

EMA

The Australian Journal of Emergency Management

SAFER SUSTAINABLE COMMUNITIES

Vol 18 | No 3 | August 2003



We are all
vulnerable

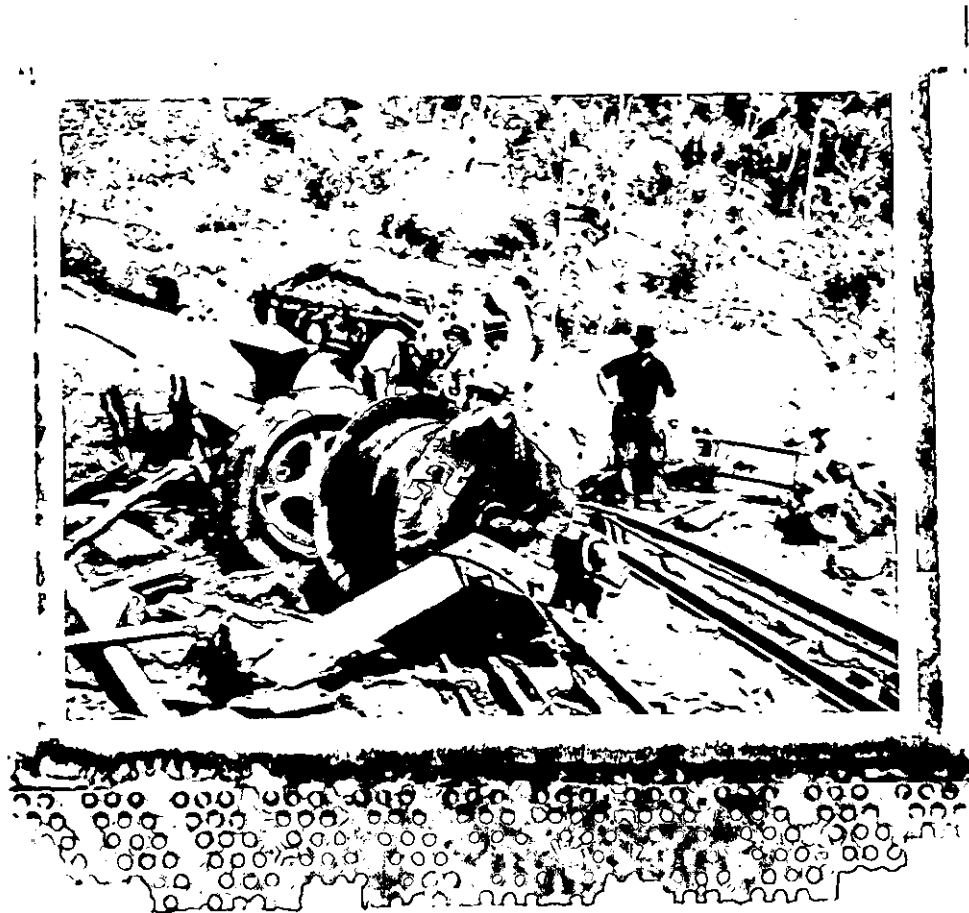
Effective
flood action plans

The key to developing
effective warning systems

How effective is
the web for
communicating
environmental hazards?

Safer Sustainable Communities
2003 Australian Disaster
Conference
10-12 September 2003
see back cover for details

historical snapshot



The Cable Drums, blown 50 feet from their foundations

On September 19, 1921 a series of explosions rocked the close knit township of Mount Mulligan, North Queensland. The explosions emanated from the local coal mine. Seventy-five men were killed in the disaster reputed to be the third worst coal mining accident in Australian history.

The disaster affected people in cities and towns all over Australia. At the time the new mine was known as a "safe" one in which gas had never been detected. Miners worked with naked light instead of safety lamps.

A Royal Commission into the accident confirmed that the disaster was caused by the explosion of a fire-damp. The Commission found explosives were used, stored, distributed and carried underground in a careless manner. The findings also concluded that a lack of adequate means to render mine-dust harmless in the mine constituted a breach of regulations.



