



# The Australian Journal of Emergency Management














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The Australian Journal of **Emergency Management**



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The journal endeavours to provide an information sharing forum for all those involved in emergency management. Contributions relating to Australian and international emergency activities, articles identifying and discussing issues, policies, planning or procedural concerns, research reports and any other information relevant to the emergency and disaster management community are welcome.

The aim of this publication is the exchange of information and views across the Australian emergency management community, therefore, the views expressed in this journal should not be taken to be the views of Emergency Management Australia.

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Articles for publication may be forwarded to:

Rob Fleming  
Editor  
Australian Emergency Management Institute  
Main Road  
Mt Macedon, Victoria 3441  
Tel: 03 5421 5100; Fax: 03 5421 5272  
Email: rfleming@ema.gov.au

**Subscriptions**

If you wish to be placed on our mailing list please contact Rob Fleming, Australian Emergency Management Institute, at the above address.

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Dianne Treble  
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RSD 813 Spring Hill, Victoria 3444  
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# Good practice in Emergency Management

Community education and awareness is slowly climbing up the priority task list for emergency management organisations.

It's a slow climb because there are some real obstacles in the way.

These include the scarcity of resources (both people and money) available to implement education and awareness programs; and more importantly some significant scepticism on the part of senior managers on the contribution of awareness and education programs to the 'core business' of managing emergencies.

Australia's emergency management organisations are all moving towards adopting a risk management model where the community has a responsibility to share in limiting the risk of a disaster—to be aware and to be prepared. In this model, the community helps itself, rather than relying completely on emergency services. Equally, the organization has a responsibility to inform, prepare and educate the community about disasters.

So on the progress chart, most are making significant headway, but headway that is limited by the two factors of resources and management scepticism.

It is against this backdrop that EMA has produced *The Good Practice Guide—Community Awareness and Education in Emergency Management*.

It tackles both the problem of resources (as how to win and justify them) and scepticism (as how to measure the benefits of the communication and education program).

*The Good Practice Guide* is aimed at a large audience—all those people and organisations in Australia that take responsibility for community awareness and education in emergency management.

They include State Emergency Services, fire authorities, local government bodies and the many community groups such as Rotary International, the Country Women's Association, school parents' organisations and residents' groups who also share a concern for the well being of the community in the context of natural and technological hazards.

All of them share either a responsibility, or a commitment, to reduce the loss of life, property damage and the social and economic disruption caused by disasters. All these organisations recognise that a well-aware and well-prepared community can reduce the impact of the disaster.

While the community can be effectively involved across the entire prevention, preparedness, responsive and recovery spectrum, *The Guide*

focuses on the pre-event activities in the context of awareness and education.

*The Good Practice Guide* is aimed at helping those people and organisations do their job better. It comprises practical advice on planning and implementing community communication campaigns. It includes advice on media relations, sponsors and partners and it has a collection of good communication ideas.

This is not intended as a complete and detailed 'how to' manual that can be applied and followed anywhere in Australia. Rather, it sets out principles, directions, plans and ideas which people and organisations can then modify and apply in their local communities.

One of the important messages in *The Good Practice Guide* is that, in a communication sense, one solution does not fit every situation. Each communication act, whether it is a media release, a neighbourhood door knock, a community meeting or a brochure, must be tailored to the needs and expectations of the groups and audiences that make up the community.

Director General of EMA, Alan Hodges, has made it clear that *The Good Practice Guide* is aimed at helping emergency management organisations improve their communication, and also push awareness and education up the priority list.

EMA has already recognised that in disaster management organisations there is still some residual scepticism about the effectiveness of community awareness campaigns, particularly in terms of their ability to influence behaviour.

The resolution of this issue is tied to the fact that little evaluation has been done on the effectiveness of campaigns. Where evaluation has been done on specific and targeted local campaigns, the evaluation results have shown that the campaigns did influence behaviour.

The research showed that many campaigns and education programs (particularly those implemented by State fire authorities) improved the community's knowledge of the risk and also influenced behaviour in the emergency.

But unless more attention is paid to evaluation at a local level (i.e. on particular campaigns, addressing particular hazards seeking particular behavioural outcomes) then agencies will be consigned to never knowing whether or not their campaigns achieved anything at all.

Perhaps the most useful and influential part of *The Good Practice Guide*—particularly in a management sense—is a practical and low cost evaluation methodology that can be applied at a local level.

It is this problem of measurement of effect that dogs the awareness work of Australia's emergency

management community. In the resource-strapped, rationalised organisations, it is imperative that the effect of awareness and education campaigns can be measured.

The penalty for not measuring effectiveness is to be consigned to the 'ineffective' basket in the organization.

But solving these problems have to be seen against a historical background where the notions of awareness and education as a legitimate part of organization's risk management framework are still fairly new.

Two observations by two members of emergency management organisations who I talked to as part of the research project capture the conflict between needs and resources.

One emergency service officer involved in community awareness observed:

'I do get tired of carrying the begging bowl for everything that I do. It's a hard slog. It makes it difficult. You do as well as you can, but it is always less than the community deserves.'

A State-based manager had a variation on that same view:

'It may be that we are not having much effect. I find it difficult to believe that much of what we have done in Australian emergency management in general has had the sort of effect in terms of bending people's minds towards appropriate mitigation behaviour. Part of the reason of course is that community awareness has never been given resources to do anything. No money is no money, so it gets a small bit of attention. We do simple brainless things like handing out cards that people don't want.'

So there are some important responsibilities here that need to be taken up. The first is a responsibility on managers to resource the community awareness and education function so that it can contribute to the overall objectives of the organization. The second is a responsibility on both managers and staff to devise evaluation methods that answer the questions about effectiveness.

*The Good Practice Guide* starts those two responsibility balls rolling.

**Thomas Parkes, BA FPRIA**  
Managing Director Capital Public Affairs  
Consultants Canberra.

*Thomas Parkes conducted the research into community awareness and education in emergency management organisations which was the foundation for EMA's The Good Practice Guide—Community Awareness and Education in Emergency Management.*

# The Port Arthur anniversary services: post-disaster rituals and symbols

**T**he excellent article: 'In Remembrance: Post Disaster Rituals and Symbols', by Anne Eyre (1999) provides a valuable framework to reflect on some of the immediate responses to the Port Arthur massacre in 1996. And more specifically, on which to evaluate the Port Arthur Anniversary Church Services held in Melbourne in 1997 and 1998, and why one was not held in 1999.

The value of symbols and ritual has been explored by many authors and in many disciplines.

Indeed the sociological perspective Symbolic Interactionism, first developed from the work of a school of American philosophers is concerned with the 'inner or phenomenological aspects of human behaviour'. A study which provides another perspective on this topic.

Herbert Blumer (1962) suggests that Symbolic Interactionism rests on three basic premises:

- that human beings act on the basis of meanings that they give to objects and events, rather than simply reacting to external stimuli such as social forces or internal stimuli such as organic drives.
- those meanings arise from the process of interaction rather than simply being present at the outset and shaping future action
- that meanings are the result of interpretive procedures employed by people within interaction contexts

Mead (1934) sums up the Interactionist perspective, 'without symbols there would be no human interaction. Social life can only proceed if the meanings attributed to the symbols are largely shared by members of the society'.

A symbol then, is a sign that points to itself and away from itself. A symbol does not simply stand for an object or an event, it defines them in a particular way and indicates a response to them.

As Eyre (1999) points out: 'Post disaster rituals and symbols have significant implications for disaster management, not only in terms of practical, logistical arrangements such as crowd control, but also in terms of managing sensitively and appropriately the range of

by The Reverent Sydney Smale, Central Coordinator Disaster Recovery, Victorian Council of Churches

*psychological, social and political issues associated with these aspects of the immediate post impact and longer term rehabilitative stages of disaster.'*

This paper examines, from a sociological Symbolic Interactionist perspective, and, I may add, with hindsight, some of the events that occurred after the shootings at Port Arthur. The paper also covers an evaluation of the first two anniversary services in Melbourne, using as a framework, the paper by Anne Eyre 'In Remembrance: Post disaster Rituals and Symbols'.

## Port Arthur Sunday 28<sup>th</sup> April 1996

Port Arthur is a historical site and a former penal colony in Tasmania, Australia, On Sunday 28<sup>th</sup> April, 1996, a lone gunman shot and killed 35 men, women and children and seriously wounded a further 29 people. For many other people the legacy of that terrible day still continues.

*I can but keep surviving to enshrine their spirit in the world*

*The incredible unconditional love, the warmth and freedom, the dance, The spontaneity, cuddling and kissing, they are no longer there. I will however, proudly endeavour to keep their spirit alive throughout my life. My love for them will never die and never be taken.*

(Walter Mikacs, whose wife and two children were among those killed.)

Shock and horror occurred all over Australia when news of the killings and the number of victims became known.

The news of the shootings was bad enough but the fact that the mass slaying had occurred in Australia, which had been relatively sheltered from this kind of event, added to the dismay and sense of unbelief.

'The greatest massacre in Australian history' screamed one national newspaper, conveniently forgetting the history of Port Arthur as a penal colony and the exter-

mination of the aboriginal people in Tasmania. Still it made good copy.

Expressions of, support, anguish and vexation poured into Port Arthur and Tasmania, not only from within Australia but from all over the world. As had happened at Bradford, Hillsborough, Dunblane and Aberfan, tributes of flowers soon formed a tapestry of colour around the Broad Arrow café where the first shootings occurred.

A message of condolence from the 'people of Dunblane' was the first of many that would be sent to the grieving and bewildered people of Port Arthur struggling to come to terms with what had happened as a result of the shootings by one of their own community.

One of the early areas of conflict was the length of time that police detained people at the site. The shootings encompassed a wide area so that the crime scene was extensive. People could not understand the delay in allowing them to move away from the death site.

The growing presence of media representatives became so pressing that arrangements were made to bus them around the site and give them sufficient access to sites appropriate to obtain information and film.

As an unbelieving nation came to grips with what had happened, all over Australia churches opened their doors encouraging people to pray for those affected by the tragedy. In many churches, halls and memorial sites people gathered and candles were lit.

Ecumenical services were held all over Australia, and in Canberra senior politicians of both major parties offered their prayers and condolences to those affected by the events of that day. Counsellors offering their services staffed many churches.

Services were quickly arranged for the Port Arthur community and in Hobart an Ecumenical Service was planned and held at the St David's Anglican Cathedral.

While not evident at the time, the first of many conflicts were already beginning to surface. For example, some of the people of Port Arthur who travelled to Hobart for the service subsequently complained that the service was for the

politicians, dignitaries and Heads of Churches rather than for those specifically affected by the shootings. Later the complaint was that the focus was on the site and not the people.

On July 15, over 700 people attended a cleansing ceremony at the Port Arthur historic site. The ceremonies involved members of Tasmania's Hindu, Buddhist and Muslim communities as well as Christian. Given the multicultural nature of the Australian population sometimes the needs of faiths other than Christian are forgotten.

In time a memorial cross and plaque were erected with the promise of a more permanent memorial. However as was the case with a number of the planned memorials as listed by Anne Ayre, the very thing that could have led to a unifying of the Port Arthur community contributed to an extended controversy.

The crux of the problem was what to do with the Broad Arrow cafe, the scene of the shootings. A strange dichotomy arose. Many in the community wanted it to be razed to the ground. But many of those who actually lost loved ones in the cafe felt a sense of attachment and wanted it retained.

It was not until January 1999, three years later, that the problem was resolved when agreement was reached that the plan for a permanent memorial would include the remaining walls of the Broad arrow cafe, a fountain and reflection pool.

The memorial will not dominate the historic site, but its importance cannot be underestimated. It's part of history whether we like it or not. Areas have to be set aside for people to reflect, to be on their own and to contemplate what happened. The memorial cross, erected after the shootings, will remain.

### **Conflict resolution**

Eyre points out in her paper, *'In recognition of various forms of giving, or convergence in the aftermath of disaster, much has been learned and applied, especially with regard to careful planning and distribution of disaster funds'*. In the case of the Port Arthur experience conflict still exists over the distribution of the \$3.6 million appeal money.

A committee was established to distribute the money working to a formula described by the Tasman Council Mayor as a levelling-out formula. Those getting workers compensation were not to get anything under the Criminal Compensation Act. Glen Martin, whose parents were killed at the Seascope boarding house, said 'I don't believe that the right

victims got the money...those who are having psychiatric treatment got the money but people who are trying to get on with their lives are missing out'.

Initially the people of Port Arthur turned inward, reaching out to each other. Such was the intensity of this process of bonding and fusion that it couldn't last. Friendships became strained, personal relationships began to disintegrate, couples broke up and marriages broke down. The distribution of Appeal money and the selection of people for bravery awards aided this process of disintegration.

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Rifts began to appear in other areas as well, between the Port Arthur Historic Site, the main employer on the peninsula and the mainstay of the local economy, and the local community

The turn over of staff in a normal year would rarely reach more than 10% of the workforce. In the immediate aftermath of April 28 1996, the figure stood at 80%.

Criticisms began to surface. Talk of a conspiracy began to be heard. 'There is a cover-up going on to protect the Tasmanian Tourist Industry'.

The desire of some visitors to concentrate on the shootings rather than on the historic site as a whole, became an issue and led to the erection of a sign at the toll booth, itself the site of seven shootings:

### **The Port Arthur Shootings April 28, 1996**

This event has touched us all  
and causes us much pain  
Written information is available  
from the staff

However, we ask you not to  
discuss the incident with us.

This, then was part of the background to the first anniversary event held in Melbourne, Victoria on April 28 1997.

### **First anniversary**

Out of the 35 people killed, 12 resided in Victoria and many more Victorians were among the seriously wounded. Since that day in 1996 a strong survivors' support group has been established with some people coming from inter-state which indicates its continuing value in meeting the needs of the members.

Had the survivors' group been more visible in 1997, and the Victorian Council of Churches planning group more aware of the importance of including the survivors in the planning of the service, the service would not have ended up in being mainly clergy directed and planned.

Not that having members of the survivors' group involved would have necessarily eliminated disagreements within the group itself over content and process as was evident in the planning for the 1998 anniversary.

Representatives of the Roman Catholic, Anglican and Uniting churches formed the major part of the worship planning committee. The Assistant Manager of the State Human Services Disaster Recovery Unit, a Human Services Deputy Recovery Manager, the consultant psychologist to the Victorian Dept. of Human Services, all of whom had been deeply involved in the initial response to the actual shootings, and two survivors also had input to the planning of the service.

The first discussion was controversial. The clergy agreed that the theme should be the keystone of the Christian faith, that of forgiveness and reconciliation. But were they expecting too much? Were the survivors ready and willing to forgive, was the concern.

The consultant psychologist believed that the survivors needed to face the issue of forgiveness if they were not to continue to live strengthened only by the need to hate. To do so he said, 'continued their suffering as victims.'

That was all very well, but where were the survivors in the journeying?

During the past year there had been many articles and interviews on the subject of grief and significant loss. 'Lives torn apart by evil insanity', 'Time to talk'. 'The living dead, coming to terms with tragedy'. To what extent had they understood, far less accepted?

However, the decision was made to go with the theme of 'Forgiveness and Renewal', and for the service to be held in a central, downtown, bluestone, century old Church which gave an atmosphere of timeless solidarity and security. To involve representatives of many denominations and other faiths, a procession of Heads of

Churches and other clergy and leaders marked the opening. Survivors took part in the service (not a significant part but a part), and a liturgy appropriate for the occasion was agreed upon.

No specific invitation was made to the Government or their representatives, though some did come in response to the public invitation.

At a similar Memorial Service in the old convict church at Port Arthur, fallen oak leaves symbolising change were the focus of the first memorial service. Over the past year visitors to the site had donated 2000 daffodil bulbs to go towards a mass planting in a special garden location. To link the service in Melbourne with Port Arthur, daffodil bulbs were to be given out to all who attended, with a request that they plant them in their own gardens. It was interesting to hear in the aftermath of the second anniversary service in 1998, people asking each other as to how well their daffodil bulbs had grown.

There was also a desire to let people know that there were still those who could be contacted if anyone felt the need for counselling. What was not wanted was an announcement to that effect during the service or the inclusion of names in the order of service.

What happened was that the bulbs were placed into a small plastic bag, bound with a ribbon and with a small card attached which read on one side, 'a symbol of love and hope' and on the other a list of contact names of counsellors. A small child and a survivor carried the bulbs in a basket into the church and placed them in the centre of a circle of burning candles to symbolise the defeat of darkness.

Arrangements were also made with the media to make a space in the church for one camera, the film to be shared among the stations, access to survivors who were willing to be interviewed in exchange for no media presence in the adjoining hall where lunch was to be served. There was a need after the service to ensure privacy and emotional security for the survivors, family and friends and, if required, counselling. The media kept the arrangement.

A lesson learnt was that the media, who needed to get their stories, were not insensitive to the needs of the survivors and their families and, if given the opportunity, were willing to help.

White doves were released as the congregation came out of the church, again a symbol of peace.

The major question over which there was great discussion and some disagree-

ment, was whether there would be a prayer for the perpetrator. In the end the answer was in the affirmative, although that was at the insistence of the clergy.

If the theme of the service was to be forgiveness and renewal they argued such a prayer had to be included.

After short prayers 'For those who have died', 'For those who mourn', 'For those who survived' with a brief silence between each with background music played on a harp, (there was a concern that complete silence may be too difficult for some of the congregation to cope with).

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Then came this prayer:

'For the perpetrator of this tragedy:  
Eternal God, for his cross of shame  
Your son forgave those who conspired and put him to death.  
Give us the strength, and help us through your grace,  
To move beyond vengeance towards him who perpetrated this horror  
To forgiveness and pity in the circumstances which led to such a crime.  
In his anguish, may he know remorse and your forgiveness.  
May the offering in prayer of our forgiveness be the beginning of our own peace.  
These things we ask in the name of our murdered, risen and victorious Saviour,  
Jesus Christ our Lord. Amen'

The clergy didn't have to wait long for a reaction. As soon as the people were in

the hall some of the survivors angrily asked 'how we could have possibly thought that they could pray for that Bastard'.

We had failed; it was too soon, too much to expect, we were naive to say the least.

Some months later at one of the gatherings of the survivors, one of the most vocal persons in her denouncement of the prayer came up and apologised for her reaction after the service. 'You know', she said, 'we were so angry with you for asking us to pray for the perpetrator that all we could do afterwards was to share our anger, hatred, disgust and rage at you, the event and our pain. And you know, when some of us met some time afterwards we discovered that for all of us it was the first time we had really vented our feelings and we felt all the better for it. Is that' she asked, 'the beginning of forgiveness?'

### **Second anniversary**

When the Victorian council of Churches was asked to organise the second Anniversary service in 1998 there was some doubt as to whether such a service hindered, rather than helped, the survivors to get on with life and to put Port Arthur behind them. That was certainly the view of a psychologist.

However, the gatherings and picnics were not only continuing, numbers were growing with new members from other states.

It would seem on that evidence that there was still a need, so a service was arranged, but this time with major input and participation by the survivors and fewer clergy.

The theme agreed to was 'Remembering our Journey' and the location was the Lutheran church at the developing new area of Southbank on the Yarra River. The church was a relatively new building, bright, modern and with an outlook to the city and the river. The atmosphere was of newness and life and the service reflected that image.

As for the first service, the Chaplain of the Hobart hospital flew into Melbourne and spoke to the congregation. He had already met some of the survivors three years previously as they arrived for treatment from Port Arthur and also the families who came to identify the dead and to grieve with the living. He had gone down to Port Arthur just before catching the plane for Melbourne and described the new beginnings and growth taking place at Port Arthur.

'I sat at the waters edge', he said. 'I watched the sun rise and give birth to a new day and I rejoiced in that rebirthing.'

In Melbourne, the sun was shining after the rain. There was movement and colour among the people. Boats were moving along the river and the service had an atmosphere of renewal and new life. Perhaps the most moving moment came when one of the survivors read this piece:

We believe in the gift of sorrow, which carries us back to humanness  
And reminds us of the way we dreamed life could be  
And marks the love and sacrifice of many people.

Love which calls us to find new paths through the blurred landscape of our tears.

We believe that, despite betrayal and violence in ways we do not fully understand

We are not left alone, that many people are standing with us and along side us.

And we believe that we need not stay sorrowing forever,

But that our spirits and hopes can rise and lift us as surely as day follows night.

### Third anniversary

This year, 1999 there was no request for an official anniversary service, instead the survivors, families and friends met in a garden and had their own service. It was a full service with prayers, poems and readings, some of which had been written by the survivors.

There were moments of silence to remember the past, those who had been killed or injured and for the survivors themselves. The service over, they then had a picnic.

They have one regret. The Victorian survivors wish for a 'Memorial Place', somewhere where they can gather to remember, a plaque, which celebrates survival. To date this request has not been granted.

The journey out of the night continues but for some, still slowly.

Anger, remorse, loss of power and control, conflict over tourists. Those on work cover and those without. Those who received Appeal monies and those who missed out. The need to continue the tourist industry on which the livelihood of the people of Port Arthur depends and those still grieving. Anger about the new \$5 million tourist centre which is being promoted as a catalyst for Port Arthur's spiritual, not to mention financial rebirth. Memorials, preserving the past, getting on with living in and for the future. A need to hate and to express that hatred and anger. The place, site, time and number of anniversaries, who conducts them, who they are for, participation, participants:

'Post-disaster rituals and symbols are a valid and important area of study because they have significant implications for disaster management, not only in terms of practical, logistical arrangements, but also in terms of managing sensitively and appropriately the range of psychological, social and political issues associated with these aspects of the immediate post-impact and longer term rehabilitative stages of disaster'. (Ayre 1999)

To ignore this advice is to add to the pain and delay recovery.

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### Postscript

This year Australia welcomed many refugees from Kosovo and housed them in a number of States.

Those housed in Tasmania approached the Trauma and Counselling Unit requesting support and assistance with organising a 'Homage for the Kosovos' and inviting the staff of the Haven Centre where they were housed to participate.

The event occurred almost one month after their arrival. All the residents were taken to Hobart, the Capital of Tasmania where they silently paraded down one of the main streets, each carrying a lighted candle.

The group then gathered around an Albanian flag and mementos and symbols of the war and their displacement were placed on it. There was a moment's silence, then a message of thanks to the Australian people was read.

A group of Kosova's then took a bottle containing a message of peace to the waters edge and launched it into the sea. Songs and speeches completed this simple but meaningful ceremony.

Truly grief and pain knows no boundaries.

## Conference announcement

### 5th Asia-Pacific Conference on Disaster Medicine

September 27th to 30th, 2000 Vancouver, BC, Canada

A conference and exhibition on emergency medicine and disaster management—working together in response to disasters.

The conference themes are:

- Sharing experiences of health professionals and emergency managers from natural and human-induced disasters
- Applying international medical standards within the disaster planning process
- Recognizing the unique hazards facing the Pacific Rim
- Creating a coordinated response to disasters utilizing existing strengths
- Developing effective models of international medical response coordination for disaster medicine
- Optimizing the functioning of multi-disciplinary teams

- Demonstrating the use of communication technology in disaster medicine
- Promoting education and awareness in disaster medicine

For more information, contact:

Diana Ericson

Manager, Disaster Preparedness Resources Centre

The University of British Columbia

2206 East Mall, 4th Floor

Vancouver, BC V6T 1Z3 Canada

phone: 604 822 6002; fax: 604 822 6164

email: [dprc@interchange.ubc.ca](mailto:dprc@interchange.ubc.ca)

or visit [www.safety.ubc.ca/SAPCDM](http://www.safety.ubc.ca/SAPCDM)

# Research development in the field of emergency management

## Introduction

Basic research is defined as research that helps us to understand the basic laws of nature and develop theories about how things work. Applied research differs from basic research in that it concentrates on the application of theory (derived from basic research) to practical situations. In the emergency management sphere, applied research often involves the application of knowledge drawn from other contexts and fields of practice to the management of emergency situations. There are many instances where basic research has been applied to emergency management. For example, medical knowledge derived from in-hospital patient care is routinely applied to patient management in the pre-hospital setting; knowledge about road traffic flows has been applied to response modelling for emergency services; and theoretical understandings about fire behaviour are applied to fire fighting. While the application of basic research to emergency management problems is laudable, this paper argues for a fundamental change in our approach to applied research in emergency management.

## Research development in the field of emergency management

In the autumn 1998 edition of the Australian Journal of Emergency Management, the Editor, Rob Fleming, argues that emergency management agencies should re-consider the place of applied research in emergency management. The point is made that research in the emergency management sector has been 'narrowly focused on specific hazards or disciplines' (Fleming 1998) and is generally basic, rather than applied, in character.

Emergency management research in Australia focuses predominantly on the development of our understanding of specific hazards (such as earthquake or tsunami). In part, this is because active researchers are usually located in universities and other research organisations where basic (theoretical) research is undertaken; in part, it is because research problems seem to be identified relatively more often by these theory and discipline based groups than by emergency manage-

ment practitioners. In addition it has been difficult to establish applied research projects in the emergency management sector. Anecdotal evidence suggests that there is poor communication and understanding between researchers/research agencies and emergency management operatives/agencies; only limited collaboration between these groups is evident in Australia. Emergency management agencies do not appear to place a high priority on research. This is probably because they are generally small organisations; they have limited resources to support research endeavour; and they do not possess a 'research culture'. A further reason is that personnel employed by these agencies generally lack the knowledge and skill to undertake research.

With the current Evidence-based Practice (EBP) movement and the need for organisations to be accountable to the public for their actions, emergency management agencies are increasingly obliged to consider seriously the role of applied research in establishing best practice.

Two features of modern research seem to work against the successful application of research in emergency management agencies. First, research is a strategic activity and does not provide immediate answers. Research projects are established, implemented and interpreted over long time frames, often addressing issues that will affect organisations in the long term. Modern management often struggles to take longer-term organisational perspectives, being arguably more familiar with the world of time pressure, ministerial briefs and economic rationalism.

Second, by its nature, research challenges taken-for-granted knowledge and understandings, thereby undermining the very sense of certainty that is an important feature of emergency management prac-

tice. Expert practitioners usually move through complex work situations in a pre-reflective fashion, making decisions in a way that some would describe as intuitive (Benner 1984, Goldberg 1983, Taylor 1990). That is, while less experienced practitioners need to think before acting, experts often think *as they act*; they are capable of making complex decisions on the basis of previous experience, and with a level of certainty about their own knowledge and their capacity to deal with the situations they encounter. Research has the capacity to challenge some of the knowledge and understandings that have underpinned emergency management work in the past, and this is dis-comforting for practitioners who rely on a high level of certainty about their knowledge and practice in work situations that are often dangerous. Sometimes, however, our best people draw conclusions based on current understandings that appear ridiculous in the light of new knowledge. Take for example Galileo and his colleague Huygens:

*When Galileo discovered in the 17<sup>th</sup> Century that Jupiter possessed four moons, the great mathematician and physicist Christian Huygens applied his reasoning power to the question of 'Why four instead of one?' He asked himself, 'What is the purpose of a moon?' Well the purpose of Earth's moon was to help sailors navigate. If a planet has four moons it must therefore have a lot of sailors. Sailors mean boats and sails mean ropes. Therefore, it is obvious that Jupiter must have many hemp producing plants (Choice 1986).*

Despite the apparent misfit between research/researchers and emergency management practitioners/agencies, research is an essential tool in the future armoury of emergency management. Research can be used by emergency management agencies for several purposes, for instance, to inform resource allocation; identify international best practice; show what works and what does not; identify emerging trends in emergency management; identify new ways of looking at issues and problems; analyse cases of organisational failure; and assist in categorising and organising insti-



tutional knowledge (Fleming 1998). Research evidence provides a foundation for many of the accepted features of modern service provision including accountability, best practice, quality control, risk management, acceptance of liability and ethical practice.

In this article we describe a strategy, the implementation of a series of research development seminars, that facilitates the development of research activity within emergency management agencies. The Emergency Services Research Development Seminar Series was an early attempt to develop an understanding and interest in research among a small group of emergency management personnel. The project arose from an evolving understanding of the place of research in emergency management and several key concerns about research development in this field. First, emergency management research was under-represented in the Australian research effort. Second, little collaboration was apparent between research agencies and emergency management agencies. And third, emergency management practitioners were poorly prepared, relatively, for involvement in research within their area(s) of practice.

### **Emergency Services Research Development seminar series**

In early 1998, St John Ambulance Australia (South Australia) and the University of South Australia collaborated in the development, implementation and evaluation of a seminar series on Emergency Services Research Development, funded by Emergency Management Australia (EMA) and attended by emergency service personnel in South Australia. This project was an attempt to address some of the issues described above and was modelled on a program that had been implemented previously within the South Australian health sector by the University of South Australia.

The seminar series provided an opportunity to trial the development of research skills by emergency service officers with an interest in, or responsibility for, research. Its aim was to support the growth of a research culture within South Australian emergency service organisations by introducing staff to the processes involved in undertaking research. The pilot program described included the development of materials and a syllabus that could provide the foundation for future research seminars and workshops. Other intended outcomes were:

- development (and implementation) of research proposals

- development of research interest networks among participants and senior managers of the organisations involved
- collection of evaluative comments from emergency service participants
- development of recommendations

### **Implementation of the seminar series**

The series comprised four half-day workshops conducted over a period of four months, that set out to introduce the research process through the development of a research proposal.

Participants were drawn from Emergency Management Australia, SA State Emergency Service, SA Country Fire Service, SA Metropolitan Fire Service, St John Ambulance Australia, SA Ambulance Service and the South Australia Police.

The seminar series considered the role of research, approaches to research, the analysis of data, presentation of results, and the application of research findings to practice. In each seminar, the generic principles of research were presented and applied to the context(s) and problems of specific emergency services. Participants were asked to develop a research idea from the conceptual stage to the production of a formal research proposal. Figure 1 provides examples of research ideas that evolved during the workshops. In the period between each workshop, participants were asked to read selected material and to further develop aspects of their research proposal. Throughout the seminar series, researchers from the University of South Australia provided individual advice and assistance. Each of the four seminars focused on particular aspects of the research process, namely *thinking* research, *planning* research, *doing* research and *applying* research.

The first seminar on *thinking* research introduced participants to the nature of research; ways of thinking about research; and research proposal development. This was facilitated by discussions on the research problems and questions that each participant brought to the workshop. From this, each research problem was refined and a clear statement of the research question was developed. Possible research approaches were discussed in relation to each identified research question.

The second seminar on *planning* research focused on identifying information resources and conducting literature reviews. Participants were introduced to the processes of critical evaluation, and their application to information from

many sources, including the academic literature. They discussed how best to develop and present this section of the research proposal. On completion of this seminar and before the third seminar, each participant was required to undertake a literature search related to their research question, and to critically evaluate the literature.

The third seminar on *doing* research focused on the selection of an appropriate research design. Participants were asked to consider where they would conduct the research, how they would access, inform and select participants, and how they would collect and analyse the data. A further focus was on ethical aspects that should be considered in implementing the project and the process(es) of seeking ethics approval.

The fourth and final seminar on applying research, focused on assisting participants to complete their research proposal, and discussed how to apply for research funding and work in collaboration with other research agencies. Each participant was asked to present a brief summary of their near completed proposal, and clarify any final concerns.

### **Outcomes of the research development seminar series**

Project evaluation suggests that the approach taken was effective and provided participants with many of the skills necessary to develop research proposals and to evaluate research submissions within their respective agencies. Research ideas developed by seminar participants addressed an interesting and diverse range of issues as shown in *Figure 1*.

While the majority of these research ideas and proposals will not be implemented several have been developed further, having received financial support, and are under way. Not all participants produced a research proposal, for reasons discussed later. However, the range of research ideas exposed by the seminars is interesting and demonstrates the breadth and relevance of potential research in the emergency management area. In fact, there appears to be considerable scope for the development of research in this area, though relatively little has so far been undertaken within emergency management agencies or in collaboration with research organisations.

### **Issues associated with the pilot program**

The Emergency Services Research Seminar Series highlighted several issues that warrant discussion. Participants

## Research ideas from the workshops

- Fire-fighter survivability—an investigation of the factors associated with the survival of firefighters in typical structure fire conditions.
- Assessment of the efficacy of an intravenous morphine administration protocol in the pre-hospital phase of cardiac care.
- An ethnographic study of an ambulance service provider focusing on organisational and professional culture(s).
- Evaluation of sites for the strategic placement of automated weather stations in the Adelaide Hills Region.
- Evaluation of joint emergency service operations to assess the effectiveness of inter-organisational operating arrangements.
- Investigation of inappropriate fire setting behaviours in children and development of educational strategies to reduce the incidence of juvenile arson.
- Review of the role of local government in effective local disaster planning—a study of current practices and perceptions about the role(s) of local government.
- Behavioural profiling of persons involved in setting rural fires—a project aimed at better understanding the behaviour and typical activity of this group of persons as a means to more effectively combating the problem of deliberately lit rural fires.
- Assessment of strategies for successful transition from registered nurse to ambulance officer
- Best policing practice at special events—a study to develop an understanding of the factors effecting public perception of policing practices at large public events.
- Models of evacuation—an evaluation of decision making related to the evacuation of persons at risk.
- Public safety—an investigation of the perception of personal safety as a basis for the development of community education programs to reduce the incidence of injury associated with normal home/business practices.
- Community perspectives on best policing practice in youth drug and alcohol related offences—an investigation of community and police perspectives on current practice in handling youth drug offenders and the development of police training and procedural guides.
- Mass gathering first aid—patient presentations and levels of patient care provided at major public events—an investigation of typical patient presentation rates at large public events and the factors effecting the incidence and type of injury.

Figure 1: Research ideas from the workshops

identified the need within emergency service organisations for an increase in research activity, and the promotion of research as a worthwhile activity. Three key areas have been identified in which research skills were seen to be required.

### Assessment of research

Participants said they were increasingly asked to be involved in the endorsement or approval of research conducted by external agencies. Emergency service managers are at times required to approve access to pre-existing data, personnel or clients, when external researchers require information or subjects for their research. A rudimentary understanding of research would help them to effectively evaluate these proposals and to identify any risks or issues that should be addressed by the

organisation. In addition, emergency services were beginning to receive research submissions from within their own ranks, particularly where emergency service officers were enrolled in higher degree (research) studies. Again, senior officers were often asked to provide the Chief Executive Officer with advice on these matters. It was apparent that research project and ethics approval procedures were often haphazard in these organisations; the importance to research of effective organisational structures was not well understood.

### Evidence-Based Practice

Participants noted that much of current emergency service practice seems, at times, to be based on tradition (it has always been done that way), taken for

granted (assume it works), or the result of intelligent guesses. How safe, effective and cost efficient is this approach to practice? Given the need for professional accountability and the potential for legal ramifications from inefficient practices, emergency service personnel can no longer rely on these traditional approaches in their practice. Increasingly, they recognise the need for new (and existing) practices to be evidence-based, but no formal strategies have yet been adopted to implement an evidence-based approach.

Evidence-Based Practice (EBP) originated with the work of Archie Cochrane who recognised that there was a lack of research evidence to support medical practice. Cochrane's main argument was that, because of limited health care resources, there was a need to ensure that whatever is available is used effectively to reach the desired outcomes. Cochrane has focused his interest on evidence-based practice for health care, but his arguments are also applicable to the emergency service field (Farrell 1997).

Evidence-based practice thus aims to bring research and practice together through the acquisition of the best available evidence to inform best practice. It is the conscientious use of current best evidence to inform decision making, whether those decisions be about health-care, emergency management or any other field. As well as identifying areas where evidence is lacking and where research is clearly needed, EBP also sets standards for what constitutes good research evidence and how this is evaluated.

The development of evidence-based approaches in, for instance, emergency service work requires the ability to access and interpret relevant literature, specifications and other materials to determine the extent to which claims about new technologies and techniques are well founded. In addition, when new ideas are applied within emergency services, applied research is sometimes necessary to ensure that the new ideas are transferred to the emergency service context in an appropriate manner. Increasingly, systematic literature reviews are being conducted to gather the best available evidence from current research and expert opinion as the basis for establishing best practice. A systematic review can also highlight those areas of practice that are not evidence-based and do require further research. Systematic reviews are a form of research and must be carefully constructed and implemented in order that all available and relevant evidence is

collected and analysed in an unbiased fashion. Sackett, Rosenburg, Muir Gray & Richardson (1996) and O'Rourke (1998) provide a more extensive discussion of EBP.

### Identification, analysis and evaluation of risk

Emergency management research can contribute to effective risk management. Emergency service officers are required to manage risk; the ability to identify, analyse and evaluate risk is included in the national public safety competencies (Public Safety Training Package 1998). Since researchers are in a position to uncover areas of risk, establish systems to manage risk, and evaluate possible consequences, the development of research skills in the emergency service area can provide the cornerstone for effective risk management.

### Recommendations for future research development

Following the seminars, a number of recommendations were developed to facilitate the growth of research within emergency service organisations, as discussed below. These recommendations aim to build part of the foundation necessary to further the development of strategic and relevant research endeavour in emergency management among emergency service agencies in Australia.

### National emergency management research development initiative

A national development initiative for emergency management research could be established to facilitate the growth of research capacity within emergency management organisations. This initiative is important, because, in line with current thinking, emergency management strategies should be based on good current evidence (EBP), successfully applying theoretical knowledge and knowledge drawn from other contexts to emergency management situations and problems. Collaboration between research organisations and emergency management agencies provides one strategy to facilitate the development of applied research. Research agencies have research expertise and infrastructures that are not available within emergency management agencies; from their side, the emergency management agencies can ensure that any proposed research is relevant and timely, and provide a detailed understanding of the context of the research problem. Several strategies, outlined below, could assist in the development of strategic collaborative links.

