston is a geologist with the Institute of Geological and Nuclear Sciences, New Zealand. He researches warning effectiveness for natural hazards.

Volunteers in public health and emergency management at outdoor music festivals (Part 2): a European study

Earl, Parker, Edwards and Capra use outdoor music festivals to consider aspects of volunteer capacity

Abstract

Volunteers working at outdoor music festivals (OMFs) throughout the world can be subject to public health risks. To reduce these risks it is important that volunteers have the capacity to undertake their responsibilities safely. For this study, volunteer capacity is discussed at two levels. As a group, adequate volunteer capacity includes having sufficient knowledge, skills and experience to perform designated tasks. Individually, adequate volunteer capacity is having a good awareness of potential problems, an understanding of control measures and knowledge of roles, responsibilities and emergency procedures.

This study provides a detailed account of volunteer capacity at a prominent OMF in Europe (referred to as 'study festival' from here on in). On the whole, the volunteers in the study reported good knowledge in public health and emergency management at the study festival with the majority having good volunteer capacity. This volunteer capacity was gained through:

- tailored training programs offered by the organisers prior to the festival,
- previous experience volunteering; and
- a proportion also having experience from the health industry.

A similar study was undertaken in Australia and was reported in *The Australian Journal of Emergency Management,* November 2003 (Earl, Stoneham, Capra, 2003). When the findings from the two studies were compared, the European participants had better overall volunteer capacity. In relation to skills, a notable difference between the two study festivals was that the European volunteers had been given training tailored to meet the demands of the work at that festival. The findings from the European study strongly support the introduction of training programs for volunteers working at OMFs.

Introduction

There are many mass gatherings throughout the world that rely almost solely on volunteer labour for the provision of services. A considerable number of these events are outdoor music festivals (OMFs). OMFs differ greatly from most other events as they are usually held in rural settings, rely on temporary infrastructure and services, include camping for patrons and attract very large crowds. At these events, the volunteers contribute to a range of services such as crowd and fire safety, campsite management and entry and exit control. Without question, volunteers are crucial to the successful and safe operation of these festivals. However, there are risks to those who volunteer (see Emergency Management Australia 2003). This risk is increased if the volunteers do not have the capacity to undertake their responsibilities.

This article reports on a study involving volunteers at a large European OMF and builds on the findings from a similar study undertaken at an Australian OMF (Earl, Stoneham and Capra, 2003). This study was designed to assess the volunteers' knowledge and skills in public health and emergency management.

Background of the study festival

The study festival selected was a popular event located in a rural setting that was instigated in the early 1970s. Since that time the event has grown and now caters for more than 150 000 patrons. The festival has more than 800 traders and 250 performers on four main stages, 10 large marques and numerous other stages (Mendip District Council 2000; Lakin, Brown & Williams 2001). In recent history this event has faced major public health and safety challenges that have had significant impacts on the future of the event (Mendip District Council 2000). The event organisers responded to

these challenges by introducing numerous management initiatives including training programs for the volunteers at the festival.

The study festival relies on up to 2000 volunteers to undertake roles including crowd management, parking and traffic management, entrances and exits, fire safety, campsite management and operating security lock ups and information centres (Glastonbury Festival Limited 2002). Candidates must meet three simple criteria to be able to volunteer at the study festival. They must be at least 18 years of age, capable of standing for long periods of time and physically able manoeuvre a person on to their side (ACCESS 2003).

Training programs for volunteers at OMFs are not common (Glastonbury Festival Limited 2002). The training programs offered through the study festival were tailored to the expected level of responsibility, complexity and level of supervision for each volunteer position. The training was undertaken by the volunteers prior to deployment at the study festival. It was delivered by qualified trainers and met the requirements of the draft British Standard (BS8406) for the training and development for outdoor event staff. These programs cover topics including customer care, social skills, site rules, emergency procedures, reporting and communication (ACCESS, 2003; Glastonbury Festival Limited 2002; National Outdoor Events Association 2004).

Method

The study

A cross sectional design was used for this study involving survey methods for the collection of self-report data (Morton, Hebel & McCarter 1990, Portney & Watkins 1993). The study was conceptualised as an exploratory study and, as such, no formal hypothesis testing was undertaken (Bouma 1996).

The study measures volunteer capacity using two sets of criteria. Firstly according the Health and Safety Executive (HSE), the volunteer population should have adequate skills to perform designated tasks with appropriate levels of knowledge, experience and also some professional expertise (HSE 1997 cited in HSE 2003). Secondly according to the findings from a study undertaken by Au et al (1993), the volunteers should also be aware of problems that may arise and have an understanding of the control measures and awareness of roles, responsibilities, contingency and emergency procedures.

One of the market areas at the festival

The findings from the European study festival were then compared with findings from a similar study in Australia (Earl, Stoneham and Capra, 2003).

The sample

A convenience sampling method was used to recruit participants into the study (Portney & Watkins 1993; Streiner, Norman & Munroe-Blum 1989). Due to security concerns at the festival, access to the volunteers was only permitted via a volunteer co-ordinator. The volunteer co-ordinator distributed the questionnaire on the second day of the three day festival and the collection process was undertaken over the subsequent two days. The volunteer co-ordinator was requested to approach only volunteers who had received training. A total of 50 volunteers agreed to participate in the study.

Survey questionnaire

The questionnaire was developed to collect self-report data on volunteer capacity at OMFs and consisted of a combination of closed and open questions. The questionnaire had been used successfully for an earlier Australian study so no pilot testing was required (Earl, Stoneham & Capra 2003).

The questionnaire comprised four sections. The first section related to demographic information. This included age, gender, experience in volunteering and usual occupation. The second section focused on public health hazards and control measures. The third section focused on emergency management for the festival. The final section focused on volunteer confidence in dealing with emergency situations.

Statistical methods

As this was an exploratory study with little statistical testing employed, only findings that were considered statistically significant or notable (greater than 10% differences between the variables) have been reported. The associations between variables are summarised in tables showing counts and percentages.

Representativeness of the sample

Basic demographic data was collected via the questionnaire. Volunteer training records were kept in a secure data base by the training organisation and were not directly available to the researcher. However demographic data from this study was referred to the training organisation that provided advice on the representativeness of the sample collected. When compared to the volunteer training

data base there was an over sampling of females and older age groups in the study (personal communication 22nd November 2003).

Results

Adequate skills to perform designated tasks

Only volunteers who had undergone the training programs were recruited into the study. Data was collected on additional abilities of the study cohort. These additional abilities were gained through previous experience volunteering at OMFs and the type of work usually undertaken. In the study cohort there were volunteers with extra abilities gained through professional experience from:

- health related industries (23 percent);
- previous experience volunteering at the study festival (50 percent); and
- other OMFs (22 percent).

Twenty six percent of the participants reported no other abilities or experiences beyond the training offered by the festival organisers.

Awareness of problems that may arise

Awareness of problems (public health and safety hazards)

The participants were asked to identify the main public health and safety hazards likely to impact on the areas where they worked. Ninety-two percent of the participants reported hazards associated with the festival. The most commonly reported hazards were vehicle related hazards, aggressive behaviour of patrons, waste management and fire related hazards. The remainder considered that the festival was well managed and there were no likely hazards (refer to Figure 1).

Figure 1. Priority hazards identified

Public health hazards identified	Hazards identified
Vehicle related hazards	20.0%
Aggressive behaviour from the patrons	14.0%
Waste management related hazards	14.0%
Fire related hazards	12.0%
Drug & alcohol related behavioural hazards	6.0%
Medical conditions	6.0%
Trips and falls (due to uneven ground)	6.0%
Crowd safety	4.0%
Contamination of the water safety	4.0%
Inadequate lighting	2.0%
Dust nuisances	2.0%
Sun exposure	2.0%
None – well managed	8.0%
TOTAL	**100%**

Volunteer briefing

Understanding control measures for identified hazards

The participants were considered to have an understanding of control measures if they could identify measures used at the study festival and identify their involvement. Sixty-seven percent of the participants who identified hazards also had an understanding of the control measures used to manage these hazards at the study festival.

The participants provided examples of the control measures used at the study festival to manage the identified hazards. For example the control measures reported by the participants used to improve vehicle safety for the camping areas included:

- limiting vehicle movements within camping areas;
- redirecting vehicles away from camping areas; and
- enforcing the speed limits set for the festival.

Previous experience of volunteering at OMFs was associated with this awareness. Over 60 percent of the participants who had previous experience volunteering at the study festival and 75 percent of those who had volunteered at other OMFs had an understanding of control measures used at the study festival. Comparatively, only 38 percent of the participants without experience volunteering at the study festival and 53 percent of the participants without experience at other OMFs, reported understanding the control measures used.

Awareness of roles, responsibilities, contingency and emergency procedures

Emergency management at the study festival

The following relates to volunteer awareness of emergency management for locations in the study festival. The participants were asked if they had an awareness of the festival's emergency management plan (EMP) and their responsibilities within this plan.

Vehicle safety was a major concern according to the volunteers (volunteers in the yellow safety vests)

They were also asked if they could identify the person responsible for localised emergency co-ordination.

(a) The festival Emergency Management Plan

The greater proportion of the participants (82 percent) indicated an awareness of the festival's EMP. The remaining participants indicated that they had either no awareness of any EMP or offered no comment. Ninety-five percent of the participants with awareness of the EMP also had an understanding of their responsibilities within that Plan.

(b) Localised emergency co-ordination

Eighty percent of the participants were able to correctly identify the person responsible for the co-ordination of emergency responses within their individual work areas. The remainder either did not know who that person was or provided no response.

Previous experience volunteering at the study festival was associated with increased knowledge of localised emergency co-ordination. Over 90 percent of the participants who had volunteered previously at the study festival could identify an emergency co-ordinator compared to 73 percent of those without that experience.

Emergency situations and volunteer confidence

The participants were asked to identify the emergency situation they were most likely to encounter at the study festival. The participants identified a total of eight different emergency situations that they might encounter. The most commonly reported situations were crowd crushes, fire incidents, and dealing with a variety of medical conditions (refer to Figure 2).

Figure 2. Types of potential emergency issues

Emergency situation identified	Responses
Crowd crushes (including overcrowding and pinch points)	22.0%
Fire incidents (involving tents and resulting burns)	22.0%
A variety of medical conditions (including dehydration, exhaustion and cardiac arrest)	22.0%
Patron violence (caused by ticket issues or drugs or alcohol)	8.0%
Injuries caused by vehicle	8.0%
Extreme cases of sunburn	2.0%
Emergency evacuation	2.0%
Food poisoning	2.0%
No issue or response given	12.0%
Total	**100%**

The participants were asked to rate their level of confidence (ranging from 'not confident' to 'very confident') to deal with an emergency situation at the study festival (refer to Figure 3). Overall, 94 percent of the participants considered they would respond with some level of confidence if an emergency situation arose in the areas worked. From this group, almost half reported having a very high level of confidence

Figure 3. Distribution of confidence levels of volunteers

Not confident	Undecided	Confident	Quite confident	Very confident	Total
2.0%	4.1%	22.6%	24.6%	46.7%	**100%**

Missing Datum = 1

Figure 4. Training and volunteer capacity

Knowledge	Australian study cohort	European study cohort	
	_	Training only	Training/experience
PH* Hazards	71.0%	92.0%	92.0%
PH control measures	44.0%	38.0%	82.0%
EMP	24.0%	83.0%	87.0%
Localised co-ordination	44.0%	73.0%	91.0%

(*PH = Public Health)

Australian study cohort data originally reported in Earl, Stoneham & Capra (2003)

Training and volunteer capacity

Figure 4 represents the responses from:

- the volunteers for the Australian study and European study who only reported having received training; and
- the European volunteers with training and experience for the key knowledge variables of the studies.

(a) Comparison within the European cohort

When comparing the proportion of responses between the European participants who only reported training to those with training and experience, proportions were the same for knowledge of hazards and similar for awareness of the festival EMP. The participants with training and experience reported better proportions of knowledge for localised emergency co-ordination and significantly higher proportions for control measures.

(b) Comparison with the Australian cohort

The most notable difference for the skill variables between the Australian and European studies was that only 36 percent of the participants in the Australian study reported having received useful training. This useful training had been provided by organisations such as the State Emergency Service and Rural Fire Services (Earl, Stoneham & Capra 2003).

The European participants with training and experience had better proportions for all key knowledge variables than the Australian study cohort. The European participants who reported only receiving training had better proportions than Australian participants for most of the key knowledge variables. However understanding of control measures at their respective study festivals was reasonably similar. Similar to the European study, Earl, Stoneham and Capra (2003), also found an association with understanding of control measures and previous volunteer experience within their study cohort.

Discussion

Adequate skills to perform designated tasks

All the participants in the European study had received the festival training with an additional 72 percent reporting other capabilities gained through professional and volunteering experience. It was expected that the cohort should be able to show a good level of knowledge and have a good mix of experience and professional expertise (HSE 1997 cited in HSE 2003). The study findings concluded that the study cohort met the HSE recommendations (ibid).

It appeared that a good volunteer capacity had a positive affect on the volunteer services provided for the study festival. The organisers of the event completed a performance evaluation and found that 'stewarding (volunteer) standards at the 2003 festival were the highest ever' (ACCESS 2003 pg 2).

Awareness of problems that may arise and understanding of the control measures

The majority of the participants (92 percent) identified public health hazards they were likely to encounter at the study festival. Sources of these hazards included vehicle movements, waste management, aggressive behaviour and fire hazards. Understanding of control measures for these hazards was lower with only 67 percent of the cohort able to identify control measures for these hazards. The participants who reported only having received the festival training responded very poorly to this question. Notably, there was a positive association between knowledge of control measures and previous experience volunteering at the study festival. These findings show an apparent weakness to relying on training as the sole source of capacity building for volunteers at OMFs. This provides a good argument to encourage the retention of experienced volunteers.

Awareness of roles, responsibilities, contingency and emergency procedures

The European study cohort had a very good of awareness of emergency management at the study festival. Awareness of the festival EMP was not associated with previous experience volunteering at the study festival however understanding of responsibilities within the EMP and knowledge of emergency co-ordination was associated. Importantly, a very small portion of participants were unable to identify a person responsible for emergency co-ordination.

Interestingly, the majority of this study cohort also considered they could respond confidently to an emergency situation if it arose. Potential emergencies likely to be encountered at this study festival included injuries from crowd crushes, fire hazards and a variety of medical conditions. These situations would have potentially serious implications for the patrons involved.

Comparison with the Australian cohort

A similar study of volunteers at a large OMF was previously conducted in Australia (Earl, Stoneham & Capra 2003). When comparing the findings from the two studies the participants in the European study reported better overall knowledge than the Australian participants. In terms of the skill variables used in the studies, the major difference between the two study cohorts was the amount of training received. Only 36 percent of the Australian participants reported receiving training that was not initiated by the festival organisers or tailored to the demands of that festival. Alternatively all the European participants had received training to support their work at that festival.

Earl, Stoneham and Capra (2003) reported a particular concern regarding awareness of emergency management for that festival. These authors found that less than a quarter of their participants (24 percent) had awareness of emergency management for that festival. This was not the case for the European study where those participants had a good awareness of emergency management. There is evidence that the training programs offered at the European study festival have been influential in this area. Both studies found an association between previous experience volunteering and understanding of control measures for the hazards identified and knowledge of emergency co-ordination (Earl, Stoneham & Capra 2003).