Cover Photo: The possum had a very narrow escape from the fire unlike many other animals that perished in the deliberately lit fire at Kyeema Conservation Park. CFS volunteer, Wayne McMurtrie. Published in Adelaide Advertiser, Friday 19 January 2001. Photo by Jo-Anna Robinson.



**The Australian
Journal of Emergency
Management**

Vol 18, No 3, August 2003 ISSN: 1324 1540

PUBLISHER

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

EDITOR-IN-CHIEF

David Templeman, Director General,
Emergency Management Australia.

AJEM ADVISORY COMMITTEE

Louisa Graham, Office of Emergency Services
Commissioner, Melbourne

Christine Jenkinson, Emergency
Management Australia

Roger Jones, TEM Consultants, Mt. Macedon

Chas Keys, NSW State Emergency Service

Cate Moore, Emergency Management Australia

Dr Jennifer McKay, University of South
Australia

Graeme Nicholas, Queensland Emergency
Services

David Parsons, Sydney Water Corporation

Michael Tarrant, Emergency
Management Australia

PUBLISHER & EDITORIAL TEAM

Grey Worldwide Canberra

Manager, Mark Godfrey

Editor, Anita Cleaver

Researcher, Margaret Wallis

Design and Typesetting by Whizzbang Art

CIRCULATION

Published on the last day of August, November,
February and May each year. Over 5,000 copies
are distributed quarterly without charge to
subscribers throughout Australia and overseas.

COPYRIGHT

Material in *The Australian Journal of Emergency
Management* is protected under the
Commonwealth Copyright Act 1968.

No material may be reproduced in part or in
whole without written consent from the
copyright holders. The views in this journal are
not necessarily the views of Emergency
Management Australia.

SUBMISSIONS & SUBSCRIPTIONS

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

The Australian Journal of
Emergency Management
Main Road

MT MACEDON VIC 3441

Tel: (02) 6295 3662

Email: ajem@ema.gov.au

Or visit us online at www.ema.gov.au/ajem

For your free subscription
contact us on the above email

Contents

Vol 18 | No 3 | August 2003

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

FOREWORD 2



Overview of Customs Coastwatch 3
Customs Coastwatch gives an overview of its roles, goals and objectives.



Demographic projection as a tool for analysing trends of community vulnerability 9
Glavac, Hastings and Childs discuss the potential for using demographic and socioeconomic data projections to study geographical and temporal trends of community vulnerability to hazards.



The utility of the World-Wide-Web for fire preparedness of residents 20
Bernd Rohrmann reports on an expert assessment of six websites regarding their usefulness for informing residents about environmental hazards.



Structural and personal social processes in disaster 29
George Silberbauer discusses how disaster changes an individual's social reality.



The missing links in Community warning systems: Findings from Two Victorian Community Warning System Projects 37
Robyn Betts identifies the missing links in warning systems development through analysis of two recent Victorian projects.



Flood action plans—making loss reduction more effective in the commercial sector 46
Andrew Gissing argues flood action plans can overcome low flood preparedness but research shows they are often poorly developed.



We are all vulnerable 55
John Handmer suggests the issue of 'vulnerability' should be approached positively as resilience or as the capacity to cope with or adapt to change.

EMA UPDATE 61
CONFERENCE DIARY 66
NOTES FROM THE FIELD 71

FOREWORD

Assistance from the air

by Rear Admiral Max Hancock

The primary task of Coastwatch is the coordination of civil maritime surveillance and response service. The bushfires that confronted the ACT earlier this year provided the Government with an opportunity to exploit the flexibility of the Dash 8 aircraft to detect the new fires and to plot the movement of existing fire fronts. In this role Coastwatch provided an important contribution to the firefighting effort.