### Strategy 1. Development of the research capacity of organisations

Extension activities: research development workshops could be conducted in each State/Territory or within agencies to provide individuals with opportunities to develop research ideas and generate associated research proposals. These workshops would facilitate the development of strong research proposals by encouraging individual participants to focus on identifying meaningful research problems.

### Strategy 2. Facilitation of strategic cross agency research

National Workshop: a regular annual workshop could be developed to allow research issues and problems identified within States/ Territories by senior emergency management personnel to be addressed. This workshop would focus on issues identified as of strategic importance by State/Territory disaster committees/planners, and could provide the opportunity to address cross agency and corporate level research.

The formation of strategic research partnerships between emergency management agencies would be another important strategy. This approach to developing research endeavour recognises the relatively limited resources and infrastructure available within individual agencies for the conduct of research and, particularly at the State level, allows for the development of a strategic research plan that takes account of the research needs and priorities of each agency and directs attention to priority research issues.

### Strategy 3. Research and education support

Mentoring: individuals and/or organisations could be given the opportunity to develop links with selected mentors within the research sector. Mentors would provide guidance and supervision for research projects during the developmental phase, and assist in the identification of suitable collaborative partners for individuals or organisations wishing to undertake research. Mentor relationships could also facilitate entry into higher degree (research) studies and provide academic counselling for prospective higher education students.

### Emergency management research interest home page

The University of South Australia has established an Emergency Management Research Interest page on the World Wide Web as one outcome of the South Australian project. This page provides a summary

of some emergency management research projects in progress and gives contact details for researchers. The intent is to provide a forum for the exchange of research ideas and support among researchers within the university and emergency management sectors. The Emergency Management Research Interest page is located at: [www.unisa.edu.au/nur/ESRIG.html](http://www.unisa.edu.au/nur/ESRIG.html).

Other existing World Wide Web pages, while providing an important resource for emergency management practitioners, have focused on research about specific hazards rather than the management of emergencies. The Australasian Disaster and Hazard Research Directory provides a useful database of hazard related research and is located at [www.es.mq.edu.au/NHRC/ema.html](http://www.es.mq.edu.au/NHRC/ema.html).

### Conclusions

The Emergency Services Research Development Seminar Series arose from several concerns about the low level of emergency management research apparent in Australia and the tendency for emergency management research to be driven by the more theoretical and discipline based perspectives of researchers rather than emergency management practitioners. The seminars provided useful information about the potential range and scope of emergency management research and led the authors to consider other strategies that might facilitate the implementation of strategically important research projects within the emergency management sector.

It is apparent that many of the issues canvassed above have not yet been adequately addressed and the challenge remains for emergency management agencies and practitioners to develop their research capacity. In doing so it is important that emergency management practitioners develop an understanding of the role of research in their practice and adopt a pro-active stance that will promote research projects that are applied in nature, relevant to emergency management practice and result in practical outcomes.

*Perhaps with a new perception of the value of research within our own field, we should take full advantage of it and turn it into the vital knowledge that enhances Australia's emergency management capability (Fleming 1998).*

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## New Books



### Disaster-Induced Employee Evacuation

by Thomas E. Drabek

Published by the Natural Hazards Research and Applications Information Centre, Institute of Behavioural Science, University of Colorado.

Thomas Drabek has produced for us another advance in researching disasters. Building upon his previous work titled *Human Systems Response to Disaster*, Drabek continues to focus upon understanding human behaviour within organisations when confronted with a potential or real disaster event.

The results of his research follow on from interviews conducted with 23 Federal, State and local emergency management managers, interviews with business executives and employees, and an extensive questionnaire.

As outlined in this study, Drabek uses seven disaster events, which have occurred across 12 communities. He focuses

on the effect these events had on the employees of some 118 businesses.

Drabek establishes excellent comparative criteria for these events. This provides him with a good data on which he bases his conclusions.

Using terms like 'Uncertainty of Forewarning', the 'Magnitude of Impact' and the 'Accessibility of Escape Routes' Drabek is able to provide good comparisons related to 'similarities' and 'differences' that arise from the seven disasters studied.

Students and practitioners of Emergency Management in Australia, who need to understand more the employees behaviour when faced with the need to evacuate, will find this publication an excellent source of data.

For example, I found it of interest that of the 406 employees involved in this current study, 92% had some prior disaster experience which had triggered a workplace evacuation. 40% of the interviewees had also evacuated from their home because of a prior disaster.

However, according to Drabek's research, only 27% of the 406 employees claimed that they had received some form of disaster training at their place of work. Drabek provides an analysis of workplace training and its effectiveness.

What can we learn from this publication? That will depend on your understanding of both the 'theoretical' and 'behavioural' concepts used by the author.

Thomas Drabek provides us with good discussion on the results of his research. He uses responses from his interviews and the questionnaire to predict employee behaviour and document their concerns.

While based upon disaster events that have occurred within America, his work none-the-less proves a rich source of data for those involved in emergency management. His work will be of particular interest to those who are seeking organisational change that will provide for educative programs and support for the employee whenever a disaster event occurs.

To my knowledge, no comparative research has been published that deals with our employees' behaviour during evacuations that have been initiated in response to a disaster.

*Reviewed by:*

Neville J. Betts, BA., Grad Dip OHM, CFSIA. Neville is the principal of Booreea Rudd Pty Ltd, a company that provides industry with training and educative programs covering 'emergency response' and disaster recovery. He is a graduate of LaTrobe and Ballarat Universities and is a Chartered Fellow of the Safety Institute of Australia.

His company, Booreea Rudd Pty Ltd can be found on the World Wide Web at [www.booreearudd.com.au](http://www.booreearudd.com.au).

Email: [booreea@ocean.com.au](mailto:booreea@ocean.com.au).

*The publication is available from:*

The Natural Hazards Research and Applications Information Centre Campus Box 482

University of Colorado

Boulder CO 80309-0482 USA

E-mail: [hazctr@colorado.edu](mailto:hazctr@colorado.edu)

The cost of the publication is US\$20, plus shipping and handling.

# How high was the storm surge from Tropical Cyclone Mahina?

North Queensland, 1899

## Introduction

Tropical Cyclone Mahina was the most intense tropical cyclone to cross the Australian coast in historical times. Its central pressure was recorded by barometer at 27 inches (914hPa) as the eye approached the coast at Bathurst Bay (Figure 1) at approximately 4.30 am on the 22<sup>nd</sup> March 1899 (Whittingham 1958). Over 300 persons lost their lives when a fleet of pearling luggers and schooners were wrecked and sunk by the phenomenal seas. One of the most interesting aspects of this event was the eyewitness report of a 43 foot (13m) surge at Ninian Bay adjacent to Barrow Point 30 km south of Bathurst Bay which extended inland for 2–3 miles (3–5 km). Constable Kenny, camped on a ridge fully 40 foot above sea level, was inundated to his waist by a 'tidal wave' (storm surge and associated ephemeral sea level rise) at his camp site some 0.5 miles (800m) inland at approximately 5 am (Anonymous 1899). This account suggests this surge was the largest ever recorded in Australia.

There is considerable departure between the size of this reported surge and the results of numerical models that determine the magnitude of surges based upon the storm characteristics and the local bathymetry. In this instance a number of numerical simulations of the Cyclone Mahina storm surge were undertaken using Hubbert et al. (1991) Australian real-time system for forecasting tropical storm surges (Callaghan 1993). No appreciable surge (<3m) was produced by the model. The Jelesnianski-Trajer nomogram technique, still widely used for forecasting surge heights by the Australian Bureau of Meteorology, also produced a surge height of 2–3m for Cyclone Mahina.

Because of these discrepancies, and because predictions of surge inundation during modern cyclone events are based upon these forecasting methods, it is important to verify the magnitude of the surge during Cyclone Mahina. Virtually all marine inundations either transport marine materials landward or leave erosional indicators in the coastal landscape. By recognising these 'fingerprints' it is possible to determine the magnitude

by Jonathan Nott, James Cook University, Cairns, & Matthew Hayne, Australia Geological Survey Organisation, Canberra

of a past inundation event and its approximate age. We undertook a field survey of the area from Cape Melville to Ninian Bay to ascertain the heights of past storm surges in this region and determine if there is physical evidence of the extreme magnitude surge reported to have occurred during Cyclone Mahina. The results of this survey are presented here.

## Heights of past surges in the Bathurst Bay region

Storm related marine inundation is the term adopted here to include storm surge, wave set up and wave run-up. Here we refer storm surge to mean a rise above normal water level resulting from a reduction in atmospheric pressure combined with the effects of surface wind stress. Wave set-up is a quasi-steady super-elevation of the sea-surface due to the onshore mass transport of water

resulting from breaking waves. Wave run-up is the extent or height to which broken waves swash onto the land. Such inundations typically leave distinct markers in the coastal landscape. These include sedimentary deposits or debris lines of both ephemeral and longer-lived (century to millennia scale) materials. The former includes seaweed, coastal grasses and marine faunal carcasses and the latter fragments of corals, shells and coarse-grained marine sands. Erosional indicators can also be produced during the inundation; these include small wave eroded scarps or terraces within unconsolidated coastal deposits such as raised gravel beaches or ridges as well as the general disturbance of terrestrial materials. The heights of these features can be surveyed to mean sea level or some other datum and materials within the deposit dated, usually using carbon dating, to give an approximate age of the event. In this manner a frequency/ magnitude record of pre-historic marine inundation events can be developed.

At Ninian Bay we surveyed four separate transects from the modern beach to approximately 30m above sea level. These

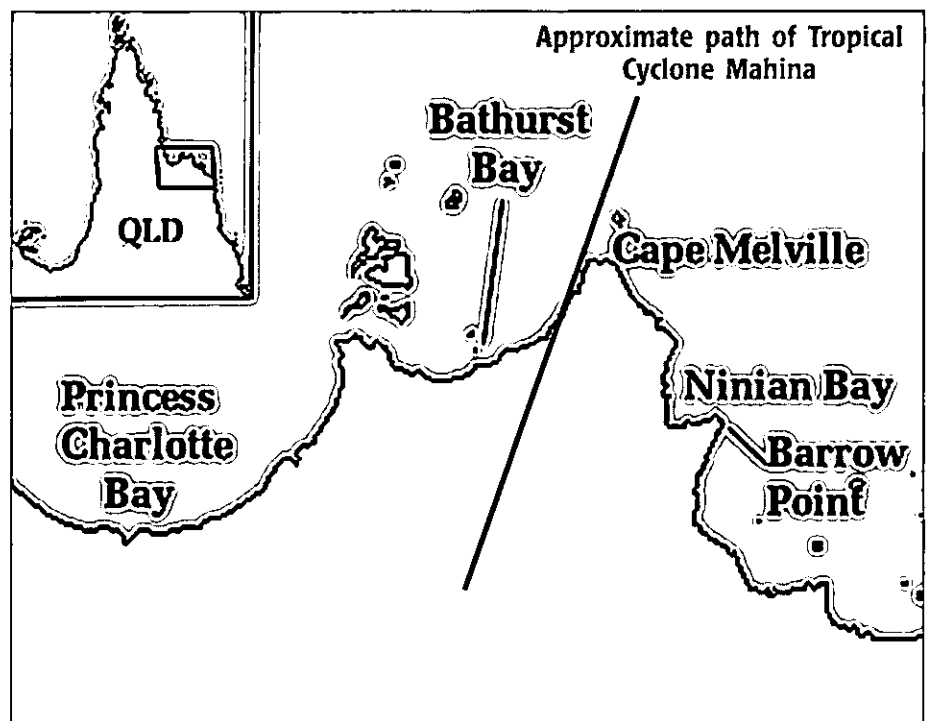


Figure 1: Location map

transects were located at the eastern and western ends of Ninian Bay and extended over the rocky headlands at these locations. The other transects were located within the central portion of the bay and extended onto a 20m high aeolian sand ridge that runs parallel to the shore approximately 1 km inland. Other transects were also undertaken along the crest and seaward flank of this sand ridge for approximately 500m towards its western end. Further transects, perpendicular to the coast, were also surveyed on the rocky headlands and promontories both bounding and within Ninian Bay. A similar procedure was undertaken at Cape Melville in the vicinity of the Outridge monument and along the coast west of Cape Melville for approximately 5 km. Along each of these transects a thorough search was undertaken for marine inundation deposits.

No evidence for marine inundation events was discovered above approximately 3–5m HAT. Below this level abundant deposits of marine shell, coral, pumice and wave transported sands were evident. At the eastern end of Ninian Bay these deposits extend up to the base of the granite slopes 2–3m HAT. No marine carbonates or sands were found amongst the granites or within the narrow valleys that extend into the backing range of hills. Weathered material derived from the granites (Gruss) and littering the gentle granite slopes above 3m HAT also showed no signs of disturbance. A similar situation occurs at the western end of Ninian Bay. Here shells and fragments of shells were found within crevasses of the folded strata of the headland up to a height of approximately 4–5m HAT. Above this height no other marine carbonates or sands were located except within a small midden (shells deposited by Aborigines after eating the contents) towards the crest of the headland. The sands that comprise the bulk of this midden are fine-grained and hence appear to have an aeolian origin.

Shells on the sand ridge behind Ninian Bay as well as those behind a small lagoon at the rear of the main barrier were found at a height of approximately 10–15m HAT. These shells displayed clear anthropological associations having a concentrated spatial distribution, a limited number of species (predominantly of the genus *Anadara*) of uniformly large size and no indication of littoral scarring suggesting they were alive at the time of deposition. The absence of coral, pumice or wave emplaced sand that discount the possibility of midden associations was found at any site.

A similar situation was observed at Cape Melville. Here small blocks and fragments of coral along with marine shells and coarse-grained marine sands occur to a height of approximately 3 m HAT. These deposits are in the form of a series of beach ridges that extend parallel to the coast for hundreds of metres to over one kilometre. These beach ridges were no doubt deposited during cyclonic events and represent the elevation to which the most extreme storm related marine inundations have reached in recent geological time. No other fragments of shell, coral or wave emplaced sands were found extending to elevations above the level of these beach ridges. Reports of large coral blocks located close to and at higher elevations than the Outridge memorial located approximately 600m inland were not substantiated. Only locally derived terrestrial sediments from the granite hills behind surround this memorial.

### Discussion

The heights of marine deposits at Cape Melville and Ninian Bay suggests that the majority, if not all, storm related marine inundations have only extended to a maximum elevation of 3–5m HAT in recent geological history (up to 6,000 yrs B.P.). This result stands in stark contrast to the report of the 13m inundation at Ninian Bay in 1899. A number of reasons may account for this apparent discrepancy. First, the 13m inundation may not have deposited any material above 3–5m HAT, especially in areas fronted by extensive stands of vegetation. Often storm surges, by themselves, represent a reasonably passive rise in sea level and their transporting capacity may be minimal because of their inherent low forward velocity. Waves on top of the surge and other associated currents are usually responsible for transporting marine materials landward. In this case, and at locations between 0.5 and 1 km inland from the coast, current velocities within the water column may have only been sufficient to have transported materials up to approximately 3–5m HAT. Above this elevation vegetation and other obstacles may have inhibited the fluid flow such that the water column was largely devoid of suspended materials except for light organics such as leaves and other flotsam. Such materials may have decomposed over the last century and hence no longer mark the elevation to which the inundation extended.

This explanation, however, is unlikely to account for the lack of wave trans-

ported material above 5 m on headlands and rocky promontories; at these locations there is little to inhibit the velocity of waves on top of a surge. Ninian Bay was in the left forward quadrant of Cyclone Mahina. The phenomenal seas of a severe category 5 cyclone in this quadrant could be expected to transport at least small fragments of shell and sand up to elevations well in excess of the height of the actual storm surge on headlands. This is especially so considering that on steeply fronted coasts wave run-up can be as much as 5 times wave height at the shore (Camfield 1980, Synolakis 1987). At these locations wave transported deposits could be expected to remain within crevasses and cracks in the rock for considerable time even under continued tropical rainfall conditions.

Another possibility is that Constable Kenny's interpretation of the surge may have been confused and then reported in the Outridge document. Constable Kenny may not have been camped as high above sea level as has been presumed. He arrived at the camp site at night (6pm) (Anonymous 1899) and during the mayhem of the cyclone before day break the next morning he may not have fully appreciated the exact elevation of his camp. It is also possible that Kenny's camp was inundated by wave run-up and not strictly surge although this may seem unlikely if he was camped 0.5 mile inland as suggested in the Outridge report (Anonymous 1899). Alternatively, Kenny's camp may have been inundated by a peak in terrestrial flood waters or a combination of marine surge and terrestrial run off which may have given the appearance of a 'tidal wave'.

The significance of wave run-up and at times its apparent confusion with the surge component of marine inundation is not to be underestimated. The Outridge report (Anonymous 1899) for example was not the only document to comment upon the height of the surge. Whittingham (1959) reports a verbal account of 13 'porpoises' were found after the storm some 50 feet (15m) above sea level, up a cliff, on Flinders Island near Bathurst Bay. This at first would appear to support the claim of a 43 foot (13m) surge at Ninian Bay. However, due to run-up, transportation and deposition of animals and debris can occur well above the depth of water at the shore. A 3m wave at the shore for example, supported by at least 3.5m of surge, is possible at this location and under these conditions according to wave forecasting curves (Komar 1976). Waves of this magnitude could theoretically

transport objects (of a certain size and mass) up to 21m above normal sea level (3.5m surge +3m wave +15m run-up). This is especially the case where waves impinge upon a steep coastal topography for here the run-up values are significantly greater than on gently sloping shores (Camfield 1980, Synolakis 1987). If 'porpoises' were deposited at 50 feet (15m) a.s.l. on a cliffed section of Flinders Island then it would only require a 2-3m wave and near equivalent surge for this to be achieved.

### Conclusion

There is little doubt that severe category 5 Cyclone Mahina struck the Bathurst Bay region on the morning of 22<sup>nd</sup> March 1899. However, the absence of marine deposits above 3-5 m HAT suggests that marine inundations have not exceeded this elevation in this region over recent geological history. These results agree

closely with the results of numerical models of the storm surge associated with Cyclone Mahina. However, these models do not take into account wave run-up. While it is possible that wave run-up in some locations may have reached significantly higher elevations as Cyclone Mahina approached and crossed the coast the absence of marine deposits above 5m HAT generally suggests otherwise.

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## Australian Disaster Research Grants



### The 2000/2001 Australian Disaster Research Grants

Applications close 19 May 2000

Emergency Management Australia (EMA) supports research being undertaken in the immediate post-impact period at an Australian disaster site through the Australian Disaster Research Grants program.

Disasters are conditions or events of significant destruction, disruption or distress to a community. The information gathered from such events contributes to reducing the impact of disasters on Australian communities.

EMA will provide limited financial support for Australian researchers to go to a disaster site in Australia to conduct short qualitative and quantitative field investigations within a few days or weeks after the event. The program is for the coming financial year and open to academics, scholars and practitioners in any area of emergency management. The applicant/s will need to demonstrate an ability to undertake the type of research intended and to draw conclusions that provide relevant information to the emergency management field.

Submissions must identify the research problem to be studied; the research design to be followed; the

plan to move into the field and access the data needed; the theoretical and or applied benefits to emergency management; and a tentative budget.

An application form and further information on the program is available from the EMA homepage at [www.ema.gov.au/ausgrants.htm](http://www.ema.gov.au/ausgrants.htm) or from the Director—Development  
Emergency Management Australia

Applications to register as a researcher under this scheme must be submitted to the Director—  
Development by **19 May 2000**.

#### Contact details:

Mr Chris Hunter  
Director—Development  
Emergency Management Australia  
Department of Defence  
PO Box 1020  
Dickson ACT 2602

phone: 02 6266 5309  
fax: 02 6257 7665  
email: [chunter@ema.gov.au](mailto:chunter@ema.gov.au)

# Critical assessment of information on bushfire preparedness for residents

## Introduction

The risk management of hazards such as bushfires utilises various means for enhancing disaster preparedness, such as printed materials (leaflets, brochures, books), picture series (graphs, slides, posters) and videos. If active participation of residents is to be achieved, motivating risk information/communication/education campaigns are vital.

However, mere distribution of information is not enough—it is crucial that communication efforts are effective. This requires socio-psychological expertise and critical impact evaluation. In a project on bushfire preparedness programs, materials used by fire authorities in bushfire information/education were studied.

The research questions included: What are relevant criteria for risk communication? Which factors determine whether residents evaluate information material as useful? How do officers and experts assess the utility of educational materials? What is the didactic value of texts and audiovisual materials? Data were collected via surveys with residents, focus-group discussions, and expert appraisals of materials.

Results indicate: Short one-issue leaflets and broad/comprehensive booklets are useful in different contexts; the use of (colour) illustrations is expected, yet they seem more significant for attracting attention than enhancing understanding; graphs and drawings are less appealing but more instructive; 'fill-in-yourself' sections (e.g., checklists, agendas) are appreciated but not much utilised. Regarding videos, realistic footage and practical advice for bushfire preparedness are especially esteemed features; accompanying booklets (summing up key points) would enhance their utility.

Future investigations should look carefully at the best use of specific means such as drawings or simulations. Furthermore it seems necessary to test newer information technologies, such as CD-ROM's, and explore the feasibility and efficiency of improving disaster preparedness via Internet use.

## The problem: evaluating communication effectiveness

Every country, wherever in the world, is

by Dr Bernd Rohrmann, Senior Lecturer,  
Dept of Psychology, University of  
Melbourne, Australia, Adjunct Professor,  
Social Science Faculty, University of  
Mannheim, Germany

vulnerable to disasters. Once humans face the risk of environmental disasters—natural ones such as floods, hurricanes, wildfires or earthquakes; or technological ones, such as explosions, chemical spills, train crashes and so on—hazard management becomes a very important task (Blaikie et al. 1994, Drabek 1990, Raphael 1986).

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In Australia, fire hazards are particularly salient (EMA 1997). Bushfires are seen as a genuine part of the Australian ecology (Pyne 1991). In spite of major advances in bushfire control, bushfire disasters have claimed hundreds of lives and assets worth billions of dollars—thus the risk of disasters remains very real.

People exposed to hazards need to be optimally informed about risk characteristics, preventative measures, appropriate behaviours during emergencies, and they must understand their own

responsibility. Authorities have to compose pertinent planning, prepare coping strategies and effectively communicate the relevant information to residents and communities as a whole (Barham 1986, Canter 1985, Salter 1991).

The more disaster management requires active involvement of residents, the more vital risk information/communication/education become (Covello et al. 1988, Fischhoff et al. 1997, Soerensen & Mileti 1991). However, mere distribution of material is not enough—it is crucial that communication efforts are effective. This requires socio-psychological expertise and critical effectiveness evaluation. Within pertinent campaigns, various means are used for enhancing disaster preparedness, including leaflets/brochures, picture series (graphs, slides, posters) and videos; altogether printed material is prevailing.

How efficient is the use of such materials? Is the disaster preparedness of people at risk improved? Do the employed risk communication (RC) strategies 'work' with respect to the target group, and what are the preconditions of effective programs? To answer such questions, *empirical* evaluation is indispensable (Gaul 1997, Kasperson & Palmund 1989, Rohrmann 1992)—yet pertinent empirical studies are still rare (Lange 1998, Rohrmann 1998).

Valid *evaluation research* (i.e. the scientific assessment of the content, process and outcomes of an intervention (here: RC program) and their assessment according to the stated goals (Fink 1993, Patton 1997; see Rohrmann 1992 with respect to RC) needs to be based on two conceptual steps: assessment criteria are to be explicated, and this requires a realistic model of the RC process under study.

Such a model was presented in Rohrmann 1995 and 1998. It states that the impact of risk information on the ultimate outcome variable, risk-reducing behaviour regarding a hazard (here: bushfires), is determined not just by the communicated content of the program but the result of a complex evaluation process.

This includes (re-)appraisals of the risk situation as well as the suggested action,



and is influenced by personal characteristics (exposure, skills, risk beliefs etc) and manifold context factors, e.g., attributes of the information source and 'channel' features as well as family/friends and the community one belongs to. Also, a longitudinal perspective is implied, as any risk communication has to deal with pre-existing attitudes and behaviours and is shaped by the safety culture prevailing in a society.

Such a conceptual framework can also be utilised to identify barriers to a successful risk communication process. In *figure 1*, the implications for the information-behaviour link are shown in a related model.

For each step of the core process (from receiving information to implementing an advised action or behaviour change) both internal factors and external influences must be favourable to achieve the RC goal.

These models guided the specification of evaluative criteria and the design of instruments for empirical investigations on hazard information and disaster preparedness programs. The main aspects are listed in *figure 2*.

The overall criterion 'effectiveness' is to be explicated by observable characteristics of program materials and strategies. The first set of criteria refers to the question whether the *content* of the message and its presentation is valid for the communication goals; the second set of criteria is related to the *process* of conducting risk communication programs; the third set deals with the actual *outcomes* of campaigns.

In addition to substantial (goal-related) criteria, organisational issues deserve attention. For most criteria, data need to be obtained from several sources, in particular the authors and the receivers of RC.

As both of these parties might be biased, appraisal by independent experts would be very valuable.

### A research project on disaster preparedness

Given the scarcity of empirical data, it seemed highly relevant to investigate current programs conducted in communities at risk.

The project 'Improving bushfire preparedness through effective risk communication' (IBP) focuses on information/education programs for residents, in particular the materials used by pertinent authorities.

The research aim is to clarify the following issues:

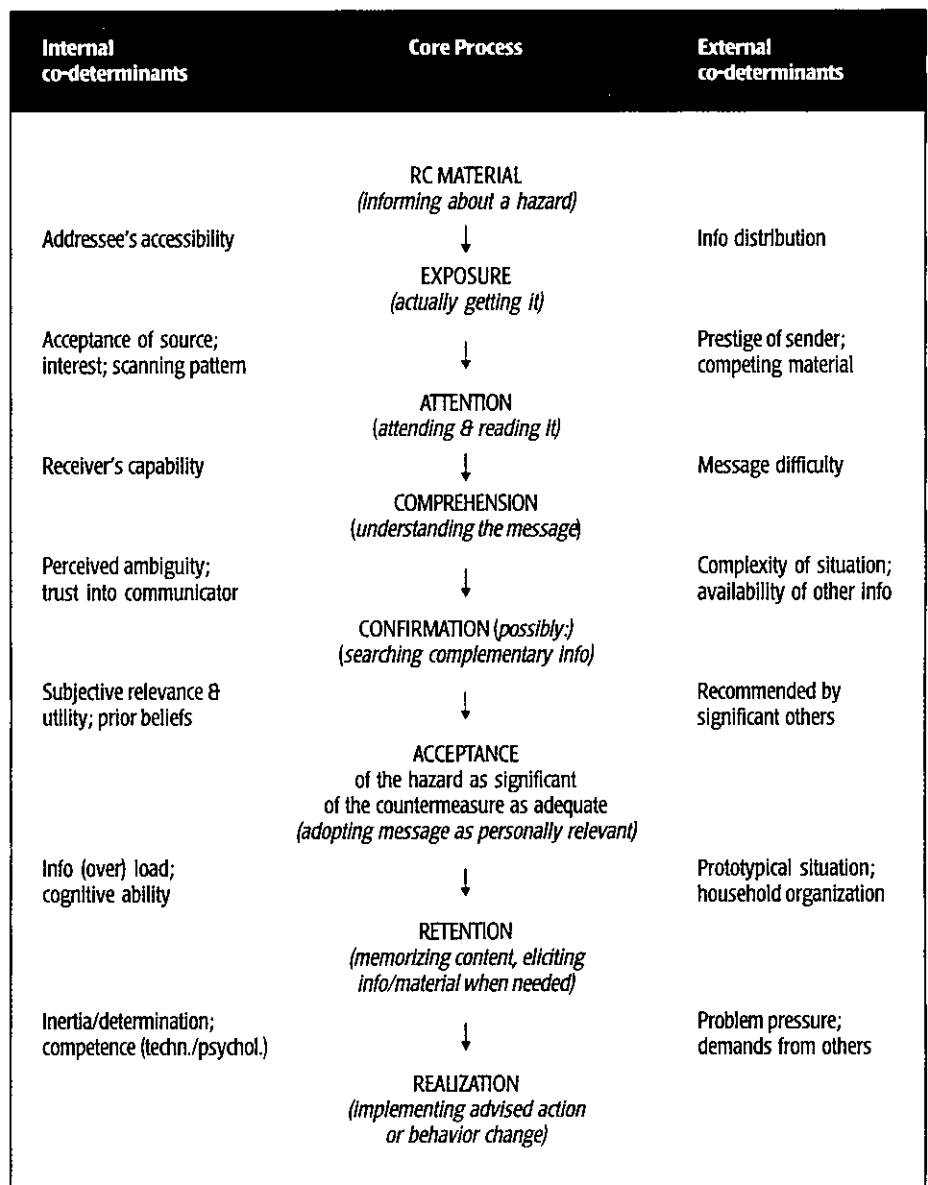


Figure 1: Risk communication for hazards – A provisional framework for the information-behavior link

- Which factors determine whether residents evaluate information material as useful?
  - How do officers and experts assess the utility of educational materials?
  - What is the role of texts and audiovisual materials in relation to group activities such as community 'fireguard' groups?
- The findings are then to be utilised for enhanced community campaigns.

Within the *Project IBP*, the impact of different means of bushfire information/education were investigated in several sub-studies, namely surveys, scaling tasks and qualitative studies using a focus group approach (cf. Krueger 1997, Morgan 1997). These include:

#### Study 1: Surveys with residents in exposed areas

**Purpose:** Collecting quantitative data about residents' knowledge/attitudes/evaluations.

**Design:** Residents surveyed three times, before & twice after a specific risk

communication event

**Materials:** Two leaflets (one including pictures) and a 30-page brochure; cf materials A, B, C in list below.

**Procedure:** Participants received *one* material between interview 1 and 2 and *all* materials before interview 3. Interviews based on standardised questionnaires; data collection 1 via face-to-face interviews, 2 and 3 via telephone.

**Sample/participants:** Residents in a bushfire-prone area, N=120; 113, 57 in phases 1, 2, 3.

*Note: Phase 1 and 2 conducted in co-operation with B. Lange (Postgraduate Diploma project).*

#### Study 2: Focus group discussion on information materials

**Purpose:** To enrich the outcomes of the 'quantitative' surveys on a variety of bushfire information means.

**Design:** Group discussion with residents from bushfire areas; also participation of bushfire experts.

## Type of criteria and examples

### Content evaluation

e.g. correctness & completeness of information, comprehensibility, usefulness of graphs/ pictures/ drawings, concordance with information needs, feasibility of proposed activities

### Process evaluation

e.g. difficulties/failures in running the program, inclusion of relevant actors/societal groups, feedback and confirmation possibilities, relevant target audiences reached

### Outcome evaluation

e.g. reception of materials, increased problem awareness & knowledge, acceptance of messages, change of beliefs, utilization of proposed activities, risk-reducing behavior

### Practicality aspects

e.g. ease of storage of the materials, availability of info updates, technical requirements

## Pertinent assessors (depending on the evaluation criterion)

A: RC agency (authoring the risk communication material or program)

E: hazard and/or risk communication experts (independent researchers)

R: information receivers or participants of the RC program

Figure 2: Assessing risk communication effectiveness Source: adapted from Rohrmann 1992 & 1998

**Procedure:** The discussions were directed by a standardised guideline and tape-recorded. Duration: 3 hours.

**Participants:** Groups of interviewees from study 1 (N=8), i.e., residents who had received materials; 3 experts.

### Study 3: Assessment of brochures

**Purpose:** To apply relevant RC evaluation criteria to different types of fire preparedness information brochures

**Design/procedure:** Experts assessed bushfire brochures, based on a standardised appraisal form

**Materials:** Four brochures, i.e. materials A, C, D, E in list below

**Participants:** A small group of scientists (3 each of psychologists, other academics, risk researchers, fire experts)

### Study 4: Usefulness of fire information material in community education

**Purpose:** To learn about the utility of printed materials about bushfire preparedness (in comparison to other information means, e.g., lecturing, videos).

**Design/procedure:** Personal interviews with highly experienced officers from fire authorities. Focus on their utilisation and evaluation of brochures in relation to other materials. Use of scales and explorative questions.

**Participants:** All CFA facilitators who work with Community Fireguard groups around Melbourne.

### Study 5: Focus group discussion on bushfire videos

**Purpose:** To show currently used educational videos and discuss their utility in a community context

**Materials:** Two videos; cf description V1 and V2 below.

**Design:** Presentation of videos to residents who participate in Community Fireguard groups; both experienced members of established groups and recently formed groups.

#### Procedure:

1. General discussion
2. presentation video [V1]
3. discussion of V1
4. presentation video [V2]
5. discussion of V2
6. sum-up discussion.

Duration: about 3 hours. The discussions were directed by a standardised guideline and tape-recorded.

**Participants:** Two groups in country Victoria (N=20).

The main print materials looked at in IBP-studies 1 and 3 (two leaflets, three brochures) were the following:

#### 'A' Wildfire evacuation—it's your decision

**Topic:** Evacuation: describes factors to consider in the decision to evacuate or not and outlines important steps in planning for evacuation and home preparation

**Length:** 2 pages (on one A4 sheet)

**Features:** A black and white flyer, containing text only

**'B' Wildfire evacuation—it's your decision**  
**Topic:** Evacuation: describes factors to consider in the decision to evacuate or not and outlines important steps in planning for evacuation and home preparation

**Length:** 2 pages (one A4 sheet)

**Features:** A flyer with black & white text and 3 pictures in colour

**Note:** experimental modification of 'A'

#### 'C' Living in the bush—Bushfire survival plan workbook

**Topic:** Bushfire preparedness in general: comprehensive overview of issues such as fire behaviour, evacuation planning, identifying risks for home/property, protective activities, fire-safe planting, building design, and defending the home in a bushfire

**Length:** 30 pages

**Features:** An elaborated booklet in matt colour print; large coloured headings; each page illustrated with photographs and/or diagrams; contains a grid to sketch the house and property, space to list tasks/plans, checklists, phone contacts, references

#### 'D' Will you survive? A guide to lowering your risks before and during wildfires

**Topic:** Bushfire preparedness in general: describes factors to consider in a survival plan, common misconceptions, preparatory actions; also covers fire-fighting equipment

**Length:** 8 pages

**Features:** A booklet in glossy colour print; main points are accompanied by large hand-drawn illustrations; full-page photographs on the front and back cover

#### 'E' Bushfire: Recognise the risks

**Topic:** Bushfire preparedness in general: describes relevant steps to consider in developing a survival plan; briefly describes bushfire behaviour and disputes common misconceptions

**Length:** 8 pages

**Features:** A booklet in glossy colour print with photographs (approximately one per page); contains a checklist for preparedness tasks

**Note:** All brochures (except 'B') provided by CFA, the Victorian Country Fire Authority. Furthermore, two videos on bushfire preparedness were used within IBP sub-study 5; these are:

#### 'V1' Bushfire Hazard

**Topic:** Impacts of bushfire; planning for evacuation; practical suggestions for preparing the house and property for bushfire

Length: 15 minutes

Features: Residents and a fire officer present information; strong footage of fires; text listing key points

Source: EMA/IDNDR, Canberra 1998

'V2' Living with bushfire

Topic: Impacts of bushfire; planning for evacuation; practical suggestions for preparing the house and property for bushfire

Length: 20 minutes

Features: Several residents report their personal experiences; strong footage of fires; some use of computer-simulation graphs

Source: CFA, Melbourne 1998

These two were chosen after inspection of about a dozen videos because they are recent, cover bushfire preparedness issues in general and are professionally made.

### Findings regarding print materials on bushfires

The survey with residents (Study 1) together with the subsequent focus groups (Study 2) provided a comprehensive insight into the viewpoints of information receivers. The main points raised by the

#### Brochures: Content & length

- Information should be factual, concise, presented in point form or ordered lists and be relevant to the specific target audience
- Should include information on personal safety, evacuation, animal issues, local information relevant to the community, and phone numbers for emergency situations

- Suggestion of a booklet of detachable brochures on different issues) so residents can keep relevant materials as a reference and discard others)
- Preference for rather compact leaflets/brochures

#### Presentation/layout/style of brochures

- Illustrations seen as very important; colored, illustrated brochures preferred
- Pictures seen as essential to attract attention and to add emotional tone

- Diagrams and drawings often more instructive more instructive than photographs
- Lists to 'tick' and 'fill-in-yourself' sections appreciated but not much utilized

#### Usefulness of videos studied at home:

- Pro's: visual presentations very instructive; easier to understand concepts presented orally and visually; can add in-depth/technical to general information; 'real-life' footage has greater impact than photographs.

- Con's: videos (if not very short) may be considered as too time-consuming and hence not much watched; content can't be referred to instantly in the case of emergency.

#### Media: Radio/Television/Newspapers:

- Short information spots on the radio (to remind residents to take action to prepare for the fire season) are appreciated.
- Positive attitude towards TV ads on bushfires (tend to be remembered).

- Residents expect to see bushfire awareness messages in a range of media, particularly newspapers, close to the bushfire season.

#### Information from the InterNet/WWW:

- Residents not yet connected to the Internet: can not imagine its potential; little enthusiasm for seeking bushfire information on the WWW.

- If connected: not very familiar with the possibilities; skepticism regarding relevance for residents; accessibility in emergency situations questioned.