Implications for volunteers

The Australian study reported by Earl, Stoneham and Capra (2003) showed some deficiencies in volunteer knowledge within that cohort. Particularly low was awareness of emergency management at that event. Encouragingly, the European participants demonstrated much better levels of awareness for public health and emergency management. In terms of the skill variables in the studies, the greatest difference between the two study cohorts was the level of training reported by the participants. There was sufficient evidence in these findings that volunteers working at OMFs would benefit from receiving training programs similar to those given to the European participants.

It was also evident that previous experience volunteering was positively associated with a number of key knowledge variables within the two studies. These findings provide an argument to encourage the retention of volunteers in order to improve volunteer capacity at OMFs.

Limitations of the study

There are two main limitations associated with this study. Firstly there was a concern regarding the representativeness of the sample as it was determined that there was over sampling of older volunteers and female volunteers in the study (Bouma 1996). Secondly,

Oxfam volunteers working at the gates (orange vests)

Fire safety volunteers (red vests)

the use of a cross-sectional research design did not allow for the identification of causal factors related to the study findings (Hedrick, Bickman & Rog 1993).

Conclusion

This study has investigated the awareness and skills of a sample of volunteers from a European OMF. The study findings revealed the majority of the study participant's demonstrated good awareness of public health and emergency management and reported a good mix of capabilities gained through training and experience. In total, the level of capacity found within the participants was considered appropriate to assist them in carrying out their responsibilities at the study festival.

The organisers of the European festival had introduced training programs for volunteers working at this festival. The European study participants had much better knowledge than those in a similar study undertaken by Earl, Stoneham and Capra (2003) at an Australian OMF. Most notably the Australian study festival did not offer training programs for their volunteers. There was sufficient evidence from these studies that the tailored training programs given to European participants contributed to their volunteer capacity. Consequently it is strongly recommended that volunteers working at OMFs receive training tailored to meet the demands of the events where they are working.

References

ACCESS (2003) *Training volunteer stewards – A scheme of work to train volunteers stewards at outdoor events,* Access Training Consultants Ltd publication, England.

Au SYZ, Ryan MC, Carey MS & Whalley SP (1993) *Managing crowd safety in public venues: a study to generate guidance for venue owners and enforcing authority inspectors,* Health and Safety Executive Publication, England.

Bouma GD (1996) *The research process (3rd edition),* Oxford University Press, Melbourne.

Crowd Management Strategies (2003) *News and views,* http://www.crowdsafe.com/new.asp?ID=92, accessed on the 3rd January 2003.

Earl C, Stoneham M & Capra M (2003) Volunteers in public health and emergency management at outdoor music festivals, *The Australian Journal of Emergency Management,* Vol 18, No 4, November.

Emergency Management Australia (2003) *Suppose there was an emergency and nobody came, guidelines for managing the risks of using volunteers in emergency management situations,* Canberra, Emergency Management Australia Publication.

Glastonbury Festival Limited (2002) *'marketing plan – Glastonbury Festival 2002',* http://www.glastonburyfestivals.co.uk/2002, accessed on the 27th August 2004.

Glastonbury Festival Limited (2001) *'2001 – steward training',* http://www.glastonburyfestivals.co.uk/2001/stewardscertified.html, accessed on the 30th August 2004.

Health and Safety Executive (2003) *'Good practice and pitfalls in risk assessment',* England, HSE publication.

Hedrick TE., Bickman L. and Rog DJ (1993) *Applied research design – a practical guide,* SAGE publications, London.

Lakin C, Brown C, & Williams M (2001) 'From Dusk 'Til Dawn' EHJ, *Environmental Health Journal,* January edition, http://www.ehj-online.com/archive/2000/jan2001/january4.html, accessed on 20th July 2004.

Mendip District Council (2000) 'Minutes from the Regulatory Board held on the 12th October 2000', Sumerset, MDC publication.

Morton, R.F., Hebel, J.R., MsCarter, R.J., (1990) *A study guide to epidemiology and biostatistics,* Maryland, Aspen Publications.

National Outdoor Events Association (2004) *Training and development* (Guidance Note 03.04), NOEA publication, http://www.noea.org.uk/training.htm, accessed on the 11th of June 2004.

Personal communication (22nd November 2003) with ACCESS Training Consultants, England.

Portney LG & Watkins MP (1993) *Foundations of Clinical Research – applications to practice,* Sydney, Prentice Hall of Australia.

Streiner, Norman & Munroe-Blum (1989) *PDQ Epidemiology,* DC Decker Inc.

Authors

Cameron Earl is a candidate for a Doctor of Health Science with the Queensland University of Technology and has a background in the field of Environmental Health. The research component of this doctorate has focused on public health management at outdoor music festivals and includes investigating the capacity of volunteers at these events to participate in public health management strategies.

Dr Elizabeth Parker is a senior lecturer and post-graduate coursework co-ordinator in the School of Public Health, Queensland University of Technology, Brisbane. She has extensive public health and health promotion experience and is co-author of a book with Dr. MaryLou Fleming, *'Health Promotion in the Australian context: Principles and Practice'*.

Martin Edwards is a senior tutor providing training for volunteer stewards at outdoor music events and holds the position of volunteer steward manager at one of the largest a large outdoor music festival in England.

Dr Mike Capra is the Head of School of Health Science at the Newcastle University. He has extensive workplace health and safety and research experience and is currently holding the position of Director of a new centre of research excellence affiliated with the Newcastle University.

Patrol Smart 7/52: Queensland's integrated surf life saving program

Wilks, Dawes and Williamson present research into Queensland's integrated lifesaving program

Abstract

Surf Life Saving Queensland (SLSQ) is a community-based organisation with more than 26,000 active volunteer members patrolling 65 beaches on weekends from September to April each year. Additional patrol coverage is provided on 41 beaches at other times of the year, especially school holidays, by SLSQ professional lifeguards. These beach patrols are further strengthened by support services that include inflatable rescue boats (IRBs), rescue water craft, jet rescue boats and helicopters. However, despite the efforts of lifesavers, 17 people drowned in unpatrolled areas of the Queensland coastline during the 2001–2002 season. This prompted SLSQ to develop their Frontline First initiative, a repositioning strategy aimed at focusing the organisation's collective energies and resources to support 'frontline' service delivery – the lifesavers – through building capacity and capability. A central element of Frontline First is the *Patrol Smart 7/52* program that aims to provide a more integrated lifesaving service across the State. This paper describes the *Patrol Smart 7/52* program, drawing on recent reviews to show how emergency services are managed.

Introduction

Surf Life Saving Queensland is very clear about its purpose. The organisation's vision is 'Zero Preventable Deaths and Injuries on Queensland Beaches'. Where SLSQ members patrol designated swimming areas that are clearly identified by red and yellow flags, the figures show that this vision is achievable. In truth, there has never been a Queensland case of a person drowning while swimming between the flags on a SLSQ club patrolled beach. On the other hand, all of the 17 drowning deaths recorded on the Queensland coastline during the 2001-2002 season occurred in unpatrolled areas (SLSQ, 2002). Table 1 shows that in the same time period SLSQ members provided a range of vital lifesaving services for the community.

Table 1. SLSQ lifesaving actions during the 2001–2002 season

Lives saved (rescues)	4,732
Resuscitations	33
First aid treatments	11,844
Marine stinger treatments	7,247
Preventative actions	152,503

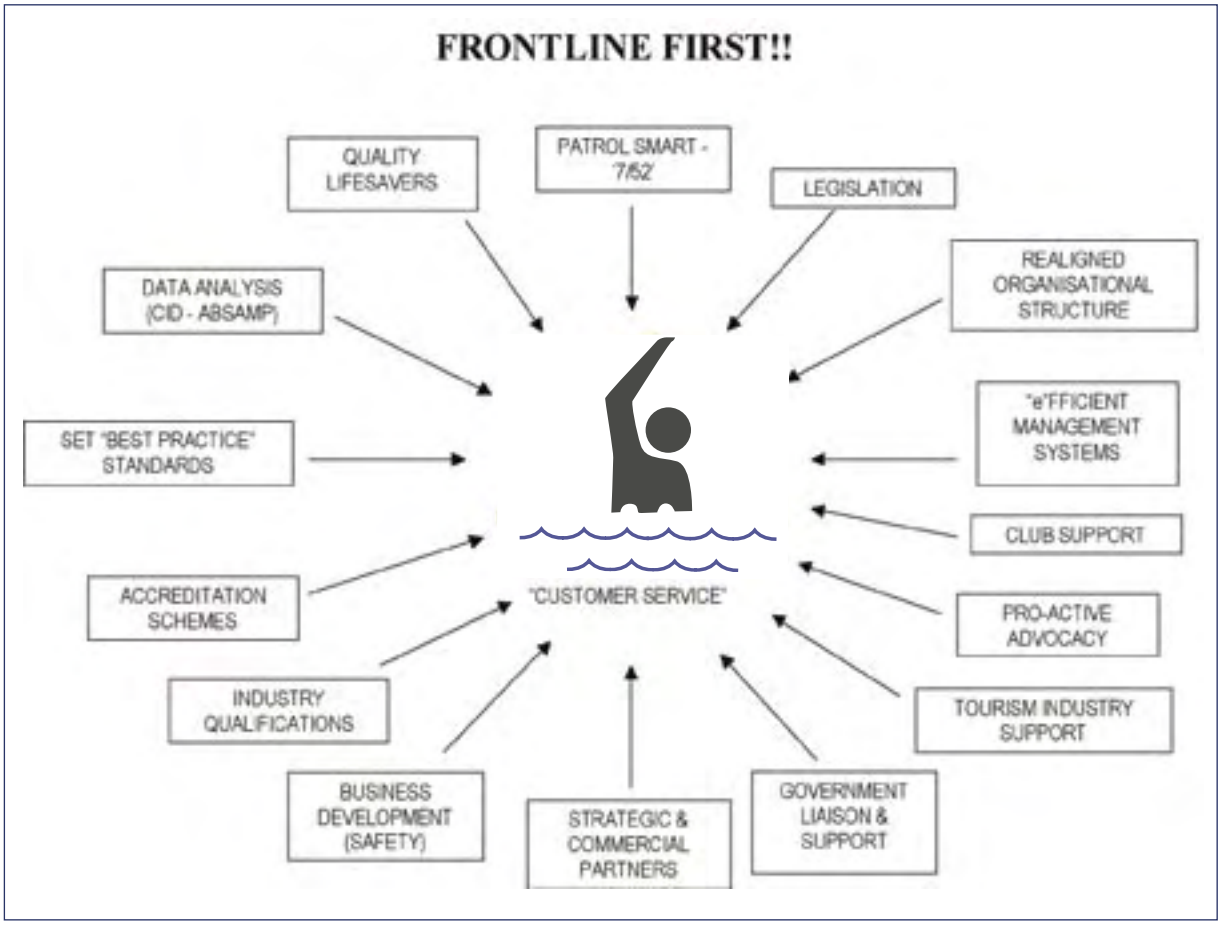
In response to the arguably preventable deaths during the 2001–2002 season SLSQ embarked on a re-positioning strategy titled Frontline First aimed at focusing the organisation's collective energies and resources to support 'frontline' service delivery – the lifesavers – through building capacity and capability. Figure 1 presents the core elements of Frontline First (FLF).

Patrol Smart 7/52

A key component of the FLF strategy is *Patrol Smart 7/52*, described in the SLSQ Annual Report (SLSQ, 2002, p. 14) as 'the way of the future for Surf Life Saving services across the State'. *Patrol Smart 7/52* recognises that SLSQ has a vast collection of resources at its disposal and needs to use these resources effectively to ensure a 'total integrated service' across Queensland beaches. This requires a clear and shared vision on how to best service its 'customers'—the people who visit the beaches. In Queensland there are more than 30 million beach visitors each year. *Patrol Smart 7/52* therefore strives to be an innovative, integrated and 'smart' lifesaving service—24 hours a day, seven days a week, 52 weeks a year.

The *Patrol Smart 7/52* plan has 11 key strategies (SLSQ, 2004). These are:

- **Expand services** – expanding lifesaving services to popular beaches that are currently unpatrolled;
- **Sunrise to sunset patrols** – extending times of patrols at popular beaches to reduce drownings that occur in areas and times outside of standard patrol hours;
- **Integrated and co-ordinated services** – improving the integration and co-ordination of all lifesaving



services, including clubs, lifeguards and support services;

- **Camera safety surveillance** – implementing camera technology to high-risk areas to enhance surveillance capabilities;
- **Westpac lifesaver helicopter rescue service patrols** – operating the most efficient and cost-effective aerial services delivery;
- **Jet rescue boat patrols** – operating the most efficient and cost-effective JRB services delivery;
- **Rescue water craft patrols** – expanding the number of RWC operations in co-ordination with other support services';
- **Personalised customer service** – increasing the interaction and improving face-to-face 'public relations' between lifesavers and beach-goers;
- **Central communications** – establishing state-of-the-art communication centres (SurfComs);
- **Innovation** – including research and development of new equipment, analyzing incidents, and adopting a beach management role to improve lifesaving service delivery; and
- **Develop better lifesavers** – providing for the education of future lifesavers, improving communication with members, increasing resources, involving lifesavers in the decision-making process, and increasing interaction of patrol personnel with external agencies.

Lifesaving services

Assessing the success of *Patrol Smart 7/52* in achieving its stated goals requires evaluation of lifesaving services objective performance. According to the current *SLSQ Annual Report (2004)* the seven drowning deaths in the 2003/2004 season was the lowest number in the past five years (see Figure 2) and continues an observable downward trend in fatalities. At the same time, there has been a significant increase in the number of preventative actions performed by lifesavers (Figure 3). A preventative action is defined as 'interceptions to prevent rescues or problems occurring' (Fenner, Leahy, Buhk & Dawes, 1999).

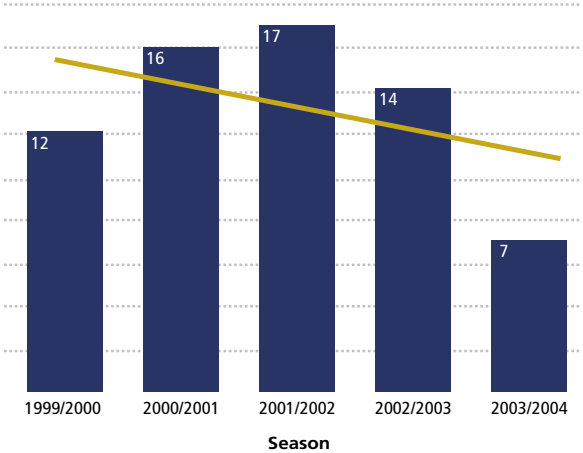


Figure 2. Queensland surf related drowinings 1999–2004

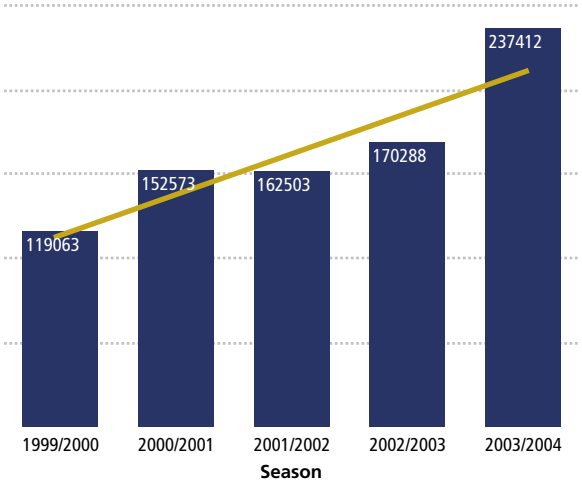


Figure 3. Total preventative actions 1999–2004

Table 2 indicates SLSQ services are now reaching more people before they face difficulties in the surf; with a corresponding slight decrease in the overall number of rescues that are necessary. In particular, the expanded use of rescue water craft (jet skis) has resulted in greater beach coverage (28,387 nautical miles traveled in 2003/2004). Almost all of the 678 rescues conducted by the Rescue Water Craft Service were outside flag patrolled areas.