The January 2003 Canberra bushfires posed a considerable threat to Canberra residents and stretched the Emergency Services ability to track the numerous fire fronts that existed across the ACT. With the forecast of extreme fire weather conditions, the Australian Federal Police (ACT Division) approached Customs Coastwatch to discuss the potential for aerial assistance to the fire-fighting effort. Coastwatch had one of its Dash 8 aircraft operating from Canberra at the time and agreed to test the effectiveness of the aircraft's advanced electronic surveillance systems for monitoring movements of the fire fronts. A short flight over the bushfire area clearly demonstrated that the equipment could provide fire-controllers with valuable images of the fire's behavior with the added advantage that the newly fitted satellite communications system could immediately relay the images back to the National Surveillance Centre. The Coastwatch aircraft provided assistance to the emergency services by flying over Canberra at considerable altitude while using an infrared sensor to locate fire-fronts that may affect life or property. Due to the considerable amount of smoke produced by these fires, fire

crews on the ground and water-bombing helicopters were hampered in their efforts to locate fires of concern. With the capability to view through the thick smoke, the Coastwatch aircraft instantaneously reported significant fires back to the National Surveillance Centre. This information was immediately passed to the ACT Emergency Services Headquarters.

At the conclusion of the bushfire battle, the following letter was received by the senior management of Coastwatch from the Deputy Chief Police Officer, Andy Hughes.

"Just a quick note to convey my personal thanks for the excellent cooperation and assistance Coastwatch provided ACT Policing during the recent bushfires... I know that my troops on the ground, who were bracing themselves for a potential repeat of the disastrous events of Saturday 18 January, were encouraged in the knowledge that there were some friendly eyes in the sky that were tracking the movement of the firefronts. ACT Policing is indebted to you both, your professional team at the Coordination Centre and the flight crew."

Although not a usual task for a Coastwatch aircraft, both the aircraft crew and the staff in the National Surveillance Centre met the challenge and felt highly satisfied that they assisted in preventing further loss of life and property in Canberra.

The success of the flying provided by Coastwatch during the bushfire crisis was achieved due to the sophisticated array of electronic equipment that the Coastwatch

Dash 8 aircraft supports.

This equipment allowed the crews to conduct enhanced surveillance that would otherwise have been impossible to achieve. Electronic sensors such as radar, infra red, day television (DTV) and Inmarsat satellite technology create a formidable platform for conducting surveillance operations in all types of weather conditions. Inmarsat in particular has enhanced the Coastwatch decision-making process through reliable, high-speed transmission of data and imagery previously unable to be attained.

This electronic equipment is also used in the support of the search and rescue (SAR) operations occasionally performed by Coastwatch. In 2002–2003 alone Coastwatch aircraft responded to over 100 requests for SAR support in one form or another. With flight operations 365 days of the year covering an area of over 15 million square nautical miles, Coastwatch is often able to provide a rapid response when a call comes through from AUSSAR for search and rescue support, particularly in areas hundreds of miles offshore.

While the main responsibility for Coastwatch will continue to be the ongoing surveillance of the Australian coastline and territorial waters it has demonstrated a capacity and ability to provide important aerial support to emergency service organisations in times of crisis.

**Rear Admiral Max Hancock is
Director General of Coastwatch**

Overview of Customs Coastwatch

Customs Coastwatch gives an overview of its roles, goals and objectives

By Customs Coastwatch

Customs is responsible for providing a civil maritime surveillance and response service to a range of government agencies. Customs Coastwatch, a division of the Australian Customs Service, provides this service.

Coastwatch uses a combination of assets in order to manage and coordinate this responsibility.

This includes contracted aircraft, seagoing vessels of the Customs National Marine Unit and Australian Defence Force patrol boats and aircraft. The activities of Coastwatch are determined by the surveillance and response needs of the various government agencies that form its client base.

Coastwatch vessels patrol the Australian coastline, Australia's offshore territories, the Australian Fishing Zone and the Exclusive Economic Zone surrounding these areas.

Australia's offshore maritime area amounts to approximately 37,000km of coastline and an offshore maritime area of over nine million square kilometres. Increasingly, Coastwatch is being called on to investigate incidents beyond the Exclusive Economic Zone.