Figure 3: Residents' views on bushfire preparedness information (Project IBP-2)

Materials: 'A': b&w, 2 pp on 1 sheet, text only; 'B': same as 'A' plus 3 pictures in color 'C': elaborated booklet, 30 pages, in color print (cf. table 2 for details)

Mean ratings of materials	when judging one material alone				after comparing all three materials			
	A	B	C	Sign.	A	B	C	Sign.
Quality aspect								
Rated as interesting (scale: 1..5)	3.9	4.0	4.0	n.s.	2.8	3.9	4.4	**(.47)
Enjoyable to look at (scale: 1..5)	3.2	3.3	3.7	*(. )	2.1	3.6	4.2	**(.64)
Easy to understand (scale: 1..5)	4.6	4.6	4.7	n.s.	4.2	4.5	4.6	**(.11)
Relevant to own situation (1..5)	4.2	4.4	4.0	n.s.	3.9	4.1	4.2	n.s.
Answers questions of concern (1..5)	3.7	3.9	4.4	**(. )	3.7	3.8	4.4	**(.21)
Seen as reliable source (1..5)	4.1	4.3	4.5	*(. )	4.0	4.2	4.7	**(.25)
Overall appraisal (scale: 0..10)	-	-	-		5.4	6.9	7.9	*(.38)

Significance: \*\* for p<.05/.01; ANOVA's (within-effect), N=120 or 60 (Eta<sup>2</sup> in brackets).

Figure 4: Residents' appraisal of bushfire info/brochures (project IBP-1)

Materials: 'A' b&w leaflet (no pictures); 'C' elaborated 30 pp booklet; 'D' compact booklet (8 pp), mostly drawings (color); 'E' compact booklet (8 pp), many color photos, checklist. (Rank order given in brackets).

Mean rating of material:	A	C	D	E
Quality aspect				
Rated as interesting (scale: 1..5)	3.3 (4)	4.5 (1)	3.4 (3)	4.3 (2)
Enjoyable to look at (scale: 1..5)	1.7 (4)	3.6 (2)	2.6 (3)	3.7 (1)
Easy to understand (scale: 1..5)	3.6 (3)	3.7 (1)	3.6 (3)	4.0 (1)
Usefulness of pictures/illustrations (scale: 1..5)	-	3.6	3.8	1.9
Length of brochure (less..ok..more = 1..5)	3.5 (4)	2.7 (3)	3.0 (1)	3.1 (2)
Usefulness of checklist(s) (scale: 1..5)	-	3.7	-	3.5
Seen as reliable source (scale: 1..5)	4.1 (3)	4.6 (1)	4.1 (3)	4.2 (2)
Overall appraisal (scale: 0..10)	5.4 (4)	7.9 (1)	6.2 (3)	6.7 (2)

Figure 5: Expert assessment of bushfire brochures (project IBP-3)

### Important features of brochures: officers' views

Importance ratings (1..5 = not..very):

Illustrations (photos, drawings, graphs)	4.3	Lists of essential activities & steps	4.5
Lists of necessary equipment	4.1	Checklists (to be ticked)	4.0
Space/grid for drawing a ground plan	2.8	List of references & pertinent literature	3.6
Glossary of technical terminology	3.4	Contact addresses + phone numbers	4.3

Note: Based on interviews with all facilitators of the CFA Community Fireguard program

Figure 6: Important features of brochures: Views of officers (Project IBP-4)

### Bushfire preparedness videos: residents' views

- Real-life footage of bushfires seen as important to raise awareness of the potential physical and emotional impacts of bushfire and thus prompt action to prepare.
- This to be complemented by practical advice on how to prepare for and fight bushfire.
- Practical, low-cost suggestions for protecting the home are highly valued.
- Information should be presented in a calm and rational manner - to foster a sense of confidence and control (and possibly decrease fear).
- Videos should be concise and logically structured, with succinct text headings.
- They should be supplemented with point-form handouts summarising the key points.
- Information is best conveyed by firefighters (providing factual knowledge, e.g., on bushfire behaviour), and actual residents reporting experiences and demonstrating preparedness activities (rather than by officials or experts).
- Should include advice on what *not* to do in a bushfire, and try to dispel common myths.

Figure 7: Residents' views on bushfire preparedness videos (Project IBP-5)

group participants are listed in figure 3. In a somewhat contradictory way, both compact and comprehensive information is requested.

At least some reference to local circumstances is generally expected. Regarding special features, lists to 'tick' and 'fill-in-yourself' sections are appreciated but appear to be not much utilised. The discussion also showed that the information needs of older and newer residents differ considerably.

Selected quantitative results are listed in figure 4. (The left part refers to the study's phase 1 in which respondents were provided with one of the materials only; the right part gives the judgments made after they had seen all three materials. Most differences are statistically significant).

Clearly the elaborated brochure 'C' gets the best evaluations, but the short leaflets are judged positively as well as stand-alone info on a topic.

In fact many residents prefer compact focused materials to multi-issue ones. The addition of colour pictures enhances the rating of 'B' vs 'A' only marginally.

In study 3, systematic *expert appraisals* were collected on four brochures of different design; cf. figure 5 for selected results. Again the elaborated high-quality brochure 'C' is evaluated most favourably, but several assessors found it too long. Interestingly, drawings (as opposed to photos) were judged quite positively because of their instructive value. (Note that 'D', while rated below 'E' on most aspects, gets a much better score for the illustrations). Also, the specific usefulness of short leaflets such as 'A' is acknowledged by most raters.

A series of *interviews with facilitators* of the 'Community Fireguard' program in Victoria (Study 4) was very instructive because of their specific experiences and the fact that they use various communication means (discussions, texts, videos, exercises) in conjunction. As listed in figure 6, to them particular text components—such as lists of essential preparedness steps—are most important, but they are somewhat sceptical regarding check-lists, reading tips and drawing-grids. Regarding illustration, on average a 60:40 proportion for text: pictures is

suggested. Photographs are seen as vital for attention rather than explanation.

For a more comprehensive report on the quantitative and qualitative results from studies 1 to 4, cf. Rohrmann (in prep).

### Findings regarding videos on fire preparedness

The use of videos for bushfire information was explored in studies 2 and 4; in both cases the utility of educational videos was confirmed. Furthermore, two often-used videos on bushfire preparedness (one from Victoria, one from NSW, see description above) were exposed to *focus group discussions* (Study 5). The main viewpoints of participants are summarised in figure 7.

Generally, graphic bushfire footage is valued because it substantiates the harsh reality, including emotional impacts and promotes problem awareness. Even arousing fear is accepted by most and not seen as counter-productive as long as instructive advice follows.

Consequently, demonstrations of the hazards needs to be complemented with practical guidance and recommendations so the viewer gets the core message that bushfire is dangerous and frightening but can be survived if appropriate steps are taken.

The views within new and old Community Fireguard groups were similar, but residents with little experience in bushfire preparedness tended to show higher demands and to value confidence-enhancing substance.

Some features get mixed and partly critical evaluations, such as larger text blocks, messages presented by officials or experts, and the use of computer simulations of burning bush and houses.

### Conclusions for future work

The results show that altogether the investigated materials—both the leaflets/brochures and the videos—received quite favourable evaluations.

Their usefulness is dependent on the quality of the wider risk communication process though (cf. figure 1). Whether short one-issue leaflets or comprehensive booklets are preferred depends on the utilisation context.

As the use of (colour) illustrations is expected but their educational value somewhat ambiguous, professional drawings deserve serious consideration. A respective experimental study could clarify how to capitalise on this option.

Regarding videos as means to enhance bushfire preparedness, a series of videos would be desirable—beginning with an

overview of bushfire issues as an introduction, followed by a set of videos elaborating on specific issues.

Furthermore, the provision of accompanying booklets which are systematically linked to the content of the video and sum up the key messages would certainly enhance their utility.

Particular features such as the amount of text and the use of computer graphs for demonstrating bushfire effects need to be clarified in more detailed studies.

Finally, while print material is reasonably well researched, future investigations should pay increased attention to newer means such as CD-ROM's and explore the feasibility and efficiency of improving disaster preparedness via Internet/WWW use (where both text and audio-visual material can be presented).

Exploratory questions in studies 2 and 4 indicate that these possibilities are not yet used much but have considerable potential, at least in conjunction with conventional risk communication means. Certainly the percentage of households with PC's and Internet connections is rapidly increasing in Australia. Given the significance of preparedness in a bushfire-prone country, it seems vital to systematically research this potential.

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Author's contact details:

Dr. B. Rohrmann  
University of Melbourne  
Department of Psychology  
Parkville, VIC 3052 Australia

Phone: +61 3 93446349

Fax 93476618

E-Mail rohrmann@rubens.its.unimelb.edu.au

[www.psych.unimelb.edu.au/staff/acad/rohrmann.html](http://www.psych.unimelb.edu.au/staff/acad/rohrmann.html)



# An information infrastructure for disaster management in Pacific island countries

## Introduction

There is nothing more certain in the disaster management business than the fact that once a disaster starts to unfold, it is too late to start looking for the information needed to manage it.

This paper<sup>1</sup> reports on a study into the information needs of disaster managers in Pacific Island Countries (PICs) and the nature of the information infrastructure needed to ensure delivery of that information. It addresses two key aspects. First, it provides a guide to follow by those engaged in disaster management and research in building their own project, national or regional disaster information collections. It is specifically targeted at the National Disaster Management Officers (NDMO), regional agencies such as the South Pacific Applied Geoscience Commission (SOPAC) and aid donors. Second, it makes some observations on a range of technical and organisational issues, such as data formats, transfer standards and custodianship arrangements, that need to be considered in establishing and operating any modern information infrastructure.

Key input to the study was gained through two workshops. The first was in Suva, Fiji, in October 1998 in conjunction with the 7<sup>th</sup> IDNDR Pacific Regional Disaster Management Meeting and the second was held in Cairns in November 1998 in conjunction with a conference organised by the Centre for Disaster Studies at James Cook University.

## Data, information & knowledge

Collections of data are raw material. They are of little value on their own, but begin to gain value when they are drawn together to create a body of information. Decisions can begin to be made once this has been done. Information, in turn, gains greater value and potency when it is integrated with other information (and experience) to generate knowledge. Sound decisions are based on knowledge. Wisdom, for disaster managers, emerges from learning the lessons of success and failure gained through managing actual disasters, and requires a store of knowledge. It is clear that a large store of knowledge of disasters already exists in villages and communities throughout the Pacific. For modern disaster managers, it

by Ken Granger, Australian Geological Survey Organisation

will need to be built through the formal analysis and assessment of actual events and the post-disaster debriefing process.

One of the first systematic reviews of the need for information and the application of information technology in the disaster management field was undertaken by a subcommittee of the US Congress after the Mount Saint Helens volcano disaster of 1980 (US Congress 1983). That group described the development of 'profiles of need' and the identification of the 'essential elements of information' as integral parts of the information management process that lies at the heart of any information infrastructure.

## Information management

Information management is a simple cyclical process with has four stages: direction, collection, processing (or collation) and dissemination (Figure 1).

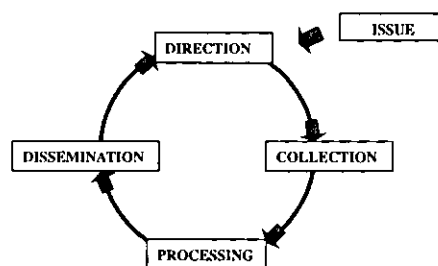


Figure 1: The information management cycle

## Direction

The first steps in establishing any information management regime are to:

- monitor the external environment to identify problems as they evolve and to be responsive to issues that are identified from outside the 'system'
- define the problems to be addressed
- identify the information requirements that flow from them
- identify who is to benefit from the information

It is through this process that the elements of information and profiles of

need discussed in the US Congress report (1983) are established and the broad nature of the information requirement becomes clear. Once the problem has been defined, the collection of information can be planned to satisfy the profiles of need and to assign responsibility for gathering and maintaining the information.

In a disaster management context, delegation of responsibility for information collection and maintenance might parallel the responsibilities outlined in the disaster plan. For example, the agency with responsibility for the provision and management of emergency shelter would, as part of that, gather and maintain information on shelter resources and their status. Such an approach avoids the need to set up an information collection and management system completely separate from the disaster management system.

A central point of control for directing the information management process is, none-the-less, needed within the disaster management process. This will need to interact with the wider local, provincial or national information management control arrangements to ensure that the disaster management information requirements and needs are adequately represented in the wider process.

## Collection

Implementation of the collection plan should focus on the essential elements of information that have been identified, with collection priorities flowing from the profiles of need. Working to the standards established by the directors of the information management system, information collectors need to employ all the data capture resources available to them. These include making use of *existing* information, which may have been developed for other purposes, such as land management or social planning, but which is also relevant to disaster management.

Where data must be captured from scratch, remote-sensing technology, on satellites or aircraft, holds great potential in a disaster situation especially in remote areas, while global positioning systems (GPS) make accurate positioning very simple. The bulk of information collec-

tion, however, will need to rely on more basic and traditional methods such as getting out and asking questions or making measurements on the ground.

Getting the gathered information to those who need it is part of the collection process. Again, technology provides many advantages, though traditional methods continue to remain important in Pacific Island Countries.

It is important to involve the eventual users of the information in the design and development of the collection process, not only to ensure that their needs are fully taken into account, but also to maximise acceptance of the process by users. This is a central focus of the village-based Community Vulnerability Assessment (CVA) methodology being developed as part of the South Pacific Disaster Reduction Program (SPDRP), for example (see UNDHA 1998).

### Processing

In this stage, answers to the various questions are developed by converting data into information. This calls for a system that facilitates the collation, analysis, evaluation and interpretation of the data. Here, tools such as GIS, databases and spreadsheets provide considerable help. It is important, however, to ensure that information processing for disaster management is not totally dependent on technology or the skills and experience of one person.

Some of the more complex forms of processing, such as terrain modelling or analysis of multi-dimensional inter-relationships, such as the effect of wind at different levels on the spread of ash during a volcanic eruption, are simply too slow, too difficult, or too daunting to be undertaken manually. They are also the types of processing that can (and should) be undertaken *before* the onset of disaster. It is also important to recognise that much of this processing does not need to be done by disaster managers. This is the role of specialists such as vulcanologists, meteorologists, social scientists and engineers, for example. Disaster managers do, however, need to receive the processed information in a form they can understand and use.

#### Note

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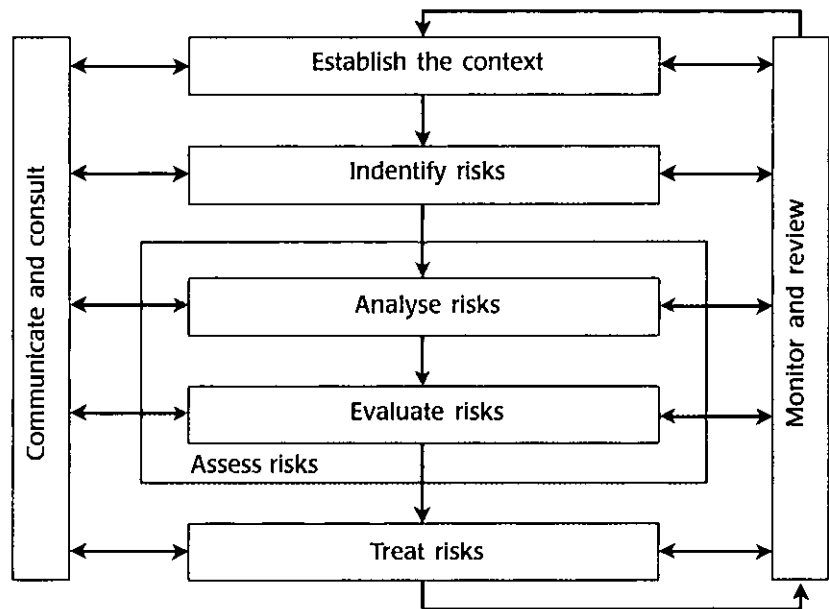


Figure 2: Risk management process (from Standards Australia, 1999)

### Dissemination

The final process in the cycle is the timely distribution of information to those who need it to make decisions. The ability of modern systems to present processed information in a variety of forms greatly assists the dissemination of information and its understanding, thus reducing the chance of disaster managers and the general public falling into the old trap of 'information-free decision making'.

And then the process starts all over again as more disaster lessons are learned, problems are posed, and questions arise.

### Disaster management and risk context

It is important that the development of an information infrastructure for disaster management be seen in the context of the community-wide information infrastructure, and that the disaster management process be seen in the broader context of community governance and risk management. Disaster management is not an end in itself, but one part in the much larger process of community governance. It involves a wide range of people and disciplines, not just those designated as 'disaster managers'.

The holistic nature of this broad view of disaster management can be illustrated by reference to the risk management process described in AS/NZS 4360:1999 in the following terms (Figure 2):

*Management of risk is an integral part of the management process. Risk management is a multifaceted process, appropriate aspects of which are often best carried out by a multi-disciplinary team. It is an iterative process of continual improvement.* (Standards Australia 1999)

In this context the prevention, preparedness, response and recovery (PPRR) components of disaster management require a multi-disciplinary approach. The medical staff involved in treating victims, the agricultural people who monitor crop production, the Red Cross organiser involved in public awareness programs at the village level, for example, are all 'disaster managers' in their own right. Collectively, they are involved in all stages of the PPRR process, even though they may not identify it as such until there is a need to respond to an actual disaster event.

The information required to support disaster management is, to a significant extent, the output from a wide range of other processes that are seemingly remote from disaster management. Professional disaster managers should, therefore, not attempt to carry out the whole process by themselves, but they should participate in the various stages so that the information flowing from each stage is understood and appropriate to their needs

### Spatial information and risk-gis

Much of the information needed for effective decision-making by disaster managers is to do with location. This is spatial information. Typically, it includes the information that appears on maps, but it can also include information linked to locations by name or a variety of other referencing systems.

Over the past decade or so, GIS have been used increasingly as a tool to provide information to address specific aspects of disaster management problems, especially in hazard mapping and modelling of phenomena such as flood and storm

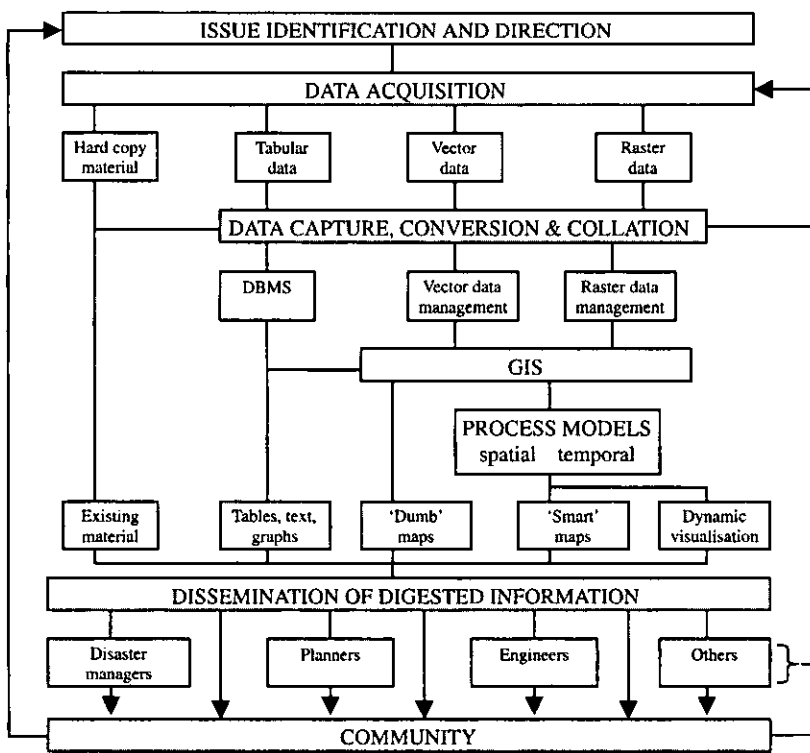


Figure 3: Risk-GIS structural elements

tide inundation. Burrough (1987) typically defines GIS, the tool, as 'a powerful set of tools for collecting, storing, retrieving at will, transforming, and displaying spatial data from the real world for a particular set of purposes'.

This definition has a clear focus on the technology, and the term 'GIS' is used in this paper to specifically refer to the technology component. There are clear advantages, however, in developing a fusion between the broad philosophy of risk and/or disaster management and the power of GIS as a decision support tool, hence Risk-GIS as it has been christened in the AGSO Cities Project. It has, as its philosophical roots, the comprehensive risk management approach outlined in the Australia and New Zealand risk management standard and the view embodied in Cowan's (1988) definition of GIS as 'a decision support system involving the integration of spatially referenced data in a problem solving environment'. In this context, the 'problem solving environment' is risk or disaster management.

Disaster management demands a wide range of information products. To cater for this, Risk-GIS must be structured to cope with all external inputs, internal operations and output to a wide range of external consumers. Figure 3 summarises the key structural elements of Risk-GIS.

This model goes somewhat beyond the conventional view of GIS as being made up primarily of hardware, software and data. It also incorporates the people,

administrative arrangements and infrastructure issues, as well as recognising the significance of:

- the information management cycle
- the range of information products that satisfy the diverse needs of risk managers and the communities they serve and the diverse source material that must be drawn on to create those products
- the information infrastructure, which facilitates the flow of data and information throughout the model (shown as the linking lines)
- the fact that the process and structures are aimed at meeting the needs of the community as the ultimate beneficiaries, who in turn provide input to the system.

### An information infrastructure

The process of information management and the structural requirements of Risk-GIS provide the foundations on which to build an information infrastructure, especially a spatial information infrastructure. It should be emphasised here that an information infrastructure is not a physical thing, it is more of an accepted way of doing things.

There are six elements in this model of an information infrastructure. They are:

- an information culture
- the right people
- a coordination process
- data and information products
- guidelines and standards

- an institutional framework

This model is applicable at any level of jurisdiction—from the smallest local village or project, to the local council or business level, the provincial and departmental level, the national level, and the international level. It is also applicable to any 'industry' focus. In this paper, however, it generally relates to the disaster management 'industry' in its widest context.

### An information culture

The phenomenon of 'information-free decision making', referred to earlier, is not confined to disaster managers or the Pacific—it is very widespread.

There are at least four powerful forces working against developing and sustaining an information culture. The first such force is what I have called 'spinformation' (i.e. the output from 'spin doctors'), which distorts, misuses or censors knowledge for the purposes of exerting power and influence (Granger 1997).

The second is the general lack of spatial awareness shown by many decision makers, despite the fact that the overwhelming majority of decisions made in most fields contain a spatial element. How often are decisions handed down that do not make sense environmentally or in terms of community safety, simply because spatial relationships have been ignored? Housing developments on flood plains or areas prone to coastal inundation, or waste disposal facilities sited in aquifer recharge areas are just two of the more obvious.

The third force is the widespread fear of information and knowledge. There appears to be an unwritten law that the higher up the corporate or institutional ladder one climbs, the less knowledge one should seek because of the constraints it places on 'independent' decision making. The American futurist, Alvin Toffler, observed in an interview published in *Wired* (November 1993):

*If you have the right knowledge, you can substitute it for all the other factors of production. You reduce the amount of labor, capital, energy, raw materials, and space you need in the warehouse. So knowledge is not only a factor of production, it is the factor of production. And none of the powers that be, in Washington and in the industrial centres of our country, seem yet to fully comprehend it. It scares them. It's threatening.*

The fourth, and possibly most widespread, force is a general lack of good information management practices. The



'file and forget' and the 'why bother to file' approaches are said to be very much alive and well in PICs—and elsewhere.

These barriers have got to be overcome before an information infrastructure can become a reality. Disaster managers need to remind themselves regularly of the observation made by that other great futurist, Aldous Huxley, in his essay *Proper Studies*, that 'facts do not cease to exist because they are ignored.'

### **The right people**

GIS (the technology) is not a 'black box' solution that only requires the right buttons to be pushed to obtain 'the truth'. It requires people who not only understand the technology of GIS and its associated systems, such as GPS and remote sensing, but who also understand the real world problems they are trying to solve with GIS (the disaster, natural resource, planning, engineering and human services managers, for example). The 'right' people provide the input that energises the whole infrastructure. The 'right' people are those who are competent, committed, cooperative and communicative.

### **Competent people**

Competent people are those who have and maintain the skills needed to do their job. This requires ongoing education and training, a fact well recognised in the disaster management field.

Given the real-world, holistic nature of disaster management, as discussed earlier, and its place in community governance processes, it is clear that professional disaster managers should, ideally, have a broad span of knowledge, but should they be expected to have, for example, a competency in, or understanding of the sciences associated with the various hazard phenomena (geology, meteorology, hydrology, volcanology, etc); structural or civil engineering; the demographic, social, economic and cultural aspects of the people that make up their communities; the psychology, sociology and politics of disaster; the logistic, communications and transport resources that support the community; and/or all of these and more?

The Australian *National Emergency Management Competency Standards* (EMA 1995), developed for professional and volunteer disaster managers, do not help to answer those questions definitively, but they do identify the need for emergency managers to be competent in the use of (unspecified) information. They contain two explicit competency units relating to information (Unit 10, Manage information, and Unit 11, Process infor-

mation). Both are 'core' (i.e. compulsory) competencies and are described in terms of the 'processes of collecting, recording, verification, interpretation, structuring, collation and dissemination of emergency management information', i.e. they relate to the information cycle described previously.

The Australian competency standard also contains reference to the use of GIS, as one of the activities under Unit 2, Assess vulnerability, a process described in the standards as examining 'the interaction of hazards, communities, agencies and the environment'.

There is another spectrum of competencies involving GIS. These range from the highly technical levels of professional GIS analysts who have strong skills in programming and spatial modelling; to those who use GIS to analyse spatial issues as part of their core work; to those who simply use GIS to display a map.

The Suva workshop clearly demonstrated that there is a good pool of competent people ranging across this spectrum of GIS use. At the professional and applications end, most of these are graduates from the University of South Pacific (USP) in Suva, the PNG University of Technology (Unitech) in Lae or from universities in Australia or New Zealand. USP offers a range of courses in disciplines including earth science, geography, land management, sociology, population studies, environmental science and tourism. Some of these involve or can include training in the application of GIS.

While there may not be a large number of NDMOs or their staff who have yet gained access to or experience in the application of GIS and other spatial technologies, there are certainly competent people available in most PICs to provide that type of support to disaster managers.

### **Committed people**

Skills alone do not guarantee a successful use of information or tools such as GIS (or indeed, disaster management). That requires a strong measure of commitment to the process involved. Again, it is clear that there is a good resource of people in the PICs who understand the issues and challenges they are meeting in the GIS and disaster management processes and want to make a difference. They are dedicated to solving the problems that confront their communities.

### **Communicative people**

Competence and commitment are of little value if the people with those attributes are not willing to pass on their knowledge.

In PICs, the widely dispersed population and, at times, tenuous links call for special efforts to be made to facilitate communication. This requires the operation of both formal processes, such as workshops and conferences; newsletters such as those facilitated by SOPAC; and informal networks such as the GIS user groups that exist in Suva and other centres.

### **Cooperative people**

It is clear that no individual or organisation has all the answers, either in disaster management or in the use of GIS. To maximise the acknowledged benefits of both, it is essential that an environment of cooperation both within organisations and between organisations is strongly maintained. There is clearly a strong level of cooperation within and between the various NDMO organisations. That commitment is not, however, always experienced between organisations that develop, manage or look after spatial information and GIS resources.

This situation is not peculiar to the PICs. In the multi-hazard risk assessment undertaken by the AGSO *Cities Project* in Cairns, data was assembled from at least 35 different sources, most of whom, at the time, did not share information with any of the others (Granger 1998). Some were not even aware that the others actually existed!

### **A coordination process**

PIC disaster managers clearly acknowledge that information is an essential ingredient to effective and sustainable decision making at personal, organisational and jurisdictional levels. A culture of information is well established in this community. The practice and experience of using it, however, has yet to develop to the same degree.

It is also clear that the information needed for decision making tends to be developed, used and managed in an insular fashion (also by individuals and organisations), without much reference to others, who may have an interest in or need for the same or very similar information. There are many instances of expensive information collection programs being undertaken by two or more different agencies, more or less simultaneously and in the same community, without the knowledge of, or reference to, agencies with similar needs.

There are solutions available to facilitate the linkage of the many 'islands' of information and thus break down this insularity. While many of these are built round technology, the principles of coordination and cooperation, on which

they are based, are non-technical. The development of these links is the objective of what is usually referred to in the literature on spatial data infrastructures as the 'clearinghouse' network or mechanism.

### The clearinghouse

The US literature on their National Spatial Data Infrastructure (NSDI) describes the clearinghouse concept as 'a system of software and institutions to facilitate the discovery, evaluation, and downloading of digital geospatial data' (FGDC 1997). This description identifies two distinct aspects, namely:

- from an *institutional* perspective, it is a referral service, or a 'library index' used to discover who has what information; and
- from a *technical* perspective, it is a set of information stores that use hardware, software and telecommunications networks to provide access to information.

**Institutional issues:** The key objective of the clearinghouse is to identify what information is available, where it came from and who has it. In reality, a clearinghouse can be as simple as a box full of reference cards or as complex as some of the directories that are already in place, such as the Internet-based Australian Spatial Data Directory or the CD-ROM-based Queensland Spatial Information Directory.

SOPAC's Internet-based 'virtual library' provides another, more general, example of a technology driven directory (found at [www.sopac.org.ff](http://www.sopac.org.ff)).

Like any library index the clearinghouse directory does not contain actual information, it only contains information that will help the researcher to make a judgement as to whether it is what they are looking for, and if so, where to find it. This information is referred to as metadata (data about data).

Metadata describes the content, quality, condition and other characteristics of the material of interest, be it data in a database, a satellite image or a coverage of aerial photography, a report or a map. The key headings for a metadata directory for spatial information (i.e. the SII 'library index') should include:

- Identification (title of the database, map, report, etc.; area, place, etc. covered; themes and subjects addressed; currency—when the material was produced or last updated; whether the material can be released to anyone or if there are access restrictions).
- Data quality (accuracy; completeness; logical consistency; lineage—where the

data originated and what has been done to it since)

- Data organisation (is it spatial or non-spatial, structured or free text, digital or analogue, etc.; if it is spatial data, is it vector data with or without topology, is it raster data, and what type of spatial elements are involved—point, line, polygon)
- Spatial reference (projection; grid system; datum; coordinate system)
- Entity and attribute information (features—topography, buildings, social value, cultural feature, etc.; attributes; attribute values—quantitative, qualitative, names, scales, etc.; time perspective—historical, real-time, forecast, etc.)
- Distribution (distributor or custodian—who to contact; on line or postal access address; language or languages available; formats available—database, spreadsheet, map, book, etc.; media available—audio tape, video tape, floppy disk, CD-ROM, paper, film, etc.; price and payment details)
- Metadata reference (when was the metadata developed; who was responsible for the metadata)

This scheme can be applied to any form of information, be it the most sophisticated *Risk-GIS* information, or an oral history recorded in a remote village; a satellite image or a sketch in a field notebook, and so on—it is all information and it all needs to be properly indexed.

The Australia New Zealand Land Information Council (ANZLIC) has established a standard for spatial metadata, the details of which can be found on their Internet site at [www.anzlic.org.au/metaelem.htm](http://www.anzlic.org.au/metaelem.htm). This is a highly technical standard, designed mainly for traditional spatial data products such as cadastral and topographic databases. It is, none the less, in increasingly wide use in Australia and it might be a useful model for SOPAC and PIC authorities to look at if it is decided to go down a more formal information infrastructure path.

**Technical issues:** Once the information needed has been identified and access has been arranged, the next issue is to transfer it from its source to the user. Traditional 'hard copy' materials, such as books, reports, maps, films and photos, are typically transferred physically, i.e. sent by hand, post, courier, and so on. For digital material the transfer options are somewhat greater, though in many cases the actual transfer will still rely on physically carrying or posting the transfer medium from the originator to the user.

### Data and information products

The identification and provision of the data sets and products required by the widest range of users is a central aspect of any information infrastructure. The data sets and products provide the foundation on which all decision support applications may be built. It is usual to establish minimum (or fundamental) requirements for both baseline data sets and those required for direct disaster management. Those requirements will evolve as experience in the application of spatial information increases in disaster management in PICs. It is a function of the coordination process to monitor and manage that evolution.

### What information?

Disaster management is, by its very nature, an information-hungry activity. It must deal with real-world issues and cover the full range of activities involved in preventing, preparing for, responding to and recovering from disaster impacts. It is also important to reiterate that the PPRR of disaster management is but one of the treatment strategies of comprehensive community risk management. It should, therefore, be supported by the process of risk assessment as outlined previously. The information needed across this combined span of activity must be capable of describing or defining the widest possible range of real-world issues. This differs markedly from most other activities, such as land management or regional planning, which tend to have a significantly narrower subject focus.

The temporal span may also need to be comprehensive. Throughout its various stages, disaster management can require information that is, at least by human timeframes, timeless (such as climate, terrain or geology); it needs information on past events; it needs immediate information about the current situation; and, it needs information about the future, in the form of forecasts or predictions. Disaster managers may need access to great detail down to the level of individual buildings and people, or general information across wide areas, such as sea surface temperatures across the whole Pacific Basin.

This does not, however, mean that disaster managers need to know everything about everything. The trick is to identify what information and information products are required at which stages of the risk assessment and disaster management processes, so that they can be prioritised. It is important, therefore, to follow a systematic process that maximises the

efficiency of information management and minimises duplication of information collection and, more importantly, gaps in information—hence the need for an information infrastructure.

### Dividing the task

There are many ways of systematically dividing the task of information management. The scheme described here is based on the experience we have gained under the AGSO *Cities Project* (Granger and others 1999).

'Risk' is the outcome of the impact of hazards on a community. The organisation of information can, therefore be split between the two key factors:

- the hazards and environments in which they operate
- the elements at risk and their characteristics that make them more or less vulnerable to disaster impact.

This approach, however, does not take account of the level of community awareness and acceptance of risk that is an important component in risk communication and in the prioritisation of risk treatment options, and hence disaster management. This factor also needs to be included.

These components come together in the *Cities Project's* understanding of the risk management process, and consequently our approach to information management. This is illustrated in *Figure 4*.

### Hazards

The hazard phenomena that are most relevant in PICs can be divided into four groups, on the basis of their origin, as shown in *Table 1*.

Obviously, not all of these hazards are experienced in all PICs. Frosts, for example, are probably only an issue in PNG, whilst tropical cyclones are a relatively rare problem in PNG. Overall, however, most countries can potentially be affected by most of these hazards.

The information required by disaster managers on hazard phenomena is typically confined to:

- the history of hazard impacts and their consequences
- warnings or forecasts of an impending hazard event
- forecasts of the likely level of impact of events of different probability (i.e. hazard scenarios).

To provide that information on at least the last two of these, however, hazard scientists require a wide range of data on the respective phenomena and the environments they function in.

**Hazard history:** Information on the community's experience of hazard impacts

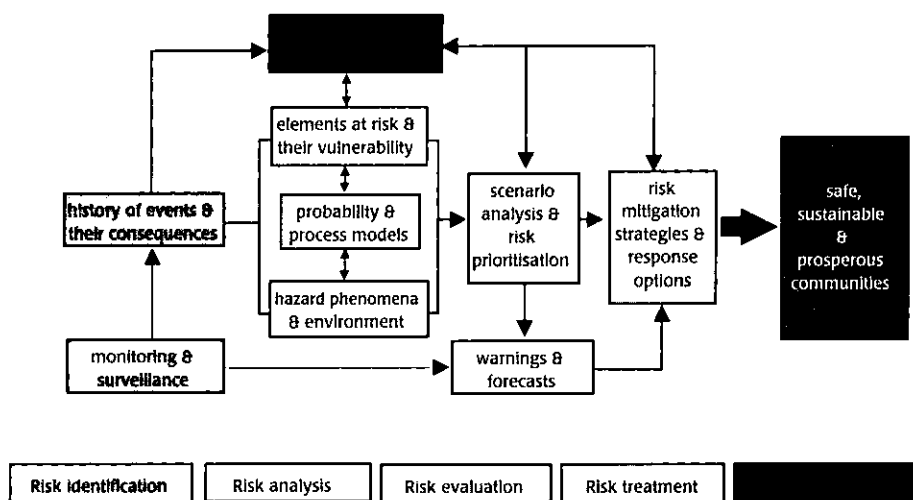


Figure 4: *Cities Project* understanding of the risk management process

Atmospheric	Earth	Biological	Human
tropical cyclones	landslides	human epidemics	industrial accidents
tornadoes	earthquakes	plant epidemics	transport accidents
storm surges	tsunamis	animal epidemics	crime
floods	volcanoes	plagues	political conflicts
frosts	lahar	bush fires	structure failures
droughts	erosion		structure fire
severe storms	ground failure		contamination

Table 1: Classification of hazards

is, in my experience, perhaps the single most important resource that should be available to disaster managers. It represents reality and helps to overcome the inherent problem that human memory tends to be significantly shorter than the return period of most hazard phenomena.

There are many sources for this information. The availability of well-managed collections of such information, however, is highly variable and typically confined to the larger PIC and international agencies, such as AGSO at [www.agso.gov.au](http://www.agso.gov.au), the Australian Bureau of Meteorology at [www.bom.gov.au](http://www.bom.gov.au), the New Zealand Institute for Geological and Nuclear Sciences at [www.gns.cri.nz](http://www.gns.cri.nz), the US Geological Survey at [gldss7.cr.usgs.gov/neis/bulletin/bulletin.htm](http://gldss7.cr.usgs.gov/neis/bulletin/bulletin.htm) and the US National Oceanographic and Atmospheric Administration at [www.ceos.noaa.gov](http://www.ceos.noaa.gov).

Documentary records of disaster events in PICs can, in some areas, extend back to the mid-to-late 19<sup>th</sup> Century or (in rare cases) even as far back as the 16<sup>th</sup> Century. These records are found in the journals of explorers, missionaries and other travellers, official government reports and through contemporary press reports.

These reports are valuable because they frequently contain much information on the consequences of the disaster and how the affected community coped with the experience, though they are largely presented from the perspectives of outside observers.

Oral tradition, local myths and creation legends can also provide evidence of such events. These records often contain information on how the affected community experienced the event and how they responded. Typically, they are associated with major events in specific named locations and can be of value as a guide to modern scientific investigation.