Table 2. SLSQ lifesaving actions during the 2003–2004 season

Lives saved (rescues)	3,683
Resuscitations	80
First aid treatments	9,384
Marine stinger treatments	6,438
Spinal injury treatments	22
Preventative actions	237,412

A similar profile of service activity is revealed for the jet rescue boats, with 13,720 nautical miles covered during 2173 patrol hours with 258 successful rescues conducted. Finally, the Westpac Lifesaver Helicopter conducted 29 rescues and was involved in co-ordinating rescues with other services, responding to callouts from both police and the coast guard.

This wider service coverage provided by SLSQ during the 2003-2004 season is a key response to the challenges of *Patrol Smart 7/52*. Reviews have also been undertaken to determine the best way to extend coverage to unpatrolled Queensland beaches and to document the benefits of SLSQ professional lifeguard services by local government councils (Ernst & Young, 2004). These councils are increasingly seen as legally responsible for beach safety in their electorates (see Charrington, 2002; Fitzgerald & Harrison, 2003; Wilks & Davis, 2003). On the Gold Coast, for example, sunrise to sunset patrols were initially introduced in response to incidents involving tourists who died while swimming in the surf during twilight hours.

The co-ordination of patrol and response activity has taken on a greater significance with the expansion of lifesaving services to include both volunteers and professionals on traditional beach patrol, and the use of support services like inflatable rescue boats, rescue water craft, jet rescue boats and helicopters. The SurfCom communications network is now operational on both the Gold and Sunshine Coasts. It includes a radio network, camera surveillance, Global Positioning System (GPS) tracking and an incident reporting system (see www.lifesaving.org.au/services/communications.cfm). During the period September 2003 to May 2004, for example, the Gold Coast SurfCom received up to 1000 calls per day.

Beach safety for tourists

Australian reviews continuously report that international visitors are a particular target group for water safety education and assistance, based on the numbers who experience problems related to aquatic activities (Australian Water Safety Council, 1998; Mackie, 1999; Wilks & Coory, 2000). Queensland has historically recorded the largest number of tourist drowning deaths (Australian Water Safety Council, 2000). For overseas tourists the key education issues in beach safety include:

- awareness of 'swimming between the flags';
- beach signage;
- recognition of Surf Life Savers (by uniform and the yellow and red colours worn);
- an appreciation of swimming only during daylight hours; and
- an understanding of what to do if they experience trouble (Pendergast, Wilks & Dawes, 2003).

All of these issues highlight the limited experience most tourists have when it comes to swimming safely in the surf (Wilks, Pendergast & Wood, 2003).

SLSQ has responded to the surf safety needs of tourists, both domestic and overseas visitors, through multi-lingual beach signage and the placement of surf safety

Jet skis facilitate fast response to surf emergencies

Helicopter rescue service in action

information in tourist accommodation venues. On the Gold Coast, daily guided beach walks are conducted by uniformed lifesavers for Japanese tourists. This visitor group was identified in the organisation's research program as requiring additional assistance due to their unfamiliarity with swimming in the surf (Wilks, Pendergast & Wood, 2003).

In partnership with Tourism Queensland, SLSQ has also contributed expert information to national visitor safety campaigns (Tourism Ministers Council, 2002) and taken a leadership role in the Queensland Government's Irukandji Jellyfish Response Taskforce. Risk management of marine stingers is especially important to protect tourists in tropical waters. In recognition of these contributions SLSQ was recently inducted into the Australian Tourism Hall of Fame, having won the State and National awards for General Tourism Services three years in succession (SLSQ, 2004).

Continuous evaluation and adjustment of lifesaving services

SLSQ research supports a focus on protecting visitors to the beach, as 79 percent of drowning deaths involve people who live more than 50 km from the beach, with 45 percent being international tourists and the remaining 34 percent being domestic tourists. This involves putting procedures in place to continuously improve lifesaving services to benefit all beachgoers. A key element of the *Patrol Smart 7/52* program is a series of targeted reviews that engage SLSQ stakeholders in evaluating and improving rescue services. A good example was the Helicopter Rescue Service review (O'Hara, De Groot & Wilks, 2002) which examined the full range of SLSQ lifesaving support services and resources.

In undertaking the helicopter review five stakeholder groups were identified for consultation. These groups were:

- internal stakeholders—those directly involved with SLSQ in a voluntary or professional capacity;
- external stakeholders—those who have a relationship at an administrative or operational level (for example, other community rescue service providers);
- government stakeholders—such as Police, Department of Emergency Services and Queensland Health, as well as local councils;
- sponsors actively involved in sponsoring some area in SLSQ; and
- the community—who have expectations about SLSQ services and who are the clients of *Frontline First.*

In the development of *Patrol Smart 7/52* some of the helicopter review findings are noteable. There were 18 face-to-face interviews conducted with internal stakeholders and 21 interviews with external and government stakeholders (combined in this summary). Figure 4 presents the overall levels of satisfaction reported for SLSQ Lifesaving Support Services.

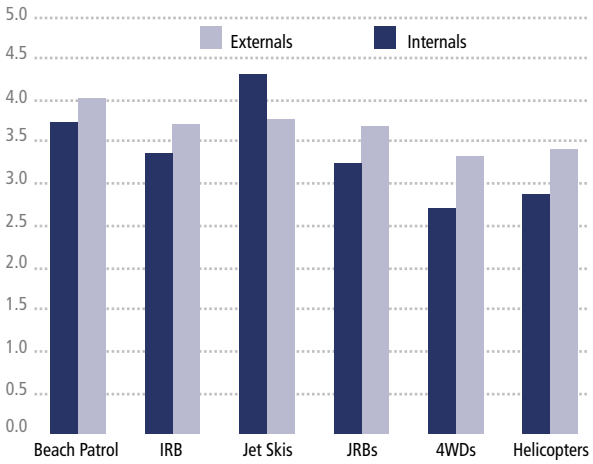


Figure 4. Mean levels fo satisfaction with support services by stakeholders

Internal stakeholders

On the rating scale of 5 = Excellent; 4 = Very Good; 3 = Satisfactory; 2 = Below Standard and 1 = Poor, internal stakeholders rated jet skis highest (very good to excellent), followed by beach patrols, IRBs (Inflatable Rescue Boats) and jet boats at between 'satisfactory to very good'. Four wheel drive vehicles and helicopters were rated between 'below standard to satisfactory'.

Allocation of money to SLSQ support services

Another way used to assess services was to ask stakeholders "If you had $100 to allocate toward SLSQ support services, how would you allocate that money? (whole dollars only)." Stakeholders were advised that training, uniforms, marketing and all administration should be assumed to be spread across the service areas. A total of 16 usable responses were obtained (one person allocated $100 across all services together while one person did not respond to the question).

Table 3. Allocation of money to SLSQ support services by internal stakeholders

Service	No money allocated	<$25	$26–$50	$51–$75	$76–$100	Average $ (mean)
Beach patrol	0	2	10	2	2	48
IRB	3	9	4	0	0	15
Water rescue craft	2	11	3	0	0	16
Jet rescue boats	5	11	0	0	0	5
4WDs	7	9	0	0	0	5
Helicopters	8	5	3	0	0	11

Table 4. Allocation of money to SLSQ support services by external stakeholders

Service	No money allocated	<$25	$26–$50	$51–$75	$76–$100	Average $ (mean)
Beach patrol	0	3	12	2	2	44
IRB	2	15	2	0	0	15
Water rescue craft	4	15	0	0	0	16
Jet rescue boats	9	10	0	0	0	10
4WDs	7	11	1	0	0	13
Helicopters	9	6	4	0	0	28

On beach resuscitations require highly trained beach patrol personnel

Table 3 shows that all respondents allocated at least some money to beach patrols, mostly in the $26–50 range, with an average of $48. The most frequent allocations were $40 (4) and $30 (3). Two respondents allocated all $100 of their money to beach patrols.

Rescue water craft were the next most popular choice for internal stakeholders with only two respondents not allocating funds. The majority of people nominated money in the 'less than or equal to $25' range. The most frequent allocations were $10 (4) and $20 (3), with the overall average for rescue water craft being $16.

For IRBs, three respondents declined to allocate funds. Of the 13 people who did allocate money, most nominated amounts in the 'less than or equal to $25' range. The most frequent allocation was $5 (4) and the overall average was $15.

Five of the 16 respondents did not allocate money for jet boats. Of the 11 people who did allocate funds, all were in the 'less than or equal to $25' range. The most frequent allocation was $5 (7) and the overall average for jet boats was $5.

Nine people allocated money to 4WD vehicles. The most frequent allocation was $5 (6), with the overall average being $5.

Half of the internal respondents (8/16) allocated money to helicopters. There were five allocations in the 'less than or equal to $25' range (two at $5; one at $10; one at $20 and one at $25) and three allocations in the '$26–$50 range' (one at $30; two at $40). The overall average for the eight people who allocated money to helicopters was $11.

In summary, responses to this question showed that all internal stakeholders supported beach patrols and were most likely to allocate funds to that SLSQ support service. On average, almost half the money available ($48 from a total of $100) was allocated to beach patrols. Most respondents also allocated money to rescue water craft and IRBs at about the same amount. There was less overall support for jet rescue boats (average $5), 4WDs (average $5) or helicopters (average $11).

Lifesaver beach patrols are strongly supported by internal and external stakeholders

External and government stakeholders

Figure 4 shows that external stakeholders gave higher ratings than internal stakeholders to all support services, with the exception of rescue water craft. External respondants rated all services between 'satisfactory and very good'. When asked to allocate their $100 toward SLSQ services, Table 4 shows that all respondents allocated at least some money to beach patrols, mostly in the $26–50 range, with an average of $44. The most frequent allocations were $30 (4), $40 (4) and $50 (3).

IRB's were the next most popular choice, with only two respondents not allocating funds. The majority of people nominated money in the 'less than or equal to $25' range. The most frequent allocation was $10 (7) and the overall average for IRBs was $15.

For rescue water craft services, four respondents declined to allocate any funds. Of the 14 people who did allocate money, most nominated the 'less than or equal to $25' range. The most frequent allocations were $10 (5) and $20 (5), with the overall average for rescue water craft being $16.

Nine of the 19 respondents did not allocate money for jet boats. Of the 10 people who did allocate funds, all were in the 'less than or equal to $25' range. The most frequent allocation was $10 (5) and the overall average for jet boats was $10.

Twelve people allocated money to 4WD vehicles and one person (not included in the analysis) allocated $20 to quad bikes. The most frequent allocation for 4WDs was $10 (7), with the overall average being $13.

Ten of the 19 respondents allocated money to helicopters. There were six allocations in the 'less than or equal to $25' range (one at $15; five at $20) and four allocations in the '$26-$50 range' (two at $30; two at $50). The overall average for the 10 people who allocated money to helicopters was $28.

In summary, responses to this question showed that external stakeholders supported beach patrols and were most likely to allocate funds to that SLSQ service. Most respondents also allocated money to IRBs and rescue water craft at about the same amount. There was less overall support for jet rescue boats, 4WDs or helicopters.

Perception and support of rescue services

From over 50 key stakeholder interviews undertaken for the helicopter report, it emerged that the SLSQ support services were viewed as two distinct groups. The first group includes beach patrols, IRBs and rescue water craft. These services were highly regarded, endorsed and supported by stakeholders. The second group includes jet boats, 4WD vehicles and helicopters. This group was considered second tier and received much less endorsement and support

from stakeholders. While all of the services examined make a significant contribution to saving lives, the evaluation process described, especially a willingness for stakeholders to allocate funds, provides a valuable insight into the grassroots support SLSQ might experience when reallocating resources or expanding its rescue services.

Interestingly, the wider community in Queensland is also most aware and supportive of the rescue services provided by SLSQ, particularly the highly visible and perhaps more well-established beach patrols. In a June 2000 report prepared for the Surf Life Saving Foundation, Marketshare investigated public perceptions and attitudes toward SLSQ. They found that awareness of the SLSQ services was very high, with the beach patrol being 99 percent and the Westpac Lifesaver Rescue Helicopter Service being 92 percent (Figure 5).

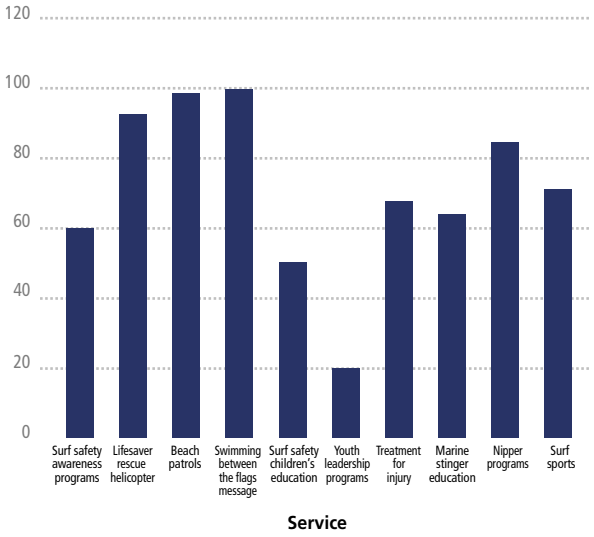


Figure 5. Community awareness of SLSQ services

Conclusion

While there are clearly some beach visitors, especially tourists, who require ongoing education and supervision in the surf (SLSQ, 2003) recent reviews suggest that the *Patrol Smart 7/52* strategies are being implemented effectively and are having a tangible impact by saving lives. In particular, the use of new technology and co-ordination of rescue services and resources is providing a wider protective coverage of Queensland beaches. The Australian Government has recently announced that 2007 will be officially known as the *Year of the Surf Lifesaver.* This provides SLSQ with an additional incentive to expand its successful rescue programs and further develop its leadership role in beach safety.

Lifesavers need mobile communications, like 2-way radio to optimise quick response

Acknowledgments

Some examples of stakeholder perceptions presented in this paper were adapted from an independent evaluation and report on the 'Helicopter Rescue Service' prepared for SLSQ by John O'Hara, Alison De Groot and Jeff Wilks. That report was the first in a series of evaluations conducted for the *Frontline First* initiative. As such, it examined a range of emergency services provided by SLSQ in addition to helicopters.

Contact details

Surf Life Saving Queensland
PO Box 3747 South Brisbane Queensland 4101
Phone: +61 7 3846 8000
www.lifesaving.com.au

Helicopters, jet rescue boats and jet skis were highly regarded, endorsed and supported by stakeholders

References

Australian Water Safety Council, 1998, *National Water Safety Plan,* Author, Sydney.

Australian Water Safety Council, 2000, *Analysis of Drowning in Australia and Pilot Analysis of Near-Drowning in New South Wales,* NSW Injury Risk Management Research Centre, University of New South Wales, Sydney.

Charrington, B., 2002, Surf Related Litigation: Keeping Your Case between the Flags, *Plaintiff,* Vol. 53, pp. 6–14.

Ernst & Young, 2004, Cost/Benefit Assessment of the *Provision of In-House Professional Lifeguard Services Compared to Outsourcing,* Final Report prepared for Surf Life Saving Queensland, Author, Brisbane.