Coastwatch plays an important role in supporting Australia's Oceans Policy by identifying and

responding to illegal fishing in Australian waters. Coastwatch detects and reports environmental incidents such as marine pollution and contributes to marine species protection through reporting sightings of marine animals. Coastwatch also provides support to Australia's search and rescue authorities.

Surveillance flights are undertaken to detect and report activities as diverse as people smuggling, attempts to import or export prohibited goods, illegal trafficking in flora and fauna and human incursions on coral reefs and other protected areas. These represent potential threats to quarantine, health and marine habitat.

The key to Coastwatch's effectiveness is an operational method that is client-driven, threat-based and risk assessed. Coastwatch's effectiveness is directly related to the quality and timeliness of available information and the intelligence assessments that are derived from this information.



Reims, F406 twin engine combined electronic and visual surveillance aircraft

History

Civil surveillance in Australia began in the late 1960s using Royal Australian Air Force aircraft to patrol the newly declared 12 nautical mile fishing zone. In addition, Royal Australian Navy patrol boats assisted with surveillance and acted as a response force.

During the early and mid 1970s, a number of issues began to focus the Government's attention on Australia's civil surveillance needs. These were as follows:

- increased activity of foreign fishing vessels during 1973 and 1974
- traditional fisherman landing in the Kimberley coastal area
- the first 'boat people' arrived in Darwin in 1976
- the Government announced its intention to declare a 200 nautical mile Australian Fishing Zone around Australia in 1977
- the Government made the Department of Transport responsible for coastal surveillance in the late 1970s. This moved Australia closer to a coordinated civil surveillance effort.

In 1983, responsibility for managing and coordinating civil surveillance transferred to the Australian Federal Police (AFP). This followed a review by the Minister assisting the Minister for Defence, Kim Beazley. In 1987, the Australian Government commissioned a review of civil surveillance arrangements. Conducted by Sir Hugh Hudson, the report, *Northern Approaches*, was handed to the Government in 1988.

This provided the foundation for future civil maritime surveillance activity and the development of Customs Coastwatch. In that year, the term 'Coastwatch' was coined.

Responsibility for civil surveillance programs was allocated to the AFP. However, funding for the program was divided among client agencies. This was seen as a major flaw and it was subsequently recommended that the funding and administration be streamlined. This brought together policy, operational control, contract administration and funding in one autonomous agency.

This recommendation resulted in the transfer of all administrative and operational responsibility for civil surveillance operations to the Australian Customs Service. This decision was reaffirmed through a series of government and inter-departmental reviews between 1988 and 1999.

In early 1999, two undetected arrivals of suspect illegal entrant vessels were discovered. A review of coastal surveillance was ordered in April 1999. The review developed 18 recommendations that were fully accepted and funded by the Government. This resulted in an influx of new resources,

among them marine and aircraft crews, new aircraft, increased staff and a National Surveillance Centre. It was through this that the existing operational and planning capability was combined with a new analytical role.

Organisation

Customs Coastwatch is an operational division of Customs headed by the Director-General Coastwatch. Since July 1999, serving rear admirals from the Australian Defence Force have filled this position. The Director-General Coastwatch is responsible for:

- delivering effective and efficient civil maritime surveillance and response services.
- determining national surveillance planning priorities
- administering the contractual and overall financial aspects of the national surveillance program.

Coastwatch headquarters and the National Surveillance Centre are located in Central Office in Canberra. This ensures effective liaison with the head offices of its major clients.

Coastwatch has regional bases in Cairns, Darwin, Broome and Thursday Island. Regional

Coastwatch staff undertake liaison and provide operational planning and flight briefing for contractor aircraft assigned to the regional base.

Operation Relex

In August 2001, the Australian Government instituted new arrangements for the detection and response to suspect illegal entrant vessel (SIEV) arrivals. Within the Operation Relex area of operation, the Australian Defence Force has the lead role in all SIEV-related activity. Within this area, Customs Coastwatch operate in support of the Australian Defence Force. Coastwatch retains the lead for other activities within this operation and in all civil maritime surveillance and response matters. Customs Operation Eddington complements Operation Relex.