More detailed scientific records, especially those in which instrument measurements are available, tend to date from the 1940s at best. The availability of satellite data on cyclones over much of the Pacific generally dates from the 1970s. The instrumental coverage of hazards such as earthquakes, volcanic eruptions, cyclones, severe storms and tsunamis is constantly improving, as is the number of researchers who take an interest in those phenomena in the Pacific.

The 'damage assessment workshops'

held in three PICs under the SPDRP in 1997 and 1998 have established an excellent framework on which to collect post-event impact information. The generic 'initial damage report' forms developed for Cook Islands, Samoa and Tonga, and the 'drought assessment' forms used in Fiji and Solomon Islands during 1998, are very comprehensive. In the case of Tonga, their form has been translated into Tongan and has been distributed to outer island District Officers. They were used for the first time following Cyclone Cora in February 1999 (Angelika Planitz, SOPAC, personal communication).

It is, however, one thing to have the proforma in place, another to have it used, and yet another thing for the data collected to be subsequently collated, analysed and preserved to ensure that the maximum value can be gained from the effort of collecting it. At this stage completed forms tend to be accumulated at the National Emergency Operation Centre in the respective country.

It is worth observing that these proforma place the PICs well ahead of most Australian jurisdictions, where there is a very poor record of detailed and coordinated post-event studies. The most comprehensive collection of post-event information for Australia is that collated by the Newcastle Region Library on the experience of the 1989 earthquake in that city. It is a very good model for such collections. The Web site [www.newcastle.infohunt.nsw.gov.au/library/eqdb/earthq.htm](http://www.newcastle.infohunt.nsw.gov.au/library/eqdb/earthq.htm) provides details.

**Warnings and forecasts:** There are only two hazard warning and forecasting services that cover all PICs. They are the Tropical Cyclone Warning Centre (TCWC) based in Nadi and the Pacific Tsunami Warning Centre (PTWC) based in Hawaii. The Pacific ENSO Applications Centre (PEAC) in Hawaii also provides forecasts of El Nino events, though their primary clients are the US and former US Territories. These centres have well-established procedures and communications networks to provide warning and tracking of their respective phenomena. Many of the active volcanic centres close to populated centres are also monitored for activity, and warnings of impending eruption are provided. Perhaps the most comprehensive of these is that centred on the Rabaul Volcanological Observatory in PNG.

Apart from the system on Fiji's Rewa River, there appear to be no local flood-warning systems available in PIC. The dissemination of the warnings from the Rewa system to the communities under threat relies on established tele-

communications systems, especially broadcast radio.

**Hazard scenarios:** Perhaps the most familiar way of providing hazard information to disaster managers and others is through the use of maps portraying the extent of the area likely to be affected by scenario events such as the '1:100 year' flood or storm tide, or the likely ash fall or blast areas for a given volcano. These are frequently referred to as 'risk maps', though they typically relate only to a modelled, or postulated, hazard scenario.

There are many hazard or site-specific studies that contain hazard scenario (or probability) information. These include an earthquake hazard assessment of Fiji (Jones 1997), seismic risk in the principal towns of PNG (Gaul 1979), various volcanic disaster plans in PNG, Solomon Islands and Vanuatu and the Suva earthquake risk management scenario pilot project (SERMP) developed under SPDRP (Rynn 1997).

### Elements at risk & their vulnerability

Information on hazard phenomena alone does not provide an adequate base for disaster management. After all, if there are no people involved then there is really no disaster. The development of an understanding of the elements at risk in communities (also termed 'assets' or 'capacity' by some agencies), and their vulnerability (ranging from susceptibility to resilience) to a given hazard impact, involves input from a very wide range of disciplines, such as geography, demography, psychology, economics and engineering. It also involves many sources from both public, private and academic sectors.

There is undoubtedly a substantial amount of background or baseline information available, such as maps, population figures from national censuses and other population counts, and statistics from surveys of land use and so on. The biggest challenge is to find out that it exists, what form it is in and who has it—i.e. there is a need for a 'clearinghouse' directory. A systematic approach to listing the information needed is strongly recommended, so as to more easily identify where gaps exist.

The experience we have gained in AGSO under the *Cities Project* has led us to follow a system based on five broad groups of elements at risk, which we refer to as the 'five esses'—shelter, sustenance, security, society and setting.

**Shelter:** The buildings that provide shelter to the community at home, at work and at play, vary considerably in their

vulnerability to different hazards. There is considerable diversity throughout the PICs as far as building structure and materials are concerned, ranging from engineered, high-rise buildings in urban centres, to temporary, 'bush material' shelters in many rural areas, and virtually everything else in between.

Disaster managers need to have details of emergency shelters and buildings that can serve as safe havens from events such as cyclones and storm tides. They also need information on the availability of material, such as tents, tarpaulins and rolls of plastic, to provide temporary post-impact shelter.

To assess the vulnerability of buildings, a range of information relating to their construction is required. These building characteristics contribute to the relative degree of vulnerability associated with exposure to a range of hazards. In Table 2, the number of stars reflects the significance of each attribute's contribution to building vulnerability.

A standard set of attribute information is now being collected in the urban centres covered by the SOPAC *Pacific Cities Project*. It is very similar to the approach followed under the AGSO *Cities Project*. This system is probably appropriate for any urban centre or for non-village settlements in rural areas such as mines, logging camps, missions, and so on, although, perhaps too detailed and complex for use in rural village communities. The SPDRP CVA method, which classifies village buildings along the lines shown in Table 3, provides an alternative approach.

Access to shelter is also significant; thus, information on mobility *within* the community is needed. Within urban areas, details of the capacity and vulnerability of the road network, for example, are important, e.g. flood points, bridges, steep-sided cuttings, traffic 'black spots' and so on.

Vehicles and their availability can also be important, especially for disaster managers who need to undertake an evacuation. For example, are there buses or trucks available to evacuate people who do not have their own transport, or ambulances available to move people from hospitals, and so on?

**Sustenance:** All communities depend on a safe and adequate supply of both water and food, and fuel (or energy) for cooking and warmth. These are the minimum requirements for a sustainable community.

The larger and more complex the community, the greater the range of

infrastructures and services that have been established to sustain it. Modern urban communities are highly dependent on their utility infrastructures such as water and power supplies, sewerage, and telecommunications. These so-called lifelines, in turn, depend on each other and other logistic resources, such as fuel supply.

Power supply and telecommunications are overwhelmingly the most important of all lifeline assets in terms of what depends on them, followed closely by fuel supply, bridges, roads and water supply. Their significance to community sustainability, however, may be somewhat different; e.g. people cannot survive for long without a safe water supply, but they can survive (albeit with some inconvenience) without the telephone, fuel, light and even power for some time. Ports, airports and fuel supply are the most exposed in terms of their dependence on the widest range of other lifelines.

In most PIC villages, supplies of lighting kerosene and fuel can, to some extent, replace dependence on power, whilst water sources such as roof catchment, wells and streams substitute for a reticulated water supply. In village communities the sources of food can be very diverse, ranging from garden crops and fishing to animals (such as pigs and cattle) and 'bush tucker' gathered from the surrounding countryside. The availability of these may be seasonal and in some communities there may be traditional methods of food storage to cover times of hardship or to cover the seasons when produce is in short supply. A good knowledge of these food sources and their susceptibility to hazards, such as drought, frost or pests, is every bit as important as a knowledge of the availability of rice and tinned fish in an urban warehouse.

**Security:** The security of the community can be measured in terms of its health and wealth and by the forms of protection that are provided.

To establish a better understanding of health factors, information is needed on:

- hospitals, nursing homes, clinics, aid posts, doctors, nurses, dentists, x-ray services, etc.
- endemic diseases and efforts to control them, e.g. inoculation and screening campaigns
- demographic characteristics, such as the very young (under 5) and elderly (over 60 or 65)
- disabilities that reduce mobility or a capacity to cope with disaster and people who need to be accompanied by carers.

Characteristic	Flood <sup>1</sup>	Wind	Fire	Quake	Volc <sup>2</sup>
Building age	***	*****	*****	*****	****
Floor height or vertical regularity	*****	*	****	*****	***
Wall material	***	***	*****	****	**
Roof material		****	*****	****	****
Roof pitch		****	*		*****
Large unprotected windows	**	*****	*****	**	***
Unlined eaves		***	*****		
Number of stories	****	**	*	*****	*
Plan regularity	**	**	***	*****	***
Topography	*****	****	****	***	****

<sup>1</sup> Includes all forms of inundation hazard including storm surge and tsunami.  
<sup>2</sup> Volcanic hazards including ash fall and blast.

Table 2: Relative contribution of building characteristics to vulnerability

Type of building	Use	Material
Timber house class A	Family	Sawn timber, nails, fibro walls, corrugated iron roof
Timber house class B	Family	Bush timber, nails and bush rope, corrugated iron
Timber house class C	Family	Bush timber, bush rope, matting walls, thatch roof
Concrete block house	Family	Concrete block walls, corrugated iron roof
Kitchen shed	Cooking	Round poles, thatch roof
Toilet	Toilet	Round poles, matting walls, corrugated iron roof
Community hall	Meetings	Concrete frame and block walls, corrugated iron roof
School classroom	School	Sawn timber, fibro walls, corrugated iron roof
Church	Meetings	Concrete frame and block walls, corrugated iron roof

Note: The CVA methodology envisages such a classification be developed specifically for each community.

Table 3: Example of a model building classification for village communities (based on UNDHA, 1998, Table 5.9, p. 39)

To better understand economic factors, information is needed on:

- the primary industries, such as commercial crops and grazing, mining, fisheries, etc.
- basic processing industries, such as sawmills, abattoirs, copra mills, basic ore treatment, fish processing plants, etc.
- other secondary industries, such as ship building, concrete batching plants and construction industries
- principal tertiary industries, including banks, insurance, clothing and footwear manufacture, crafts, tourist industry, repair services, etc.
- the degree of dependence on subsistence agriculture and fishing, i.e. the significance of the informal economy
- in the more formal economy, information on issues such as household

income, unemployment and home ownership may be relevant

To better understand protection factors, information is needed on:

- ambulance stations, fire stations, police stations, defence force posts, etc.
- engineered works, such as flood detention basins, levees, sea walls, etc.
- traditional defences, such as mangrove belts to protect the coastline, etc.
- contact details for hazard specialists, such as meteorologists, geologists, engineers, etc.
- contact details for key emergency services staff, including disaster managers, police, fire service, military, etc.
- the resources available at the fire and police stations and military posts
- local, district and national disaster plans.

It is particularly important to identify

those facilities and services, the loss of which would magnify the impact of the disaster on the affected community. These 'critical' facilities, such as hospitals and disaster management headquarters, may call for additional protection or planning because of their significance to the wider community.

**Society:** Here we find most of the more intangible, non-physical factors, such as language, ethnicity, religion, nationality, community and welfare groups, education, disaster awareness, custom and cultural activities, and so on. These are the aspects that define the social fabric of the community and the degree to which communities, families and individuals are likely to be susceptible or resilient to the impact of disaster.

Information required to better define and describe the social environment of the community can include consideration of:

- community and official languages and the levels of literacy in those languages
- ethnic and racial groups and their inter-relationships, tensions, etc.
- religions represented in the community and their inter-relationships, tensions, etc.
- cultural, social or religious constraints such as dietary restrictions, funeral requirements, cultural taboos, etc.
- representation by NGOs such as Red Cross, Saint Vincents, etc.
- contact details for key community and welfare staff such as ministers/priests/pastors, NGOs, business leaders, teachers, parliamentarians, local councillors, etc.
- contact details for traditional leaders such as chiefs and other custom leaders and community elders
- levels and availability of education and the contact details of teachers

Some of this information may be available from the periodic censuses conducted nationally. However, the more detailed information will rely very heavily on site-specific studies, such as those envisaged under the CVA methodology.

**Setting:** To place communities in a broader spatial and disaster management context it is beneficial to develop information on factors, including:

- the broad regional physical environment (climate, vegetation, geology, soils, land use, topography, elevation, etc.)
- population distribution and basic demographic information
- external access, including links by road, rail, air, sea and telecommunications infrastructures; the services that provide that access, such as postal services,

airline and shipping service schedules, charter services, radio broadcast programming, etc.

- external sources of power and water supply, such as remote hydro-electric and water supply dams
- administrative arrangements, including local government, suburb, police district, electoral and other administrative boundaries
- legal arrangements such as cadastre and land tenure.

The broad administrative arrangements under which disaster management services are provided (while well known to insiders such as NDMOs) also need to be well documented, especially for outsiders.

### Community awareness and risk acceptance

PIC communities are said to have a good level of awareness of the hazards that could have an impact on them. Certainly, where such events are fairly common (such as cyclones) or more obvious (such as an active volcano), a strong level of awareness is clearly the case. Where events are less frequent, such as tsunami and major earthquake, the level of awareness is less well developed. For communities to take active steps to reduce risks, they must obviously be aware that the risk exists and is real. This is central to determining issues such as risk tolerance or risk acceptance. To a large degree this is a key output of the risk assessment process.

In the approach to risk assessment set out in the Australia New Zealand risk management standard (Standards Australia 1999), it is the practice to compare the level of risk found during the assessment process with previously established risk criteria, so that it can be judged whether the risk is 'acceptable' or not. The acceptability factor is central to the process of risk prioritisation, and hence the development of appropriate treatment strategies, including disaster plans. This is the first step in the allocation of resources to risk mitigation, especially if considered in a multi-hazard context. Under the AGSO *Cities Project*, and with our SOPAC *Pacific Cities Project* colleagues, we are beginning to address the complex issue of comparing the risks posed by hazards with greatly different impact potential. In many coastal areas, for example, there is often a strong spatial correlation between the areas that are most at risk from major inundation hazards (river flooding, storm tide and tsunami) and those in which deep soft sediments are most likely to maximise

earthquake impact. Conversely these are the areas that are at least risk from landslide impact and, to some degree, from severe wind impact. These issues are, to a degree, able to be addressed scientifically by computing probabilities and modelling *Risk-GIS* scenario impacts, and so on.

This scientific approach, however, does not really tell us what the community understands about the risks of disaster impact and how they believe those risks might be treated. It is here that the community consultation process embedded in the CVA approach really comes into its own. There are very few examples in the international literature to serve as a guide to what type of questions need to be answered in this process. One of the few I have encountered is the work undertaken in Cairns by Linda Berry of James Cook University. Her report (Berry 1996) includes a copy of the questionnaire used to survey some 600 Cairns households regarding their understanding of the risk of storm surge and their preparedness to cope. While that questionnaire would need to be modified for use in PICs, it provides an excellent starting point.

**Observations:** During the Suva workshop, PIC disaster managers were asked to complete a survey that asked them to rate a comprehensive range of topics according to their perceived need for information on those topics. The themes identified as being needed by more than 75% of respondents were:

- hazard history (details of previous earthquake, landslide, flood, cyclones, severe storms, drought etc.)
- population (census and estimates of numbers, age, sex, etc.)
- settlement type (city, town, village, hamlet, etc. names and locality)
- settlement structures (houses shops, schools, resorts, etc.)
- health services (hospitals, doctors, clinics, dentists, ambulance, etc.)
- welfare services (Red Cross, St Vincents, NGOs, etc.)
- agriculture (subsistence & other crops, livestock, storage, etc.)
- roads and streets (surface, capacity, bridges, etc.)
- telecommunications (phone, radio, TV, Web, mobile phone, etc)
- water supply (source, storage, treatment, reticulation, etc.)
- technical experts (GIS & computer staff, plant operators, builders, etc.)

This result is remarkably similar to the results of a similar survey I conducted within the police and emergency service agencies in Queensland in 1991.

Both surveys reflected a strong bias towards a response culture, rather than embracing a broader risk management culture. They also convey to me that there is an expectation that extra information will be provided by other agencies should, or when, the disaster managers need it. I suggest this is a very hazardous approach to disaster management, let alone risk management, unless those agencies that are expected to hold and manage that 'extra' information see themselves as part of the disaster management process and are aware of the requirements of disaster managers for their information.

As stated at the beginning of this paper, there is nothing more certain in the disaster management business than the fact that once a disaster starts to unfold, it is too late to start looking for the information needed to manage it. The risk management process tends to overcome this potential problem because much of the information needed to manage disasters has already been developed in the risk assessment process and is in a form best suited to the needs of disaster managers.

### National guidelines and standards

To maximise the integration and exchange of spatial data it is necessary to establish a range of standards and guidelines as an integral part of the information infrastructure. Some of the more technical standards, such as the implementation of the national or regional spatial datum (such as WGS 84) may be mandated by legislation, whilst others may be established by default (e.g. through the widespread use of a specific GIS, such as MapInfo). The guidelines and standards developed will need to cover transfer standards (detailed technical standards to enable data to be moved from one GIS environment to another without loss of information); geographic guidelines and standards (coordinate systems and projections, location keys, such as property address; attribute content and classification standards (e.g. standard soil or vegetation classifications); algorithm guidelines and standards to cover computational operations of GIS such as slope analysis or DEM generation; and interpretation guidelines and standards to cover aspects of accuracy, uncertainty statements, descriptions of ground truthing and so on.

### Institutional framework

The oversight of policy and administrative arrangements for building, maintaining, funding, accessing and applying national standards and guidelines and their appli-

cation to the basic information products used across the nation requires an institutional framework. These matters typically lie outside the realm of disaster management; however, NDMOs will need to become involved so that their requirements and priorities are reflected in national and provincial spatial information programs.

It is patently obvious that, for an information infrastructure to flourish, the institutional framework in which it operates will need to be as free as possible from 'competing interest groups squabbling in the marketplace' (Mant 1997). Given that disaster managers carry relatively little 'power' when it comes to spatial information, they need to develop strategies to give themselves a greater degree of standing in what has been termed the 'information power environment'.

In these 'environments', information is *controlled* (owned, collected and maintained directly), *influenced* (the collection and maintenance of data can be influenced by long-term relationships, mutual interest, or money) or *appreciated* (users can only appreciate that the data exists and must anticipate the way in which it will evolve).

In a 'normal' organisational situation (Figure 5a) much of the information, such as that on budgets, accounts, inventory, assets, and so on, and the personnel resources that collect and maintain that data, belong to the organisation and hence, the information is 'controlled'. In the 'typical' GIS environment (Figure 5b), by contrast, there is significantly less control or influence, hence a greater reliance is placed on externally sourced (appreciated) information such as digital cadastral and topographic data. Knowledge of the existence and relevance of 'appreciated' information is, typically, also limited (Lyons 1992).

An institutional framework is required to facilitate the non-technology links (legal, fiscal, administrative, bureaucratic, etc) between various stakeholders in the information infrastructure, from the smallest user-focused project, such as a village CVA, to the highest national or international-level policy environment and laterally within the widest circumference of the disaster management and spatial information communities. The institutional framework is the indispensable infrastructure within the overall information infrastructure.

In a study of the spatial information infrastructure requirements of PNG, a group of experienced consultants recommended the development of an institutional framework along the lines shown in Figure 6. This recognises the need for both high-level political support, and for both information users as well as technical experts to have input. It would clearly be advantageous for one of the theme-based consultative committees to have a disaster management theme, chaired by the NDMO. A key role of these consultative committees would be to oversight the custodianship and coordination arrangements for information.

It has been my experience that the institutional framework will tend to take on a nested hierarchical form. At the lowest level (the project level) the framework should be simple and can be largely informal. In the AGSO *Cities Project* Cairns case study, for example, it tended to reside in my head, my computer and in a few key documents. It only had to serve a couple of people within the project. At the next level up, our project information infrastructure is just one of many that go to make up the city information infrastructure; the city information infrastructure forms part of a regional information infrastructure, which in turn is part of a state information infra-

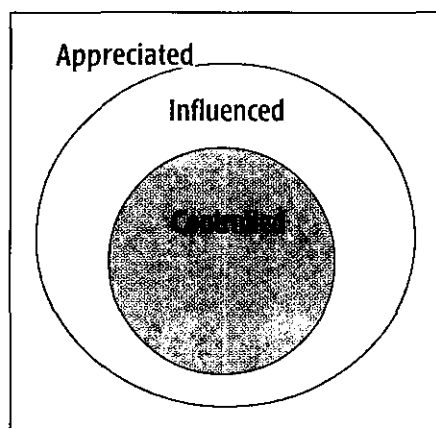


Figure 5a: 'Normal' power environment

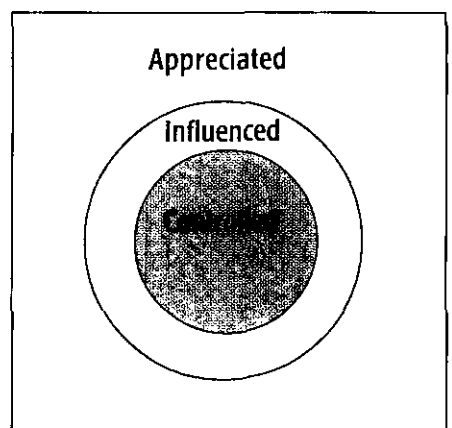


Figure 5b: 'Typical' GIS power environment

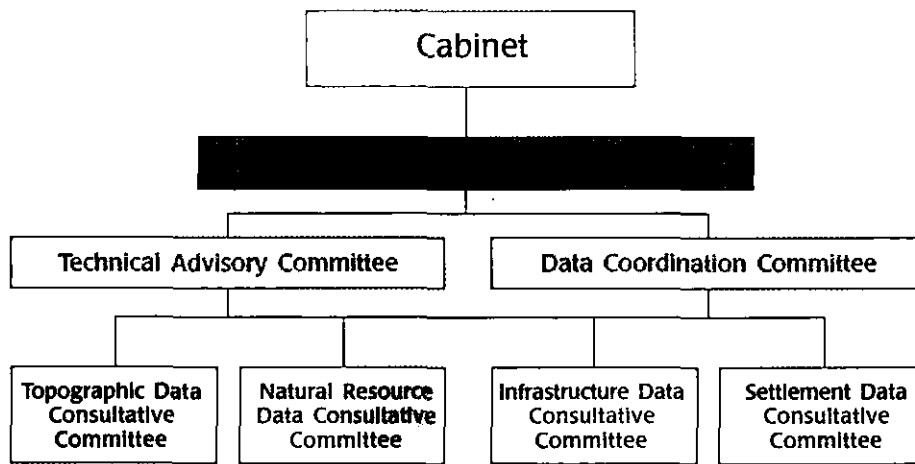


Figure 6: An Institutional framework structure suggested for PNG (Granger and others, 1998, fig.3, p. 16)

structure and so on.

### Custodianship

The concept of data custodianship is a key aspect of the institutional arrangements and hence, central to the creation of an information infrastructure. This concept is strongly developed in Australia and elsewhere and is based on seven principles as follows (condensed from ANZLIC 1998):

- **Principle 1 Trusteeship:** custodians do not 'own' data, but hold it on behalf of the community.
- **Principle 2 Standard setting:** custodians, in consultation with the national sponsor and users, are responsible for defining appropriate standards and proposing them for national ratification.
- **Principle 3 Maintenance of information:** custodial agencies must maintain plans for information collection, conversion and maintenance in consultation with the national sponsor and users.
- **Principle 4 Authoritative source:** the custodian becomes the authoritative source for the fundamental dataset in its care.
- **Principle 5 Accountability:** the custodian is accountable for the integrity of the data in its care.
- **Principle 6 Information collection:** collection or conversion of information can only be justified in terms of a custodian's business needs.
- **Principle 7 Maintain access:** a custodian must maintain access to the fundamental datasets in its care at the highest level for all users.

If an effective custodianship network can be established, the burden on individuals and organisations to collect and maintain their own information is greatly reduced. The most appropriate individual

or organisation commits to maintaining their part or parts of the community's (region's or nation's) information resource. It may, however, take time for information users to develop confidence in a system based on custodianship given the long history in most places of people doing their own thing as far as information is concerned.

### Some implementation strategies

The development of a disaster management information infrastructure need not be a difficult or expensive process, nor need it be dominated by the technical and bureaucratic considerations that appear to be so significant in other schemes such as NSDI and ASDI. The following thoughts may help PIC disaster managers (and their Australian counterparts) to ease into the task and build very robust information infrastructure to support their work.

**Start with your existing material:** The best place to start is with the information already held by disaster managers. Develop a metadata inventory ('library index') of existing material as the first step so that it is easier to identify where the significant gaps are.

**Develop a plan:** Sketch out an information management plan, as part of the disaster management plan, that clearly identifies the desired outcomes, benefits and likely costs.

**Take your time:** Given that an effective information infrastructure requires the development of strong networks of collaborators and the development, or strengthening, of an information culture, its evolution will take time. It is preferable to plan for the process to take five or even ten years, if necessary. It should be seen as an evolutionary process of constant improvement and enhancement – it may never actually provide all of the infor-

mation needed, but it should provide the most important. It is important to be practical in setting targets, because if they are too ambitious at the outset and subsequently fail, the whole process of developing the information management process could be seriously set back.

**Establish priorities:** The so-called '80/20 rule' needs to be kept in mind. That says that 80% of the answers can be provided by 20% of the information. There are, consequently, themes of information that are much more significant and urgent than others.

**History is important:** In my experience, the best returns can be gained from investment in collecting detailed disaster histories, including community response. That material represents reality and can be used to generate both community and political support for disaster management and community awareness programs. It also contains lessons on past disaster management that can be built into present practice.

**Document disaster experience:** It is clearly much easier to document history as it happens than to search for information well after the event. The damage assessment forms already developed in PICs are a good start, however, it is most important to have in place the capacity to analyse and digest the results. The information management performance of the disaster management system should be reviewed as part of the post-disaster performance process.

**International assistance:** In the case of major disasters it is usual for PICs to receive assistance from the international community. This can take various forms, ranging from relief and humanitarian assistance to scientific input to the study of the disaster event. This input needs to be documented as part of the disaster experience. Most of these operations will need (and seek) access to local information and they will generate significant information from their own involvement. It is most important that arrangements for the flow of information in both directions be as smooth as possible. This may require the negotiation of standing bilateral or multi-lateral agreements with likely sources of assistance that addresses the information flow in both directions.

There is potential for some international assistance being the cause of tension, if not conflict. This is particularly the case where foreign scientists and others use the disaster event to further their own personal interests and do not provide information back to the host country. One international professional



scientific association has seen the need to publish a protocol that sets out guidelines for professional conduct in disaster events for its members (IAVCEI 1999). This is a valuable and long overdue initiative.

**Establish networks:** The disaster management process can become rather isolated and inward looking, especially if it is not activated regularly. It can be difficult to maintain the level of 'profile' that guarantees attention or attracts support. That inevitably has an impact on the degree to which information management and disaster research programs can attract support. The development of partnerships with key data custodians and research agencies is, therefore, very important. Similarly, it is important to involve as wide a cross section of stakeholders as possible in the process. By involving agencies or businesses that control critical facilities such as hospitals, power supply or fuel supply, for example, in the total process, the chances of gaining access to their information and political support is greatly enhanced. NDMOs should aim to place themselves at the centre of their own web of networks, rather than being on the edge of everyone else's network.

**Apply appropriate technology:** Whilst the ultimate objective may be to employ Risk-GIS and other computer decision support tools, it is not necessary to have such technology in place before starting to either use information or to build an information infrastructure. Hard copy maps, manuals, reports and so on, will always be needed and used, regardless of how many computers are available. This is particularly the case with field operations under disaster conditions because computers may not be available or reliable under those circumstances. It is important, however, that the hard copy material provided is the most accurate and current available—hopefully produced from GIS and so on.

**Information packaging:** Not everyone needs access to all of the available information. It is, therefore, helpful to design specific information products or packages of products tailored for particular users. Agencies that have specified roles under the disaster management plan, be it transport and logistics, health, welfare and so on, should identify their requirements for information products as part of the overall disaster management information infrastructure development process. Those separate products, however, must be produced from the common set of core information to ensure that all

participants are 'singing from the same sheet of music'.

By following the scenario modelling approach to risk assessment it is also possible to develop specific packages of information relating to various disaster scenarios (e.g. different flood heights) and to have them prepared *before* the disaster strikes.

**Use case studies:** It is much easier to 'sell' the message of information and information infrastructures if their benefits can be demonstrated in a real-world case study. Having a worked-through example to demonstrate is far more believable than a 'dummy' or artificial example. It is also human nature to want what the neighbour has, so being able to demonstrate what one village or town has done and the advantages that they have gained, tends to stimulate other villages and towns to want the same advantages. Case studies are also very useful for disaster managers to share their experiences and to exchange ideas that might be useful in other areas. The work completed by the *Pacific Cities Project* in establishing a broadly based information infrastructure for its case study cities provides an excellent starting point.

**Cost/benefit:** It is not always easy to demonstrate the costs and benefits of information. In disaster management terms, one useful approach is to demonstrate the potential savings that would flow from having the right information, or conversely, what the loss would be without the information. This can be illustrated by the following observation from a study undertaken by the Institution of Engineers, Australia (IEAust 1993).

*The costs of data collection are usually readily identifiable. The dollar benefits are generally less so. However a simple method is now available which enables ready estimate of the benefits achieved through utilisation of data. This method is based on the concept that the value of data is the value of the reduced uncertainty which results from the incremental use of data to improve knowledge. Hence the dollar value of data can be directly determined as being the dollar value of the improved knowledge. The improved knowledge being quantifiable in terms of reduction in risk of failure or minimisation of over-investment of funds.*

**Invest wisely:** I have seen many GIS implementations that have turned out to be financial and management disasters, more often than not because they invested most of their resources in technology

rather than spreading it across information and people as well. A good rule of thumb is to allocate 5 to 10% of the budget to technology, 10 to 20% to people and the remaining 70 to 85% for data.

There may be better long term returns from investing in the training of a couple of key NGO volunteers in the processes and benefits of information collection and management, for example, than in upgrading computers in the disaster management headquarters to the latest software. Providing a single computer for an NDMO office where no computer currently exists will probably return greater benefits than upgrading computers in an office which already has several machines.

**Think risk management:** The focus on disaster response is a natural and important aspect of the disaster manager's role. It will, however, be greatly enhanced by taking a broader view of their role to embrace the risk assessment and broader risk mitigation process as well. By taking a holistic view, disaster managers will be in a better position to influence the direction of scientific research into both the hazard phenomena and community vulnerability. It is important to acknowledge that it is a complex world that we live in and no single person, organisation or science has the complete solution.

## Conclusions

The development of an information infrastructure to support disaster management in PICs has been identified as an important objective. This study confirms and reinforces the importance of:

- information, especially spatial information, as a critical decision making resource for disaster managers
- the information management process as a core disaster management activity
- the value of information management being supported by an information infrastructure, especially a SII
- building the disaster management information infrastructure from the ground up, but within the guidelines and structures established at a national level
- collaborating and cooperating with a wide range of partners and stakeholders in the disaster management and wider risk management process

Much has already been achieved in establishing disaster management information infrastructure in PICs, though a lot of that effort has been undertaken by agencies such as SOPAC and foreign researchers rather than by NDMOs and other national bodies. The foundations

that have been established are sound and provide an excellent base on which to build an appropriate and sustainable information infrastructure to address issues from the village level to the level of the national capital and beyond. There are undoubtedly frustrations and problems that will need to be addressed along the way. However, it is clear that NDMOs are committed to embarking on this journey. It is also clear that they will make a good job of it because they are committed to the task.

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# Obituary Notice

## Mr Ludwick Kembu QPM

The head of disaster management in PNG, Mr Ludwick Kembu QPM, passed away unexpectedly on 25 March 2000 after a short illness.

As Director-General of the National Disaster Management Office, Mr Kembu had been leading profound changes in PNG's disaster management system and arrangements. He was an Assistant Police Commissioner immediately before he was appointed as Director-General of the then National Disasters and Emergency Services in early 1998.

Mr Kembu led the organisation through a complete re-structure, its re-naming, the 1998 tsunami response, the revision of the National Disaster Management Plan, development of a five-year business plan, as well as participating in the final design procedure for the PNG Disaster Management Project. This project is expected to commence later this year.

A forthright and dynamic man, Mr Kembu will be sadly missed by those who knew him and worked with him, and particularly by him many friends and colleagues in Australia.

## Guidelines for Interstate disaster assistance

Many disasters and emergencies require a response, which is beyond the immediate capabilities of the affected State necessitating assistance from another State. To provide a basis for arrangements for the provision of mutual assistance between States in managing an emergency or disaster, EMA has recently published Guidelines for Interstate Disaster Assistance. The Guidelines, which were approved by the National Emergency Management Executive Group in late 1999, are non-prescriptive and can be adapted for any situation involving mutual aid.

*Copies are available free through EMA:*

phone: + 61 2 6266 5402  
fax: + 61 2 6266 5029  
email: [ema@ema.gov.au](mailto:ema@ema.gov.au)

## Year 2000 rollover

While the rollover into the Year 2000 passed uneventfully, the National Coordination Centre Website ([www.y2kaustralia.gov.au](http://www.y2kaustralia.gov.au)) established by EMA and the Office for Government Online was kept busy. The site recorded over 4 million hits between midnight on 31 December and 6am on 1 January. This is believed to be a record.

In anticipation of international interest in Australia during the rollover and based on experience gained from the website established for 1999 Referendum on the Republic, the site was designed to take in excess of 80 million hits during the critical period. Some statistics on the site design are as follows:

- three dedicated servers in two cities
- switching device at an additional site to automatically distribute traffic over the three servers
- site automatically updated to one server with other 'mirror' sites being automatically updated every 5 minutes
- built-in redundancy to allow for failure of more than one server with extra redundancy achieved by having bandwidth supplied by multiple carriers
- separate restricted access site.

## Disaster assistance

During March, EMA's National Emergency Management Coordination Centre was kept busy processing requests for Commonwealth assistance to flood relief operations in the Northern Territory, South Australia and Western Australia. Tasks included the delivery of packaged water from Perth to Carnarvon, the delivery of essential commodities from Darwin and Broome to isolated Kimberley communities, from Uluru to isolated

communities in the north of South Australia and from Katherine to isolated communities in the Northern Territory. The tasks were undertaken by the Australian Defence Force using C130 Hercules aircraft and Chinook helicopters.

*For further information contact:*

Don Patterson  
phone: 02 6266 5165  
email: [dpatterson@ema.gov.au](mailto:dpatterson@ema.gov.au)

## Communications in times of crisis

Discussions aimed at determining how the telecommunications needs of emergency service organisations, especially the unplanned needs, might best be met during disasters in the deregulated telecommunications market are currently underway. A number of options are being considered by State/Territory emergency service organisation representatives and the DISPLAN sub-group of the Operations Code Reference Panel sponsored by the Australian Communications Industry Forum.

*For further information contact:*

Barry Stanton  
phone: 02 6266 5339  
email: [bstanton@ema.gov.au](mailto:bstanton@ema.gov.au)

## National Communications and Information Systems Advisory Group

The annual meeting of the National Communications and Information Systems Advisory Group (NCISAG) of the National Emergency Management Committee was held at the Australian Emergency Management Institute on 16-17 March. The meeting discussed a wide range of issues including the closure of Telstra's paging services, the identification of data standards for emergency management and the development of a strategic plan for the group.

The meeting also received presentations from the Australian Centre for Remote Sensing on current satellite remote sensing capabilities and products and from Mr Bernie Joyce from the Victorian Institute of Earth and Planetary Sciences on a project to publish disaster information on the web.

*For further information contact:*

Barry Stanton  
phone: 02 6266 5339  
email: [bstanton@ema.gov.au](mailto:bstanton@ema.gov.au)

## Addition of flood to the Australian Building Code

In an earlier edition it was reported that EMA had submitted a proposal to the Australian Building Code

Board for the inclusion of flood and storm surge in the Building Code of Australia.

The aims of the proposal were to enhance safety from building failure, to ensure safe evacuation routes at times of flood, and to highlight the need for designs and the use of flood-compatible building materials to reduce flood damage.

At its meeting in early March, the ABCB supported the development of a regulatory document on flood protection. The code will be limited initially to residential properties (including storm surge, but excluding minor flooding).

The process of actually adding items to the Australian Building Code is a thorough and lengthy one, and much work is still required. Nevertheless, a code for flood and storm surge will now become a reality, thereby helping to mitigate against one of Australia's most frequent and costly natural hazards.

*For further information contact:*

David Winterburn  
phone: 02 6266 5009  
email: [dwinterburn@ema.gov.au](mailto:dwinterburn@ema.gov.au)

### **The EMA Projects Program**

Applications are now closed for the EMA Projects Program. The Program is aimed at fostering projects which:

- improve Australia's capabilities for preventing or dealing with natural or technological hazards and disasters
- improve community awareness of the risks posed by natural and technological hazards
- focus on prevention, preparedness, response and recovery strategies
- reduce the vulnerability of communities and essential services to natural and technological hazards.

Over 140 proposals have been received from a wide range of individuals and organisations. Projects are evaluated on the basis of their expected direct practical contribution towards the improvement of emergency management capabilities. A selection committee, comprising government and industry representatives, emergency managers and academics will soon commence the arduous task of assessing the proposals.

*For further information contact:*

Chris Hunter  
phone: 02 6266 5309  
email: [projects@ema.gov.au](mailto:projects@ema.gov.au)

### **National Emergency Management Strategic Plan 2000-2005**

At its 1999 meeting last November, the National Emergency Management Committee endorsed a National Emergency Management Strategic Plan to provide advice and direction on the coordination and advancements of Commonwealth and State and Territory interests in emergency management arrangements and procedures.

The vision for emergency management in the Plan is for

*A safer community, while the mission is to ensure emergency management strengthens community safety. In support, there are three key areas identified of Communities, Development and Business Processes with seven major supporting strategies and 22 specific activities. The Plan particularly recognises the importance of working with communities within a risk management context.*

A key feature of the plan is the ready agreement by the Commonwealth and the States and Territories to take lead responsibility for particular areas. Furthermore, the National Emergency Management Committee has agreed that it will review progress on a regular basis.