Fenner, P., Leahy, S., Buhk, A. & Dawes, P., 1999, Prevention of Drowning: Visual Scanning and Attention Span in Lifeguards, *Journal of Occupational Health and Safety – Australia and New Zealand,* Vol. 15, No. 1, pp. 61–66.

Fitzgerald, B. & Harrison, J., 2003, Law of the Surf. *Australian Law Journal,* Vol. 77, pp. 109-116.

Mackie, I.J., 1999, Patterns of Drowning in Australia, 1992–1997, *Medical Journal of Australia,* Vol. 171, pp. 587–590.

Marketshare, 2000, *Surf Life Saving Brand Evaluation Study,* Author, Brisbane.

O'Hara, J., De Groot, A. & Wilks, J., 2002, *Helicopter Rescue Service: An Independent Evaluation Prepared for Surf Life Saving Queensland,* Author, Brisbane.

Pendergast, D., Wilks, J. & Dawes, P., 2003, Educational Strategies for the Beach Safety of Tourists. Paper presented at the *Taking Tourism to the Limits Conference,* Hamilton, New Zealand, 10 December.

Surf Life Saving Queensland, 2002, *Annual Report,* Author, Brisbane.

Surf Life Saving Queensland, 2003, *Benchmarking Best Practice Beach Safety Management. Beach Safety Research,* Author, Brisbane.

Surf Life Saving Queensland, 2004, *Annual Report,* Author, Brisbane.

Tourism Ministers Council, 2002, *Safety Tips for Visitors to Australia,* Tourism Queensland, Brisbane.

Wilks, J. & Coory, M., 2000, Overseas Visitors Admitted to Queensland Hospitals for Water-Related Injuries, *Medical Journal of Australia,* Vol. 173, pp. 244–246.

Wilks, J. & Davis, R., 2003, Duty of Care to Resort Guest who Drowned, *International Travel Law Journal,* Vol. 2, pp. 77–79.

Wilks, J., Pendergast, D.L. & Wood, M.T., 2003, Accidental Deaths of Overseas Visitors in Australia 1997–2000. *Journal of Hospitality and Tourism Management,* Vol. 10, pp. 79–89.

Authors

Dr Jeff Wilks is Professor of Tourism at The University of Queensland. A qualified psychologist and lawyer, he has a particular interest in the health and safety of tourists. Jeff is a member of the Risk Management Advisory Committee for Surf Life Saving Queensland and a Consultant in Safety and Security to the World Tourism Organization.

Peter Dawes is Operations Manager with Surf Life Saving Queensland and, in this role, he is responsible for ensuring best practice management of key beach safety services including lifesaving, lifeguarding, lifesaving support services, training and community education. He is a member of a range of advisory and consultative committees including the Queensland Government Irukandji Response Task Force.

Brett Williamson OAM is the Chief Executive Officer of Surf Life Saving Queensland and has held this position since 1991. He has degrees in Human Movement Studies (BHMS Ed) and Education (B. Ed). As CEO he takes primary responsibility for the management and development of Surf Life Saving Queensland, including its 59 affiliated Surf Life Saving Clubs. His responsibilities cover a diverse range of services and operations ranging from rescue, emergency care, education and training to surf sports, research and marketing.

Orange on the scene: the SES media officer program

Goodin and O'Neill examine the use of community-based media officers in the context of a structured media-management plan

Summary

One of the ongoing challenges in public education is how to manage the sudden, even overwhelming, media interest that is an inevitable part of a community crisis. The NSW State Emergency Service (SES) has developed an approach that puts them a jump ahead in getting the right information to the public at the right time. This paper examines the use of community-based media officers in the context of a structured media-management plan. It examines the rationale for appointing local-level media officers; the strengths and drawbacks of such an approach; the policies, training, procedures and resources that are part of its implementation; and what's next for the SES media officers' program.

Introduction

The 1999 Sydney hailstorm has proven to be a pivotal event in the development of the NSW SES as an organisation. One of the areas that this damaging and costly event highlighted was the close relationship between the media and the emergency services—whether people like it or not. The Deputy Director General of the NSW SES wrote not long after the event:

> "Today the media spotlight is harsher than it has ever been, weaknesses or alleged weaknesses are quickly discovered and misunderstandings of complex matters are broadcast as fact. These things being so, the management of the media must be given a high priority. If this is not done effectively the core business of the operation...can be derailed to the detriment of the victims of the disaster" (Keys 1999–2000).

The role and relative importance of local media per se has traditionally not received much scrutiny in the literature, which has tended to focus on how media coverage in general shapes public perception of disasters, or on ways the media contributes in a relatively broad sense to the warning and informing functions of emergency preparation and response. A number of recent studies and anecdotal accounts, however, have pointed out that there is, in fact, a unique and highly valuable role that locally targeted media activities can play in emergency management.

Retired BBC journalist John Jefferson, for example, wrote: "Although people...develop a bond with their favourite national newspaper or their preferred national radio programme ..., [they] are bound to appear more distant and less in touch than a local media dedicated to telling the daily story of their region" (Jefferson 1999). He also points out that "should a major incident occur, the locals will be first on the scene and although their principal purpose ought to be to serve their local audience they will also hold the fort for the nationals until reinforcements arrive." Moreover, "long after the national and international media circus has left town, the local media will continue to pursue a story and the issues it has raised. It will rumble on until the community itself signals it has read and heard enough" (ibid).

A report on perceptions of the 1998 California mudslides found that 74 percent of survey respondents cited local television as a source of information about the disaster, as opposed to 33 percent who mentioned national television. The authors concluded that "[r]espondents ... draw their information more widely than from a single newspaper, relying on local television and radio, as well as their own difficulties in a disaster" (Rodrigue et al. 1998).

The prominence of locally focused information has also been noted by researchers examining 1995 flooding, also in California. They theorise that:

> "in a widespread disaster event, newspaper editors select a small number of locations out of those where significant damages exist to give special emphasis, often developing the personal stories of a small number of individuals victimized by the disaster ... Areas near the onset of the disaster are prone to receive disproportionate coverage. If a paper sends a reporter to the first town with a breached levee, that reporter is likely to continue filing stories from that same location for the duration of the disaster" (Dymon and Bascoe 1996).

They also note that specific locations with a "hook", or some memorable characteristic, can receive disproportionate coverage. In other words, the local angle can and often does take precedence over the "big picture".

Such localised information may be more effective from an emergency management perspective than the big picture. Research on a flood event in Puerto Rico in 1998 found that residents dismissed general flood-preparedness information in the media because the safety advice did not mention their area by name as vulnerable to flooding. "It never floods here, so we don't have to pay attention" was the prevailing attitude (Perez-Lugo 1999).

In short, finding and making the most of the local angle in any story can ensure that safety and public-awareness messages get the coverage they need. Locally targeted stories are not only more appealing in many cases to the media, they are more effective in impressing on people the relevance of the information. Certainly, local media is only one aspect of an effective overall media strategy, but it can be a crucially important one—and it forms one of the key aspects of the media program of the NSW State Emergency Service.

The SES media program

The SES media strategy aims to increase public safety by:

- Enhancing public awareness of the identity, roles and activities of the SES. This improves "brand recognition" and makes the SES more attractive to the media as a source of news and safety information.
- Increasing awareness of SES members' skills as highly trained, professional volunteers. This raises the SES's credibility as a source of quality information for both the media and the public.
- Producing and disseminating storm and flood safety information that is both genuinely useful and easy to follow. This includes information during the events themselves and information designed to help people prepare for them.
- Strengthening Units and Divisions by supporting their local recruitment, fundraising and community education activities, as well as their operational media activities.

In order to produce these results, the SES has developed a suite of documents and materials that give the entire media team – from the local Units through Divisions to State Headquarters – a consistent environment within which to conduct media operations. The first of these documents was a set of core messages: the information that was imperative to get out to the public. These messages highlight the SES's credibility so people are more likely to seek SES help in emergencies and to give more weight to SES advice and warnings. They also publicise the state-wide storm and flood emergency help line and aim to increase people's motivation and ability to take simple self-help measures (such as cleaning gutters and assembling an emergency kit) to reduce their vulnerability in a flood or storm.

Central to day-to-day media operations is the SES media policy, which:

- outlines the rationale for engaging with the media;
- summarises the key messages;
- articulates the authorisation for speaking with the media at each level of the organisation;
- sets out the duties and responsibilities for media officers at each level; and
- describes the training each media officer will receive.

As the role of the media officer often involves community education and public relations, the policy also states the goals and areas of activity for these functions. Every media officer and Unit and Division Controller is familiar with the policy.

Based on its media strategy and policy, the SES devised a decentralised, locally targeted media program. It considered three primary needs that a locally targeted approach could fulfil. First, local media opportunities enhance grass-roots awareness of the SES and of storm and flood safety. Second, locally targeted safety messages such as flood warnings greatly improve

PHOTO BY ANDREW HENNELL

Good relationships with the media enhance NSW SES operations and contribute to public safety

PHOTO: ANDREW HENNELL

The NSW SES media policy empowers volunteers and staff at all levels to work effectively with the media

the degree to which the public notice, remember and act on the messages. Third, local perspectives, information, interviews and photo and video opportunities provide life and drama to what would otherwise be matter-of-fact operational information.

The local angle

The SES chose at the outset to guide its media program on two principles. First, the SES media staff knew that the agency's greatest strength from a media-relations point of view was its traditional presence in the local community. Since its beginnings in 1955, SES volunteers have been prominent figures in their communities. Local, suburban and regional newspapers, radio stations and television stations have been consistently far more eager to give their local SES Units prominent coverage from week to week than the Sydney and state-wide media outlets. Moreover, Unit and Division volunteers often develop a very close and effective working relationship with the journalists in their communities.

Second, the SES already has a strong and tested method of operation in place – in accordance with international emergency management practice – that places operational activity at the lowest appropriate level. SES media staff structured media activities in the same way. Unit media officers would conduct local-level media activities within the scope of their training and the authorisations given them through the media policy. As an event escalated (in intensity, geographical scope or political interest), they would hand media co-ordination over to the Division media officer, and, as necessary, State Headquarters media staff. This three-tiered structure is highly flexible, and conserves scarce media resources while ensuring the appropriate level of response with minimal delay.

The SES media officer program

The SES media approach requires one more crucial element: well-trained and enthusiastic Unit and Division media officers who would be uniquely positioned to make the most of – and generate – media opportunities.

To train these media officers, the SES determined the competencies (based primarily but not exclusively on the national competency standard PUACOM012A, "Liaise with media at the local level") that SES media officers would need. This determination took into account the core roles of the SES, the nature of emergency media, the general relationship of the SES with the media, the goals of the media program and the locally targeted media approach. The resulting training course covers the skills for media management—that is, meeting and anticipating the media's need for specific types of information, which in turn generates opportunities for guiding coverage in the way the SES wants it to go. These skills include:

- co-ordinating media conferences;
- writing media releases;

- drawing up operational and non-operational media plans;
- planning and carrying out public relations events; and
- working effectively with reporters (which includes presenting a professional image during interviews).

The SES media strategy builds on and emphasises the personal presence of the SES in each community. Specifically, this means media officers create opportunities for their controller to represent the SES to the media and the public and promote images that stress the importance and personal dedication of volunteers (rather than focusing on, for example, the floodboats or vehicles). There are certainly times when a single, high-level spokesperson is necessary. At these times, State Headquarters senior management are available to speak to the media.

Along with their local and regional activities, SES media officers are trained, and expected, to contribute to state-wide media activities during both operational and non-operational times. The media want information beyond the normal details contained in situation reports. They want 'colour', unusual stories, interesting hooks. They also want the operational details worded in a way that conveys the situation so that non-emergency management professionals can understand.

During operations, the media officers are the eyes, ears, hands and feet of the State Headquarters media staff, performing work that is invaluable to a successful media presence. They find good photo and video opportunities, co-ordinate interviews and photo and video shoots at task sites, seek out and create interview opportunities, identify human interest stories and work with Operations staff to gather information about the operational response. Most importantly, they relay this information to State Headquarters media staff, where it forms part of the overall analysis that the SES supplies to the major media outlets. During non-operational times, the media officers implement co-ordinated state-wide media campaigns, working with their local and regional media outlets and providing local angles on state-wide messages and events.

In summary, the media officer program is designed to give Unit and Division media officers the greatest possible degree of decision-making power and scope for innovation, to support them with training, resources and consultation, to co-ordinate their activities in providing a consistent image to the public and to facilitate media coverage and develop good working relationships with journalists at all levels.

PHOTO BY ANDREW HENNELL

Effective media liaison allows field volunteers to focus on responding to calls for help

The results so far

The media officer program has, by any measure, exceeded even the SES media staff's optimistic expectations. Interest in the program from the volunteers has been very high since its inception. The SES has active media officers in over one-third of its Units and Divisions (including many of the Sydney metropolitan Units, where media attention tends to be the most concentrated), with more signing on every month.

The degree of local and regional coverage the SES receives has increased dramatically. While the SES doesn't have the resources to fund comprehensive, quantitative studies of media coverage, particularly in local and regional media across NSW, the number of news clippings and radio and television stories has increased considerably since the launch in 1999 of the comprehensive media strategy, of which the media officer program is a major part. The media officers themselves keep State Headquarters informed of their activities and every week at least one Unit or Division somewhere in the State is conducting or participating in a significant public relations or community education event.

Not least among the accomplishments of the media officer program is the increase in Units' and Divisions' emergency management capacity. The media are essential partners in all aspects of emergency management—prevention, preparation, response and recovery. The presence of a corps of dedicated media officers not only frees operational and field staff to focus on the jobs they're trained for, it improves the overall quality of the Service's interaction with the media and its capacity to help communities be safer and more resilient.

PHOTO BY ANDREW HENNELL

NSW SES media officers are ideally positioned to highlight the unique aspects of their Unit's activities in local media

The media officers themselves validate the decentralised media approach. "Most of what we submit to our local paper gets published because the stories are of local interest," said one media officer. "They concern events or activities in our community, of benefit to our community, carried out by people from our community." This sentiment has been echoed by a dozen other media officers in numerous electronic discussions.

Finally, the media officers have reported that their participation in the program has provided them with many benefits, both personal and professional. They have reported an increase in confidence, broader skills, enthusiasm about a whole new field of activity, enjoyment of the creativity involved, interest in further emergency management training and the satisfaction of working closely with their media colleagues in other Units and Divisions.

It would be inaccurate to give the impression that there are no drawbacks or bugs in the media officer program. For example, the skill level among the media officers, although they are required to meet a standard in such things as writing ability and confidence in interviews, varies widely. So does the time each has to devote to the role, as well as the degree to which media officers possess "bonus skills" like photography, graphic design and public speaking. This means that absolute consistency in Units' media activities is difficult to achieve. There are also times when two or more Units covered by the same local or regional media may inadvertently be competing for coverage. In a number of these situations, the media officers of the Units involved have decided to proactively collaborate to produce joint media releases at times when both Units are active. However, in other areas the media officers are still developing procedures to co-ordinate their activities to minimise competition.

Despite these drawbacks, the SES media staff consider the media officer program to be an overwhelming success. There are a number of factors that contribute to this:

- The role of the media officer has been rigorously defined, yet with scope for personal initiative, varying skills (and skill levels) and the application of experience to refine the role over time. Media officers are clear on what they are expected to do and how they are expected to do it. At the same time, there are as few restrictions as possible on their own creativity, and as many opportunities as possible to exercise it.
- The media officer's role, while it has been a part of SES operations for quite some time, has over the past few years acquired legitimacy and credibility within the organisation. This is a result

of State Headquarter's efforts to promote it, resource and standardise it, and raise it from the level of the ad hoc to its position as an integral part of Unit and Division management teams.