Clients

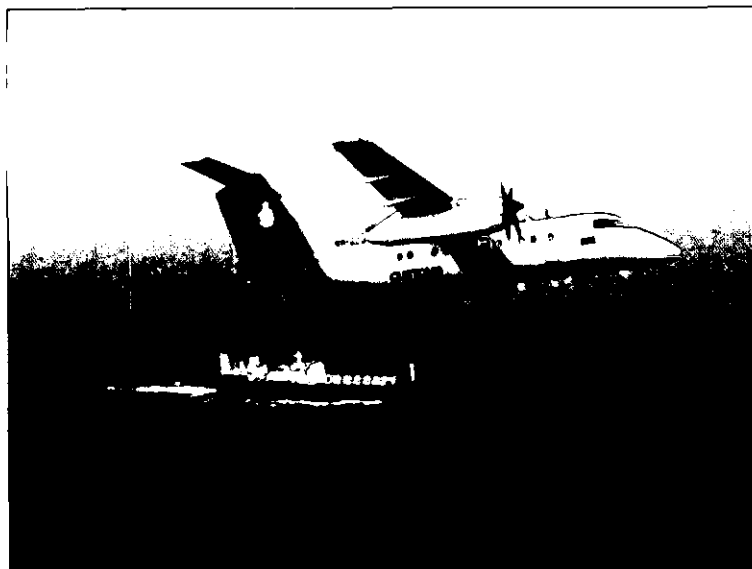
The activities of Customs Coastwatch are determined by the surveillance and response needs of the various government agencies that form its client base. Coastwatch primary clients are:

- Australian Fisheries Management Authority
- Australian Quarantine and Inspection Service
- Department of Immigration and Multicultural and Indigenous Affairs
- Environment Australia
- Great Barrier Reef Marine Park Authority
- Australian Customs Service

Surveillance and response resources

The main components of Australia's current civil maritime surveillance and response effort are:

- visual and electronic aerial surveillance using contracted fixed-wing aircraft
- Customs Coastwatch surveillance, response and logistical support from



Bombardier de Havilland Dash 8 – offshore electronic surveillance



Bombardier de Havilland Dash 8 – offshore electronic surveillance

contracted helicopters based in the Torres Strait

- support from the Royal Australian Air Force's P3-C Orion offshore patrol aircraft
- eight Customs Bay-class sea-going vessels of the National Marine Unit
- support from the Royal Australian Navy patrol boats
- additional charter air or surface resources as required.

The Customs Coastwatch aircraft fleet comprises:

- six Pilatus Britten Norman Islanders and one Shrike AC 500 Aero Commander for visual surveillance
- five de Havilland Dash 8 – 200 series aircraft fitted with digital radar and opto-electronics sensors including a Wescam infra-red turret and advanced satellite technology
- three Reims F406 aircraft equipped with radar and night vision equipment for both visual and radar work adjacent to the shore
- one Bell 412EP helicopter with an infra-red detection system
- one Bell Longranger IV helicopter.

While contractors supply aircraft, aircrew, administration and engineering support, Coastwatch controls the operational aspects of tasking and performance management, including training and monitoring programs.

Operations

Wide area planned and targeted surveillance

The civil surveillance program is comprised of wide area planned surveillance and targeted surveillance operations.

Wide area planned surveillance

This forms the majority of the flying program. It involves the translation of planned, risk-assessed taskings submitted by client agencies and translated into flying programs. These are developed two to three months prior, allowing the Customs Coastwatch Regional Offices and the contractor to determine the general resource requirements.

The Coastwatch Monthly Surveillance Program is flexible. This allows it to be varied to suit emerging threats. More precise flying programs are developed leading up to each flight. The surface assets of the Royal

Australian Navy and Customs National Marine Unit are dovetailed into these programs to support these strategic areas of client interest. Vessel programs are also planned several months in advance.