You can see that plan through the EMA homepage at [www.ema.gov.au](http://www.ema.gov.au)

*For further information contact:*

Alan Hodges  
phone: 02 6266 5184  
email: [ahodges@ema.gov.au](mailto:ahodges@ema.gov.au)

## **What's on at AEMI**

### **The Australian Emergency Management program of activities**

The AEMI Handbook with the descriptions of the courses and the program of activities for 2000/2001 has been published. It is available as a hardcopy or on the EMA website, [www.ema.gov.au](http://www.ema.gov.au)

*If you would like a hardcopy please contact AEMI:*

phone: 03 5421 5100  
fax: 03 5421 5272  
email: [aemi@ema.gov.au](mailto:aemi@ema.gov.au)

### **Emergency Management Officers Professional Development Program**

A national committee has now scoped a draft structure for a professional development program for emergency management officers. The program will begin in August this year, and will be designed to support the role and function of both newly appointed and longer-serving emergency management officers.

Participants will be able to choose pathways to suit their specific needs. The pathway for newly appointed officers will include a foundation course addressing the key topics in emergency management. This will be followed by two courses addressing risk management and operational management respectively. These face-to-face activities will be supported by other development activities, including projects and assignments, field studies and a mentoring program. Longer serving emergency management officers will have access to a similar range of activities, including courses designed to specifically address their on-going professional development needs.

### **School education**

Emergency Management Australia is enthusiastic about

continuing the work initiated in school education during the International Decade for Natural Disaster Reduction and recently appointed John Fitzgerald to the position of School Education Officer based at AEMI, Mt. Macedon.

John is keen to consult with and support those responsible for school education in State or Territory emergency management organisations. A workshop to be held at AEMI in May with State and Territory representatives will be an initial step in this process. The workshop will:

- examine current national trends in school education related to emergency management,
- establish what direction States and Territories are taking in the field of school education
- facilitate the development of a draft national school education policy and implementation strategy.

The outcomes of this workshop will be presented in the winter edition of this journal.

John is also keen to work with others to develop education resources which emphasize generic life-long skills in order to provide students with the skills and knowledge to assess their vulnerability to risk and to devise appropriate disaster prevention and preparedness strategies for the future. If you have any suggestions relating to directions we should be heading in relation to school education or any idea of possible co-operative projects which will enhance our aims then do not hesitate to contact John.

*For further information contact:*

John Fitzgerald  
phone: 03 5421 5242, or 03 5421 5727  
email: jfitzgerald@ema.gov.au

### **New website for EMA**

In recent years the Internet has become a key medium for the exchange of information within the emergency management sector. The EMA site ([www.ema.gov.au](http://www.ema.gov.au)) has contributed to this development through the provision of extensive, up-to-date, data designed for agencies and organisations involved in emergency management, practitioners, researchers, educators and the community. It has become one of the most comprehensive emergency management sites in the world and has been used extensively since its inception.

During 1999, in response to suggestions from users of the site and to reports from the Australian Geological Survey Organisation (AGSO) and the Australian National Audit Office (ANAO), EMA decided to update and redesign its site. In April this year this project was completed. Not only does the EMA website have a new look, but information has been reorganised to improve accessibility and to meet current government guidelines. For those who have not visited the site for a while, now would be a good time to re-acquaint yourself with [www.ema.gov.au](http://www.ema.gov.au).

### **Materials to support the emergency risk management process**

The National Emergency Risk Management Working

Group has been developing a series of publications to support the use of emergency risk management in Australia. The first publication in the series 'Emergency Risk Management Applications guide' has been released and is available from the Australian Emergency Management Institute. The Applications Guide describes the risk management process within the emergency management context. The next publication will be 'A Facilitators Guide to Working with Committees and Communities' which will be released in the second half of this year.

*For further information contact:*

The Australian Emergency Management Institute  
ph: 03 54 215 100, or email: [aemi@ema.gov.au](mailto:aemi@ema.gov.au)

## **EMA publication news**

### **New and revised publications now available**

#### **Community Awareness and Education**

##### **Managing Animals in Disasters**

*colourful, 1/3 A4 size, pamphlet*

This new pamphlet was developed by the National Community Awareness Advisory Group to provide advice to pet and livestock owners on how to effectively plan and prepare for, and respond to major emergencies and disasters, which could affect the safety and well being of their animals. It includes the issue of evacuation.

*Copies available through all State/Territory Emergency Services.*

#### **Australian Emergency Manual Series**

##### **Part III: Emergency Management Practice**

*Volume 2: Specific Issues*

Manual 3 – Health Aspects of Chemical, Biological and Radiological Hazards

*Copies available through your State/Territory department of health*

#### **EMA addresses for publications orders:**

*(first check above for appropriate EMA Office or S/T authority):*

Emergency Management Australia  
PO Box 1020  
Dickson ACT 2602 Australia

Australian Emergency Management Institute  
Main Rd  
Mt Macedon VIC 3441 Australia

## Course announcement

# 1st Asian Executive Development Program for Emergency Managers (Graduate Certificate in Executive Development)

3-14 July 2000, AIM Conference Center Makati City, Philippines

Call for applications

The APDMC, have recognized that rapidly changing global environments, strategic alliances, corporate ethics, leadership, human resource management and international relations are only a part of the expectations placed on executives and senior staff to manage. The challenge to direct and manage organizations as the information technology age continues to drive the pace of corporate and individual performance is becoming more and more demanding and only those qualified have a chance to succeed.

Emergency managers today, more than ever before, are expected to effectively operate in and respond to constantly changing environments. In a world of scarce resources they are required to achieve maximum results with minimum investment. To play an effective role in their organization the successful manager also needs to be a skilled people person, a keen observer of global trends and a strategic decision-maker.

APDMC, in collaboration with our partner organization, the Australian Institute of Police Management (AIPM), Australia, have designed a unique program specifically to assist executives and senior managers undertake a fully credited Australian University 'Graduate Certificate in Executive Development'.

The Graduate Certificate in 'Executive Development for Emergency Managers' is offered in two components:

1. Two-week Residential Component (includes Action Learning Component).
2. 16 week Distant Learning Component.

This course is unique in content, and has been specifically designed to address the challenges confronting emergency managers throughout the region and indeed globally.

*For more information and registration, contact:*

Mr John Barrett AFSM, Chief Executive Officer  
Asia Pacific Disaster Management Centre (APDMC)  
PO Box 1005  
Makati Central Post Office  
1250 Makati City  
Philippines  
phone: 632 810 5444  
fax: 632 817 0894  
email: apdmc@nsclub.net

### The Program

The Executive Development Program for Emergency Managers is designed for executive and senior managers in the public and private sectors and NGOs within the Asia Pacific Region. This program focuses on the development of management and leadership skills required to more effectively operate in a rapidly changing environment.

This accredited program, which leads to a Graduate Certificate, is offered jointly by the Asia Pacific Disaster Management Centre (APDMC) Manila and the Australian Institute of Police Management (AIPM) Sydney. It is particularly relevant for professionals with an interest in or responsibility for disaster management and community safety.

Participants who successfully complete the 2 week Residential and Action Learning Components will be eligible to undertake an applied research paper which will qualify them for the award of 'Graduate Certificate in Executive Development'.

The program comprises three parts:

#### First: Residential Component

To be conducted at the AIM Conference Center, Makati City, Philippines over a 2 week period from 3-14 July 2000, and is preceded by a 1 week pre-course reading in the workplace.

#### Second: Action Learning Component

Field work at major natural and man-made disaster sites in the Philippines and visits to organizations working the field of Emergency and Disaster Management. The schedule of this activity is incorporated on the Residential Component Schedule.

#### Third: Distance Learning Component

Participants will complete a work related applied research paper over a 16 week period upon returning to their posts.

### Learning Outcomes

Participants will leave the program with:

- broader knowledge of contemporary management theory and practice
- greater understanding of the impacts of technological change and globalization
- enhanced capacity for strategic leadership and decision making
- improved ability to implement and manage organizational change
- enhanced understanding of emergency management and community safety policy and planning issues
- Better personal insight and self awareness

### Key content areas

The program will include the following content areas:

- emerging leadership capabilities and responsibilities
- introducing and managing organizational change
- international relations, strategic alliances, networks and protocols
- disaster/risk management policy and planning
- people management and team effectiveness
- corporate governance, ethics and accountability
- preparing to effectively respond to globalization
- communications and knowledge management

# Flood warning and awareness at Blandswood Peel Forest

South Canterbury, New Zealand

## Introduction

Blandswood is a picturesque and popular holiday place near the Kowhai Stream at the foot of Little Mount Peel, South Canterbury (135 km from Christchurch). The settlement is located partly on an alluvial fan and partly on moderate to steep range-front foot-slopes. The dominant vegetation is remnant podocarp-mixed hardwood forest.

Despite the idyllic setting, severe flash floods occur here and in 1975 four lives were lost following heavy rainfall.

To reduce the likelihood of future loss of life, the Canterbury Regional Council has implemented a series of innovative flood warning and flood awareness initiatives. These are:

- a flood warning system and flood danger signs
- flood warning notices
- an information brochure
- a flood level sign

These initiatives were developed in consultation with the Blandswood community and other key stakeholders.

The decision to implement these initiatives resulted from the reluctance of the Blandswood community to pay for maintenance of the existing flood protection works and their resistance to relocate from the flood prone site.

## The catchment

The Kowhai Stream flows from a steep forested catchment on the southeastern face of Little Mount Peel and comprises an area of about 4.5 kilometres. Little Mount Peel is the highest point in the catchment at 1311 metres above sea level. The dominant basement rock is inter-bedded greywacke sandstone and argillite mudstone.

Weathering and erosion have produced large quantities of unconsolidated regolith, with active faulting also contributing to the large quantity of material in storage. The removal and modification of the indigenous vegetation has also contributed to periodic mass-wasting processes. Debris-flows occur frequently in the catchment and their deposits often form obstructions in narrow rock lined gorges and steep stepped streams.

by Peter Kingsbury, Hazard Analyst,  
Canterbury Regional Council,  
Christchurch, New Zealand

## The flood hazard

Lower Blandswood is located on the active alluvial fan and is exposed to flash floods from Kowhai Stream. This area has been identified as a *flood hazard zone*. Flash floods, as their name implies, occur quickly.

Floodwaters not only rise rapidly but are fast flowing and contain large amounts of debris. They tear out well established vegetation, undermine built

*'... I find it almost impossible to describe the change in the Blandswood area from a quiet peaceful spot with a small stream running through it to an area devastated by a raging torrent...'*

F David, Department of Conservation Ranger to South Canterbury Catchment Board, 1975

protection works (figures 2a & 2b). Since 1975 the Kowhai Stream has aggraded by 2 to 3 metres.

## Flood warning

The flood warning system is based on antecedent rainfall, long-range weather forecasting and real-time weather surveillance. A telemetered rain gauge has been installed at Blandswood providing a daily rainfall record (figure 3).

A two stage warning system is in place. A Stage 1 alert occurs when a total of 70 mm of rain has fallen over the preceding 14 days (figure 4). When this critical level is reached the flood danger signs are changed from *LOW flood danger* to *HIGH flood danger* (figure 5). At this time people within the flood hazard zone may be advised directly of the flood alert state.

A Stage 2 alert is declared if heavy rainfall is likely whilst a Stage 1 alert is in place. The Regional Council flood controller, acting on advice from Meteorological Service New Zealand, other Regional Council staff and Blandswood residents makes this decision.

The local Civil Defence officer is advised and people evacuated from the flood hazard zone. Immediate evacuation is essential as devastating flood surges will take only minutes to reach Blandswood. The Stage 1 alert remains in place until the antecedent rainfall falls below 40 mm (figure 4).

The flood warning system was developed in consultation with the Blandswood community and emergency response organisations, as was the design, wording and location of the flood danger signs. Graphic designers, communication experts and legal advisors also assisted with the development of the signs.

## Flood warning notice

A flood hazard warning notice (figure 6) was sent to each property owner in the flood hazard zone. Property owners were encouraged to display the notice in a prominent place in their dwelling.

As many of the properties in the flood hazard zone are rented for short-term holiday accommodation it was considered important that temporary residents were made fully aware of their vul-



Figure 1: Debris piled up against home, 1975



Figure 2(a): Kowhai Stream in 1985 showing the recently completed protective works.



Figure 2(b): The same view of the Kowhai Stream in 1996 showing the significant increase in stream bed-level.

nerability to flooding. On a 'fine' day at Blandswood few people could imagine the potential for destruction and devastation.

### Information brochure

A flood hazard information brochure was produced and distributed to local residents. Copies of the brochure are also available from the local store, local authority offices and public information centres.

The brochure summarises the nature of the flood hazard at Blandswood, the flood warning system, what residents and visitors should do during a Stage 1 alert and where additional information can be obtained. The brochure combines text, photographs and other graphics in an informative and easily read format.

As with the danger signs and warning notice the brochure involved input from a range of people, including the local community, graphic designers, communication experts and legal advisors, emergency managers, planners and flood hazard experts.

### Flood level sign

A sign indicating the 1975 flood level at Lookout Road is displayed in Blandswood (figure 7). Flood surges, estimated at up to 3.5 metres high, swept through Lower Blandswood in 1975.

Signage showing historic flood extent and/or flood depth is considered a very powerful public awareness tool, but surprisingly seldom used in New Zealand.

### Discussion

Provision of information about the flood hazard at Blandswood will hopefully encourage an appropriate public response.



Figure 3: Telemetered rain gauge site at Blandswood



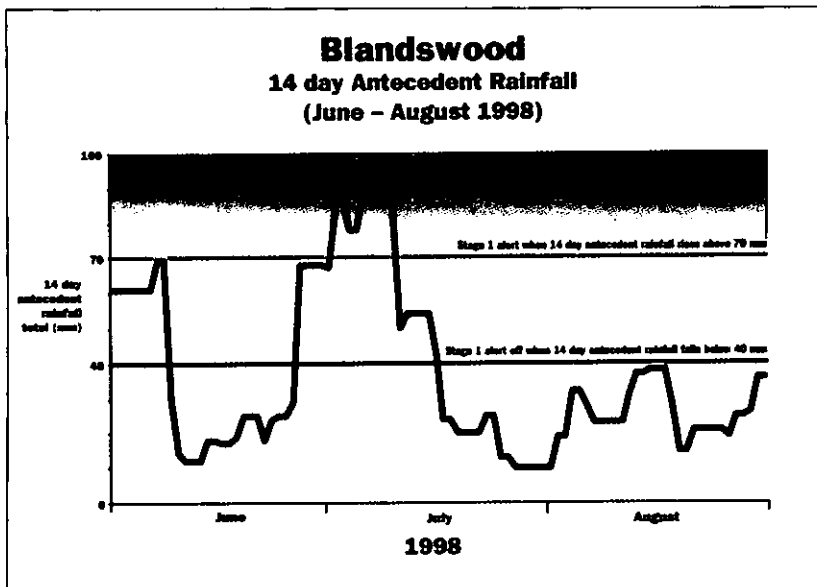


Figure 4: Antecedent rainfall record (June - August 1998)



Figure 5: Changing the flood danger sign to 'HIGH' as the antecedent rainfall threshold (70 mm) is reached.

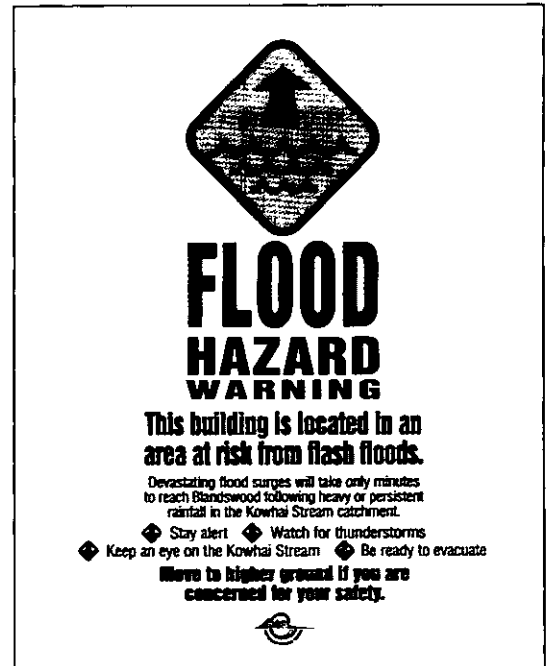


Figure 6: Flood warning notice displayed in homes in flood hazard zone

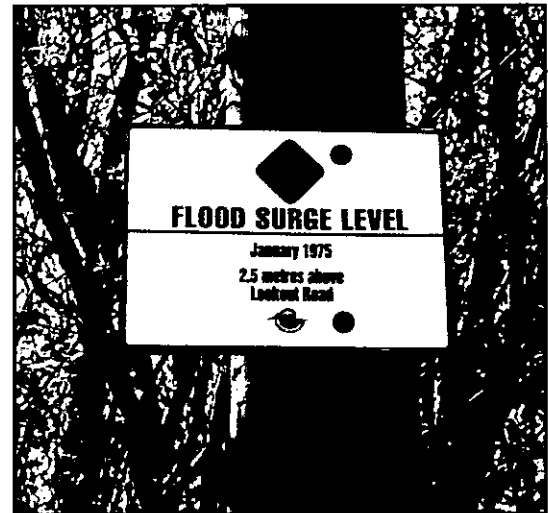


Figure 7: 1975 flood surge level

Although the majority of the public do not carry out the self-protective measures recommended to them, there is good evidence that hazard knowledge and understanding can lead to appropriate response.

Multiple messages delivered in different formats, but carrying a consistent theme can lead to an interactive personal search for more information and in turn to protective behaviour. To this end, signs, notices and a brochure have been used at Blandswood and periodically presentations are given to the residents.

An 'international' symbol (indicating rising water) has been used deliberately on all signs and documents to link each source of information and provide a common theme (Figures 5, 6 & 7).

An interesting response from residents recently has been that the flood danger

signs are 'too big' and 'too obvious'. This feedback has been largely from those trying to sell their properties.

Some residents have noted fewer visitors in the area generally since the signs were erected. Others have commented on the reluctance of visitors to stop for any length of time during 'high flood danger' periods.

Given the relatively few number of properties at risk (about ten), and when compared with other potentially more vulnerable sites in Canterbury, the resources applied to warn and increase the public's awareness at Blandswood may be (and has been) considered excessive by some. However, most people directly affected by potential flood, consider the level of expenditure appropriate given the consequences of the 1975 flood.

No new development is allowed in the

flood hazard zone, however the risk will remain for many years as existing residents maintain (and in some cases almost rebuild) their dwellings.

Furthermore, access to Upper Blandswood remains under threat from flash floods and deposition of debris.

The initiatives implemented at Blandswood are considered an effective non-regulatory way of reducing the risk to Blandswood residents and visitors, however the risk from flash floods remains significant.

**Authors contact details**

Peter Kingsbury  
 Hazard Analyst, Canterbury Regional Council  
 P O Box 345  
 Christchurch, New Zealand  
 phone: +64 03 365 3828  
 fax: +64 03 365 3194  
 email: peterk@crc.govt.nz

# The Kosova experience—in the Department of Human Services

## South Australia

### Introduction

During the first few months of 1999 Australia watched as the world media reported on the crisis situation in Yugoslavia. On 24 March NATO began its air bombardment targeting Yugoslavia. At this time, over one million of Kosova's 1.8 million ethnic Albanians had been displaced from their homes. Many of these people flooded into townships and camps in the southern border regions of Albania and Macedonia. Human rights organisations and aid agencies were having little impact on the enormous calamity that faced them. The focus of their work was to care for refugees.

This overwhelming and threatening situation and the emerging human disaster caused Western Governments (including Australia) to consider drastic action. In the South Australian Department of Human Services (DHS) we theorised about how agencies would assist in these circumstances. As a recovery coordinator in DHS I didn't expect the United Nations to agree to a mass movement of displaced people off shore. I assumed our questions were academic and that we would watch from a distance as the Northern Hemisphere managed the largest exodus of people

by Jill Coombe, Project Officer,  
Department of Human Services (Family &  
Youth Services), coordinating welfare and  
community services activities for the  
Adelaide Safe Haven

from one nation since World War II.

How wrong could I have been!

The following paragraphs illustrate how DHS received the news of its requirement to be involved in Operation Safe Haven and how we planned to assist the people of Kosova. This is also an opportunity to document how the combination of State and Commonwealth agencies and the goodwill of the SA community combined to provide a well coordinated, effective response to people's needs.

### Planning

An international picture was developed of those most at need and at risk—women, female led households, children, the elderly, the sick, the malnourished and the disabled. There was also a greater than usual need for assistance for urban people trying to cope in rural surrounds.

The sheer volume of people arriving on a daily basis at temporary aid camps

created enormous logistical problems and health concerns.

The Australian Government decided to assist the aid program by offering temporary relief and accommodation in Australia for a small number of the displaced people. In the first week of April 1999 the Minister for the Department of Immigration and Multicultural Affairs (DIMA), Phillip Ruddock MP, announced to the nation that the Commonwealth Government would provide safe haven to refugees evacuated from the troubled region of Kosova. Operation Safe Haven would see approximately 4,000 people evacuated to Australia over a six-week period.

At this time, anyone involved in the evacuation and reception of victims began working overtime to consider the service ramifications. It was a difficult task to imagine what services would be required for an as yet unknown group of people via a group of agencies not yet identified.

South Australia received notification of possible 'activation' for this operation via Emergency Management Australia. The State Disaster organisation in SA forwarded the information to the Department of Human Services Chief Executive for action. Meanwhile DIMA were considering which site might be most appropriate as a Safe Haven (if indeed we were to receive any evacuees). The Department of Defence (DoD) was considering the same question.

DHS in South Australia incorporates a wide range of State Government agencies and authorities (health, housing, welfare) and it seemed appropriate for the Premier to nominate the Chief Executive to be the coordinator of all SA Government agencies to ensure the most effective response to this operation.

It took DHS several days to come to terms with the possible services requirements, and indeed, the enormity of the operation, logistically, politically and from a management and coordination perspective.

Initially the Chief Executive elected to work with a small team of emergency management and executive staff, to quickly identify:



A banner in the dining room at the Adelaide Safe Haven

- emergent needs
- what exactly was the 'Whole of Government' brief
- all the agencies that might need to be involved from an early stage
- communication and information priorities and issues.

At the initial meeting Dr Rod Givney was delegated the responsibility for coordinating medical services and I was given responsibility for coordination of all other DHS services and maintaining communications with agencies.

This meeting also identified a Pandora's box of issues and considerations that, in isolation, caused little concern in the normal working day, but confronting us altogether over a short period, would leave us with more than one headache. Issues included:

- community focus on what people will need (not just food and shelter) for an unknown period of time
- liaison with Commonwealth agencies and non government organisations we had no previous experience with
- keeping the Premier involved and informed on a politically sensitive and volatile topic
- preparing guidelines for on site service delivery with no benchmarks or previous experience in a Haven situation
- finding out what other States were doing/planning
- at the same time as planning to provide services planning for people to return home
- planning for a 'camp' environment in one of two possible locations (one a remote outback Defence facility, the other an inner metropolitan Defence training facility)
- did we have the expertise to provide cultural awareness training about Kosovars
- intense media interest well before arrival day (with positive and negative reactions to cope with)
- short notice of arrival
- community groups actively pursuing fundraising well before numbers and profile of the group were known
- security and identification of displaced persons, staff and visitors to the Haven and outside of the Haven
- staff offline to manage and participate—who, how many, how long
- appropriateness of Haven site—length of stay, access to outside services, on site service delivery requirements, transport, comfortable environment
- interpreters—who, how many, where from, payment, rosters
- budget

- priority of other agencies to be involved (maintaining core business and mainstream services for general population and refugees from other places).

### Agency profiles and responsibilities

By 30 April we had called together representatives from a wide range of organisations to brief them on our information to date and request assistance for particular services. The core group of agencies that we liaised with, and their roles were:

- Office of Multicultural and International Affairs (OMIA)—interpreters (training, screening, availability, employment, on site involvement, initial selection and reception of refugees). OMIA and DIMA had already met with representatives of the SA Albanian Community
- Department of Premier and Cabinet (DPC)—managing the media contact on behalf of State agencies, timing of briefings for the Premier, requesting special assistance and support outside of normal business
- Department of Treasury—monitoring State expenditure on the operation, liaising with Commonwealth agencies on funding arrangements
- English Language and Literacy Services

(ELLS)—contracted by DIMA to provide on site education, information and child care services for adults and children. (We had an initial discussion with the Department of Education, Training and Employment about the facilities and services available close to potential havens, however, we were required to provide all of these services on site)

- Passenger Transport Board—transport availability and assistance
- Red Cross—already receiving calls from the Albanian Community in SA wishing to trace relatives. Red Cross registered all offers of volunteer work and processed all donations. Red Cross in SA has a strong Community Services branch and was able to offer a wide range of personal services
- SA Police—security, civil disturbance, education, to deal with potential offences on and off site
- Migrant Health—able to assist with existing programs and provide primary health assessments to quickly determine health status and needs.

### Clear roles

By the end of April it had become apparent to each of the agencies involved that a clearly identified structure was required. With such a large number of



*A handmade quilt and gift basket were placed on each bed for arrival day*

State, Commonwealth and non-Government agencies contributing the co-ordination and communication was beginning to waiver. We worried about maintaining the momentum and ensuring the quality of our contribution.

On 7 May 1999 DIMA called a meeting of key agencies and we held the first Safe Haven Executive. This small group was to be the key to improved communication, decision making and delegation throughout Operation Safe Haven in SA.

The Safe Haven Executive was made up of South Australian executive heads of DIMA (chair), DoD and DHS. The terms of reference for the Executive were to manage, coordinate and take responsibility for the following:

- DIMA
  - Liaison with Albanian Community
  - Reception Arrangements
  - Religious Observance
  - Tracing
  - General Media Liaison
  - Financial Assistance
  - Cultural Awareness
- DoD
  - Safe Haven management
  - Defence Media Liaison
  - Identification and Security
- State Government (led by DHS)
  - Community Services
  - Recreational Activities
  - Welfare
  - Interpreting and Translating
  - Education, Resources and Information
  - Health and Medical Services

The Executive gave priority to the operation over the initial weeks to expedite the work of the teams.

Friday 7 May was also the day that Intake 1 arrived at East Hills, near Sydney (the initial reception centre). At this stage SA continued to prepare for the imminent arrival of up to 132 people (the declared capacity of Hampstead, the preferred site).

### Communication

We were in rumour filled times during May. Each day the media and the Premier's office would phone to ask if our Kosovars were in the country, how many were coming and the time of the flight. It was clear that it would be difficult to maintain control and accuracy of arrival details and numbers with so much speculation.

Given the media had been taken on a tour of inspection at the Hampstead site, they were keen to keep the SA public on the edge of their seats, ready to surge forward with acts of kindness and goodwill at a moment's notice.

DIMA appointed a Media Liaison

Officer for these early days to assist those agencies grappling with this pressure. By mid May we had news from Brighton, Tasmania.

Brighton had led the way into the unknown world of Safe Havens and we appreciated their willingness to share their experiences and help us to prepare. We noted the following with interest:

- heavy smoking amongst residents (even some children)
- not fervently religious as expected
- considerable late night activity due to interrupted sleep
- big demand for coffee and sugar.

Our call-out lists were up to date and it was not possible to carry any more communication tools – beepers, pagers, mobiles. We were as ready as we were ever going to be (without knowing how many and when!).

### Training

Receiving displaced persons or refugees is the pass time of a select few staff—we knew we would need some sort of training. We attended a cultural awareness briefing from specialists in the torture and trauma counselling field. We were also given some background information on the Kosovar people, their history and lifestyle.

This session was provided for anyone who was likely to be working on site at the Safe Haven. We cautiously accepted a list of common phrases and began to practice our 'good mornings'. Albanian is not a common language to learn at school and we struggled with the most basic conversation.

Our efforts to familiarise ourselves with the Albanian language proved invaluable as we later encountered unusual reactions to situations and heard stories we thought were not possible. It helped 'lay workers' to cope better when dealing with traumatised people and made people laugh as we tried to speak some of their language.

### Safe Haven facilities

The initial consideration of two sites in South Australia required some critical attention to detail. Representatives from Safe Haven Executive agencies visited both sites to determine their suitability and to assist the DoD and DIMA in the final decision.

Woomera, at the time, was a Defence facility in the remote north of the State, supporting the US Joint Defence Facility at Narrungar (since closed this activity). Woomera provided a large amount of accommodation, community facilities (sport, recreation, religious), education

and medical facilities and an opportunity for a small rural population to 'sponsor' the Kosovar group.

Hampstead was an inner suburban Defence facility about 6 kilometres from the CBD in Adelaide. Hampstead is utilised for Reserve training and accommodation.

Although Hampstead would only accommodate about 130 people and had limited additional recreational/activity buildings, it was in the metropolitan area. Staff, volunteers and the Albanian community would be able to resource the Haven much more readily than Woomera. In addition, access to a wider range of mainstream medical and community health services was possible.

### Arrival

Late in the day on 9 June Safe Haven Executive received confirmation from DIMA that 'our Kosovars' would arrive in Sydney in 2 days and be transferred to Adelaide on the Sunday, 13 June (a much longed for holiday weekend).

Although we had planned for two months and done all we could to be ready, it was still a shock to know they were actually coming. Numbers and composition of the group were not to be confirmed until the early hours of Sunday morning (by DIMA and Red Cross staff who had travelled to East Hills to negotiate family groupings).

DIMA had not officially notified the media at this point and the rumour needle flew off the scale with suggested arrival times, flight details and airport reception arrangements. It was a difficult couple of days quelling the excitement and anticipation.

During the previous week we had an airport reception briefing—identifying the process for the most expedient arrival and dispatch to the Haven. The reception was to include a welcome by the Premier and the head of the Albanian community.

I had worked at the Haven with the other DHS coordinator for the week prior to making last minute arrangements with DoD for facilities preparation, both of us fielding numerous calls about our readiness and capacity to cope.

The DoD had provided a transportable hut transformed to meet our requirements as a Medical Centre and I had post-it notes everywhere recording offers of assistance for all things recreational.

Red Cross had prepared the accommodation, down to the donated, hand-made quilts, flowers and gift baskets in each room.

On the wintry evening of 13 June, 147

tired refugees arrived in South Australia. From a DHS perspective, this is where the real work began.

### **The good, the bad and the ugly**

This national project of goodwill was not without its trials and traumas. Neither was it devoid of heart warming stories of generosity and humanitarian effort.

The SA Albanian Community, led by a man who is normally an opera singer, opened their homes to our visitors and extended a warm welcome. They provided outings, entertainment, comfort and a reminder of happier time in Europe.

As planners and service providers we asked ourselves some difficult questions along the way—like how do you support a father and mother who have shaved their daughters' heads for fear they will be violated?

We discovered hidden talent in our security guards, who quickly developed friendships with many of the residents—our mouth guard, body guard, aero guard and life guard!

We marvelled at the humility of our visitors, who at the first Residents' Committee, collectively apologised for their late arrival at the airport and thanked us for waiting. (We also held a regular women's committee to discuss food, education, child care, clothing, specific activities for women and girls.)

We could not believe their appetite for sugar—the children helping themselves to all the sugar sachets in the prestigious Mount Lofty Summit Café while the rest of us were admiring the sunset and views over the city!

We struggled with the protectiveness and embarrassment of the group as they pretended that a problem associated with a violent husband and his family, did not exist.

We delighted in the excitement of adults and children splashing in a never before experienced ocean swim—fully clothed!

The Red Cross excelled. They provided a shop for clothes, treats for children, haircuts, personal items, baby goods and birthday gifts. Their most valuable service however, was the coordination of hundreds of registered and trained volunteer hours to transport people, accompany people to activities, help in the classrooms, shop, medical and child care centres and sort thousands of items of clothing and goods.

Some of these people continue to offer support to those who remain and maintain contact with those who have returned.

Dozens of community groups and



*Security entrance at the Adelaide Safe Haven and some of the residents checking back in after attending a concert at the local church hall*

individuals donated time, money, goods and services to make our visitors feel welcome and allow them to experience South Australia's hospitality.

We were fortunate to be hosting a relatively small group and this gave us the scope to offer some memorable visits and activities.

We worked hard through a period when the first group was to return home and the Minister for Immigration had confirmed the temporary nature of their visit. School and activity attendance dropped and the Haven environment became sombre.

This was not enhanced by the need to conduct land mine awareness sessions for adults and children, anticipating their return home.

What began in South Australia as an emergency management issue escalated to an exercise in cooperation and determination by agencies to provide the best possible facility and services to a group of vulnerable people.

In the Department of Human Services we believe it has given us a valuable opportunity to exercise our skills in recovery management and develop meaningful relationships and networks with many other agencies. These liaisons can only benefit us in future times of emergency or disaster.

### **South Australian Safe Haven and displaced person statistics**

- Haven activated 13 June 1999, 10pm (Day 1)
- 147 arrivals (+ 1 during first month)—72 adults, 76 children (22 under 2)
- First group of 10 departed Adelaide 4 August 1999
- Nine people departed 8 September 1999
- 48 returned to Kosova by 30 September 1999
- Haven closed to remaining residents 1 October 1999, 6pm (Day 111)
- 62 elected to be billeted privately in SA rather than transfer interstate to another Haven.
- They were all due to depart Australia by the end of November 1999.
- To commemorate the use of the site as a Safe Haven all the children made a paver and they are displayed on the wall of the Mess at Hampstead.
- Haven decommissioned 11 October 1999
- 5 January, 2000 – 19 Kosovar refugees remain in Adelaide. These people continue to seek permanent asylum in Australia and must apply each month for visa extensions.

# Operation Safe Haven—disaster recovery management with the Kosovar refugees at Leeuwin Barracks, Western Australia

## Introduction

In 1999 the war in Kosova resulted in many civilians fleeing and being placed in refugee camps in Macedonia and Albania. The pressure placed on these camps led the United Nations High Commission for Refugees to take the unprecedented step of relocating the displaced persons around the world. Australia was of these countries to which refugees were sent.

Australia agreed to accept 4,000 refugees and accommodate them in Safe Havens across the nation. On 27 May 1999, Leeuwin Army Barracks in Western Australia received 384 Kosovar men, women and children.

The group represented a diverse amalgam of people in terms of religion, beliefs, values, attitudes and experiences. Many of the refugees had experience of the practice referred to as 'ethnic cleansing'. Some had witnessed the murder, torture and rape of family, friends and community members. They were denied the rights of their homeland and watched the burning and destruction of their villages and communities. They were forced to flee their homes and relocate to foreign countries. In some instances people were separated and isolated from family and community members.

To accommodate the Kosova people in Western Australia, the Leeuwin Barracks Safe Haven was established with the Australian Defence Force and Department of Immigration and Multicultural Affairs (DIMA) as lead agencies. Other agencies included the Western Australian Police Service, Hospital and Allied Health Services, Association for Services to Torture and Trauma Survivors (ASeTTS), West Coast College of Education, Red Cross and Salvation Army. The Department of Family and Children's Services (F&CS) was invited to participate as a result of its involvement in the state emergency management advisory committee.

The initial briefing provided by DIMA before the arrival of the Kosovars, set the scene for the department's role with the Kosova people in terms of recovery management. F&CS's main involvement was to assess the needs of the Kosovars

by Bayman R., Burton G., D'Cruz D., Gebhard F., Humphries J., Kenny J., King K., Matijas-Kekez J., Mavor C., Searle G., Talikowski E., Vicary D., & Wettinger M. of Western Australian Department of Family and Children's Services

and provide appropriate family and individual support, information, and advocacy.

## Recovery strategies

F&CS selected a multi-disciplinary team of professionals from diverse cultures and disciplines including clinical psychologists, social workers, education officers, children's services officers, community development officers and administrative staff to support the refugees.

Other selection criteria for team members included knowledge and experience in dealing with disaster recovery management and working in culturally diverse communities. Some staff were chosen for their language skills and experience in interpreting and translation services.

It was envisaged that the Kosovar people, most of whom had not met one another previously, would become a small, largely self governing community. It was also anticipated that this group of people would require services such as education, health, accommodation, counselling, transport, security, interpreters and recreation activities. Information provided at the briefing indicated that the Kosovars were of strict Muslim faith and followed rigid gender divisions.

The F&CS Team employed the broad principles of disaster recovery management and community development with particular sensitivity to cross cultural issues. The aim of community development is to empower a particular community or group of communities, and therefore the individuals within it, to address their needs. It involves a focus on issues such as access, equity and participation, and as such, has particular

relevance for marginalised groups and individuals within the wider community. (McGorry 1995).

In line with procedures outlined by the Australian Emergency Manual—Disaster Recovery (1996) and community development literature, staff began the process of assessing the needs of the community by forming and developing relationships and gaining acceptance and trust<sup>1</sup>. A literature review was undertaken focussing on Albanian history and culture, models of community development and models of practice in working with survivors of torture and trauma. Demographic information of the Kosova people was obtained from DIMA and Defence.

Staff conducted a cross sectional needs analysis to ascertain the Kosova people's requirements while living within the Leeuwin Barracks Safe Haven. The needs analysis was conducted by dividing the team into pairs each focussing on key groups of Kosovar people. The key groups were identified as being the zero to six-year-old children, young people aged 12 to 25, parents of young children and the elderly. The needs analysis was conducted via consultation and observation. It examined the areas of education, recreation, safety, health, and emotional/psychological wellbeing.

The needs analysis illustrated that the Leeuwin refugees represented a cross section of the Kosova population and were by no means a homogenous group. It further demonstrated the diverse characteristics of the community in terms of their varying levels of education, social, economic and religious backgrounds. There was also a distinct rural-urban dichotomy.