- The training offered for the role not only develops a standard set of assumptions and methods of operation; it also imparts a standard level of quality and a broad suite of skills. This, in turn, raises media officers' confidence and helps ensure their success.
- State Headquarters media staff have committed significant time and funding to support the Unit and Division media officers, producing resources, being available for consultation and providing a forum for collaboration.
- In keeping with its overall training strategy, the SES has made a point of valuing and seeking out media officers' existing expertise, as well as fostering their growth in the role. Those media officers with extensive experience in media and public relations are glad to contribute their insights, and those with less experience are eager to learn from them and, when they feel confident, to contribute their own insights.
- The SES also encourages collaboration and co-ordination among the media officers. Such tools as an electronic mailing list, joint media events and campaigns and media exercises that involve several Units and Divisions help contribute to this.
- Crucially, the media strategy in general and the media officer program in particular enjoy strong and effective support from SES senior management. Because of this, its momentum grows and the role is increasingly integrated with operations management, recruitment, community education and public relations. It becomes, in short, a source of strength for the Units and Divisions, and for the Service as a whole.

Next steps

Now that the media officer program is firmly established and successful, it is time to move to the next phase. The SES intends to consolidate the program with further training courses, media exercises, additional resources such as draft media releases and promotional items (as funding permits) and ongoing consultation and dissemination of best practice.

Based on the media officers' field experience over the last several years, State Headquarters, in consultation with Divisions and Units, are currently gathering that experience into a set of standard operating procedures (SOPs) for the media function. These SOPs incorporate media officers' field experience and feedback, the needs of the media and the SES's operations-management imperatives, and will guide media activities at all levels of the organisation. State Headquarters have also revised the SES media policy to incorporate these experiences and insights.

State Headquarters are also introducing and contributing to initiatives to expand responsiveness and flexibility. For example, SES media staff have joined with media staff of other emergency services to devise a state-wide plan to establish and staff Joint Media Information Centres (which are activated during large or multi-agency events). These centres are an important area of participation for Unit and Division media officers.

Over the past two years, the SES has been piloting and rolling out a program of training, equipping and supporting community liaison officers (CLOs). This role complements the role of the media officer, and the SES continues to strengthen the ties between the two programs. Media staff often identify opportunities in media and community education for mutual support (for example, a Unit media officer and CLO may plan a commemoration of a local flooding event; the CLO might co-ordinate a public ceremony with the media officer arranging for interviews and photo opportunities).

Conclusion

As far as can be determined, the NSW State Emergency Service is an international pioneer in implementing a formal program to produce trained, professional, well-supported volunteer media officers at the local and regional levels and in providing them with the autonomy to make the role fully their own. As a result of commitment from State Headquarters and the enthusiasm, dedication and skill of the media officers, the SES's media presence is far stronger and public awareness of its roles and activities is far higher. The SES is much better placed to give warnings and safety information to the communities it serves. As the media officers

PHOTO BY ANDREW HENNELL

Media officers are part of Unit and Division operations-management teams

PHOTO BY ANDREW HENNELL

The NSW SES will continue to strengthen its media management capacity as one vital component of its overall operational readiness

continue to increase in number and skill they will ensure that there is always orange on the scene.

For more information

To obtain the SES media policy and the training materials for the media officer program, contact the Public Relations Officer, NSW SES.

References

Keys, C. (1999–2000). "The Response to the 'Mother of all Storms': a Combat Agency View", *The Australian Journal of Emergency Management*, 14(4), pp.10–14.

Jefferson, J. (1999). "The Local News", in *Disasters and the Media*, ed. Shirley Harrison. London: MacMillan Press Ltd., 1999, pp.42-55.

Rodrigue, C. *et al.* (1998). "Quick Response Report #107: El Niño and Perceptions of the Southern California Floods and Mudslides of 1998". Natural Hazards Centre, University of Colorado: http://www.colorado.edu/hazards/qr/qr107.html (viewed June 25, 2003).

Dymon, U. and Boscoe, F. (1996). "Quick Response Report #81: Newspaper Reporting in Wake of the 1995 Spring Floods in Northern California". Natural Hazards Centre, University of Colorado: http://www.colorado.edu/hazards/qr/qr81.html (viewed June 25, 2003).

Perez-Lugo, M. (1999). "Quick Response Report #113: The Mass Media, Political Fragmentation, and Environmental Injustice in Puerto Rico: a Case Study of the Floods in Barrio Tortugo". Natural Hazards Centre, University of Colorado: http://www.colorado.edu/hazards/qr/qr113.html (viewed June 26, 2003).

Authors

Laura Goodin began in the emergency services as a volunteer with the NSW SES in 1998. In 2000, she joined SES State Headquarters as the Public Relations Officer, where one of the most gratifying parts of the job has been working with the volunteer media officers. Although no longer a paid staff member, she continues as an SES volunteer.

For the last six years, Peter O'Neill was responsible for promoting safety behaviour through the Triple Helix Risk Communication Model, managing the media response during disasters and marketing the NSW SES. Peter has now established a consultancy business specialising in marketing and branding of emergency agencies and programs, social marketing, community engagement, media management (including large disasters), public relations and sponsorship.

The great Labe-Elbe river flood of 2002

by Chas Keys

In 2002 the Czech Republic and Germany experienced devastating flooding on the Labe-Elbe river system. Stream heights were reached which had not been experienced for centuries. Late in 2003 Chas Keys of the NSW State Emergency Service spent several days in Aue and Dresden, in the German state of Saxony, and in Prague talking to mayors, hydrologists, emergency managers and people who had bee caught in the flooding. He reports on his findings.

The flood

The Labe-Elbe river system drains a large area encompassing the western two thirds of the Czech Republic and much of eastern and northern Germany. Extreme flood rains in August 2002 over the upper reaches of the system produced flooding of great rarity. On some tributaries, the floods were once-in-10,000-years events. Above the Czech capital, Prague, the Vltava River had something like a 1000-year flood, and in Prague itself the river reached its highest level since 1432. Downstream, the city of Dresden had a flood of a magnitude expected there only once in every 300–500 years. Further downstream again, as levels attenuated on the flood's way through Magdeburg and Hamburg to the North Sea, the return frequencies fell away.

The damage in the upper parts of the catchment was considerable, especially in the Czech Republic and on the northern slopes of the Erzgebirge (Erz Mountains) in the German state of Saxony. One hundred Czech towns and villages were completely flooded and a further 350 partly so, with scores more in Germany experiencing partial or complete inundation.

Hundreds of houses in the two countries were destroyed and there was severe damage to industrial and commercial premises and to infrastructure (especially roads, railway lines and bridges) across a wide area.

The damage bills were estimated in the Czech Republic at 70 billion krone and in Germany at six billion euro. Taken together, these sums represent in excess of $A13 billion. No single Australian natural disaster event of the past several decades comes close in terms of total costs incurred—not *Cyclone Tracy* (1974), the Newcastle earthquake (1989), the Sydney hailstorm (1999), or any of the numerous serious floods, bush fires or droughts experienced in Australia.

The high cost of the Labe-Elbe flood was largely a measure of the high population densities of central Europe and the great exposure of assets on floodplains. It also indicates the extreme nature of the event which damaged assets few would have believed would be liable to flooding.

The response

Germany and the Czech Republic do not have volunteer flood management agencies like the State and Territory Emergency Services in Australia. Fire services deal with the bulk of the sharp-end flood response work, including rescue, with local and regional councils and welfare agencies playing significant roles. As in Australia, the armed forces can be called upon and in western Europe these are large, very well equipped, and have great technological power. In recent times, with the Cold War over, these armed forces can focus on civil protection when necessary. They played a major role during the floods in Saxony in 2002.

Over 12,000 military personnel were deployed in Saxony on a wide range of flood tasks. Laser-equipped Tornado jets were used to measure flood heights after many gauges in the Czech Republic were washed away. Amphibious and submersible craft were employed for transport purposes when bridges were closed or damaged. Military aircraft also played a major role in evacuating hospital patients to cities far away from the flood-affected areas including Cologne and Berlin.

Thousands of people were rescued by trucks, boats or helicopters, and almost 300,000 people – most of them in the Czech Republic – had to evacuate. Some, in the upland areas where the flooding came and went quickly, were out of their homes for only a few hours, but a few could not return for months. Many people simply moved from ground floors to higher levels of their homes. The capacity for 'vertical evacuation' is high in Europe where large proportions of dwellings near watercourses are two or more storeys

high. Personal property was saved by moving it to upper floors.

One success in the response was the deployment of the new 'pallet barrier' temporary levee system in central Prague. The system, which is now available in Australia, kept most of the famous 'old town' free of flood waters.

The lessons

As always after a major event there were several enquiries conducted and many lessons to be learned. The emergency planning regimes in both countries were found wanting in various ways.

In and near Prague, many nominated evacuation shelters were useless because they were flooded and too few shelters were available to meet the evacuation demand. On the German side of the border the high-quality flood planning that had been undertaken in the former East Germany had fallen into disuse. The priorities of German reunification and the reconstruction of the former Soviet satellite state had seen emergency plans largely ignored for more than a decade and there had been little updating or exercising of them. Consequently managers were uncertain of their responsibilities and powers, co-ordination suffered, and the majority of the response to the flooding was crisis-driven.

These management difficulties were exacerbated by the sheer scale and severity of the flooding and, in the upper reaches of the river system, by the lack of warning time available. Warning quality was diminished by the failure of gauges and communications, the lack of prior knowledge of the effects which would be felt by the extreme flood heights reached and the lack of emphasis given to the warning function generally.

Civil defence sirens that had been widely installed in Germany during the Cold War had been sold off after reunification and few remained to alert people to the approaching danger. Municipalities are re-investing in sirens as well as developing warning strategies incorporating SMS and email delivery. Some are also preparing warning messages ahead of time for floods of differing severities and impacts. Warning initiatives, in short, are being planned for more fully.

Land management issues also came to the fore in the post-flood analyses. Near Dresden, a new village established since German reunification was lost—a reminder of the folly of building large numbers of dwellings on land which will inevitably be inundated. It has since been decided that new facilities will not be provided for this village.

There is also a focus on the need for reafforestation of areas clear-felled for agricultural use or where forests had been badly damaged by acid rain over recent decades. To retard runoff and reduce erosion in the Erzgebirge, thousands of hectares will be taken out of farming and re-forested over the next few years using funding from the European Union.

And what are the implications for Australia? In the eastern States the flood hazard sits at or near the top of the list of natural disaster agents as far as costs incurred are concerned, and flood management planning should not be neglected. These central European floods illustrated the need for planning to consider the full range of flood severities, not just the more common, lower-level flood events. They showed, too, the critical importance of the warning function and the need to maintain vigilance in relation to development on floodplains. These lessons are capable of being learned, but there is doubt as to whether they are heeded sufficiently in Australia or elsewhere. For this reason flood damages continue to increase.

The State and Territory Emergency Services, as flood combat agencies, would be wise to take note of this given Australia's history of occasional very severe and highly damaging floods. There is a real danger that emergency managers will focus on the more common, less consequential lower-level floods with which they are familiar and will ignore the events which will most test their capabilities and expose weaknesses in their management systems.

Huge floods like those on the Hawkesbury River in 1867, at Mackay in 1916, on the Hunter River in 1955 and on the Brisbane River in 1974 will happen again and will one day be exceeded in severity. Not to plan for such events by developing flood intelligence in depth, building strong warning systems and procedures, planning evacuation strategies, and ensuring that flood managers understand they might one day have to manage really severe flooding, is a mistake. Failure to plan guarantees that the next genuinely big flood will elicit a poor management response. The Czechs and the Germans discovered in 2002 just how devastating a flood can be and how much better prepared they could have been.

The author gratefully acknowledges the support provided by Emergency Management Australia which made possible this study tour as well as attendance at the International Disaster and Emergency Readiness conference in London.

In Profile:

Transitions in emergency management in Australia

In the first of AJEM's feature column *In Profile*, veteran educator, Roger Jones transits through his 30 year history in the emergency management field, reminiscing on the transitions in the industry since 1954 and speculating on its future directions.

Summing up his time and experiences, Roger Jones, one of the architects of contemporary emergency management in Australia, maintains two transitions have defined his career and feels gratified to have contributed to both.

Becoming actively involved in the change from World War II civil defence concepts and structures, with their emphasis on preparedness and response to war related events, to a focus on so-called natural disasters was the first transition. A further transition to a comprehensive and integrated approach to community safety, the all hazards/all agency concept with its whole-of-government approach to effective co-ordination, was the second.

As morbid as it may seem, other personal highlights included the happy, wonderful, odd collaborations that come when people work together on emergencies, disasters and events such as the *Granville Train Crash, Ash Wednesday, Cyclone Tracy* and the *Longford Gas Crisis*. They gave him the opportunity to contribute to concept development and policy formulation based on the cumulative lessons from these experiences.

Jones' history with emergency management started with his graduation in education and secondary school teaching in Western Australia—a background, he says, that stood him in good stead throughout his career. In 1954 he joined the Regular Army.

In 1974, after a number of command, staff and training appointments, he was posted to Canberra as the first Director of Operations and Plans in the then Natural Disasters Organisation (NDO), now known as Emergency Management Australia.

Cyclone Tracy struck Darwin barely six months after NDO's establishment. He describes the *Tracy* experience as a "reality check".

When asked how emergency management may have turned out if *Cyclone Tracy* had not hit Darwin and struck Cairns instead, he said "It must be recognised that Darwin was a pretty atypical place in terms of its isolation and it was also under Commonwealth administration rather than having recognition as a State or Territory—regardless of what it might have been called. What *Tracy* did, of course, was focus attention on the supreme importance of distance and on being able to produce resources from the Australian Defence Force in its civil role.

Had *Tracy* happened in a State or Territory jurisdiction, it may have concentrated attention on the key issues of public policy, inter-agency co-ordination, and the need for a whole-of-government approach a little earlier.

"Arguably, if it had happened in Cairns we might have been a little more prepared—a team from NDO had conducted an exercise there only months before *Tracy!* The irony is that while the event happened in Darwin it gave an impetus to the development of legislation and new arrangements for States and Territories. In Queensland it gave birth in 1975 to the State *Counter-Disaster Organisation Act,* an Act modelled fairly closely on NSW legislation set up in 1972. But it took a retrograde step in establishing separate management arrangements for what were called *emergencies* and what were called *disasters.* That anomaly, in my view, still exists in Queensland so if it had happened in Cairns it may have obviated that anomaly."

Jones believes that *Cyclone Tracy* had a critical role in the structuring of the National Disasters Organisation.

"To be perfectly frank and I'm sure Alan Stretton wouldn't mind me saying so, at the time, we only had the haziest ideas of where we were coming from. For example we set up the National Emergency Operations Centre, as we grandiosely called it, based on the only sort of models that we had—the old civil defence models. Those models were based

on loose concepts that when an event happened, we rushed out and ran it—which of course we didn't. That was one of the first vital lessons. I think it certainly coloured the next few years of NDO's evolution into EMA and still does. It very much puts the role of EMA into perspective as a support resource apart from its Commonwealth responsibility."

In late 1975 Jones left the Army to become Deputy Director and Chief Instructor of the then Australian Counter Disaster College (now EMA Institute) at Mount Macedon. One of the many highlights of Jones' career was the relationships he developed through seminars and studies at the College with the academic community, operational people and community leaders. He said they provided constant stimulation, especially veterinarians who he describes as an extraordinary group of committed people.

In 1985, following the *Ash Wednesday* fires, Jones joined Victoria's Office of the Co-ordinator-In-Chief of Disaster Control as Deputy Director. One of his tasks was to undertake the reviews of the State's emergency management arrangements and then shepherd the 1986 *Emergency Management Act* through the Victorian Parliament.

According to Jones, the policy decision that had the greatest impact on emergency management in Australia was the major public policy change in the 1980s which adopted the prevention, preparedness, response, recovery (PPRR) model of emergency management. "The recognition of the need to integrate mitigation at one end and recovery at the other end of the scope of emergency management was a considerable shift in the way policy makers viewed events. A good deal of work has been done in the mitigation prevention and recovery fields in recent years and it is good to see. One indication of the change in approach was that we held the first Post-Disaster Management Seminar in 1981, a couple of years before, ironically, *Ash Wednesday* hit the area in which we had devised the policy."

Another major policy change Jones considers significant in recent years was the whole-of-government approach to emergency management exemplified by COAG's recent inclusion of hazard mitigation and hazard reduction in its ruminations on emergency management.

Although he doesn't believe we have yet seen the full benefit of the increased recognition of mitigation and recovery issues, he thinks progress will continue as a slow evolutionary process.

He returned to the College and its fundamentally challenging role as its Director in late 1987 and served until his retirement there in late 1994. Jones' one lament is that he didn't fight earlier and harder to have the educational, rather than purely training, role of the College/Institute established sooner. "I believe there is a constant need to challenge current wisdom and to test out new approaches but in doing so one needs to recognise the very real political and organisational sensitivities such an approach may generate," he said.

Jones is concerned that future leaders in the emergency management field recognise the continued existence of organisational silos. "These silos are there, they have been there a long time, they are well-established and they are hard to break down but I think any future leader needs to be prepared to do whatever he or she can to break down those walls". He cautions however that "[…] in doing so you have to remember the central business of emergency management is about communities and people and so future leaders worth their salt are going to need to do frequent reality checks to make sure that what they are doing is what communities really need and want them to do".

However, the current debate over the eventual convergence of various disciplines (eg. disaster management, risk management, crisis management, business continuity, etc.) needs to be approached with caution. He believes these various influences may well develop a new set of silos—which he says we need like we need a hole in the head. "The need to break down the walls between silos is quite critical but equally in convergence I see the developing broader acceptance and understanding of risk management concepts and principles and processes as similarly critical. I think the risk management discipline provides an umbrella under which most of these influences can operate without creating their own silos or, at least, I would hope that is so. As far as education and training is concerned, I think convergence demonstrates the need for a much broader input from all the sectors involved in these activities. I think education and training in emergency management also should be promoted across the variety of professions that interface with emergency managers," he said.

Jones is currently consulting in the field of public safety risk management and is actively engaged in a wide variety of community activities in the Macedon Ranges area.

Local politics and local government in Victoria have long been a passion of Jones. His views on how local government fits into the rapidly evolving environment of emergency management are provocative. He says "A great premium must be placed back on the States on issues of state wide concern such as emergencies and disasters. There has been a considerable devolution of responsibilities from State to local governments in recent times. In Victoria for example, there

has been devolution, without the necessary injection of resources in skills and materiel. I've seen this situation in community support arrangements in flood-affected communities. The communities' problems involved planning issues, with a considerable deficit of skilled planners available to local government and a huge range of problems which were almost insurmountable. The local government resources were vitally in need of supplementation (a) to be able to cope with the planning role and (b) to cope with the incidents as they occurred. The State has to be able to resource local government more effectively."

Where to from here? Jones predicts both threats and opportunities for emergency management's future. "We are set for a relatively even rate of transition. Perturbation factors like the concentration on the war against terror and so on will occasionally throw up slight changes in direction but the broad direction has been fairly well established," he said.

He thinks there are some substantive threats in the current focus on security. "One of the clear threats is a possible reversion to the reactive preparedness/response approach and to a focus on single issues as well as single hazards."

One concern Jones has is that the focus on terrorism has cast doubt on the credibility of intelligence agencies and issues of secrecy—a concern to be avoided in a security environment. "If you look at the response of tourists proposing to visit Bali after the issue of a very clear warning recently by the Federal Government—it had hardly any effect at all—they continued to go and continued to do what they wished to do. There was really a question of 'OK, I hear what you're saying but do I put the value of what you are saying, over what I wish to do?' The overpublicised focus on security has cast some distrust over the whole thing. There is almost a cynicism about the sources of the information that give warnings and advice about what one should and shouldn't do".

When asked to identify the major features of emergency management in Australia Jones immediately referred to the magnificent contribution of volunteers to the industry. He claims the strength of the volunteer movement lies in its "organisation of volunteers, the grounding the volunteers have and their willingness to work under conditions which are sometimes very trying." But he thinks one of the industry's sleepers is going to be where the volunteer movement goes in the future.

The ageing baby boomer population presents some problems and possibilities for this sleeper. "The problems include the limited time people have these days. We had a meeting last night in my house for my local community fireguard group. One person has lived diagonally opposite me in the main road of Mt Macedon for three years and it is the first time I've met him because he is either at work, interstate or busy. Even his wife says she doesn't see him very often. I think that is one of the continuing problems that the volunteer arm is going to have to face—limitations in many cases of time, ability and opportunity. Early retirees may present some opportunities for volunteerism in emergency management by devoting needed time, skills and opportunity to the community, both of which will benefit from the contribution. For instance, I took a slightly early retirement and as the saying goes 'I have never been busier!'

To those people aspiring to enter the field, Jones advises that the time of his entry into the field of emergency management in the 70s and 80s a military or para-military background was almost a prerequisite but such a background he maintains could bring with it a somewhat narrow view of issues such as command and control and underplay the importance of effective inter-agency consultation and co-ordination. He maintains that any aspirant needs to be fully aware that emergency management is a broad field and requires a multitude of skills. Today, any grounding in fields such as sociology, public administration, local government, constructional techniques, information technology and even teaching could be an advantage. All of those would give an acquaintance with and understanding of the need for continuing research.

Roger Jones is currently providing public safety risk management consultancies in Australia and the Pacific through his company TEM Consultants. His activities in the Pacific, as a member of a regional team providing community risk management advocacy services to the 15 small island developing states of the Pacific Forum, take up most of his time, and his spare time goes into local bodies in the Macedon area. He is a long-time member of the AJEM Advisory Committee.

NOTES FROM THE FIELD

Jakarta deployment: tsunami response

by Donovan Croucamp, EMA Liaison Officer, Jakarta

As part of Australia's response to the tsunami disaster in SE Asia, EMA sent me to Jakarta, Indonesia to act as a liaison officer between the United Nations and both EMA and the Australian Agency for International Development (AusAID). This role was one of strategic level co-ordination and information exchange.

After being rerouted twice and losing but regaining my baggage I arrived in hot, humid Jakarta. Catching a weaving, hooting taxi was an interesting experience and so was standing outside the Australian Embassy for close to an hour trying to convince the local Indonesian Security Detachment that I needed to gain admission. The Indonesian city of Jakarta is a busy, congested place with many motorcycles and Toyotas of every description.

The work environment was very intense for the first week as structures, relationships and co-ordination systems were still being developed. The diversity of UN agencies, Non Government Organisations (NGO's) and donor countries was wide-ranging. The response from the international community was swift and, as a result, there were many well meaning players all jostling for resources and information. The biggest challenge for the UN was to get all the foreign countries, foreign military forces, and NGO's to work in a co-ordinated fashion. I was introduced to the UN Disaster Assessment and co-ordination Team (UNDAC) by Trevor Haines and my AusAID contact was Sally-Anne Henfry, both friendly Australian faces.

PHOTO: TREVOR HAINES

Donovan Croucamp and fellow workers in the UNDAC Communications room.

Civil and military co-ordination was essential as the Indonesian Military (TNI) initially co-ordinated all military resources, both Indonesian and foreign, through a Joint Operations Centre in Medan. Military support was the backbone to the initial response and relief efforts into the affected area of the Aceh province. The focal point was Banda Aceh where the losses were most obvious and significant. Air operations by both fixed-wing and helicopter aircraft bore the brunt of the logistical support with the RAAF doing an outstanding job of service provision and air operations support.

My role was quite removed from the affected area although I was inundated with information and images from the field. I began the task of strengthening links with AusAID and providing regular intelligence to Canberra through daily situation reports (Sitreps) and other UN documentation. Working at a strategic level with UN agencies was an interesting experience and working with key players from UN, NGO and donor countries was rewarding despite the tragedy of the overall situation.

The business and hype of the first week was stressful but it seemed to stabilise and calm down in the second week as regular meetings were established and key figures got to know each other and their responsibilities. Disaster logistics was a very important functional area and the UN Joint Logistics Centre (UNJLC) managed a key forum to co-ordinate and manage the movement of resources into and around the affected areas. Other UN agencies included UNDP, OCHA, WFP, IOM, WHO and many others whose acronyms are sure to confuse most people for a few days. I attended an address by UN Secretary General, Kofi Anan, as well as many meetings and forums chaired by various UN and Indonesian leaders. In addition to my UN/AusAID role I was involved in assisting the extracation and debrief of the first Australian medical team that provided an emergency medical and surgical capability in Banda Aceh for two weeks. Many lives were saved by this team and they helped set up structures and relationships for the replacement medical teams who were deployed on a rostered basis. The experience was challenging and rewarding although disasters alter one's perspective on what is important in life.

EMA Research & Innovation Program

The EMA Projects Program is aimed at fostering projects that help improve Australia's capabilities for preventing or dealing with natural or technological hazards and disasters.

Please be advised that the EMA Projects Program has now been replaced by the EMA Research and Innovation Program. Information on this new funding initiative is available on the EMA website www.ema.gov.au or by contacting Rheannon Nicholson, Co-ordinator Development Projects, (02) 6256 4614 or rheannon.nicholson@ema.gov.au

Field trial of WARPS in two Australian states

Maureen Norman – CEO, WARPS Australia Pty Ltd

This final project report describes Project 02/03: "Field Trial of WARPS' (Wireless Automated Response Positioning System) in two Australian States: An innovative hands-free radio-tracking technology". WARPS was purpose-designed to reduce known risks to volunteer fire fighters, and the Report provides a review of the operational effectiveness and benefits of the technology during trials with rural fire services in New South Wales and Australia. The Trial Report considers the implications of the technology for all emergency services regardless of their primary function, and describes its acceptance by volunteers and management, and transferability to other agencies.

The EMA trial of WARPS was conducted with four rural fire service brigades in Gosford, NSW and five brigades across Mt Lofty Ranges, SA over a period of four months (1 December 2003–31 March 2004). WARPS units were installed in a range of vehicles (urban and rural pumpers and tankers, rescue and command vehicles). WARPS software was installed on standalone computers at local operation headquarters. Following installation each rural fire service continued operations as usual.

Technical viability was assessed using a range of parameters, including accuracy, functionality in poor radio signal areas and variance in radio communications infrastructure. Volunteer and management feedback was assessed during post-trial using notebooks and interviews. Operational data were collected from both sites using the AIIMS database, to identify the number and types of incidents attended. A comprehensive literature search was conducted, with a focus on recommendations from previous Bushfire Inquiries, the limitations of radio infrastructure, and workplace safety/ legal liability issues. Discussions with and presentations to other emergency service organisations provided an opportunity to assess WARPS capacity to assist a wider range of agencies.

The EMA trial demonstrated that WARPS technology delivers a uniquely simple, elegant and problem-specific resolution to communications and workplace safety problems common to all emergency service organisations (ESOs), particularly those based in rural areas typically marginalised in terms of accessing viable new technology.

WARPS provides the means to achieve national interoperability for vehicle location, by delivering the key enabling technology required for all ESOs to locate, monitor and deploy vehicles using their existing radio network architecture, with minimal cost and maximum resource efficiency.

The trial identified issues of importance to managers and suppliers of emergency service radio network services, and to State/Territory and Federal bodies responsible for ensuring the rapid, effective deployment of resources to major incidents.

Discussion of the trial findings goes beyond the use of WARPS with rural fire services. It assesses WARPS validity as a management tool across the spectrum of emergency service response capacity as part of the counter-terrorism environment that all emergency service organisations (ESOs) function in 2004. It considers the implications for EMA and all levels of Government involved in counter-terrorism planning, preparedness, response and recovery across State and Territory borders in light of the wide variation in radio communications infrastructure which currently exists from State to State.

RESULTS OF AJEM SURVEY 2004

In March 2004 a survey was sent to our subscribers asking for feedback on the *Australian Journal of Emergency Management* (AJEM). A total of 36.6 percent of our readers responded to the survey, providing valuable suggestions, thoughts and opinions on the relevance of AJEM to its readership and what opportunities existed for its future evolution.

The Editorial Advisory Committee was delighted with the high level of survey returns and have provided these results as a general guide to the survey responses.

AJEM format

Each issue of the Journal contains regular features that include the EMA Updates, Conference Diary, Notes from the Field, Historical Snapshot, and Interesting Websites. The survey revealed that the most popular of these regular features was the EMA Updates and the Notes from the Field.

The editors welcome contributions for consideration for publication in the Notes from the Field feature.

Although we live in a technological age, 82 percent of responses indicated a clear preference for the printed version of AJEM over an electronic version, archived to the EMA website.

The survey indicated that the Journal is largely successful in catering to its varied audiences. Its aim for a blend of articles in each issue that appeals to a diverse audience from academics to practitioners, appears generally well received by our readership.


The Australian Journal of Emergency Management

Content

The production of a quality Journal involves an editorial process that often results in a 'lag' of information to its readership. Despite this process, it was pleasing to note that over 55 percent of respondents considered AJEM contained timely information that was well written and nearly 90 percent believed it contained information relevant to their work.

Readership extension

The survey asked if readers would recommend AJEM to their colleagues. It is very encouraging to see that 96 percent of respondents indicated that they would or currently do recommend AJEM to colleagues and associates.

Over 70 percent of survey respondents indicated that they retained the Journal as a resource and referred to it on a regular basis. Respondents indicated that the Journal was used in planning, training, education, exercise management, and presentations as well as a range of other uses. This has resulted in the introduction of an annual index of AJEM articles to be published in the last AJEM for each Volume to assist the easy referencing to past articles. The index for Volume 19 is included in this issue.

Article submission

To maintain the quality of AJEM content and its relevance to the readership and industry, AJEM has comprehensive submission guidelines to assist authors. These are available at http://www.ema.gov.au/agd/EMA/emaInternet.nsf/Page/AJEM. Assistance with capturing your story in print is available if required.

Conclusion

The *Australian Journal of Emergency Management* is regarded as the principal or prime source of information for the emergency management sector within Australia. It is the only regular, comprehensive, multi-disciplinary publication of its type and is regarded by its readership as a reliable and credible source of information covering the full spectrum of emergency management.

The AJEM Advisory Committee thanks those who took the time and gave thoughtful feedback in this survey. It is these valuable comments and suggestions that inform the future direction of the Journal.

EMA Update

Emergency Management Australia provides national leadership in the development of measures to reduce risk to communities and manage the consequences of disasters. EMA Update keeps AJEM readers abreast of the courses and activities that assist in this aim.

KNOWLEDGE MANAGEMENT & BUSINESS

Community awareness

The revised *Lightning Action Guide* is now available for distribution. This guide is the sixth in the series and provides helpful safety tips during a lightning storm. The guide is DL (1/3 A4) in size and printed on self adhesive card. A limited number of print copies are available from EMA and it is accessible via the EMA website.