## Other findings of the initial assessment (analysis):

- it was apparent that there were no appropriate facilities or structured activities for children under the age of

## Notes

1. This was conducted via informal and formal meetings in familiar surroundings within the Leeuwin Safe Haven.

- seven years
- many adults indicated a strong desire to improve their English speaking skills but some were limited in attending classes due to lack of childcare
- the young women expressed a desire to have access to their own meeting area
- the men in the community requested participation in activities to support their traditional roles.

These findings showed that staff needed to overcome cultural and language differences so that they could work effectively with the people. Staff were also required to work collaboratively with the other agencies involved. This required participation in regular morning briefings at which critical information was disseminated, agency roles clarified, tasks and activities negotiated, and a fortnightly calendar of events endorsed. This forum then linked into regular meetings attended by DIMA and Defence with the Kosovar's own elected management council.

As a result of the needs analysis, and Lead Agency support, F&CS undertook to provide the following services:

- early education—providing a safe environment in which children aged four to seven years could have educational input and give parents time out for their own needs including attending English classes
- advocacy and support
- recreational and social activities
- counselling—one to one informal basic counselling and psychological therapy related to child behaviour management and post trauma support
- child protection.

These services were provided via consultation and involvement of community members (for example, consulting parents and the elected Kosova Council) thereby empowering and enabling the Kosovars to make their own informed decisions. This approach is consistent with the process suggested by Papadopoulos (1999). Papadopoulos emphasises the importance of 'therapeutic presence' instead of imposing formal psychotherapy, and is characterised by an avoidance of psychologising the evil nature of war atrocities and pathologising political dimensions.

To support staff<sup>2</sup>, debriefings were

provided on a daily and weekly basis. These sessions involved peer support such as sharing information, experiences and events which occurred during the day, and planning for the next day's activities and events.

Formal weekly debriefings were also conducted by a Senior Clinical Psychologist from the F&CS and involved providing information on appropriate self care, self monitoring for level of distress and signs of vicarious trauma. The nature of the debriefings was informal, flexible and sensitive to the team's issues and concerns and often involved an interweaving of personal and procedural issues.

## Results

### Early education

There were a number of positive outcomes and achievements in the area of early education including:

- acquisition of appropriate infrastructure and resources to run an early education service
- delivery of two modified education programs sensitive to the children's level of development, linguistic abilities and psychological health
- regular attendance of 16 to 23 children in the kindergarten (4 and 5 year olds) and 16 (6 year olds) in the preschool
- parents were given the option of leaving children in a supervised education environment while they attended adult English classes
- parents commented on their children's enjoyment in attending and the benefits to the whole family when the children were occupied in a positive way
- children's development improved such as their ability to share and interact with others, gross and fine motor skills, communication skills, increased attention and concentration span
- flow on effect of children's learning to other family members, especially language skills
- parents were able to seek advice on child management issues and staff were able to provide positive role models in parenting.

### Advocacy and support

The Family and Children's Services team provided extensive advocacy and support services to the Kosovars and personnel from other agencies. This included:

- raising of Kosovar issues and concerns to appropriate agencies and engaging them in services to best assist them in having these needs met and issues addressed

- appropriate referral of people to relevant agencies
- follow up with Kosovars and agencies to check on adequacy of service provision
- acquisition of resources for staff and the Kosova people
- effective and open communication to ensure the community understood the role of Family and Children's Services (done via the daily Safe Haven bulletin, in both English and Albanian, and distribution of notices to relevant Kosova groups).

### Recreational and social activities

Family and Children's Services was involved in planning, organising and implementing recreational and social activities. Staff actively participated in the majority of events. This involved:

- provision of informal and non threatening settings in which the Kosova people felt comfortable to disclose and discuss their experiences
- recognition of existing skills of the young people and assisting them to develop new skills
- increase in the cohesiveness of the group of Kosova people through participation in events organised by both the community and agencies
- breakdown of formal barriers which existed between agencies and between the agencies and Kosovars
- help in containing post trauma symptoms
- provision of opportunities to support parents in appropriate and positive interactions with their children
- recognition, invitation and involvement with the Kosovars in significant celebrations such as the Kosova Flag Day celebrations and the double wedding.

### Counselling

Counselling comprised a major part of the work done by Family and Children's Services and included:

- provision of informal counselling to the majority of the Kosova people; initially this comprised active listening, summarising and reflection while subsequent discussions involved ongoing active listening
- reinforcement and modelling of positive and preventive parenting, appropriate anger management, valuing of individual's characteristics, current status and circumstances
- promotion and assistance in developing assertiveness and positive self esteem skills in children, young people and parents
- creation of an environment which reinforced appropriate communi-

## Notes

2. This is consistent with the theories and models of the management of staff engaged in emergency/disaster recovery.

cation and interactions between the children

- incidental learning particularly within the early education forum.

### Child protection

Child protection is a statutory responsibility of the department and as such was an important component of the F&CS intervention.

By remaining sensitive to cultural issues of the Kosova people, the F&CS effectively assessed and intervened on several child protection matters. These issues were all resolved in a culturally appropriate manner. The Department also ensured the safety of the community, particularly the children, via discussion with lead agencies about appropriate child safety procedures, and the development of rules and routines.

### Summary

Recovery management at the Leeuwin Safe Haven can be conceived as being more on an interim basis.

That is it was envisaged that victim recovery would take considerable time due to the nature of infrastructure damage, psychological damage, disruptions to services, shortages of essential items (ie. food, water etc), ongoing fear and distrust. Sadly some people may never recover from the trauma of their experiences. For many victims of the war, recovery will take some time as they set about re-establishing themselves in Kosova.

F&CS work at Leeuwin Barracks has been unique in that the department was one of two state government agencies invited to provide services.

Whilst at the Barracks the refugees were provided with recovery strategies, information and interventions to assist them in expediting their recovery upon the return to their homeland. Working with refugees was complex and required creative strategies. The primary objective of the Department's involvement was to provide family and individual support to the Kosova people. In meeting this objective, the team assessed the current needs of the people and provided services appropriate to these needs.

The work undertaken by the team was mindful of community recovery and development models; cross cultural models and issues of sensitivity; client empowerment, and the need to create a supportive and safe environment. The approach was activity based and consisted of programs which promoted resilience within the Kosovar people. Activities focused on recognising existing skills and

developing new skills. The approach was deliberately competency based as opposed to analysing deficits within the community.

The team benefited from not being expected to engage in the work of 'therapy' as this was provided by a contracted non government service (ASeTTS). Team members were free to encounter the Kosovar people as a 'therapeutic presence' rather than as clients with whom therapy was a service which had to be provided.

The generosity of the Western Australian community cannot be overlooked in the overwhelming offers of goods and services which clearly made a difference to the Kosovars quality of life.

The obvious barrier of language proved to be a vehicle for bringing staff and Kosovars together through a mutual need to understand one another and in particular the Kosovars eagerness to learn English.

While not formally assessed, the value of the activities undertaken by the Team has been acknowledged by the lead agencies in the operation, other state organisations, and by the Kosovars themselves. F&CS Disaster Management Team at Leeuwin measured it's success by the fact that the Kosovar parents entrusted their children into its care for activities on and off the Base. Ultimately the joint efforts of all service agencies did indeed create a Safe Haven where individuals could begin to come to terms with

their tragic circumstances and constructively prepare for the return to their homeland.

### References

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# ASEP Journal 2000

## Call for papers

The Journal of the American Society of Professional Emergency Planners has issued a call for papers for the 2000 edition. **Papers are due July 31, 2000.**

The Journal will be released in November at the annual conference of the International Association of Emergency Managers in Austin, Texas.

*For more information, contact:*

Thomas M Heath, AICP, CEM  
Gamewell Emergency Management Services  
1235 Lambeth Road  
Oakville, Ontario, Canada  
L6H 2E2

phone: 905 844 6597

fax: 905 849 9715

or visit [www.globalserve.net/~tmheath/](http://www.globalserve.net/~tmheath/)

## Spatial Data In Emergency Management workshop

This workshop was held in conjunction with the Australian Disasters Conference 1999 in Canberra.

The proceedings are now available on-line on the ACT Emergency Services Bureau's web site, at:  
[www.esb.act.gov.au/ad99/](http://www.esb.act.gov.au/ad99/)

Anyone involved with spatial data, GIS, decision support, risk management or field data collection and mapping should read this.



# Katherine 1998: Appeals and self sufficiency—lessons for the future

## Introduction

This paper discusses the relief effort undertaken during Katherine and Daly Region flood disaster in the Northern Territory during January 1998. The paper discusses the means by which the Northern Territory Division of the Australian Red Cross provided financial assistance to those affected by the disaster and how the principles utilised in 1998 can be applied to lessen the financial impact of disasters on affected communities in the future. Several factors that could improve future service delivery became apparent during the conduct of this appeal. These included the importance of keeping the community advised about the conduct of the appeal and, very importantly, a speedy distribution of money and goods. The first distribution occurred within three weeks of the appeal's launch. Two of the most important factors, however, were the use of a transparent, yet simple, distribution system and the necessity of helping local business. A voucher scheme was devised and vouchers issued to all affected persons. This provided a simple, yet virtually fraud free, means of directly helping all those individuals who had suffered loss. The vouchers, by being redeemable only in affected communities, also helped local businesses to re-establish their operations quickly with support from the local community. The single appeal to coordinate all aid, and use of vouchers as a means of distributing aid are recommended as proven, highly successful methods of helping a disaster affected community in the future.

## Background

### The district

The Katherine-Daly region of the Northern Territory is located approximately 300 kilometres south of Darwin. The region (approximately 22,500 km) (Skertchly & Skertchly 1999) encompasses the rugged Arnhem land terrain and low-lying river flats. There are many small creeks and rivers, which feed into the major watercourses of the King, Edith, Flora and Katherine rivers. These rivers, in turn, drain into the Daly and Victoria Rivers. The major communities in the region are Katherine, a regional centre with a

by Bill Wilson, APM, BA (Hons), FAIM,  
Australian Red Cross

population of 10,809 and many Aboriginal communities, for example Beswick, Barunga and Nauiui Nambiyu. There are also numerous pastoral properties, a major tourist attraction at Nitmiluk (Katherine Gorge) and the Tindal RAAF Base some 15 kilometres south-east of the Katherine Township (Skertchly & Skertchly 1999).

Skertchly and Skertchly (1999) have reported on a number of distinctive features of Katherine, which influenced the response to the flood. First, Katherine is a regional centre, important to the daily lives of people in smaller townships in the surrounding area. Second, it is on both the north-south and east-west transport axis and a major communication centre. When Katherine becomes impassable, Darwin's food supplies are affected, tourism is disrupted and communication links to both Western Australia and South Australia are adversely affected. The RAAF Base at Tindal can also be cut off from Katherine if Tindal Creek floods. Finally, the local member of the Legislative Assembly (MLA) is the Deputy Chief Minister, Treasurer, and Minister for Police, Fire, and Emergency services. According to Skertchly and Skertchly (1999) this point ensured there was immediate access to whole of government resources after the flood.

### The flood

In January 1998, the region experienced the worst floods ever recorded. Cyclone Les, which had moved inland from the Gulf of Carpentaria, produced between 300mm and 400mm of rain in the Katherine River catchment area and over Katherine itself during the period 25-26 January 1998. The Katherine River rose rapidly and peaked at 20.4 metres at 7.15pm on Tuesday 27 January 1998, this was more than one metre above the previously recorded high. The peak flow rate was 12,000 cubic metres per second (Tambling 1998). The majority of residents in the older parts of Katherine, including the CBD, were evacuated by 27

January 1998 (Hagger: Reed 1998).

Eventually, the rising waters seriously damaged more than 1,100 dwellings, government offices in the CBD and all the business premises located in the CBD (Tambling 1998). In all, 1,000 square kilometres of country were covered by floodwater and some residents of the nearby communities of Beswick and Mataranka were also evacuated.

The other major community that suffered from flood devastation was Nauiui Nambiyu. In the past at Nauiui Nambiyu, there has always been at least four days warning between the rising of the Katherine River and its eventual effect on the Daly River (Rowlands 1998). This gave residents plenty of time to evacuate in an orderly way. In 1998, because of the cyclonic depression overhead, residents of the small Aboriginal community had a mere four hours in which to evacuate the township. On 27 January, some low-key evacuation commenced because it was considered that there would be plenty of time to relocate the community. This was wrong; the river rose swiftly. On the following day, it became apparent that urgent action had to be taken and helicopters and boats were utilised to evacuate the community (Rowlands 1998). The Nauiui Nambiyu Township became a ghost town with the whole community evacuated to safety; the river height exceeding all previous records peaked at 15 metres (Rowlands 1998). All buildings in the town were almost totally submerged and the majority of the community lost all their possessions.

### The Red Cross response

It became clear, very early in the disaster, that there was significant flood damage to numerous buildings in Katherine itself with many homes and businesses inundated by water. The exact number of people who had suffered hardship from the flood was not immediately apparent but was thought to be in excess of 2000 people. The Nauiui Nambiyu community was almost totally under water. In Barunga, many of the small community's population suffered some dislocation by taking in refugees from Beswick community. In economic terms, this meant that at least

five thousand people were suffering from financial hardship. Not all were insured.

The Executive Director of the Northern Territory Division of Australian Red Cross made contact with staff at the Red Cross premises in Katherine. Their advice was that most people in the older part of the town had lost most if not all their possessions. Many people were traumatised from the effects of the disaster and were seeking aid from the Society in order to rebuild their lives.

Several organisations throughout the Northern Territory, including the Australian Red Cross, proposed undertaking appeals for flood victims and it became clear that the relief effort could possibly be fragmented. There was a danger that with a multiplicity of appeals, the available funds might be concentrated towards one group or another and that some people might not receive adequate relief. The Northern Territory Division of Australian Red Cross was acutely aware of the Cyclone Tracy (Darwin 1974) experience when community anger erupted at perceived injustices in the distribution of relief.

Following discussions with the Northern Territory Division of the Australian Red Cross and other groups, the Northern Territory Government determined a single appeal would be the best method of channelling relief funds to those in need. The Red Cross was chosen as the lead agency for this appeal. Other agencies were requested by the Northern Territory Government and the Australian Red Cross to channel funds through the single appeal. The majority did so.

## Appeal management

### Management committee

In order to ensure the independence of the appeal was not seen solely as being a creature of the government or the Australian Red Cross, a Committee of prominent Northern Territory citizens and Northern Territory Red Cross members was established to oversee the appeal. The chair of the committee was Mrs Josephine Stone, a solicitor and the Chief Minister's wife. Mrs Stone proved to be ideal in the role being able to approach many high profile donors and media organisations. It was largely through the efforts of Mrs Stone that the Channel 9 *Today* program visited Katherine. This event was to be a catalyst in increasing the number of donations received from Australia's eastern seaboard. Mrs Stone had an entrée where most other people did not and used this to great effect. The other members of the committee were: the Chairman and

Vice Chairman of the NT Division of Australian Red Cross, a member from the business community, a lawyer, a banker, a media representative and a microbiologist. The committee worked well together, pooling their expertise and knowledge to the best advantage.

### Donations

Funds exceeding 2.3 million dollars were eventually raised and distributed. Money did not flow evenly, there was an immediate influx of funds from the Northern Territory, then donations came from around Australia but these quickly slowed. The committee members worked tirelessly, and probably lost many friends in their efforts to increase the rate of donations. The third wave of donations came from business and government, both of which contributed significantly to the appeal. Finally, the last trickle of funds came from around the nation, including a second round of funds from the Northern Territory that came towards the end. Some innovative methods were utilised to raise funds. For example, The Northern Territory Lottery Company donated the proceeds of a special lottery to the fund. Businesses donated items as prizes in raffles and goods were auctioned at lunches, the total proceeds of which were donated to the appeal.

### Fund distribution

One of the first decisions taken by the committee was to provide relief by way of a general grant to all residents whose dwelling had been affected by the flood, as soon as funds were received. Agreement was also reached that this initial grant would be free of any means test and be equal, regardless of the size of family or value of the premises that had been damaged. According to the list of donations received and disbursed the Disaster Relief Appeal Committee had distributed \$760,000 by the close of business on 16 February 1998. By 28 February 1998, over \$1.4 million dollars had been received of which \$921,000 had been disbursed within the community (Tambling 1998).

Another early decision was to distribute the funds in Katherine in such a way that local businesses could be assisted to recover without directly providing any of the appeal funds to business. This was critical because businesses in Katherine had suffered financially through the flooding and their survival was crucial to the region's economy. However, the appeal had raised funds for the benefit of individuals only not businesses. In order to meet these twin imperatives a voucher system was devised. In Katherine, the

vouchers were only exchangeable at local businesses. Anything could be purchased except alcohol, tobacco or travel from a travel agent.

The exclusions were designed to ward off external criticism that flood relief was being frittered away on 'grog or smokes' or that 'the neighbours have gone to Fiji on their relief money'. The vouchers were coloured red with the text in black. This prevented frauds being committed by photocopying vouchers. The vouchers were also numbered and a record kept of the names and addresses of recipients. This list was checked against a register of buildings that had suffered inundation to ensure that only those entitled to relief received vouchers. These measures to combat fraud or adverse publicity may be thought excessive. However, the measures were put in place in order to maintain the integrity of Red Cross principles and ensure that the appeal was scrupulously fair and equitable to all recipients.

A small team travelled from Darwin to assist with the distribution of the vouchers. While the Darwin members, under the direction of the Executive Director, formed the core group, local volunteers were sought to augment the team. This had the benefit of locals being highly visible in the voucher distribution system. At the same time, any decision to reject an application was made by a member from Darwin, thus removing any odium from the locals. An initial distribution of \$500 worth of vouchers was made to all eligible applicants. A register was kept by completing the butt of the voucher and this was later checked against vouchers returned for payment. No fraudulent applications were detected.

Publicity was also a vital component of the voucher distribution scheme. Close liaison was maintained with the government officers responsible for the recovery phase of the operation. Notices were posted about distribution times; the same information was published on radio and television so that messages could be passed to those in need. Word of mouth was also a common means of passing relevant information. Members of the Katherine Chamber of Commerce were also briefed before implementation of the voucher system. Above all, keeping the public informed was a vital method of preventing rumours starting and spreading.

The scheme assisted local businesses recover beyond the expectations of the organisers. Because vouchers were only exchangeable locally, Katherine busines-

## Voucher

Australian Red Cross

Katherine and District  
Flood Relief Voucher  
\$100

Name:.....

of.....

Address.....

Issued by:.....

12345

Australian Red Cross

Katherine and District  
Flood Relief Voucher  
\$100

This voucher is issued to the .....  
Family

And may be exchanged at any Katherine  
business for household items, personal  
items or food, excluding alcoholic beverages  
and tobacco to the value of \$100.

This voucher has been issued by the  
Australian Red Cross Katherine & District  
Flood Appeal from funds raised by public  
donations.

**Please note, no more than \$10 change  
will be given if this voucher is not fully  
utilised**

Must be utilised by 30 June 98. 12345

Katherine or the Nauiui Nambiyu store. In the community itself, the President of the local council was invited to offer suggestions about the voucher distribution. A first distribution was made to each family in the same ratio as Katherine. These vouchers were exchangeable at the local store, or at Katherine stores. Once again, the use of vouchers helped the community support their own store and those in the Katherine Township. One touching comment came from a community leader who expressed delight that money from the broad Australian community was being given to an Aboriginal township. A second distribution was made to the Nauiui Nambiyu in May 1998. This was made as a financial grant to the community, based on the same criteria as that used for second grants in Katherine.

### The final distribution

After the two rounds of grants had been made throughout the region, outstanding needs were assessed. A call was then made for special purpose/ special needs applications to be lodged. Over 100 applications were received. These ranged from application to replace text books to a bid for assistance in rehabilitating a club house. The Committee considered all the applications and prioritised them. A lengthy meeting saw the committee members trying to provide funds to as many applicants as possible. Finally, it was determined that several applications were outstanding and these were almost completely met. Another group received a proportion of the amounts sought in their application. Sixty-five applicants received funds to the value of \$540,000 (Australian Red Cross 1998).

All funds were expended by the end of July 1998, thus having achieved the committee's goal of distributing funds as early as possible. A final task was to have the accounts audited and the details published in the local media. This ensured an open, transparent system of fund distribution and kept the public advised of the process.

### Lessons learnt

Following a debrief of the appeal and method of distribution the Northern Territory Division of the Australian Red Cross determined that the operation had been successful (Katherine and District Flood Appeal 1998). The benefits were:

- Conducting a single appeal meant that administrative overheads were reduced and more money was available for distribution. Using a broad committee rather than one from a single charity

Figure 1: sample voucher

ses had a unique opportunity to re-establish themselves. The money was there if they started operating quickly. The businesses, having received a voucher, could either submit it to Red Cross immediately for payment or, as many business persons chose to do, use the voucher at another local business for supplies. Anecdotal, there is evidence that some vouchers were used three or four times over in Katherine. This multiple use provided added incentives and support to business. A side benefit, which emerged later, was that the Katherine residents having to spend their vouchers locally helped rebuild confidence in the community.

A second distribution of vouchers was made in April. On this occasion, the distribution was on a basis of family size and actual need. Vouchers issued were valued between \$100 and \$400. Once again, the vouchers went round the community several times before submission for payment occurred.

### Donated goods

During March and April 1998, donated goods with an estimated value of \$1 million arrived in Katherine for distribution. The most useful items received were food and mattresses. Unfortunately, goods are not as useful as cash. Whilst donors give generously and their donations are always welcome, they are not

aware of local situations. In the case of Katherine, for example, winter weight clothing was not appropriate for distribution at the height of a tropical wet season. Nevertheless, all goods received were utilised.

### Aboriginal communities

A number of small Aboriginal communities in the Katherine region also received financial assistance, these included Barunga, Beswick, Binjari, Delye and Kalano. After discussion with community councils, distribution to Aboriginal communities was made in cash direct to the council for distribution, rather than by vouchers to individuals. The community made subsequent distributions to individuals councils' based on individual needs. The councillors assumed responsibility for ensuring the aid was not spent inappropriately. The grants were made on exactly the same basis used for Katherine residents. The assistance was spent in the local store or in Katherine when travel there became possible.

In the Nauiui Nambiyu region the Aboriginal community and the residents from a number of outlying farms all required relief. The Executive Director of the Red Cross travelled to the area to ensure that each family in the scattered farms received vouchers in exactly the same ratio used in Katherine. These vouchers were exchangeable at either

helped attract increased donations.

- The initial distribution on an equal rather than selective basis meant that distribution was undertaken quickly. It also reduced tensions amongst the affected community.
- The use of vouchers enabled controls on the use of the appeal monies.
- The vouchers helped the local business houses re-establish themselves quickly. They were also a means of indirectly channelling funds to businesses through individuals.
- Keeping the community informed and involved reduced rumours and arguments about entitlements.

The less successful aspects of the operation were:

- Accepting donations in kind was labour intensive and resulted in some inappropriate donations being received.
- Additional staff had to be hired to cope with the volume of donated goods and warehouses had to be hired in the local community, throwing a strain on

already overtaxed resources.

- Broader charity representation on the Committee would have improved liaison.

In conclusion, according to Mr Shane Stone, MLA and the Mayor of Katherine Mr Jim Forscutt (1998) the use of vouchers as a means of providing aid to communities was highly successful. The use of a single appeal also ensured that there was no overlap in the distribution of funds. Both mechanisms are highly recommended as a means of helping the community to help themselves after any future disaster.

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## Conference Announcement

### Natural Hazards Management Conference 2000

#### Interpreting and Applying Natural Hazard Information

16-17 August 2000, Napier, New Zealand

The Institute of Geological & Nuclear Sciences Limited (GNS), Hawke's Bay Regional Council and Ministry for Emergency Management invites natural hazard mitigation practitioners, emergency managers, utility managers, natural hazard researchers and scientists to participate in the Natural Hazards Management Conference 2000.

Conference 2000 is about natural hazard information and its interpretation and application for practitioners. Practitioners and researchers/scientists are aware of the difficulties of applying natural hazard information and this conference will further build on the work of the previous conferences by:

- highlighting how to overcome the difficulties of compiling, assessing, interpreting and applying hazard information
- examining methods used to successfully apply hazard information for solving practical planning, development and construction problems, as well as emergency preparedness and response.

The Conference will feature keynote addresses, case studies from practitioners, formal presentations from scientists, panel discussions and poster sessions.

The Natural Hazards Management Conference will be run in

Napier, New Zealand on the 16-17 August 2000.

The Conference venue is Napier War Memorial Conference Centre located on the beach of Napier's famous Marine Parade. The Centre offers stunning views of the Pacific Ocean and well located amenities being 5 minutes walk from the centre of Napier City. Closely located motels/hotels will provide accommodation, including standard and premium, twin and double rooms plus suites.

A one-day optional field trip is planned for Friday 18 August 2000. The trip will visit sites around Hawke's Bay where successful hazard mitigation strategies have been implemented.

*For further information contact:*

Julia Becker  
Wairakei Research Centre  
Institute of Geological & Nuclear Sciences Limited  
Private Bag 2000  
TAUPO

phone: 07 374 8211

fax: 07 374 8199

email: [j.becker@gns.cri.nz](mailto:j.becker@gns.cri.nz)

or visit [www.gns.cri.nz/news/conferences](http://www.gns.cri.nz/news/conferences)

# Human aspects of the Katherine-Daly flood disaster

**M**any important lessons can be learned from those who experienced the devastating rainfall inundation and flooding in the Katherine and Daly River Regions in the wake of severe tropical 'Cyclone Les' early in 1998 (Munday, 1998). Capturing manifest human emotions and perceptions as soon as possible after the disaster is valuable in an attempt to ensure the best possible well being for those exposed to similar situations in the future. This article complements one recently published (Skertchly and Skertchly, 1999) which focussed primarily on the material and technical aspects of the 1998 Katherine flood. Here we provide an overview of some key human aspects and findings derived from consideration of the 1998 Katherine and Daly Rivers Region Flood.

The paper draws principally upon the work completed for the Emergency Management Australia commissioned Katherine District Flood Disaster Study (Skertchly and Skertchly, 1998) and subsequently published reports, particularly the 1999 Katherine Region of Writers' book *The Katherine's Comin Down* which documents personal Katherine flood experiences. Media sources were also utilised. The article captures important disaster-coping capabilities sketching key characteristics of disaster-robust people. We note some psychological issues and problems that merit further investigation.

## Unexpected traumatic transitions

Katherine and Daly Rivers of the Northern Territory of Australia, are major tropical rain-fed watercourses upon whose banks, and in the surrounding regions, the flood-devastated settlements were located. The Katherine Gorge catchment and Douglas-Daly Region are well known to experience adverse impacts of tropical rains and raging floodwaters in the severe tropical cyclone-prone "Wet" season. Those who choose (or are compelled, by circumstance) to live close to a natural hazard, such as a major watercourse, do, of course, take risks associated with possible floods.

Katherine and Daly River towns and surrounding communities generally enjoyed normal contemporary Australian small self-centred town and bush lives and

by Allan Skertchly and Kristen Skertchly,  
(SMILE – Success Management  
International Learning Enterprises,  
Darwin, Northern Territory)

living just before the 1998 flood. Then, rather suddenly, many inhabitants and visitors had to cope with life-threatening dangers as the torrential rains associated with ex-tropical Cyclone Les wrought havoc. People were catapulted rapidly from the certainties and routines of every-day life to experience the discontinuities, disruptions and discomforts of an unanticipated natural flood trauma.

Within a relatively short period of time a 'State of Disaster' was declared in the Katherine-Daly Region and major emergency counter-disaster management took

**'You walk into  
someone's home and  
see their life there all  
over the floor.'**

**– Northern Territory  
Emergency Service  
worker, Katherine 1998**

over. The immediate task was to save lives, prevent serious injuries and safeguard property. Thousands of people were evacuated to safety and provisioned with the aid of 4000 flights. With the floods receding, the next thing to think about was reconstruction—getting the people home and communities back to normal. Thus, two complex transitions occurred. This paper highlights personal attributes, which facilitate robust personal coping behaviours in such dangerous disaster situations.

Most mainstream Australian settlements at least embrace arrangements and resources, which enable the following:

- avoidance of serious harm

- provision of harm-free shelters
- maintenance of secure, non-hazardous environments
- maintenance of individual and social behaviours acceptable to all
- maintenance of immediate physical health
- maintenance of immediate mental health
- adequate unpolluted water
- adequate nutritional food
- availability of some recreational diversions
- sufficient cash flow of negotiable currency

The survival and safety of individuals and communities traumatised by the extreme forces of nature cannot ever be absolutely guaranteed. But to the extent that sound forecasts can be made; plans formulated and resources and capable emergency managers provided, and impacted individuals respond effectively to well-informed directives and requests, the capacity to cope and survive in the immediate disaster aftermath will be much enhanced, with the basics of life, such as those noted above, being maintained.

*Table 1, Emergency and Disastrous Events—Main Strain Characteristics, summarises key concerns which many people perceive they may need to contend with in extreme unexpected situations (Paton and Long 1996).*

## Emergency management critical services and utilities available to Katherine

The on-going sufficient provision of critical life-supporting services and utilities is at the heart of successfully coping with extreme hazards, such as the 1998 Katherine Flood. These derive predominantly from normal resources put to emergency use. The aim of emergency interventions is to facilitate maintenance of living essentials. Without timely well-managed interventions utilising available resources, there would certainly have been further considerable loss of life and extreme deprivation for the Katherine and Daly regions residents and properties.

Generally, the Katherine-Daly communities already had in place an array

### Emergency and Disastrous Events— Main Strain Characteristics

1. Lack of warning
2. Abrupt contrast of scene
3. Type of event
4. Nature of destructive agent
5. Degree of uncertainty
6. Time of occurrence
7. Presence of traumatic stimuli
8. Lack of opportunity for effective action
9. Knowing the victims or their families
10. Intense media interest or public scrutiny
11. Physical or time pressures
12. Increased or unexpected responsibility
13. Greater than usual, physical, mental and emotional demands
14. Contact with victims
15. Resource availability and adequacy
16. Co-ordination problems
17. Inappropriate leadership practices
18. Inadequate and changing role definition
19. Conflict between agencies
20. Single versus multiple threats
21. High work loads

Table 1: Emergency and disastrous events—  
main strain characteristics

of official arrangements and resources with which to cope with emergencies, including floods. What was underestimated by authorities and most people was the early advent of a flood as severe as that, which occurred in 1998. A recent estimate (Skertchly, 1999) is that a flood of similar magnitude, or greater, than the 1998 Katherine flood has a 1 in 77 year probability. This contrasts markedly with the then, pre-1998, flood prevailing notion that such a flood would have but a 1 in 200-500 chance of occurrence.

Emergency management interventions available to Katherine may be considered under various categories. They derive from normal capabilities in such key domains as:

**Protection and Security:** Military Capabilities. Roles and work of the Northern Territory Police, Fire and Emergency Services; Prison Services etc. State of Disaster Directives/authority/sanctions. Fraud, pilfering & crime prevention.

**Biophysical and Psychosocial:** Air, water, sewerage and sanitary; Energy and Power; Medical, safety, nursing, immunisation; psychological, welfare and churches. Babies, sick, frail, aged, mentally

disabled etc. Animals and veterinarians. Natural hazards awareness.

**Shelter and Technological Resources:** Emergency Command Modules; Accommodation; Emergency accommodation-individuals, families, communities; victualling, grog and supplies; discipline, negotiable instruments, funds/cheques.

**Transportation:** Aircraft-fixed wing and helicopters, airstrips and landing areas; power boats and kayaks; vehicles-official, private cars and trucks, etc; highways and other main roads repair; minor roads re-opening.

**Communications:** Meteorological forecasts-accuracy, timeliness, responses; Emergency/Disaster Plans; Radio/television-forecasts and reporting. Optical cable and satellite reliability; emergency police and defence nets; pigeons.

**Political and bureaucratic:** Emergency and disaster response capabilities and competence of public bodies other than dedicated emergency bodies. Political leadership at local, Territory and federal levels. Visitations, promises, exploitations.

**Individual and Community:** Service clubs, agencies churches, welfare agencies, private providers; appeals in cash and kind.

**Risk Insurance and Reconstruction Support:** Building locations, insuring risks, reconstruction funds. The tyranny of 'status quo' restoration. Ensuring better protection in the future?

**Fostering a hazard mitigation culture:** Replacing the traditional Australian 'she'll be right culture' with one of responsible natural and technological hazard mitigation and human settlement sustainability.

In essence, Katherine already possessed a sophisticated potential for effective counter flood disaster measures.

The characteristics and dimensions of the disaster itself; the characteristics of the people; and the activities undertaken by many people working in the above categories, and the people themselves, determine the perceptions and coping behaviours of the disaster-affected community at large. These characteristics and dimensions are highlighted in the next section.

### Knowledge of Katherine's flood-prone characteristics

The general population was largely unaware of the extent to which their settlement was disastrously flood-prone. This was the case for 'the man in the street and on the land' as well as almost all

inhabitants. However, Aboriginal Australians have lived and coped successfully with floods for tens of thousands of years, including those in the Katherine Region. Palaeobiological and other evidence from Katherine Gorge confirms very high level floods in the past (Knott 1998). Living Aboriginals (Harney 1999), recall tales of past extreme floods.

A handful of people were well aware of real flood risks in the region. However, only a few members of the contemporary Katherine community had an inkling of the prospect of a flood of 1998 magnitude. Even those who had a professional interest in such matters were lulled into a false appreciation of the potential levels of flood-proneness through such documents as the 1 in 100 Year Flood Map (Department of Lands, Planning and the Environment) and the Katherine Counter Disaster Plan (NTES 1996).

The official Counter Disaster Plan for Katherine included a flood-coping plan embodying inputs from a number of relevant Departments. This Plan purported to give indicators of severe flooding to the 1 in 100 level. The flood forecasting system accommodated the notional 1 in 100 flood levels. Key people were flood-response aware and able, within the official counter-disaster framework. But the flawed 1 in 100 official flood benchmarking induced a wholly false sense of security.

To an overwhelming extent, Katherine Region residents were completely caught by surprise and expressed incredulity, as they witnessed at first hand, the severity of the 1998 flood hazard event.

It is self-evident that when there is little or no personal awareness of the scale, timing and other characteristics of a pending high impact emergency event, then little or nothing will be done to prepare for it. The whole of Australia was looking forward to a holiday weekend and Katherine was no exception. As the Australian-South African cricket match proceeded and preoccupied residents, the complex, rapidly engulfing, rising and expanding flood, progressed quickly into an emergency disaster of unprecedented proportions. Many rivers and tributaries broke their banks inundating 1,000 square kilometres, causing the evacuation of 5,000 residents and the catastrophic flooding of 1700 residences and 500 businesses. An unforeseen and frightening disaster had unfolded.

### Emergency response operational leadership

The overall success of the Katherine

District Flood Emergency Management operations rested upon the shoulders of a small group of top general contingency managers—Police, RAAF and a bureaucrat, the core—coordinating the responses of capable technocrats and their willing colleagues. Able, adaptable, effective, transformational human leadership to respond soundly, to this comprehensive flood inundation, was clearly evident. The fact that the people in such an extremely demanding situation handled it so well was a tribute too to those who had earlier selected and trained them.

As the emergency evolved rapidly into a 'state of disaster' the operations centres at Katherine and Berrimah Police Head Quarters came to life and the Northern Territory Counter Disaster Council met to monitor events. The decision-making and directing of the official bureaucracy and government quickened. Authoritative decisions and actions needed to be made fast by empowered leaders. Through largely face-to-face communications and collaborative commitment, the activities necessary to cope with this extreme crisis were successfully targeted and expedited. All key and necessary people participated. Katherine Regional Police Head Quarters became a multi-modal 'Beehive'.

The essence of operational success lay in the mental robustness, extensive know-how, conscientiousness, dedication and adaptability to rapidly changing complex circumstances that confronted the top, coping, leaders and their able experts. Conditions at operational centres were often frenzied, but a highly productive frenzy.

The question of how to quicken the response of people generally (followship) to potentially serious and life-threatening emergencies is important. On a number of tense occasions at the evacuation centres the Mayor of Katherine spoke directly to the people reassuring them as to the necessity for strangers to enter their homes and remove, on public health grounds, decaying materials. He also instigated brief return visits by evacuees to their flood ravaged homes. The Mayor, as chief citizen played a key role in reducing tension and assisting in maintaining civil order and social controls (Little 1999).

Great variability exists in Aboriginal communities as to effective day-to-day administration. When a community lacks cohesion, or ignores the advice of expert others, this seriously and adversely affects its capacity to respond and cope efficiently when exposed to potentially damaging natural hazard risks. In the case of the flooding of Beswick community,

the total responsibility for safeguarding and evacuating the community rested on the shoulders of the Officer in Charge, Maranboy who coped with all the many demands placed upon him in an outstanding manner. At the time of the flood, the Beswick community on its own could not have coped to secure the safety of all residents.

Waipiri people reacted at a late stage and they had to walk out of the community in waist-deep rising waters.

At least one community, Ngkurra (Roper River), anticipated and coped with the worst of the floods on their own. This community, under the highly commendable leadership of their local Officer in Charge, brought in extra supplies at an early stage and were therefore relatively self-sufficient. Other communities, such as Daly River, which are well administered too, were simply overwhelmed by the magnitude of the flood and had to be totally evacuated (to Batchelor) with the aid of official external emergency resources. The Daly River community were dislocated for one month before they could return.

Any sound approach to emergency preparedness and response must face the reality of widely contrasting cultural and awareness differences. Leaders must ensure that emergency communications are effective for all kinds of people. In the case of the Katherine flood, widely differing social control mechanisms existed.