Australian Emergency Manual series

Emergency Planning (manual number 43) is the latest addition to the series. Although this manual focuses primarily on planning needs at the community level the processes adopted in this manual are equally applicable to emergency planning at all levels including corporate planning.

The revision of *Commonwealth Counter Disaster Concepts and Principles* is nearly complete. This revised publication had input from all States and Territories and reflects a national approach to emergency management concepts and their application. It supports the Prime Minister's commitment that protecting Australia is the Government's highest priority and emergency management is a critical component of this approach.

Designed to be the introductory volume in the *Australian Emergency Manual Series,* the primary audience includes members of emergency management organisations and their supporting agencies as well as those who are planning a career in emergency management.

Emergency Risk Management—Applications Guide has also been revised. This manual was first published in 2000 to provide a comprehensive guide to Emergency Risk Management (ERM) and how it is applied at the community level. This revised Guide is timely as it follows publication of the *2004 Risk Management Standard* AS/NZS 4360 on which ERM is based and includes the growing body of experience in the application of ERM. In 2000 the ERM process was in its infancy and therefore the Guide was theoretically based. Now that ERM is a proven and accepted process, this version has a user-friendly structure and reflects the latest in emergency management thinking and practice.

Most manuals within the series are freely available for download from the EMA website. Limited print copies may also be available.

For further information contact Cate Moore
Phone: 03 54 21 5296; email: cate.moore@ema.gov.au

EMA library

The EMA Library collection has expanded over the last year with over 700 new items added to the collection including books, reports, videos and emergency management plans. In addition, the library team indexed more than 400 journal articles which are searchable via the new library catalogue. To keep up-to-date with the latest library additions visit the online library catalogue via the EMA Library webpage and click the 'New items list'.

The library is implementing a number of new initiatives in 2005 to further develop client online services. There is a range of electronic full-text databases available online to registered library members via the library webpage. These databases provide access to over 5,000 journals, with full-text available on most journals. Also available is a selection of full-text newspapers and newswires from Australia and New Zealand covering a range of regional and international topics. Registered library members can obtain a username and password for these resources by contacting the library.

For further information contact Troy Watson
Phone: 03 5421 5223, email: troy.watson@ema.gov.au

Australian Disasters Information Network (AusDIN) portal group

The AusDIN Portal Group is progressing a project plan to build a national Emergency Management Portal. At the last meeting in Brisbane in November 2004 a project plan and interim funding were agreed and sub-groups were formed to progress various aspects of development. Phase 1 of the portal is scheduled to go live in May/June 2005.

AusDIN working group

The future direction of the AusDIN Working Group is currently the subject of a discussion paper given changes in jurisdictions and the emergency management environment generally. This paper has aroused interest, and further discussions with members will be held in the first quarter of 2005.

KNOWLEDGE MANAGEMENT & BUSINESS CONT

A meeting will be organised in the first half of the year. Issues for consideration at this meeting may include the Emergency Management Mapping Project, development of the AusDIN Portal, the Australian Bureau of Statistics Emergency Management Information Development Plan (ABS EMIDP), and national issues noted by Australasian Libraries in the Emergency Sector (ALIES) and Emergency Management Spatial Information Network Australia (EMSINA).

The Emergency Management Mapping Project

The aim of the Emergency Management Mapping Project is to identify all Government and National, State and Territory groups and committees working in emergency management within Australia. Queensland is the pilot State with others to follow in the future. Stage one is scheduled to be completed by the end of March 2005.

For further information contact John Laurie
Phone: 03 5421 5280; email: john.laurie@ema.gov.au

Website

The EMA website has maintained a strong presence on the web, with a peak of 36,000 visits during December 2004 – 59 percent coming from overseas with the USA being the largest origin of visitors. Tsunami information available on the EMA schools website was responsible for much of this increase. During the tsunami crisis visitors were directed to the Australian Government's "tsunamiassist" website for immediate assistance.

In response to the tsunami disaster new material was developed by a nation-wide group of educationalists and emergency management experts to assist school communities in dealing with student responses to this event.

Disasters database

Working with other government agencies and organisations, EMA has commenced a project to enhance the information contained in the database and to increase its effectiveness and scope as a community information source.

For further information contact John Haydock
Phone: 03 5421 5297; email: john.haydock@ema.gov.au

EDUCATION & TRAINING

School education

In 2005 EMA will employ a full-time School Curriculum Officer to liaise with education and emergency management specialists to support integration of emergency management issues into the school curriculum. The School Curriculum Officer's duties will include developing effective networks in the schools sector and development and maintenance of the school education web-site. EMA will establish a national reference group to assist in this important work.

For further information contact Judy Parker
Email: judy.parker@ema.gov.au

Community engagement

Community engagement is an enabling skill in the national emergency management competency standards and is often cited by our clients as an area where they would like further skill development. In response to this need, EMA is in the process of recruiting a Senior Education Officer with knowledge and skills in community engagement.

For further information contact Margery Webster
Phone: 03 5421 5283; email: margery.webster@ema.gov.au

Graduate Certificate in Emergency Management

In November 2004 candidates from the first intake of the Graduate Certificate in Emergency Management attended the residential component of the second module. A number of leading thinkers in the field of emergency management in Australia presented their own and related research to introduce current issues and trends in the field of emergency management.

In December, 25 candidates were selected for the second intake. The standard of applications was high and represented the broad field of emergency management. In addition to the emergency services, candidates were from the utilities, local government, health, human services and agriculture.

For further information contact Mike Tarrant
Phone: 03 5421 5219; email: mike.tarrant@ema.gov.au

EDUCATION & TRAINING CONT

Advanced Diploma in Public Safety (Emergency Management)

A pilot program of the Advanced Diploma in Public Safety (Emergency Management), delivered over two years, commenced in February. To achieve the award candidates must complete six core and five elective competency standards. A full range of competencies is available at www.ntis.gov.au. The electives for the EMA pilot were selected in consultation with States and Territories. The *2005 EMA Institute Handbook,* available at www.ema.gov.au, includes more information about the program and a table showing the range of qualifications in the Public Safety Training Package which includes the competency standards delivered by EMA.

For further information contact Mike Tarrant
Phone: 03 5421 5219; email: mike.tarrant@ema.gov.au

Competency standards for recovery management

Consultations are currently underway to identify competency standards for Recovery Management. Consultations were held in South Australia, Perth, Victoria and Tasmania in February with a second round of consultations for NSW, Queensland, Northern Territory and ACT in July. The Project is due for completion in September 2005.

More information is available at www.ema.gov.au

Tsunami assist

Led by the Planning and Operations Group, EMA staff members are actively involved in co-ordinating Australia's assistance to the areas affected by the Asian tsunami. Lessons learned from work in the National Emergency Management Coordination Centre and from EMA Liaison Officers posted overseas will be captured to provide a valuable context for EMA programs in 2005.

DEVELOPMENT

Emergency Management Volunteers Summit 2005

Planning is in its final stage for the *Emergency Management Volunteers Summit 2005* to be held in Canberra 6-7 April 2005 with nominations closed in December 2004. The themes for the 2005 Summit are 'Drivers for Change' and 'Enhancing Links to Further Benefit Volunteers & Their Communities'. This year's Summit builds on initial aims and objectives from the 2001 Summit with the overarching goal of developing a stronger volunteer sector – nationally. That goal already has the strong support of the Australian Government Attorney-General, the Hon Philip Ruddock MP, who has portfolio responsibility for emergency management. The Summit will be officially opened by the Governor-General Michael Jeffery AC CVO MC (Retd).

For further information contact Justine Rixon
Phone: 02 6256 4616; email: justine.rixon@ema.gov.au

Emergency Management 'Volunteers in Action' photographic competition

The Volunteers in Action photographic competition closed on 14 February 2005. The judging panel is made up of representatives from the volunteer emergency management community and the photography profession. They are currently evaluating the hundreds of entries EMA received. Winners will be announced at the *Emergency Management Volunteer Summit 2005* held in Canberra 6–7 April. EMA would like to thank all those who entered the competition and wish you all good luck. EMA hopes the photographic competition goes some way to showing that volunteers in this sector are not taken for granted.

COAG report on natural disasters in Australia—reforming mitigation, relief and recovery arrangements

This landmark report has examined the ways in which Australia's national capacity to mitigate natural disasters and to manage their effects could be improved. It made a total of 12 Reform Commitments and 66 Recommendations for Action. The report can be downloaded from http://www.dotars.gov.au/ndr/nat_disaster_report/naturaldis.pdf .

The Council of Australian Governments (COAG) gave in-principle approval to this Report in December 2003. Since then there has been considerable work by governments and agencies, seeking to respond to the report beyond the 'in-principle' stage, by examining in detail the report's commitments and recommendations. The Australian Emergency Management Committee (AEMC) has been reconstituted, as recommended by the Report, and the new national Ministerial Council, the Augmented Australasian Police Ministers' Council (A/APMC) will meet for the first time in March 2005.

DEVELOPMENT CONT

This meeting will involve the Ministers responsible for emergency management in each jurisdiction. From an Australian Government agencies' point of view, EMA provides a secretariat and reporting service to eight working groups set up to develop the federal response to the Report. They will report via the AEMC to the A/APMC.

For further information contact Helen Righton
Phone: (02) 6456 4675; email: helen.righton@ema.gov.au

Bushfire awareness and preparedness day initiative

On 8 September 2004, the Prime Minister announced a funding allocation of $24 million over three years to assist local communities to better prepare for bushfires. Part of this funding package comprised $6 million over three years towards the establishment of Bushfire Awareness and Preparedness Day activities. The funding for this initiative will be managed by EMA. EMA has commenced a consultative process with State and Territory representatives, the Bushfire CRC, and Federal Government representatives and instigated preliminary discussions with relevant AFAC subcommittee representatives. Both the National Community Safety Working Group (reporting to AEMC) and the Australian Government Community Safety Working Group (feeding into the monitoring processes for the COAG Natural Disasters Report) have been alerted to these current developments and invited to contribute.

For further information contact Li Peng Monroe
Phone: 02 6256 4610 ; email: lipeng.monroe@ema.gov.au

2004 Australian Safer Communities Awards

The 2004 Australian Safer Communities Awards ceremony was held at the Mural Hall, Parliament House, Canberra on Thursday, 2 December, 2004. The Attorney-General announced the national winners of the Awards at the ceremony. The Awards recognise best practice and innovation 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 past years' winners are also available on the EMA website—www.ema.gov.au.

EMA Research and Innovation Program 2004/2005

The EMA Research & Innovation Program 2004/2005 is focusing on nationally determined priorities for research and innovation in emergency management. The Program aims to facilitate the capture and transfer of innovative practice and disaster research outcomes across the sector. From the 84 applications received for financial year 2004/2005, the Program will provide funding for six projects from a range of locations across Australia. The projects encompass a wide range of topics including volunteer issues, assessment tools and the assessment of flood mitigation devices. The projects are outlined on the EMA website. Completed projects from EMA's past funding program – EMA Projects Program – are also located on the EMA website in the research category, and are available for loan from the EMA Library at Mt Macedon, Victoria.

For further information contact Rheannon Nicholson
Phone: 02 6256 4614;
email: rheannon.nicholson@ema.gov.au

Erratum:

The November 2004 edition of the Journal included an article by Annabelle Beckenham and Susan Nicholls entitled *Government communication strategies for the community recovery following the ACT Bushfires, January 2003.* The diagram on page 74 reflects the Recovery Communication Model devised from the research. The box labeled 'CCRG' should read "CERG'. There is no change to the box labeled 'Secretariat (CCRG)'.

CONFERENCE DIARY

Conference details are sourced from the EMA website.
For more information about these and future conferences, visit www.ema.gov.au

INTERNATIONAL
2005 March

2-4 March

Location	Miami, FL
Title	A Conference on America's Beaches: Current Issues in Beach Management, Tourism, and the Coastal Environment.
Details	This conference will focus on overlapping contemporary social and scientific issues facing beach managers as scientists, marketers, citizens, and policy makers face the tough challenges of coastal life today. Topics include beach management and tourism, beach management in the face of coastal disasters, and beach management and the environment.
Enquiries	The International Hurricane Research Center, Florida International University, University Park Campus, MARC 360, Miami, FL 33199. tel: (305) 348-1339; email: defraene@fiu.edu web: http://www.ihrc.fiu.edu/.
Sponsor	International Hurricane Research Center.

21–23 March

Location	The Netherlands
Title	The First International Symposium on Geo-Information for Disaster Management.
Details	This symposium will focus on the response and relief phases of disaster management, encouraging a wide discussion on systems and requirements for use of geo-information under time and stress constraints and unfamiliar situations, environments and circumstances. It will address these challenges by bringing together technology developers, disaster management bodies, information providers, developers of standards, and users.
Enquiries	Elfriede M. Fendel, P.O. Box 5030 2600 GA, Delft, The Netherlands tel: +31152784548 email: email: e.fendel@otb.tudelft.nl web: http://www.gdmc.nl/gi4dm/.
Sponsor	Delft.

21–25 March

Location	New Orleans, Louisiana
Title	2005 National Hurricane Conference
Details	
Enquiries	web: http://www.hurricanemeeting.com/.
Sponsors	American Association for Wind Engineering, Federal Emergency Management Agency, American Red Cross, Institute for Business and Home Safety

4-8 April

Location	Kansas City, Missouri
Title	Mass Fatalities Incident Response Planning
Details	This course addresses the essential elements of planning for response to a mass fatalities event. It is designed to help planning-level officials from various governmental jurisdictions, public service, private sector business, and voluntary organizations understand the concepts of a multifaceted, integrated response plan.
Enquiries	National Mass Fatalities Institute, 6301 Kirkwood Boulevard SW, Cedar Rapids, IA 52404 tel: (319) 398-7122 email: nmfi@kirkwood.edu web: http://www.nmfi.org/events.htm
Sponsor	National Mass Fatalities Institute

5–9 April

Location	Denver, Colorado
Title	Association of American Geographers (AAG) Annual Meeting.
Details	This professional and scholarly meeting typically features a variety of hazards- and disaster-related sessions and provides attendees with the opportunity to network with colleagues, discover new developments in geography, and learn about cutting-edge research.
Enquiries	AAG, 1710 16th Street NW, Washington, DC 20009 tel: (202) 234-1450 email: meeting@aag.org web: http://www.aag.org/annualmeetings/index.cfm.

INTERNATIONAL
2005 April

12–14 April

Location	Lafayette, Louisiana
Title	Progress in Understanding Coastal Land Loss and Restoration In Louisiana: The W. Alton Jones Foundation Report Revisited.
Details	This symposium will focus on recent scientific and technological developments that provide insight into the causes of land loss, the consequences of the rapid changes during the twentieth century, and predicting the outcomes of system-scale restoration efforts. While the focus is on coastal Louisiana, discussion of important findings from other systems will be integral to the symposium program.
Enquiries	University of Louisiana Lafayette, Continuing Education, CREST Symposium 2005, P.O. Box 42411, Lafayette, LA 7050 tel: (337) 482-5712 web: http://www.gulfcrest.org/activities.htm.
Sponsors	National Oceanic and Atmospheric Administration, U.S. Army Corps of Engineers, U.S. Geological Survey, and Louisiana Governor's Applied Coastal Science Program.