Throughout the immediate emergency responses and well into the recovery stage, those concerned with managing and reconstructing the physical fabric and vital systems of the towns and settlements did an outstanding job. All essential services and utilities were kept operating to the maximum capabilities available. Much of the credit for this lies in the high quality of the multi-faceted, multi-skilled and highly experienced, human-power available *in situ* and the resources that they could access or utilise, or acquire. Many people released and exploited dormant talents.

### **Irresponsible behaviour**

There was evidence of some social issues that militated against the harmony and well-being of quite a number of people. Indeed, a number of persons commented that the problems caused by the emergency relief and recovery measures were more difficult to handle than those of the flood itself. Here, the most important of these are noted. (See Table 4 for further details.)

At normal times the problems of drugs, petrol and alcohol dependencies in many Northern Territory communities are serious and well known. In the circumstances of supply deprivation of the post-evacuation stage, and with even fewer commitments than usual, the scene was ripe for dangerous rising social tensions. In some evacuation centres there were initially a number of nasty anti-social events. Such events were close to inconsequential compared to the excessive drinking and gambling problems that arose in some groups during the later stages of flood recovery.

These problems, in large part, arose from open-ended money distribution and cheque releases that were made to flood victims by a number of government bodies.

Much of the money distributed was spent on alcohol and gambling with ensuing binges. In many cases, as reported at Katherine, Batchelor and Beswick, the control of numbers of highly inebriated people was difficult. Such circumstances caused many potential risks and dangers to others. Beswick women and children fled out of the community, many to Darwin. This added an unwanted further extreme concern to the heavily taxed Maranboy police force.

The possibility of locally available 'sworn' police aides for commissioning in times of emergencies should be considered. At Daly River on the other hand, after experiencing unacceptable behaviour at Batchelor, further cash grants were directly converted to necessary household goods to replace those lost. Widespread, discretionary cash should not be available, as this form of relief aid can lead to damaging anti-social behaviours. The form and distribution of relief funding and resources needs addressing in detail.

A small percentage of any contemporary population will always seek to gain advantages from confused abnormal situations. To the extent that other priorities in extreme emergency situations makes possible, the whole community, and especially its key people should be alert to this possibility. There were confirmed cases of looting from local businesses, schools and residences in Katherine Township.

### **Coping behaviours—majority**

People living in isolated/remote settlements generally display high levels of self-reliance. The Katherine District is a good case in point. Although very largely reliant upon government utilities and resources

for ultimate survival, often the directives from authority figures as to actions to be taken are not taken kindly by local inhabitants.

Until the water was seen to be visibly rising into houses and the direct evidence of eyes and senses conveyed the actual seriousness of the situation, many people did not take the evacuation advice seriously. The ultimate need, in the face of clear danger, to secure their own safety and survival provided the motivation for most, (with the exception of two people), to, ultimately, respond positively to directives and at least save lives.

As the floods adverse impacts increased rapidly, affected persons responded and acted accordingly. Key people endeavoured to maintain vital services and utilities; many individuals selflessly cared for and helped save property for others. Virtually every person made positive contributions to community well-being once the enormity of the flood disaster was apparent. Many individual life-guarding and humanitarian initiatives were undertaken as responsible people did all that they could do to save, protect and maintain the functionality of their domains. Where it was not possible any longer to do so, many people from all backgrounds in the flood zones contributed substantially and vitally to affecting rescues and evacuations. As thousands of people had to relocate; critical services were kept working due to the relentless work of their people; large numbers of people contributed in ways they would never have thought possible

The overall evidence gained from this study confirms that those who are best able to cope with life and its many changing circumstances and uncertainties, such as the Katherine-Daly flood, possess, *inter alia*, personalities embracing the attributes of 'mental stability', 'conscientiousness' and 'openness to new experiences'; (Clausen 1992, Costa and McCrae 1992), 'naturalistic intelligence' (Gardner 1997) and a positive 'optimistic outlook' (Seligman 1992). As is amply testified in the personal case studies of the Katherine flood, high-level personal coping qualities were in abundant evidence in leaders and managers and most (c. 80+%) of the people.

As well, 'emotional robustness and intelligence', the mature understanding and management of human emotions, are now also seen to play a vital part in adaptable self-management and living comfortably and adapting more readily to precipitate change (Goleman 1994, 1998; Weisinger 1998). The principal

Personal Emotional Responses in the 1998 Katherine-Daly Flood  
(The Katherine's Comin' Down, 1999)

**Anger:** The reality began to sink in. Most had lost everything. Homes, cars, business, possessions and personal items. This was their moment of truth. (88)

**Calm:** I got to the police station and what a hive of activity it was. The calmness of the people was a credit to them. (17)

**Concern:** Some of them didn't know if their families were alive or dead, but they kept on working, they just rose above their personal disasters. (15)

**Disgust:** Another thing that shook us up a bit was when Macca and I had to do a floater-a dead body. It had been out there three days and it stank. I've dealt with dead bodies before but the smell was the thing that got me. (23)

**Distress:** The smell, the heat, and the unavailability of anything to buy. (51) The conditions were filthy. Cleaning maggoty fridges is hard work. (90)

**Elation:** When we arrived at Tindall airport we were greeted by a well organised team. It was great to see one of our staff members who lives at the base greet us. (21)

**Enjoyment:** There's seven of us hanging onto this little tree. Butch came past in his boat and rescued us. He was just the biggest lifesaver. (60)

**Excitement:** The current was so strong the boat was difficult to steer. Stevie was screaming and the dog was jumping all over the place in panic. I arrived at Christine's house stressed to the maximum. (55)

**Fear:** It was a disaster. This flood has taken away everything. The police came and told what diseases the flood could carry. I got scared for the five kids and I thought as we left we might get all washed away and drowned in the car. It was scary. (109)

**Hope:** It was also a time when new friends were made. Everyone helped someone else no matter how bad things were for them. It was an equaliser of people. Out of adversity comes opportunity and I think we will be a better town for it. We are healthy and we are alive. We live in a wonderful part of Australia and the 1998 flood will add to the character of Katherine and her people. (135)

**Loathing:** It was now Thursday and I had been at Kane's place for six days. This was long enough to test our friendship and I was getting a little homesick. Kane and I had argued and were not talking to one another. All I wanted was to go home. (10)

**Love:** Katherine mob thanks and loves you. To the Government workers, police, fire, health crowd, many suffering losses permanently, thank you. (8)

**Sadness:** It was heartbreaking for me as I lost things that were very precious including photographs of my mother who had passed away the year before. I know I will always have memories, but the photographs are irreplaceable (116). As Shaun closed the gate on the trailer he said "there goes 30 years of my life in Australia". (135)

**Sorrow:** The flood was a time of hardship and sorrow. People lost so much.

**Surprise:** We came across people panicking and evacuating the community. People were getting out and braving the murky floodwaters and swimming to safety. (115-116) When the water reached the door it slowly seeped in but when it reached the louvres it was like a dam opening up. It was even bubbling up through the floor! The disbelief turned into numb acceptance. This was something we could not control. (47)

Table 2: Personal emotional responses in the 1998 Katherine-Daly flood (The Katherine's Comin' Down, 1999)

human emotions evinced and needing to be controlled to maintain high levels of productive performance, include: *anger, concern, disgust, distress, elation, enjoyment, excitement, fear, loathing, love, sadness, shame, and surprise*. Virtually the whole range of core human emotions were experienced during the Katherine and Daly Region flood. An emotional competencies framework is provided by Goleman (1998, 26-27) to which the interested reader should refer.

Table 2, Personal Emotional Responses in the 1998 Katherine-Daly Flood, captures examples of these reflecting the complex web of human consciousness. The extracts are taken from *The Katherine's Comin' Down* (1999) and seek to

convey the essence of the behaviours and emotions of those experiencing the 1998 Katherine flood. The figures are the page numbers at which the quotations appear. The manner in which people react to situations reflects their individually unique make-ups and personal perceptions. All of the strain characteristics noted in Table 1 were manifest in the flood responses and behaviours observed.

Table 3, profiles Core Characteristics of Traumatic-Event Robust Persons. This summary profile reveals that both intelligences and emotions are critical components of effective personal trauma-adaptive mastery and disaster-coping thinking and actions.

However, the trauma robustness of the



### Core characteristics of Traumatic-Event Robust Persons

**Physical fitness and stamina:** A sound level of physical fitness and endurance matched realistically to demanding circumstances.

**Mental stability:** A robust, well cared for, mental state, with no evidence of mental abnormalities.

**Emotional intelligence:** Sophisticated awareness of emotional states in self and others, and adequate self-managed control of personal emotions.

**A predisposition towards proactive optimism:** Maintaining a hopeful, forward-looking approach and making the best of the situation.

**An 'openness to new experiences' component of overall intelligence:** The capacity to adapt effectively to changed (and quickly changing) circumstances without undue stress.

**A 'conscientious' approach to thinking and doing component of overall intelligence:** Meticulous attention to what matters most to managing a situation. Knowing how best to think and act.

**A 'naturalistic', or native cunning and mastery of the environment, component of overall intelligence:** Practical or 'street-wise' intuitive knowledge and know-how of a natural and/or technological environment.

**An overall sense of commitment, valuing the tasks undertaken:** A sense of mission, or purpose, that the tasks undertaken are necessary and needed.

Table 3: Core characteristics of traumatic-event robust persons

Parameter	Dimensions	Comment	Research
Addiction & addicts	Drugs of dependence	Sudden withdrawal	Intervention management
Antisocial behaviours	Protecting vulnerability	Anti-criminal behaviour	Community values
Communications	Diverse	Multi-faceted	Core messages
Coping	Adaptable	Personality	Modify?
Disaster coping	Normal & 'abnormal'	Holistic functioning	Realism in the future
Bureaucracy	working		
Disbelief	Complacency	Cultural	Mind-closure
Ekistics	Settlement systems	Inter-relationships	Human system dynamics
Human inertia	'Tyranny of the status quo'	Becoming pro-active	Openness to the new and different
Ignorance	Cognition	Lack of concern	Education & training
Leadership	Contingent	Followers	Paradigm
Management	Chaos theory	Ad-hocracy	Contingency
Mind-sets	Conditioning	Cultural	Openness
Multi-cultural competencies	Accommodating diversity	'Houses of Babel'	Multiple languages
National defence	Military dependence	Final authority	Defence & civilians
Obedience	Compliance	Social control	Authority acceptance
P.T.S.S	Poly-dimensional	Clinical diagnostics	'Classical' protocols
Power	Political	Availability	Direction
Technocrats	Skilling	Diverse	Training & experience
Volunteers	Nature	Motivation	Recognition
Warnings	Intelligibility	Responses	Criticality

Table 4: Key psychological issues and problems — Katherine flood

majority of the population notwithstanding, it is important to recognise that those in the remaining sector of the population (C. 20%) will experience a variety of adverse reactions up to and including severe and lasting mental

malfunctioning (Ursano, McCaughey and Fullerton, 1994; Paton and Long, 1996).

For many, the impacts and losses experienced in such events as the Katherine and Daly Region Flood 1998 will have lasting personal repercussions.

Research confirms that up to 15% of such populations may be affected adversely for longer than a year, many for life (McMillan et al. 1997). Once the immediate reconstruction phase is over, it is important not to forget that hundreds of people may require advice and counselling to help with their post-flood lives. Providing such support in the diverse, scattered and remote communities of the Katherine District over many years to come is a challenge to the providers. A small percentage of this group may be seriously mentally scarred for life.

Table 4 summarises Key psychological issues and problems—Katherine flood. The concerns noted are all worthy of further consideration and research.

### Conclusions

The human behaviours of residents impacted by the 1998 Katherine-Daly Flood reflect a full range of human emotions and trauma-coping and response characteristics. They evidenced, overwhelmingly, the basic survival qualities of a robust majority of the population, in a possibly typical, cohesive-under-stress, Australian community. The attributes and needs of the less disaster-robust and more mendicant minority of people, were also a focus. Notably, many important lessons can be derived from the study of and reflection upon such an overwhelming catastrophic experience.

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#### Authors

Dr Allan Skertchly has qualifications in the biological, psychological and social sciences and was until recently a foundation member of the academic staff at the Northern Territory University. He now works with S.M.I.L.E. Darwin on multi-disciplinary hazard mitigation and emergency management projects.

Ms Kristen Skertchly has an honours degree in environmental science and is currently working at the Department of Lands, Planning and Environment of the Northern Territory Government.

Both authors have conjointly completed Emergency Management Australia supported projects on severe tropical cyclone human settlement vulnerability, the 1998 Katherine-Daly Flood Disaster, and Lifelines (NT), for the Counter Disaster Council and Emergency Services of the Northern Territory Government.



## New Books

### Cross-Cultural Risk Perception: A survey of Empirical Studies

Edited by Ortwin Renn and Bernd  
Rohrmann  
Kluwer Academic Publishers  
Dordrecht, 2000

This book is the thirteenth and the most recent in what has been an outstanding series of books published by Kluwer since 1986. The series of books (called *Technology, Risk, and Society: An International Series in Risk Analysis*) has been at the forefront of the move towards the application of risk management to environmental and disaster management. The quality of the series has been outstanding and this release strengthens the suite.

The focus is on what risk perception studies can offer to policy makers, risk experts and interested parties. It has brought together the leading practitioners in the field and showcases their empirical work from around the globe.

Of particular interest to Australian disaster management practitioners is the section reporting the work Bernd Rhor-

mann has done in Australia. Bernd ([b.rhormann@psych.unimelb.edu.au](mailto:b.rhormann@psych.unimelb.edu.au)) has been working with disaster managers in Australia since about 1992 when he came to the University of Melbourne. Since that time, he has contributed significantly to improvements in our approaches to risk management. The work reported in this book draws largely from work on bush-fires, but the findings are about management and can be translated across hazards.

The book is not an easy read, but the matters it deals with are not light. It moves from a critique of public policy failures, through a review of current trends, to reports on empirical work undertaken around the world, and concludes with some very useful implications for risk management. The book is worth the first chapter alone for the comprehensive cover of the experts in the field summarizing 'who believes what and why'.

The cream on the cake lies in the conclusions which can be drawn from the reported research. The conclusions reached are not merely the all too often seen tacking on of a preferred ideological position. It is practical and useful advice to practitioners. Instead of getting our

fingers burnt again, we can use the lessons reported to guide our planning

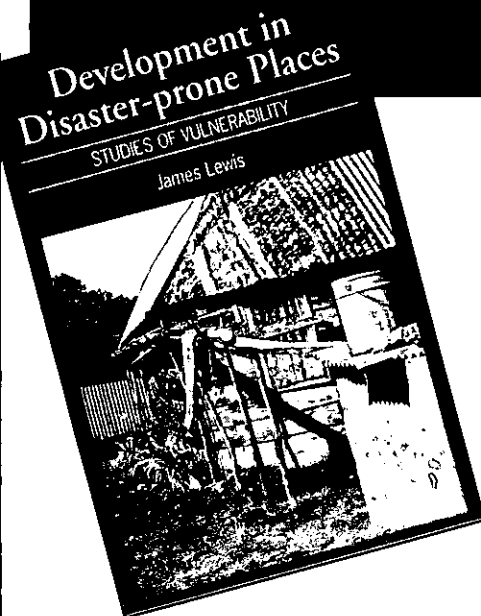
One particularly interesting point is the significant degree to which the lessons reported parallel the principles and suggested techniques in the draft Australian New Zealand Standard on Environmental Risk Management.

The work reported in this book and the Environmental Risk Management Standard will add depth to the Risk Management approach to Emergency Management, as there is much of relevance to transfer. It is not an easy task, but surely it is a worthy one.

#### Reviewed by:

John Salter ([jsalter@senet.com.au](mailto:jsalter@senet.com.au))

John Salter worked with Emergency Management Australia for over ten years. He now works with the City of Adelaide as an Environmental Manager, with the University of New England as a course coordinator of *Planning for Civil Care and Security* (a core unit of their emergency management degree), and as a consultant with Geo-Eng Australia.



## Development in Disaster-prone Places: Studies of Vulnerability

by James Lewis  
Intermediate Technology Publications, London  
1999

Over the past few years there has been a pronounced change in the way emergency managers, both here and overseas, conceptualise emergencies and disasters. Until recently disasters were, generally, identified with the hazard agent itself (the flood, the fire and so on) and operations were concentrated on controlling and suppressing the hazard and then restoring the physical damage that that occurred, generally infrastructure such as roads and bridges and private property such as houses. This operational approach was directly reflected in broader policy and program considerations. Increasingly this view that emergencies are nothing more than the hazard agent and the physical loss is being challenged by a perspective that puts greater emphasis on community impacts, psycho-social losses, damage to amenities and opportunities. Broadly disasters are seen now as consequences of impacts rather than the cause or the agent of impact. With this change of perspective—and it is clear that some rearguard action is being played out against it—comes a concomitant need to better understand communities at risk and this in turn requires an assessment of the resilience and vulnerabilities of those communities.

James Lewis' book is therefore timely. It is not the first of its kind to give weight to vulnerability analysis, Peter Winchester, Ken Hewitt, Terry Cannon and Ian Burton among others, have all written on this subject. But another book on the subject, particularly where it includes case studies, lends weight to the argument that we need to better understand the individual and social causes of risk if we are to effectively reduce risk potential and to develop arrangements and

programs that support the community if disasters do occur.

Lewis' book is clearly written and easy to read. In the earlier chapters he reviews definitions of vulnerability and goes on to indicate that there are different experiences of vulnerability which include social, economic and environmental vulnerability. This sort of distinction is useful, not simply conceptually in allowing us to grasp essential elements of vulnerability, but also in helping us segment the area so that programs can be developed which reduce vulnerability. The danger with this sort of distinction is that the borders of each of the identified will be taken as fixed when vulnerability in social, economic, environmental or others terms probably derives in part from underlying structures of societies and nations (even structures that may exist internationally or globally) that at a profound level are inextricably linked.

Lewis then goes on to examine some causes of vulnerability such as political conflict or economic exploitation and in this section he identifies and discusses some of the underlying processes that put certain groups or communities at risk. In the final sections of his book, and after discussion of some case studies, Lewis addresses issues of vulnerability and development. Again, this approach is not new. Others have argued that development (by which they usually mean economic development along the lines of western industrial societies—whether or not this is development is another argument) is a prerequisite for community empowerment, distribution of resources equitably and to those in greatest need, sustainable environmental management and the generation of robust, democratic political systems that allow for opportunity based on merit. But again this argument is well worth restating because it is not clear, despite all our efforts, that risk potential across the globe, including first world nations and differently developed nations, is diminishing or that the sum of human loss and suffering is being contained.

The most interesting part of his book is the third section where he addresses developmental issues such as equitable practice, decentralisation of services, accessibility to services and sustainability of systems. These are useful and challenging debates.

One criticism I have of his book is his propensity to put disaster management in the context of environmental management with an inclination to interpret disasters as natural disasters, with the locus of hazard agent initiation in the bio-physical realm, when I feel there are strata below this, political and economic even perhaps genetic, which are deeper determinants of risk. His

discussion is focussed and practical and while he does not break new ground he does re-state the case for vulnerability assessment, community and social analysis and a developmental focus clearly and concisely.

A useful book. Discussion of those factors or systems which promote resilience in communities would have been a relevant complement to vulnerability, but resilience assessment is likely to be the next step towards our better understanding of disasters. Most analyses of community vulnerability by European, Australasian or North American writers focus on third world countries. Perhaps because the levels of risk are heightened there in comparison with the writers' own countries, possibly because the causes and consequences of risk and vulnerability are thrown into stronger relief. But perhaps because we are unintentionally unwilling to critically examine our own societies with the same incisiveness and rigour that we apply to other societies. In our countries there may be fewer people at such great risk as in third world countries, but the underlying causes of vulnerability are likely to be the same. Many writers may perhaps be adopting a conservative position that does not challenge the context in which they live.

It is heartening to see Lewis include as one of his case studies the impact of environmental, social and technological changes on the vulnerability of Chiswell, a village in Dorset. He argues that technological or structural responses to protecting Chiswell from encroachment by the sea have not been successful and that any approach needs to be ecological, linking the vulnerability of the local community, through the mediating pathways of administrative process to the broader social and political environment.

Finally he describes vulnerability (p14) as '...not static; vulnerability is dynamic, evolutionary and accretive'. This is a useful reminder that what we are dealing with in vulnerability is a complex phenomenon that lies at the centre of effective emergency management.

### Reviewed by:

Philip Buckle, Manager, State Emergency Recovery Unit, Dept. of Human Services Vic.

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# Making Government assistance responsive to community need

Namoi Floods, NSW, 1998

## Introduction

In the North West of NSW the rain began early in June 1998. It rained, and it rained. July came and went, and it rained. Then August, and by September the Namoi Valley River system had experienced an unprecedented series of five floods. The Gwydir Valley River system had also undergone prolonged major flooding. By mid-September a number of towns, notably Mungindi and Walgett, had been isolated for periods of up to ten weeks.

On Wednesday, September 17th, 1998, at the urgent request of the Premier, Bob Carr, I began a series of emergency visits to towns in the North West of NSW, which were badly affected by flood. The express purpose of my visit was to talk directly with business people, farmers and families to gain a first-hand understanding of the specific nature of their difficulties. Both during, and at the completion of these visits, I was to make a series of recommendations to the Premier. By accessing information directly, and in a timely manner, the Government would be better placed to respond effectively.

## Visiting affected communities

Over the next three days, travelling by light plane, I visited the towns of Moree, Mungindi, Lightning Ridge, Walgett, Wee Waa, Narrabri and Gunnedah. From the air, the extent of the devastation was immediately apparent. I flew over a sea of floodwaters. Every now and then some treetops, a farmhouse, or a few desperate cattle or sheep crowded on a rocky outcrop, were all that broke the surface.

At every location the meetings were very different, yet the issues common. In some towns, particularly the larger towns of Moree, Narrabri and Gunnedah, meetings had been arranged by local Council. These meetings were held in Council Chambers and were well attended by a broad cross-section of the community including business people, farmers, SES and emergency service workers, Council workers, and community members concerned for their families. High levels of frustration were apparent, but at no point did I feel that this was directed at either myself or at Government. In the smaller towns the

by Maureen Chapman, Regional  
Co-ordinator (New England/North West)  
NSW Premier's Department

meetings were quite different. In both Mungindi and Wee Waa, for instance, I was able to meet one-to-one with local business people and farmers. This opportunity to connect personally and to hear individual circumstances in detail was significant. Not only was I far better equipped to relate the reality of the impacts of the floods to the Premier, but it also gave me the opportunity to offer some immediate advice to people who had not yet had access to any financial or other counselling.

## The key issues

The range of issues presented can be summarised as follows:

### Loss of cash flow

Business owners and operators reported decreases in economic activity ranging from 30% to 100%. People couldn't get from their properties into the towns, and if they could, had no cash to spend. Most families were being forced to shop on credit. Isolated businesses were facing extraordinarily high freight charges as freight companies recovered the cost of damage to vehicles travelling on the extraordinarily dangerous and damaged roads. Those towns that had become isolated were suffering profound effects of loss of traffic both within and through towns.

### Isolation

By the time of my visit Mungindi had been isolated for the best part of ten weeks. The situation here was quite desperate, with many businesses facing accelerating debt and possible closure. No relief was in sight. A bridge which had been under construction when the floods came needed to be finished urgently to help restore normal traffic flows. The situation here was extremely urgent. Wee Waa had been isolated for various periods of time over the past 8 weeks. Pilliga had been isolated for 8 weeks and remained

isolated. Lightning Ridge had been isolated at various times over past 10 weeks resulting in devastating losses in tourism related businesses. Across much of the North West students were unable to get to school, and people and equipment couldn't get to either to work or into towns to access shops and vital services.

## Eligibility criteria for access to low-interest loans

Through the Rural Assistance Authority, low-interest loans for farmers suffering hardship had already been extended to include small business, and the interest rate had been reduced to 4%. At that time, isolation due to flooding was not on its own considered criteria for accessing low-interest loans. In many cases there may have been no direct loss of stock due to physical impact of floodwaters, however their isolation either from other centres, from normal through traffic, or from the surrounding properties (i.e. their normal customers), had resulted in the loss of business being just as devastating. It was difficult for these people, who were suffering extreme effects of isolation and general loss of business, to access these funds. The criteria needed to be examined closely and altered where appropriate to ensure that those genuinely feeling the effects of isolation were eligible. In addition, many of those eligible to apply were having difficulty with the 'red tape' attached to the applications for financial assistance.

## Dam management

Some SES staff had expressed grave concerns regarding the possible risks involved in keeping dams at or near total capacity in terms of their ability to avoid further uncontrolled major flooding if dams remained full.

## Agriculture/industry

Most of the existing cotton crops had been lost. The next planting needed to occur by late October early November and was totally dependent on weather conditions. Many cotton growers had forward sold, consequently they needed to produce either cotton or cash. Most of the existing wheat crops had also been lost. It was

unlikely that surviving crops would be harvested, as it was impossible to get machinery onto farms. If harvesting were possible there remained problems with getting wheat to silos due to the state of the roads and bridges. Wheat farmers were consequently unable to finance their next plantings. Wool growers were unable to shear, leaving them with potentially no income until November or December depending on weather conditions. Opal miners in Lightning Ridge were unable to access mines due to badly damaged roads, and road closures and negative media coverage resulted in hundreds of tourists avoiding the North West of NSW. This had a particularly devastating effect on towns like Lightning Ridge where tourism and mining are the two main producers of income.

### **Labour/employment**

Thousands of people across the region had little or no income and were either ineligible for assistance through Centrelink, or were being forced to wait a stipulated period of time before any assistance could be made available. This in turn forced people to either utilise their savings, or to access any accumulated leave provisions. Employers were therefore facing a double burden while continuing to carry staff as skilled labour would be needed when conditions improved. This situation was not sustainable.

### **Public health**

Large amounts of water lying around for such long periods of time, and many sewage systems backed up, would no doubt result in a number of public health risks including higher numbers of mosquitoes as the weather rapidly warmed, consequently higher risk of Ross River Fever and other vector-borne diseases.

### **The recommendations**

The next step was to consider all of this information and make recommendations to the Premier.

Eligibility criteria for low-interest loans needed to be revised urgently. The criteria set in the past suited the needs of farmers during times of drought, but needed now to address the issue of loss of cash flow as a result of isolation. Should criteria be altered, there remained the issue of those newly eligible people needing to access financial assistance as a matter of urgency. Some businesses were facing end-of-month closure.

As a result, the Premier announced on the final day of my visits that the criteria for accessing low-interest loans would be

temporarily extended to include 'isolation'. While this relieved many of the concerns expressed by small business people, criteria still needed to be reviewed in some detail to ensure that definitions of isolation were not too restrictive, and to ensure flexibility in their application.

Rural Financial Counsellors or equivalent would now be needed to visit isolated towns (Mungindi, Wee Waa, Pilliga, Lightning Ridge, Walgett) to assist people with completion and lodgement of application forms. It would also be necessary to ensure that applications were then assessed as quickly and efficiently as possible. As well as providing urgent assistance to isolated towns, information regarding financial and other forms of assistance also needed to be made more accessible, as did the access to practical assistance in completing and lodging applications. For example, information could be made available through Local Councils and Banks as well as Rural Financial Counsellors, and local media could be better utilised to make general information available to communities.

The loss of the tourist dollar had been enormous throughout the region, particularly in towns which depend on tourism for their existence (e.g. Lightning Ridge). An aggressive and targeted advertising campaign would need to be developed and launched to encourage people to use the Newell Highway as an alternative Melbourne to Brisbane route.

It would also be necessary to consider a range of integrated responses with regard to public health issues.

It was also vital that the Federal Government be petitioned to recognise the current situation as being one of 'Exceptional Circumstances'. Access to this status would give eligible applicants financial assistance in the form of interest relief and assistance with general household expenses, rather than forcing them further into debt. Letters of support for this petition were collected from each of the Shires in the flood-affected area during this exercise.

### **The response**

Quick and thorough examination of all of the information I had gathered, as well as the recommendations in their entirety, was now vital, and recommendations needed to be made to the Premier which were practical and achievable in the short term.

In short, we had to recognise the fact that while we weren't able to stop the rain, we had to at least be able to ease the

situation for some people. If we were to achieve any useful outcomes at all, Government Departments would need to consider all of the information and recommendations in a whole-of-government environment.

A report was compiled for the Premier by Monday 21st September 1998 which contained all of the information gathered during the three-day consultation, along with a summary of the situation and the series of recommendations I have just described. As much as possible, the language used to convey this information to the Premier was the language of the people I consulted. The Director-General, NSW Premier's Department, immediately called an urgent meeting of Chief Executive Officers of the relevant government departments to discuss the contents of the report and its recommendations.

The achievable responses likely to have the most impact in the short term were agreed as follows.

In line with the Premier's announcement of the previous Friday, the criteria for access to low-interest loans would be temporarily relaxed to include 'isolation' as valid criteria. It was also recommended that applications be assessed on a case-by-case basis, and that criteria remain flexible enough to accommodate those who were genuinely in need.

Within a week of the meeting three Flood Relief Workers were appointed and arranged emergency visits to the worst affected areas. These workers were appointed through NSW Agriculture who already had the structure in place from the time in the not-so-distant past when Drought Relief Workers had been appointed. The Flood Relief Workers liaised closely with existing Rural Financial Counsellors to ensure best possible coverage of the flood-affected areas.

A submission was subsequently made to the Federal Government's RASAC by the NSW Minister for Agriculture urging assessment of the current circumstances as 'Exceptional'. Unfortunately, this application was ultimately refused.

There was also the need to consider those issues which required longer-term responses. Tourism NSW, through the Big Sky Country Tourism regional body, undertook to formulate a marketing strategy aimed at attracting travellers back through the flooded areas. NSW Public Health, the Environment Protection Authority and Local Councils undertook to establish a whole of government strategy which would include both preventive and reactive measures to address public health issues.

## The result

As a Government, were we able to achieve the kind of practical response we had hoped for? While we weren't able to stop the rain, we were at least able to listen directly to advice from those closest to the issues and act as a whole Government in our response, rather than reacting on minimal advice in a piecemeal fashion. By a relatively simple and temporary alteration to the existing criteria for accessing financial assistance, we were able to help some people who would otherwise have fallen outside the guidelines.

The real result, however, was the establishment of a degree of trust within a working relationship between the State Government and the communities and individuals worst affected. This relationship has lasted for over a year, and now provides a solid foundation for ongoing consultation.

## The lessons

We have learned some very important lessons from this exercise.

It was vitally important to provide these communities with direct access to Government at the decision-making level. It was important that as a representative of the Premier's Department I took the time to listen first-hand and to gain some useful level of understanding of the nature and complexities of the problems people were facing. In doing so, I was then able to make effective representation direct to government at the decision-making level. This was vital to enable government to respond in a meaningful way.

It was also important to be realistic from the outset about what can and cannot be achieved. I needed to take care to be honest about the level of response possible at the State Government level and not to raise unrealistic expectations, particularly while people were in such a vulnerable state. For this reason it was also important that the report to the Premier was written as much as possible in the language of the consultation. Direct consultation with these communities would have been pointless if it comprised

the only-too-familiar holding of chin and concerned nodding of head!

During follow-up it was vital to maintain constant contact with all relevant departments to ensure that agreed responses were carried out efficiently and in the spirit of the original recommendations. In this respect, the ability to respond as a whole Government was of enormous benefit.

I also believe that this exercise was an opportunity to genuinely present the human face of government. The fact that I had an opportunity to personally connect with victims of this disaster at a relatively early stage was instrumental in stemming some of the panic and frustration.

The final, and most important lesson? The Premier might not be able to stop the rain, but that doesn't mean we can't get out there and *ask* what we can do to help, provided we are honest both about our management of expectations and our capacity to respond.

## Course announcement

Columbia University; Joseph L. Mailman School of Public Health; Center for Population and Family Health; Program on Forced Migration and Health

in partnership with International Rescue Committee and World Education

# Public Health in Complex Emergencies Training Course 2000

Funded by the U.S. Agency for International Development  
Office of Foreign Disaster Assistance

## What does the course offer?

This course is a two-week training course that focuses on critical public health issues faced by NGO/PVO personnel working in complex health emergencies.

The goal of the course is to enhance the capacity of humanitarian assistance workers and their organizations to respond to health emergencies.

## Who should attend?

This course is best suited for professional staff with previous field experience as health workers, program managers and/or decision-makers in complex emergencies. Participants are expected to apply what they learn during the course to their immediate work in the field.

Medical Coordinators, Health Coordinators, and Program Managers from international and indigenous health organizations, are typical candidates for the course.

Foreign health ministry or government officials working in health emergency situations may also apply. All applicants should have a strong command of English, i.e. daily working knowledge and usage.

## What will participants learn?

The course combines what is scientifically optimal with what is operationally feasible in

*"At the end of two weeks, I feel I am now positioned in a better way to deal with situations as they arise in my work"*

*-August 1999 course participant*

*"...The course simulated practical field settings. All topics were field related... (the course) reflected many areas which are quite often overlooked and yet, have great impact on implementation of programs"*

*-August 1999 course participant*

*Special acknowledgement and thanks to the following organisations:*

Action Against Hunger, American Red Cross, American Refugee Committee, AMREF-Uganda, CARE, Catholic Relief Services, Doctors of the World, InterAction, Human Rights and Peace Center, Faculty of Law Makerere University, Institute of Public Health of the Faculty of Medicine Makerere University, International Center for Migration and Health, International Medical Corps, International Aid, Mercy Corps, Medecins Sans Frontieres, MERLIN, Peace Corps, Relief International, Save the Children, Transcultural Psychosocial Organization, U.S. Centers for Disease Control and Prevention, World Vision

complex emergencies. Participants will master key competencies in all of the following sectors: Context, Nutrition, Epidemiology, Reproductive Health, Communicable Disease, Ethical Issues, Environmental Health, Psychosocial Issues, Violence, Weapons, Trauma, Coordination

The course is currently offered in English. Extensive reading and participatory learning methods are used. All participants will receive a pre-reading packet of materials before arriving at the course site.

#### **What makes this course unique?**

An NGO/PVO Health Advisory Committee, representing 16 humanitarian aid agencies is actively participating in the design of the training program. This course is truly 'of the field, by the field and for the field.'

A Global Advisory Committee, comprised of experts with significant field experience, will also advise the program. Course organizers will be vigilant in monitoring evaluations from both participants and trainers. Recommendations and constructive feedback will be discussed on a continual basis and incorporated where or when appropriate.

#### **Where are they held?**

Courses during 2000 will be held at the following times and locations:

- March 19–April 1: Asia Disaster Preparedness Center, Asia Institute of Technology, Bangkok, Thailand
- June 4–June 17: Hotel Sunce, Neum, Bosnia-Herzegovina
- August 13–26: Adelphi College Campus, Garden City, New York, USA
- November: Uganda, dates/venue to be determined

#### **How much does it cost?**

The tuition for year 2000 is US \$1,800 per person, which includes room, full board, and all course materials. Participants can expect to have private rooms; in some cases, bathroom/shower facilities must be shared. It does not include: transportation, personal phone calls or faxes, or shipping of personal items from the course.

#### **What is the application procedure?**

Applications should be submitted directly to the International Rescue Committee. Students who are accepted will receive detailed registration information and payment procedures from Columbia University.

#### **All applications should be sent to:**

International Rescue Committee (IRC)  
Attn: Lorna Stevens, Director, Health Training  
122 E. 42<sup>nd</sup> Street, New York, NY 10168 USA  
phone: (212) 551-3005  
fax: (212) 551-3185  
email: [shortcourse@intrescom.org](mailto:shortcourse@intrescom.org)

#### **For more information, please contact Columbia University:**

Ronald Waldman, MD, MPH  
Director, Program on Forced Migration and Health  
Joseph L. Mailman School of Public Health  
Center for Population and Family Health  
60 Haven Avenue  
New York, NY 10032 USA  
phone: 212-304-5219  
fax: 212-305-7024  
email: [rw178@columbia.edu](mailto:rw178@columbia.edu)

Sharon Kim, MPH  
Program Coordinator, P.H.C.E.  
Training Program  
phone: 212-304-5286  
fax: 212-305-7024  
email: [ssk19@columbia.edu](mailto:ssk19@columbia.edu)

or visit: [www.cpmcnet.columbia.edu/dept/sph/popfam/refugee](http://www.cpmcnet.columbia.edu/dept/sph/popfam/refugee)

# Sustainability or invulnerable development?

## Proposals for the current shift in paradigms<sup>1</sup>

There can be little doubt about the impact that sustainable development is having upon research and policy in a variety of fields. Disaster studies are also being influenced by this widely held vision of development, which could dramatically shape the direction of practical efforts to reduce future calamitous events. But, before sustainable development becomes further entrenched in disaster academia, it might be wise to step back for a moment and examine this concept from a critical standpoint. Besides being a vague and fuzzy notion, the major problem with sustainable development is that it may not directly address the issue of vulnerability for disaster reduction. This having been said, I will express my concerns about the sustainability concept and then discuss an alternative or modified notion of 'invulnerable development'. I will also attempt to defend my position against possible criticisms, and then list the lessons that this paper may have for both scholars and practitioners.

Before doing so, I must emphasize that I am not arguing against sustainable development as an environmental policy. Instead, I am only raising a flag of caution due to the manner in which this notion is being applied to disaster studies. In addition, I acknowledge that sustainability and invulnerable development share similarities. There are differences between the two concepts, however, even though these might be regarded as minimal. Nonetheless, the variance may have significant implications for disaster research and mitigation, and should therefore warrant consideration.

### Problems with sustainable development

As I see it, there are two central problems with the notion of sustainability as it relates to disaster.