13–15 April

Location	Algarve, Portugal
Title	Coastal Engineering 2005.
Details	Scientists and engineers involved in the study and use of computational methods for coastal engineering problems are invited to attend this conference, which will address the study of seas and coastal regions under normal and extreme conditions, emphasizing the practical applications. Discussions will also take place on environmental problems of coastal areas, which are frequently densely populated or sites of industrial development. Abstracts are due as soon as possible.
Enquiries	Rachel Green, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton, SO407AA, UK tel: +44 (0) 238 029 3223 email: rgreen@wessex.ac.uk web: http://www.wessex.ac.uk/conferences/2005/coastal2005/.
Sponsors	Wessex Institute of Technology, University of Coimbra

17–20 April

Location	Kansas, City, MO
Title	2005 APWA North American Snow Conference
Details	More than 30 education and technical sessions and roundtables at this conference will address a variety of topics including snow plowing procedures, new salt applications, anti-icing and de-icing, AVL/GPS/GIS, winter pavement maintenance, fleet responsibilities in a disaster, new technologies, snow removal, winter vehicle maintenance, and more.
Enquiries	APWA, P.O. Box 802-296, Kansas City, MO 64180 tel: (816) 472-6100 email: snow@apwa.net web: http://www.apwa.net/meetings/snow/2005/.
Sponsor	American Public Works Association (APWA)

18–20 April

Location	Brussels, Belgium
Title	ISCRAM 2005: Second Annual Conference on Information Systems for Crisis Response and Management
Details	Tilburg ISCRAM2005 will bring together designers, developers and users of information systems that support crisis-related activities, such as planning and training for crisis response, responding to a crisis, and performance evaluation. Organizers welcome academic and industry researchers, practitioners, and policy makers.
Enquiries	ISCRAM email: iscram2005@uvt.nl web: http://www.sckcen.be/iscram.
Sponsors	University, Nuclear Research Center SCK-CEN, Royal Flemish Academy of Belgium for Science and the Arts, New Jersey Institute of Technology.

19–21 April

Location	New York, New York
Title	The 16th Global Warming International Conference.
Details	A variety of topics related to global warming will be addressed at this conference, including global warming science and policy, extreme events and impact assessment, and human health in a changing climate.
Enquiries	James A. Roberts, GWXVI International Program Committee, P.O. Box 5275, Woodridge, IL 60517 email: jroberts@globalwarming.net web: http://www.globalwarming.net/
Sponsor	Global Warming International Center

24–26 April

Location	Santa Fe, New Mexico
Title	ASDSO 2005 West Regional Conference
Details	This regional conference will be geared toward dam safety engineers and dam owners/operators in the Western states. Both technical and nontechnical topics will be included on the agenda.
Enquiries	ASDSO, 450 Old Vine Street, Floor 2, Lexington, KY 40507 tel: (859) 257-5140 email: info@damsafety.org web: http://www.damsafety.org/
Sponsor	Association of State Dam Safety Officials (ASDSO)

24–29 April

Location	Vienna, Austria
Title	European Geosciences Union General Assembly 2005
Details	Open to scientists of all nations, this assembly will include union symposia, oral and poster sessions on disciplinary and interdisciplinary topics covering the full spectrum of the geosciences and space and planetary sciences, short courses and workshops, key note and medal lectures, and town hall and splinter meetings
Enquiries	EGU Office, Max-Planck-Strasse 13,37191 Katlenburg-Lindau, Germany tel: +49-5556-1440 email: egu@copernicus.org web: http://www.copernicus.org/EGU/ga/egu05/index.htm.
Sponsor	European Geosciences Union (EGU)

AUSTRALIA

17–18 March

Location	Perth, Western Australia
Title	2005 West Australian Emergency Management Conference: Bridging the Gap Between Crisis and Consequence Management.
Details	The conference seeks to explore the relationship between crisis and consequence management as it applies to the field of emergency management. It provides new ideas and approaches to problem solving in emergency management; leading edge and topical presentations from international and local speakers; and opportunities to network with key individuals and organisations across the emergency management industry.
Enquiries	Management Conference FESA Emergency Management Services PO Box P1174 PERTH WA 6844. tel: +61 8 9323 9418 fax: +61 8 9323 9462 email: ssmith@fesa.wa.gov.au web: http://www.ems.fesa.wa.gov.au
Sponsor	Fire and Emergency Services Authority of Western Australia, Government of Western Australia.

12 April

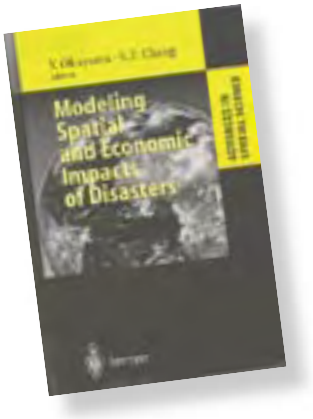
Location	Canberra
Title	2005 Humanities—Security & Counter-Terrorism Research Forum
Details	The Research Forum will showcase a range of important projects from the humanities and social science disciplines that are making a significant contribution to safeguarding Australia. The Forum is not a conference as formal papers are not presented. Instead presenters will provide sufficient information on their work to enable the audience to understand their research work and why it is important.
Enquiries	tel: + 61 2 6161 5143 fax: +61 2 6161 5144 email: athol.yates@homelandsecurity.org.au web: www.homelandsecurity.org.au/humanit
Sponsors	Australian Homeland Security Research Centre and the Australian Academy of the Humanities 2005 Safeguarding Australia Summit, Canberra, 12–14 July 2005 Organised by Australian Defence Forces Academy, University of Melbourne, Engineers Australia and Queensland University of Technology www.homelandsecurityconference.org.au

BOOK REVIEW

by Ron Shamir, Victoria Country Fire Authority

Okuyama, Yasuhide & Chang, Stephanie E. (Eds.) 2004 Modelling Spatial and Economic Impacts of Disasters, Springer Publishing, Germany.

ISBN: 3-540-21449-6



Modelling Spatial and Economic Impacts of Disasters is a new book published in 2004 by Springer Publishing as part of the Advances in Spatial Science series. The book is a sound foundational text as well as a welcomed call for increased improvement, innovation and collaboration in emergency or disaster modelling, and therefore, in emergency management.

The book is best described as an extensive, well-organised literature review of disaster impact modelling research. Examples include the measurement of varied impacts of disasters, the influence of information provision on risk perception, and the dynamics of recovery.

The chapters can be grouped into three parts. These are Conceptual and Modelling Issues, Economic Models, and Integrative Models.

These provide the researcher with a useful timeline spanning fundamentals, recent innovations and ways forward. Researchers are the likely principal audience for the book, however, professionals in emergency management, government policy, insurance, disaster recovery, and regional social and economic management would also benefit from the content.

An introduction chapter by the editors provides the book with context and cohesion. Together with a number of clear examples in other chapters and ample recent references, the book may have academic applications in geomatic or mathematical modelling curricula, as well as emergency management.

Disaster is defined in the book as the realisation of a hazard. The realisation aspect is significant given the editors' argument that conventional economic models frequently fail to account for the abruptness and intensity of disasters.

The topics covered and their sequence exposes the reader to a modelling field of ever increasing complexity and dimensionality. The editors clearly hope to bridge the gap between models (and modellers) of physical phenomena and social science models.

The high degree of fidelity to modern risk management practice is a welcome aspect of the book. While an absolute fidelity in terminology is unlikely, the book emphasizes a number of fundamental concepts. An example is the importance of the vulnerability component in impact analysis.

It is difficult to imagine a contemporary book on disaster modelling that does not reflect on the impacts of the September 11 2001 attacks. This book includes several useful references to the events without underemphasizing the impacts of other significant disasters, including significant natural disasters in the last decade. The chapter, in part, investigates longer-term "ripple" effects generated by often neglected aspects of recovery, such as public policy.

The book contains a number of recommendations that are pertinent to emergency management agencies. Particularly gratifying to a modeller is the recognition that attention to modelling fundamentals is as critical as commitment to innovation. The core business databases of emergency management agencies are often statistically young and reflect a variety of implementation artifacts. In his discussion on broadening the focus of future research, Adam Rose refers to the improvement of the empirical basis of models as the "top priority" and that it is critical to model acceptance by policy and decision makers.

It is not surprising, given significant disasters of the last decade, that the natural disaster examples are dominated by earthquake events. Modellers in emergency management agencies in Australia may need to extrapolate some of the concepts in the book in order to realise practical applications for local research.

Overall, the book is a good synopsis of fundamental concepts, current research and future directions. The additional contribution of the editors and chapter authors is a consistent call for better models for the future. There are few modellers in the Australian emergency management sector that would not share this view.

In addition to disaster and emergency modelling specialists, the book is recommended to risk management professionals, policy makers, senior managers and researchers in emergency management related roles.

Author
Ron Shamir is a spatial modeller with the Victoria Country Fire Authority (CFA). For the past two years Ron has been conducting a review of risk modelling at CFA and other emergency service organisations.

interesting websites

World Vision

http://www.worldvision.com.au/index.asp

World Vision is a non-denominational, Christian humanitarian aid and development agency whose philosophy regards emergency responses and relief as only the first step. The second step is to establish rehabilitation programs to help people rebuild their lives, and development programs that will enable people to protect themselves against future disasters.

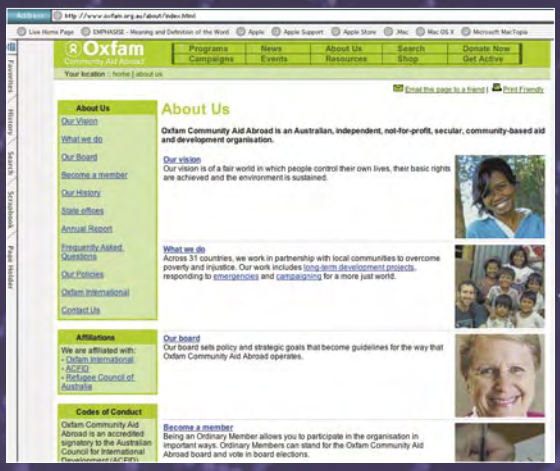
Their website provides information about their work globally and, in particular, provides up to date information about efforts focused on the Tsunami-effected areas. Information available includes relief updates, news on affected project areas and communities, and how to support the effort.

The Australian Red Cross

http://www.redcross.org.au/default.asp

The Australian Red Cross is part of the International Red Cross and Red Crescent Movement, the largest humanitarian organisation in the world with more than 97 million volunteers worldwide. The Red Cross is independent of government and is without any political, religious or cultural affiliation.

Their website provides information on their global humanitarian efforts and allows visitors to donate funds online. The news section provides updates on all relief activities including the Asian earthquake and Tsunami crisis.



Oxfam Community Aid Abroad

http://www.oxfam.org.au/about/index.html

Oxfam Community Aid Abroad is an Australian, independent, not-for-profit, secular, community-based aid and development organisation. Across 31 countries, Oxfam works in partnership with local communities to overcome poverty and injustice. Their work includes long-term development projects, responding to emergencies, and campaigning for a fair and just world.

Their website outlines projects underway and provides visitors with easy ways to donate funds to aid the emergency relief efforts currently being undertaken in areas of Indonesia and around the world.

Index of articles from the Australian Journal of Emergency Management

VOLUME 19, 2004

AUTHOR	ARTICLE TITLE	VOL.	NO.
Abrahams, Jonathan	Conference Report – Reflections on emergency management issues	19	1
Adams, David	Managing zoonotic disease risk – The case of BSE or Mad Cow Disease	19	3
Anderson-Berry, Linda and Yates, Loti	The societal and environmental impacts of Cyclone Zoe and the effectiveness of the tropical cyclone warning systems in Tikopia and Anuta Solomon Islands December 26–29, 2002	19	1
Beckenham, Annabelle and Nicholls, Susan	Government communication strategies for community recovery following the ACT bushfires, January 2003	19	4
Brieceno, Salvano	Global challenges in disaster reduction	19	1
Brunsdon, David; Brounts, Hans; Crimp, Roger; Lauder, Merv; Palmer, Rachel; Scott, Ian; Shephard, Bruce.	Key considerations for lifeline utility recovery planning	19	4
Bullock, Jane; Haddow, George and Bell, Richard	Communicating during emergencies	19	2
Callan, Tony and Flaherty, Greg	National Emergency Animal Disease Rapid Response Team	19	3
Coles, Eve and Buckle, Philip	Developing community resilience as a foundation for effective disaster recovery	19	4
Conkey, Howard	National crises communication arrangements for agricultural emergencies	19	3
Conkey, Howard; Penrose, Jamie and Donovan, Garth	Education and awareness	19	3
Donovan, Garth	Emergency Plant Pest Response Agreement	19	3
Dovers, Stephen	Sustainability and disaster management	19	1
Dovers, Steve; Cary, Geoffrey and Lindenmayer, David	Fire research and policy priorities: insights from the 2003 national fire forum	19	4
Dunlop, Catherine	Legal issues in emergency management: lessons from the last decade	19	1
Eggleston, Graeme and Koob, Peter	The role of local government in agricultural emergencies	19	3
Eyre, Anne	Psychosocial aspects of recovery: Practical implications for disaster managers	19	4
Fullam, Greg	Australia's quarantine arrangements at the border	19	3
Fullam, Greg	Preparatory emergency planning in AQIS	19	3
Garner, Graeme	Using epidemiological modeling to assist FMD preparedness in Australia	19	3
Gertner, Yetta	After the Bali bombing – the long road To recovery	19	4
Gleeson, Sharee	The Northern Australia Quarantine Strategy	19	3
Gordon, Rob	The social system as site of disaster impact and resource for recovery	19	4
Handmer, John and Hillman, Marnie	Economic and financial recovery from disaster	19	4
Hartmann, Michael	Industry preparedness and biosecurity	19	3
Hoogenraad, Wouter; van Eden, Ronald and King, David	Cyclone awareness amongst backpackers in Northern Australia	19	2
Jeggo, Martyn	CSIRO's Animal Health Laboratory	19	3
Koob, Peter	Improving Australian animal health emergency preparedness – the experience of *Exercise Minotaur*	19	3
McDonald, Christopher	The Promise of destruction	19	4
Moseley, Les	Educational needs for disaster management	19	4
Mullins, Greg	Urban Search and Rescue – developing Australia's capability	19	1
Murray, Gardner and Koob, Peter	Biosecurity in Australian agriculture	19	3
Newman, Moya and Andrew Smith, Scott	Integration of emergency risk management into West Australian indigenous communities	19	1
Nunn, Mike	Avian Influenza	19	3
O'Neill, Peter	Developing an effective risk communication model for vulnerable communities	19	2
Peebles, Ian	Towards a national emergency management framework for marine bio-invasions	19	3
Pheloung, Paul	Plant pest surveillance in Australia	19	3
Phillips, Brenda	Using online tools to foster holistic, participatory recovery: an educational approach	19	4
Pickles, Anne	A knowledge management infrastructure for the NSW Fire Brigades	19	2
Post, Lyndel; Walker, Linda and Lansdown, Philip	National coordination during emergency animal disease incidents	19	3
Scott, Karina and East, Iain	Emergency management – There's nothing fishy about it	19	3
Spratt, Walter	Risk management of a major agricultural pest in Australia – Plague locusts	19	3
Thomas, Terry	Assessment and training for agricultural emergencies	19	3
Thornber, Peter	The Australian Animal Welfare Strategy	19	3
Truscott, Jim and Kilsby, Robert	Looking out at the dark	19	2
Wells, Dick and Edwards, Alan	Securing our food supply	19	3
Wilson, John and Koob, Peter	Import risk management	19	3