First, sustainable development is unclear as a concept. It has been noted that definitions of sustainability are either non-existent or are numerous and imprecise (Kirkby et. al. 1995, Homberg and Sandbrook 1992), and this is certainly the case in disaster research (Berke 1995,

by David A. McEntire, Emergency Administration and Planning, University of North Texas

Geiss and Kutzmark 1995, Mileti et. al. 1995, Boullé 1995, Berke et. al. 1993, McAllister 1993).<sup>2</sup>

As a result, scholars in the field frequently refer back to the most popular conceptualization of sustainable development, although the World Commission on Environment and Development (WCED) definition (1987) has more to do with environmental protection and little to do—if anything—with natural hazards and catastrophic events.<sup>3</sup>

Thus, the term sustainable development is, to my knowledge, unspecified in disaster studies. Now, it is true that such vagueness may allow flexibility in application. But, if the focus is on the environment alone, other factors are ignored, and, if the scope includes additional factors, these should be specified. Without doing so, the implementation of disaster policies may be jeopardized.

Second, sustainability may not directly attack the root of the disaster problem. There is growing evidence that disasters are not 'natural'. Instead, disasters occur only when a triggering event interacts with various forms of vulnerability. For instance, an earthquake in an uninhabited area is not a disaster, but a physical process by which tectonic plates relieve built-up stress. In contrast, an earthquake becomes disastrous when it interfaces with people who settle in hazard-prone areas or live in poorly constructed houses. Sustainable development purports to reduce disasters by stopping environmental degradation and/or by eliminating 'unsustainable' practices. If sustainability confronts the vulnerabilities created by development, it may do so partially, indirectly or perhaps by chance.

### An alternate approach and its benefits

Because of the weaknesses mentioned above, I propose that disaster studies

consider what can be labeled as 'invulnerable development'.

On the one hand, invulnerable development may be clearer than its sustainable counterpart. As I define it, *invulnerable development is development pursued in such a manner as to address vulnerabilities, and thereby decrease the probability that social, political and economic progress will be set back by disaster* (McEntire 1998, 216). Invulnerable development accordingly conjures up those decisions and activities that are intentionally designed and implemented<sup>4</sup> to reduce risk and susceptibility, and also raise resistance and resilience to disaster.

On the other hand, invulnerable development may attack the root of the disaster problem in a direct fashion. The specific goal of invulnerable development is to prevent or mitigate disasters by endeavoring to eliminate or minimize the creation of vulnerabilities during the development process, and by correcting the vulnerabilities that are carried over from past activity.

With these points in mind, invulnerable development may have 10 benefits over its sustainable counterpart:

1. Invulnerable development may be more explicit in the goals it purports to achieve. As mentioned, the purpose of invulnerable development is to: a) reduce vulnerabilities, and b) minimize the probability that progress will be hindered by triggering events. While it is true that sustainability does acknowledge that the central intent is or should be a continuation of development, it may or may not (depending upon who you read) have the specific intention of mitigating disaster.

2. Invulnerable development is also

### Notes

1. This article is adapted from a paper presented at the Natural Hazards Conference, 14 July 1999, in Boulder, Colorado.

2. Mileti (1999) provides the most comprehensive conceptualization up to date, but even his work fails to adequately define the term 'sustainable development'.

3. The World Commission on Environment and Development asserts that sustainable development is 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (1987, 43).



specific about the means used to accomplish its ends. Specifically, it reduces disasters and protects development by minimizing risk (e.g. the threat posed by natural hazards) and susceptibility (e.g. the proneness of certain individuals or groups to disaster). But, because catastrophes will always occur, invulnerable development also increases disaster resistance (e.g. the capacity to withstand destructive forces) and resilience (e.g. the ability to bounce back after a community is affected by triggering events). Sustainable development generally seeks to maintain development into the future through the conservation of natural resources or the implementation of vague 'sustainable' practices.

3. Invulnerable development summons up an important pragmatic inquiry that is pertinent to the disaster problem. It asks: 'how can vulnerability be minimized in order to reduce occurrence of disaster and safeguard the progress of development?' On the other hand, sustainability asks: 'what should be done to promote the continuation of development?' This difference, if not appreciated, could have serious consequences for disasters because 'sustainable development does not necessarily lead to safe development' (Berke 1995, 14).

4. Because of the above assertions, the concept of invulnerable development captures the plethora of disaster-inducing or disaster-intensifying variables. I have categorized these contributing factors under physical, social, cultural, political, economic, technological and development headings.

Physical variables include an accurate assessment of potential hazards, the appropriate location of people and settlements, proper construction techniques, the avoidance of further environmental degradation, and the use of structural mitigation devices.

Social variables consist of educating the public about disasters, improving the provision of health care, slowing the pace of urbanization and finding ways to reverse the marginalization of specific groups and individuals (e.g. minorities, the elderly, the disabled, women and children).

Cultural variables encompass shaping people's attitudes towards hazards and encouraging their reliance upon traditional coping mechanisms.

Political variables entail altering politicians' will to do something to confront calamity, enforcing non-structural approaches, delegating authority to facilitate decision making at the local level, decentralizing responses to disaster, and strengthening relevant government institutions.

Economic variables embrace increasing wealth, reducing poverty, dedicating a sufficient amount of resources to disaster mitigation, preparedness, res-

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ponse and recovery, and insuring against potential economic losses.

Technological variables touch upon the importance of early warning systems in addition to the careful handling of modern equipment, hazardous chemicals and nuclear material.

Developmental variables involve the detailed planning of large projects aimed at improving the infrastructure as well as foresight into their consequences, in addition to the provision of disaster relief in such a way as to foster self-reliance and avoid creating relationships of dependency.

Thus, invulnerable development is comprehensive in scope, and is concerned with several variables that contribute to or resolve vulnerability. In

contrast, and depending upon who you read, sustainability generally deals with environmental degradation as a disaster-inducing or intensifying variable, and may be unclear about other contributing factors.

5. By focusing on vulnerabilities, invulnerable development is related to most types of disasters, regardless of whether they are classified as natural, human-induced or hybrid in origin. Its counterpart, sustainability, is mainly concerned with disasters that result from environmental degradation. Are other disasters that result from diverse human activities (e.g. such as those that emanate from the misuse of technology) irrelevant? Again, uncertainty exists because of the differing conceptions of sustainable development.

6. Since invulnerable development is concerned with all types of variables, it also focuses on each of the four aspects of disaster management. This is because vulnerabilities may be produced or reduced through disaster mitigation, preparation, response and recovery<sup>5</sup>. Sustainable development is mainly concerned with mitigation (e.g. environmentally friendly practices) and, to a lesser extent, response (e.g. the provision of relief in such a way as to promote development).

7. Because it focuses on vulnerability, the invulnerable development concept may also help to integrate findings from various disciplines. For instance, physical scientists attempt to reduce vulnerabilities by spreading knowledge about the factors that make natural agents particularly destructive. Geographers attempt to reduce vulnerabilities by recommending the use or non-use of certain locations. Meteorologists attempt to reduce vulnerabilities by giving advance notice of possible weather disturbances. Engineers attempt to reduce vulnerabilities by building structures that are able to withstand and resist great strain. Anthropologists attempt to reduce vulnerabilities by exposing risky attitudes and cultural behavior. Economists attempt to reduce vulnerabilities by noting the relationship between poverty and the occurrence of disaster. And political scientists attempt to reduce vulnerabilities by showing what government policies are ineffective or even dangerous.

In this sense, invulnerable development may help unify a fragmented field. Sustainability, on the other hand, was initially espoused by environmentalists and economists, and may be somewhat bound to its initial orientation.

#### Notes

4. I recognize Thomas E. Drabek for his contributions to my conceptualization of invulnerable development.

5. These steps often have unintended consequences that exacerbate the effects of disaster.

6. I agree with Frank Laird of the Graduate School of International Studies, University of Denver, about this important observation.

8. As a result of the previous assertions, invulnerable development may amount to a true disaster paradigm. The concept is explicit in its goals and means, asks questions that are pertinent to the disaster problem, captures a plethora of variables, is pertinent to all types of disasters, is related to each of the four aspects of disaster management and may help integrate findings from various disciplines. Therefore, invulnerable development identifies the general and specific areas that need to be studied, the alternative approaches and methods through which they can be examined, and the different scholars that must contribute. Sustainable development is defined imprecisely, and is therefore unclear in almost every one of these areas.

9. If invulnerable development is a more clear and appropriate disaster concept, it may simplify recommendations for those practitioners who are concerned about disaster management. This is to say, the lessons for policy makers may be more easily understood because they are more germane to the disaster problem. What is more, the comprehensiveness of invulnerable development is another reason why disaster reduction policies may become more successful. Sustainability may obscure implications for practitioners as it is imprecise as a concept and is only implicitly related to disasters. It may also hinder the reduction of disasters as it may lead to an incomplete policy guide.

10. As a result of the previous point, invulnerable development may truly help promote the worldwide effort which Blaikie et. al. propose (1994, 234-235) in order to reduce vulnerability to disasters as development proceeds. Sustainable development is mainly a lobby directed towards the conservation of natural resources for future generations. Relying on it could therefore overshadow and limit what could be achieved for disaster reduction.

### **Possible Criticisms and Rebuttal**

Four attacks are likely to be made against the argument presented in this paper.

A first possible reaction to my concept of invulnerable development is the assertion that 'no human venture has proved resistant to failure throughout history'<sup>6</sup>. For instance, if the 'unsinkable' Titanic sank, if the 'effective' technology in the Union Carbide pesticide factory in Bhopal became defective, and if the impressive 'breakthroughs' in Japanese construction engineering broke down in the Kobe earthquake, why should any-

thing—including development in the larger sense of the word—be labeled as 'invulnerable'. Past experience consequently dictates, some would argue, that the acceptance and application of my notion is utopian; it promises an undeliverable world where there are no disasters.

In response to this understandable misinterpretation of my argument, I wish to clarify my concept and then bring a similar charge against the notion of sustainable development. I assert that the term 'invulnerable development' must not

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be construed as a state or condition where disasters are completely eliminated from among those painful experiences known to mankind. Doing so would imply both omniscience about, and omnipotence over, physical forces, human-induced tragedies, vulnerabilities, and their interaction. I therefore affirm that invulnerable development should be regarded as a policy which may, if applied, lead us closer to the 'ideal' of a reduction in natural, man-made and hybrid calamities. In short, invulnerable development is not meant to imply a situation where disasters no longer occur, but instead suggest the means by which disasters may become fewer and less severe if they are approached in a different manner.

In case this clarification is unconvincing, I wish to expose the fact that sustainable development suffers from the same drawback. An unintended implication of applying this notion to disaster is that development can be 'sustained' through environmentally friendly prac-

tices alone. While this is certainly an important component of a comprehensive disaster policy, I would reiterate that development will be jeopardized unless other factors—in addition to the environment—are also taken into consideration.

A second possible criticism of invulnerable development is that it is tautological. If, for example, vulnerability—and not a natural agent—is the sole cause of disaster, then eliminating those vulnerabilities created in the development process will necessarily reduce disaster. No other conclusion is possible. Therefore, making this argument is not only easy and predictable, but indefensible.

While this theoretical drawback is certainly evident, there is growing sentiment in the field that the above relationship between vulnerability and disasters is in fact empirically accurate (see Blaikie et. al. 1994, Cannon 1993). Hence, the tautology may deserve exoneration. If this weakness is not to be overlooked, then let me remind the reader that sustainable development also exhibits circular reasoning. For, if unsustainable practices lead to disaster, then eliminating them will inevitably result in fewer or less severe disasters. Both notions again share a similar weakness.

A third likely criticism is that the invulnerable development concept does not have the large following of sustainable development. Put differently, sustainable development may be more apt to influence disaster policies and everyday activities because it is now commonly recognized by politicians and the public at large.

It is true that this is a major challenge for the concept of invulnerable development to overcome. But it should be recalled that the notion of sustainable development may hinder disaster reduction more than it helps. This is because sustainable development downplays the issue of vulnerability. Therefore, although invulnerable development is less recognized, it may be more advantageous for scholars and practitioners in that it does not suffer from this serious weakness of the sustainable development concept.

A final possible criticism of the argument presented in this paper is that my rejection of the concept of sustainable development downplays the importance of protecting the natural environment. In other words, some may view invulnerable development as a notion which either attacks environmental conservation or ignores this important issue altogether.

If this paper is indeed generating this

perception, I wish to clearly acknowledge that environmental degradation is not only hindering the development of Third World and other countries, but is promoting disaster as well. Therefore, I agree unequivocally that environmental degradation must be addressed in any serious policy that attempts to reduce disasters and promote development. To repeat, then, my argument is obviously not that environmental issues are irrelevant, or that this form of development is not headed in the right direction as it relates to disaster. Rather, it is my conviction that *the sustainable development concept does not go far enough in addressing all of the factors that contribute to vulnerability and disaster*. It deals overwhelmingly with the environment and may only be partially related to the other areas in which humans have a contributing role in disaster. Consequently, this argument against invulnerable development is not accurate either.

### Recommendations

Assuming the arguments presented in this paper are justified, five recommendations necessarily follow.

First, academics in disaster studies should use caution in borrowing foreign concepts to integrate a fragmented field and synthesize findings.

Second, disaster scholars should base the field on the knowledge that vulnerability, with its many sources, forms, and compound processes, is the root cause of disaster.

Third, academics should consider the merit of the invulnerable development concept and attempt to refine it. Fourth, practitioners are invited to apply this notion as a policy guide in order to more successfully respond to the hazardous events which affect not only the countries of the Third World, but those of the planet as a whole.

Finally, I must underscore the fact that the reduction of disasters via an alternative type of development will not be easy. For instance, technology and scientific knowledge are needed to detect risks, provide structural mitigation devices, and use hazardous materials carefully. Increasing wealth and promoting a more equitable distribution is imperative if settlement in hazardous locations is to be avoided, if the pace of urbanization is to be slowed, if the construction of building is to be improved, if health care is to reach all of those in need, and if early warning systems are to be acquired.

Changing cultural attitudes and practices is crucial if further environmental

degradation is to be avoided, if social marginalisation is to be stopped, and if relief is to be more beneficial. Political support will be required if the populace is to be educated about disasters, and if the infrastructure is to be more resistant to hazardous events. Education will be essential to promote the return to traditional coping mechanisms, enforce non-structural approaches, and encourage more resources to be dedicated to disaster mitigation, preparedness, relief and recovery. Thus, a consistent and collective effort on the part of everyone will be required if disasters are to be reduced and development is to proceed.

### Conclusion

To summarize, I wish to reiterate that it has not been my intent to discredit sustainable development as an environmental policy. This concept has done, and will continue to do much to reduce the depletion of natural resources and prevent the future degradation of our physical surroundings.

In this sense, sustainability does play an invaluable role for the future of development. But, as it is currently being applied to disaster studies, sustainable development is inadequate. This paper has attempted to illustrate that sustainability is unclear as an academic concept, does not directly address the root of catastrophic events and processes, and may therefore be incomplete as a disaster-reduction policy.

In my opinion, the ongoing shift away from the natural hazards paradigm will not be completed unless the relationship between vulnerability and development is more explicitly recognized.

What is needed is a form of development that reduces disaster vulnerabilities in order to avert the reversal of social, political and economic progress.

While the research and disaster management community may not choose to adopt the invulnerable development concept, it is hoped that my arguments will have at least altered the direction of the sustainable development school. To the extent that this has not occurred, the author encourages more discussion on how development can be made safer so that disasters can be reduced.

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### Contact details

David A. McEntire  
Emergency Administration and Planning  
University of North Texas  
P.O. Box 310617  
Denton Texas 76203-0617  
Dmcentir@scs.cmm.unt.edu

# New Books

## **Crisis Control: Preventing & Managing Corporate Crises**

by Ross Campbell

Published by Prentice Hall Australia Pty Ltd  
ISBN 0 7248 00115

Reading Ross Campbell's publication *Crisis Control*, proves to be an educative and entertaining experience. Especially prepared for decision makers, *Crisis Control: Preventing & managing corporate crisis*, contains that fine balance of essential information needed to plan for your organisations coming crisis, with the right balance of case studies to keep the reader involved.

As Ross himself acknowledges, no single book on crisis management can provide the 'ultimate response plan'. Each crisis will bring its own set of 'unknowns' and 'unintended' possibilities. For organisations, a crisis is a dynamic event that can change within seconds. What appears to be the right decision at a moment of time, can, within a few seconds, become the wrong decision. That is the nature of a crisis.

This publication is required reading for corporate decision-makers. Ross Campbell's case studies provide the reader with a real focus on what can happen. These case studies become as fresh in our mind, as they were at the time they occurred.

Briefly, we revisit some of the more important Australian and International crisis and disaster events that have occurred over the last several years.

The importance of this publication for corporate decision-makers can be illustrated by the recent Herron pharmaceutical's crisis. The Herron pharmaceutical crisis, which occurred just a few short weeks ago, involved major product recalls as the company struggled to put together an action plan that would help it survive. The Herron company's crisis has been paralleled on many occasions and will no doubt occur for other companies over time. Who can predict such a crisis?

Had the corporate office bearers of the Herron company read and understood Ross Campbell's publication, our news headlines may have looked a lot different.

*Crisis Control* is a well written publication that leads us through an understanding of the crisis event. It provides corporate decision makers with a number of diagnostic tools to assist them assess their exposures and goes on to give practical and up-to-date advice on how to plan for and manage a crisis event. The publication goes further, it discusses the 'Post-Incident' review process and how such a review can provide the necessary feed-back loop to ensure that the lessons learned are not wasted.

If you are looking for a tailor made crisis management plan to apply to your organisation, you will not find it here. Nor should you. Every crisis is different and every organisation faces different exposures. However, if you are looking for a publication that provides you with a clear understanding of how a crisis event can affect your organisation and lay before you concepts, ideas and case studies, then this is the publication for you. Corporate decision-makers will find all the 'tools' required for planning the introduction of their crisis control plan in Ross Campbell's publication, *Crisis Control*. Guidance is also provided on how to rehearse the crisis control management plan and how to draw out and learn from the essential lessons that can be found from such an exercise.

Understanding the requirements of the crisis management planning process is a must for all business managers today. This publication goes a long way to providing that understanding.

Neville J. Betts, BA., Grad Dip  
OHM, CFSIA

Neville is the principal of Booreea Rudd Pty Ltd, a company that provides industry with training and educative programs covering 'emergency response' and disaster recovery. He is a graduate of LaTrobe and Ballarat Universities and is a Chartered Fellow of the Safety Institute of Australia. His company, Booreea Rudd Pty Ltd can be found on the WWW at [booreearudd.com.au](http://booreearudd.com.au). You can email Neville on [booreea@ocean.com.au](mailto:booreea@ocean.com.au).

## **Disaster Risk Management**

by Alice Zamecka and  
Graham Buchanan

Department of Emergency Services  
(Counter Disaster and Rescue Services)  
Kedron Park Queensland, 1999.

In November 1995, Standards Australia and Standards New Zealand jointly published a new risk management standard (AS/NZS 4360 - Risk Management). The standard defined risk management as 'the systematic application of management policies, procedures and practices to the task of identifying, analysing, assessing, treating and monitoring risk'. Recognising that many industry sectors had developed their own usages and terms in relation to the management of risk,

the two standards authorities sought to rationalise these various approaches to meet growing government and industry demands for auditable technical risk assessments for public safety and 'duty of care' reasons, in a context of increasing concern over legal liability legislation.

At the time, the Australian emergency management 'industry' was working collaboratively towards the establishment of national competency standards,



and in 1996 the 'industry' peak body, the National Emergency Management Committee, endorsed the concepts and processes of the new risk management standard for application in emergency management. *Guidelines for Emergency Risk Management*, based on the standard, were developed over the next few years and subsequently endorsed by the national committee's National Emergency Management Executive Group in March 1999.

Within a federal system and given the primary

# New Books

responsibility of the Australian States and Territories for plans and programs for 'the protection and preservation of lives and property' of their citizens, the consultative processes for the development and endorsement of national guidelines in such areas

authority for dealing with such events in Queensland is the *State Counter Disaster Act 1975-78*, but it is noteworthy that the definition of *disaster risk management* in the present work is effectively identical with the definition of *emergency risk management* in the most recent version of the national *Guidelines*.

Now for the work itself. The authors point out that, although 'contingency, disaster and emergency planning' is recognised in the risk management standard itself as a field of application for the standard, the standard itself is essentially generic in nature and needs adaptation for disaster risk management purposes. The standard is directed towards the risk management needs of organisations, and defines *risk* as the chance (measured in terms of consequence and likelihood) of something happening that will have an impact on organisational objectives. Disaster risk management is concerned with communities, and both the *Guidelines* and this publication define *risk* in this context as 'a concept used to describe the likelihood of harmful consequences arising from the interaction of hazards, community and the environment'.

In consequence, while *Disaster Risk Management* in its treatment of the process in managing risks to community safety adheres closely

to the risk management process sequence and to the general approach taken in the standard itself, this publication deals at length with the risk management issues which arise from this 'interaction of hazards, community and the environment'. In identifying methods for dealing with such interaction issues, the publication draws widely on recent studies in fields such as community vulnerability, risk communication, risk information management (including the use of geographic information systems) and community planning.

Being designed, as its authors note, 'to be of assistance in helping the practical disaster planner to successfully deal with the complexities of disaster risk management', *Disaster Risk Management* is replete with examples and helpful hints for those planners at community level. Of particular value is a lengthy section (Appendix B) dealing with disaster risk management documentation and containing pro forma and sample register and recording formats; while a number of these owe something to similar

'indicative' formats in the risk management standard itself, they of course go much further in dealing with specific community safety aspects.

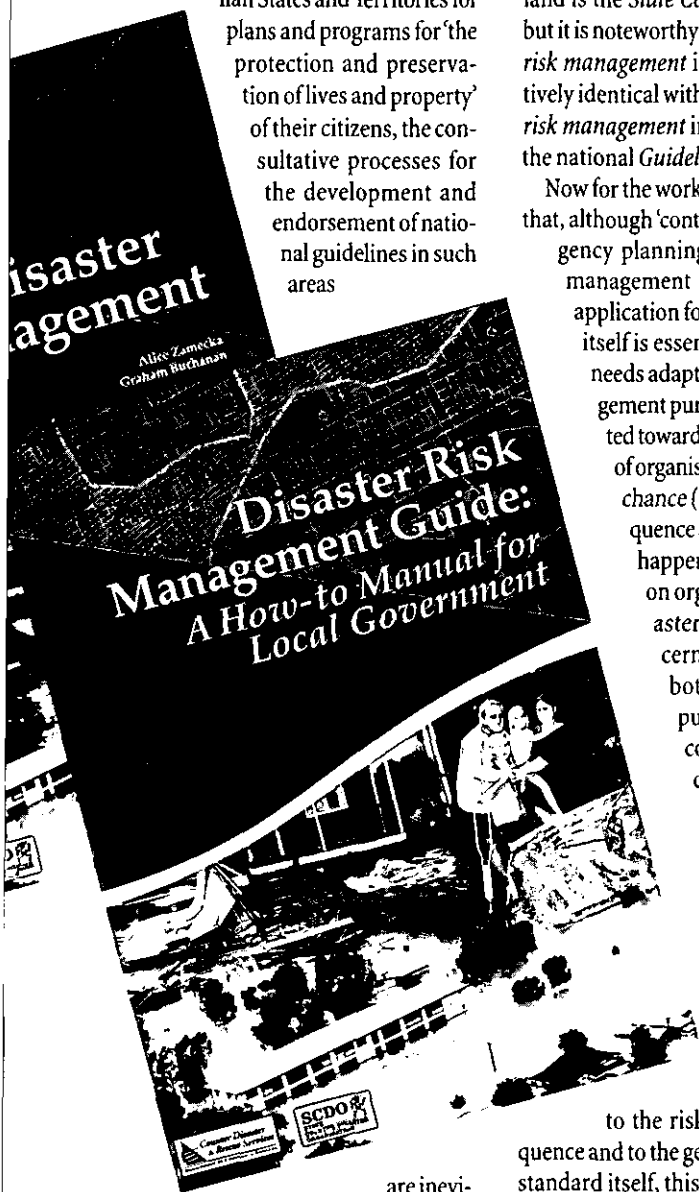
The book is attractively produced, and while having particular application in the Queensland context is just as relevant for use by emergency managers and local government authorities in other jurisdictions. It is ground-breaking as the first practical emergency risk management text available to the general public, and while it is bound to be overtaken to some extent by other publications—Emergency Management Australia and the States have just produced an 'Emergency Risk Management Applications Guide' as the first part of a series to support the uptake of emergency risk management in Australia. There is, however, one issue in the application of risk management processes in emergency/disaster management which emergency managers in Australia will need to address, and that concerns responsibility for the treatment of identified community safety risks.

The risk management standard makes clear that in any organisation the tasks of defining organisational risk management policy and ensuring commitment to and implementation of that policy are the responsibility of the organisation's management—the organisation's designated 'risk manager' usually has a staff relationship with management proper. Who, in any community, bears responsibility for defining community safety risk management policy and ensuring commitment to and implementation of that policy, and what is the relationship of the 'emergency manager' to that authority? Do similar responsibilities and relationships exist at regional, State/Territory and national levels, and how should these be addressed and defined?

*Disaster Risk Management* comes close to addressing this issue at local government level, but until responsibilities and preferred treatments in the management of community safety risks at all levels can be clarified the role of the emergency manager will remain unclear and the community is likely to be less safe. The Queensland Department of Emergency Services has also published a companion *Disaster Risk Management Guide: A How-To Manual for Local Government*.

The Reference book is priced at A\$85.00 and the How to Manual A\$45.00. The complete set is priced at A\$130.00. Copies can be ordered by cheque only from the Disaster Policy & Research Unit, Department of Emergency Service, GPO Box 1425, Brisbane QLD 4001.

Review by Roger Jones  
Director, TEM Consultants Pty. Ltd.  
Mount Macedon, Victoria  
(former Director, Australian Emergency Management Institute, EMA)



are inevitably complex and time-consuming. While the new *Guidelines* were under development, a number of authorities undertook studies which sought to apply the standard itself and progressive drafts of the *Guidelines* in various planning and training projects. The Queensland Department of Emergency Services was one such, and *Disaster Risk Management*, by two senior staff members of the Department, is the product of such studies and continued research.

A word on terminology—while the term *emergency management* is in general use in Australia in referring to policies, administrative arrangements and operational activities to deal with all types of events disruptive to the community, Queensland continues to use the term *disaster management* for managing events at the 'top end' of the spectrum of such events. This comes about because the primary legislative

# Disaster Events Calendar

June 3-6 2000  
Miami, Florida

**Reaching Women and Children in Disaster: A Global Workshop for Policy Makers, Practitioners, and Researchers**

The organizers are currently seeking program ideas and sponsors

**Contact:**

Betty Morrow  
International Hurricane Center  
Department of Sociology and Anthropology  
Florida International University  
Miami, FL 33199 USA  
phone: 305 348 1607  
fax: 305 385 7364  
email: morrowb@fiu.edu

June 4-7 2000  
Charlotte, North Carolina

**Public Risk Management Association (PRIMA) Annual Conference**

**Contact:**

PRIMA  
1815 North Fort Myer Drive  
Suite 1020  
Arlington, VA 22209  
phone: 703 528 7701  
fax: 703 528 7966  
email: primahq@aol.com  
www.primacentral.org

June 11-15 2000  
Colorado Springs, Colorado, USA

**Technology Partnership for Emergency Management Workshop and Exhibition: 'Moving Preparedness, Mitigation, and Response into the Next Century.'**

**Sponsor:**

Federal Emergency Management Agency

**Organizer:**

National Renewable Energy Laboratory

**Contact:**

Wendy Larsen  
National Renewable Energy Laboratory  
1617 Cole Boulevard  
Golden, CO USA  
phone: 80401 3393; 303 384-6497  
email: wendy\_larsen@nrel.gov  
www.nrel.gov/surviving\_disaster

June 11 - July 8 2000  
New York

**International Diploma in Humanitarian Assistance**

**Offered by:**

Center for International Health and Cooperation  
Hunter College, City University of New York; in partnership with the Royal College of Surgeons, Ireland.

The course will be conducted in English. A limited number of scholarships will be available.

**Contact:**

Michel Veuthey  
Academic Coordinator

IDHA5

15 Pierre Longue  
CH-1212 Geneva/Grand Lancy, Switzerland  
email: michel.veuthey@ties.itu.int

June 12-13 2000  
Emmitsburg, Maryland USA

**FEMA Emergency Management Higher Education Project Conference**

Conference invitees will be:

- representatives from colleges and universities with hazards, disaster, and emergency management programs
- representatives from schools investigating the development of such programs
- Higher Education Project contract course developers

**Contact:**

B. Wayne Blanchard, Ph.D.  
Higher Education Project Manager  
FEMA/NETC/ Emergency Management Institute  
16825 South Seton Avenue  
Emmitsburg, MD 21727  
phone: 301 447 1262  
fax: 301 447 1598  
email: wayne.blanchard@fema.gov

19-23 June 2000  
Ohio, USA

**Management of Complex Humanitarian Emergencies**

The fifth annual Management of Complex Humanitarian Emergencies: Focus on Children and Families is an intensive educational program featuring a problem-based learning format for pediatricians, primary health providers, NGO relief professionals, and mental health professionals. After attending this program, participants will be able to:

- identify the most important problems and priorities in complex humanitarian emergencies
- identify organizations most frequently involved in providing help in complex humanitarian emergencies and define their roles and strengths
- identify the groups most vulnerable in complex humanitarian emergencies
- do emergency nutritional assessments
- perform health profiles on refugee groups and plan interventions based on results
- define common psychosocial issues of children and the means to address them
- list basic points of international law including the Geneva Conventions that relate to all persons involved in complex humanitarian emergencies
- list security issues that are important in complex humanitarian emergencies. Employ skills in conflict resolution, negotiation, and cross cultural communication.

The program is co-sponsored by University Hospitals of Cleveland and Case Western Reserve University School of Medicine and presented by Rainbow Center for International Child Health

**Contact:**

Joan Farmer  
Continuing Medical Education

Univeristy Hospitals of Cleveland  
11100 Euclid Avenue  
Cleveland, OH 44106-6026 USA  
phone: +1-216-844-5050  
fax: +1-216-844-8133  
email: joan.farmer@uhhs.com

June 18-23 2000  
Austin, Texas

**24<sup>th</sup> Annual Conference 2000 and Beyond: a New Beginning in a New Millennium. Association of State Floodplain Managers, (ASFPM) 24<sup>th</sup> Annual Conference**

**Sponsor:**

Association of State Floodplain Managers  
For conference details cWith more than 100 speakers and 400 to 450 participants, the ASFPM annual conference represents an important resource for all community, state, and federal floodplain managers. As an additional benefit, many of the most important consulting firms and product vendors in this field participate and display their products.

**Contact:**

ASFPM  
4233 West Beltline Highway  
Madison, WI 53711  
phone: 608 274 0123  
fax: 608 274 0696  
email: asfpm@floods.org  
www.floods.org

June 22-24 2000  
Kitchener-Waterloo, Ontario, Canada

**International Conference on Climate Change Communication**

**Sponsors:**

Climate Change Action Fund  
Environment Canada  
University of Waterloo Worl

**Contact:**

<http://geognt.uwaterloo.ca/c3confer>

Communication is an integral link in the science-policy process. There has been little collaboration among those stakeholders involved in communicating climate change issues — educators, business leaders, politicians, government agencies, researchers, non-governmental organisations, the general public, native communities and the media. The aim of this conference is to improve the capacity for climate change communication. It will provide a forum for experts and practitioners to: advance the current state of knowledge in climate change communication; improve the effectiveness of climate change communication programs; increase collaboration within the climate change community; establish and maintain an international climate change communication network.

June 21-24 2000  
McLean, Virginia USA

**Society for Risk Analysis (SRA) Year 2000 International Symposium**

**Contact:**

SRA

# Disaster Events Calendar

Suite 402, 1313 Dolley Madison Boulevard  
McLean, VA 22101  
phone: 703 790-1745  
email: sra@burkinc.com

**June 26-30 2000**  
**Cardiff, Wales, U.K**

## *Eighth International Symposium on Landslide*

**Contact:**  
Eddie Bromhead  
Chairperson of the Organizing Committee  
School of Civil Engineering, Kingston University  
Penrhyn Road  
Kingston-upon-Thames, KT1 2EE, U.K  
phone: 44 181 547 2000  
fax: 44 181 547 7972  
email: e.bromhead@kingston.ac.uk  
www.king.ac.uk/~ce\_s011/isl8-000.htm

**July 3-7 2000**  
**Paris, France**

## *First World Congress of the International Water Association*

**Contact:**  
Aghtm-cfrp  
83 Avenue Foch  
BP 39.16, F-75761 Paris Cedex 16, France  
phone: +33 1 53701351  
fax: +33 1 53701340  
email: aghtm@aghtm.org  
www.aghtm.org/iwae.htm, or  
The International Water Association  
Alliance House, 12 Caxton Street  
London SW1H 0QS, U.K  
phone: +44 (0)20 7654 5500  
fax: +44 (0)20 7654 5555  
email: water@IWAhq.org.uk  
www.iawq.org.uk

**July 3-14 2000**  
**Makati City, Philippines**

## *First Asian Executive Development Course for Emergency Managers (EDC)*

**Offered by:**  
Asia Pacific Disaster Management Centre (APDMC) in partnership with the Australian Institute of Police Management

This course has an associated distance learning component towards a 'Graduate Certificate in Executive Development.'

**Contact:**  
John W. Barrett, APDMC  
P.O. Box 1005, Makati Central Post Office  
1250 Makati City, Philippines  
phone: 632 810-5444  
fax: 632 817-0894  
email: apdmc@nsclub.net

**July 9-12 2000**  
**Vienna, Austria**

## *International Conference on Catastrophic Events and Mass Extinctions: Impacts and Beyond*

**Sponsors:**  
University of Vienna, European Science Foundation, and others

**Contact:**  
E. Waggoner  
Impact 2000 Conference  
Lunar and Planetary Institute  
3600 Bay Area Boulevard  
Houston, TX 77059-1113  
phone: 281 486-2177  
fax: 281 486-2162  
email: wagganer@ipi.jsc.nasa.gov  
http://cass.jsc.nasa.gov/meetings/impact2000

**July 10-14 2000**  
**Cambridge, U.K**

## *Meteorology at the Millennium*

**Contact:**  
Royal Meteorological Society  
104 Oxford Road  
Reading, Berkshire RG1 7LL, U.K  
fax: 44-118-9568571  
Email: execsec@royal-met-soc.org.uk

**July 16-20 2000**  
**Perugia, Italy**

## *International Symposium: 10 Years of the IDNDR—How Near Are We Towards Hydro-Geological Disaster Reduction*

**Conveners:**  
National Group for the Prevention of Hydro-Geological Disasters of the National Research Council of Italy, and the Italian National Committee of UNESCO/IHP

**Contact:**  
Organising Committee  
c/o WARREDOC, Villa La Colombella  
06080 Colombella, Perugia, Italy  
phone: 0039 75 6910167  
fax: 0039 75 6919326

**July, 16-21 2000**  
**Sydney, Australia**

## *ICCE 2000, 'Coasting Ahead'. 27th International Conference on Coastal Engineering*

**Sponsors:**  
The Institution of Engineers, Australia and the Coastal Engineering Research Council of the American Society of Civil Engineers

Conference Subjects: theory, measurement, analysis, modelling, and practice for the following topics.

- coastal Oceanography and Meteorology wind, waves, currents and water levels
- coastal Sediment Processes sediment motion, sediment transport and morphology
- shore Protection beach nourishment, bypassing, hard structures, natural defences and hybrid projects.
- coastal Structures stability, construction techniques, performance.
- coastal Environment recreation, water quality, wetlands, dunes and estuaries.
- dredging, Navigation Channels, Harbours and Ports

**Contact:**  
ICCE 2000

P.O. Box N399  
Grosvenor Place, NSW 1220, Australia  
phone: +61 2 92523388  
fax: +61 2 92415282  
email: capcon@ozemail.com.au  
www.mhl.nsw.gov.au/www/icce2000.html

**July 17-28 2000**  
**Brussels, Belgium**

## *Advanced Summer Course on Public Health and Humanitarian Aid*

**Offered by:**  
Centre for Research on the Epidemiology of Disasters (CRED).  
Optional course July 10-14 on Computer Publication in Disaster Management

**Contact:**  
Caroline Michellier or Regina Below  
CRED, Ecole de Sante Publique  
Catholic University of Louvain  
30.94 Clos Chapelle-aux-Champs  
1200 Brussels, Belgium  
phone: +32 2 764 3369 or +32 2 764 3327  
email: caroline.michellier@epid.ucl.ac.be, or below@epid.ucl.ac.be

**July 25 - August 24 2000**  
**Faringdon, Oxfordshire, U.K**

Thirteenth Annual International Disaster Management Course

**Offered by:**  
Disaster Management Centre, Cranfield University

**Contact:**  
Administrator, Disaster Management Centre  
Cranfield University  
RMCS, Shrivenham  
Swindon, Wiltshire SN6 8LA, U.K  
phone: +44 1793 785287  
fax: +44 1793 785883  
email: dispreg@rmcs.cranfield.ac.uk  
www.rmcs.cranfield.ac.uk/departments/ddmsa/dmc.htm

*followed by:*

**July 25-August 24 2000**  
**Shrivenham, Swindon, U.K**

## *Training of Trainers for Disaster Management Course*

Contact the address above

**July 31 - August 18 2000**  
**Bangkok, Thailand**

## *Twenty Sixth 'Course on Disaster Management' (DMC-26)*

**Contact:**  
Zubair Murshed  
Senior Program Associate  
Learning and Professional Development  
ADPC, Asian Institute of Technology  
P.O. Box 4  
Klong Luang, Pathumthani 12120, Thailand  
phone: 66 2 524 5378/5354  
fax: 66 2 524 5360  
email: adpc@ait.ac.th  
www.adpc.ait.ac.th/Default.html