Targeted surveillance

Targeted surveillance comprises flying which is the result of specific operational intelligence. This intelligence is usually received with little notice and normally presents a more demanding situation than wide area planned surveillance. By nature, these operations are usually given absolute priority in both manpower and funding until they are concluded or cancelled. Marine assets are drawn from the strategic program to support tactical operations as required.

Planning of Surveillance Operations

Introduction

The Coastwatch Planning section is responsible for the coordination of resources and client tasking requirements to generate the Civil Maritime Surveillance Plan (CMSP). The CMSP is the authoritative source for the planning, conduct and analysis of Coastwatch air surveillance activity.



Bell helicopter – Longranger IV – conducts operation in the Torres Strait region

Wide area surveillance tasks

The nature of the Coastwatch model requires that regional staff from client agencies submit tasking through their head office to Coastwatch Central Office and state-based agencies submit tasking through a related federal agency.

Availability of surveillance assets

Coastwatch Planning, in conjunction with Coastwatch Resources, monitors aircraft usage rates on an ongoing basis.

Coastwatch planning Standard Operating Procedure (SOP)

The Coastwatch Planning SOP has been developed to provide a higher level of consistency, accountability and transparency in the planning of the Coastwatch Monthly Surveillance Program (CMSP). The CMSP is developed from tasks contained within the Coastwatch Command Support System (CWCSS).

Coastwatch Planning in Canberra issues to all regional offices, a planning matrix for each month of the year outlining planned training days, special events and aircraft usage rates, etcetera.

Flight briefs and reporting

Flight briefings

Detailed flight briefings are issued for all flights. Customs Coastwatch Regional Offices provide the flight brief for operations in northern Australia. Flights in southern Australia, from Brisbane to Perth, are briefed by Coastwatch Operations in Canberra.

Post mission reports

These reports record flight outcomes. These are forwarded electronically to the National Surveillance Centre where the information is automatically entered into the Customs Coastwatch database (CWCSS) and forwarded to the relevant client agencies and Coastwatch Regional Offices.

National Surveillance Centre

In 1999 the *Prime Minister's Task Force on Coastal Surveillance* recommended that a National Surveillance Centre be established within Customs Coastwatch in Canberra. The National Surveillance Centre became operational on 26 January 2000 and was formally commissioned by the Prime

Minister on 5 April 2000. It was anticipated that this would better manage the national effort through enhanced communication links and an internal capacity to analyse information from a variety of agencies.

A range of electronic systems supplied from a range of government agencies supports the surveillance centre. Intelligence analysts provide an internal capacity to analyse and disseminate information. These analysts use the electronic systems to assist client agencies with risk assessments and to support Coastwatch activities by providing intelligence that allows more effective deployment of surveillance assets.

All of Coastwatch's operational activities are monitored in the National Surveillance Centre in Canberra. When a Coastwatch aircraft detects an incident that the crew considers to be a potential or actual breach of Australia's laws, it reports to the National Surveillance Centre. The centre consults the relevant client agency to determine the requirement for follow up action. If a surface response is

requested, the National Surveillance Centre arranges for the most appropriate vessel, usually a Customs vessel or a naval patrol boat, to respond. Coastwatch aircraft often provide forward air support to the response vessel until it reaches the scene.

Concept of operations

The Customs Coastwatch Concept of Operations has continued to evolve over the 14 years of its existence. In more recent years, the process has been informed by the outcome and recommendations of a number of detailed reviews of Australia's civil maritime surveillance arrangements.

The overriding objective has always been to try to achieve and maintain an operational solution that meets the needs of client agencies and represents an effective and cost-efficient use of resources. The flexibility of aircraft has helped overcome barriers including the size of the surveillance area and the diversity of Coastwatch client interests. To ensure maximum effectiveness, surveillance planning takes account of the aggregated needs of all clients and the combined effect of all flights.

Depending on clients' interests, response requirements differ. A viable maritime capability is central to most successful responses. Most responses are mounted with the Customs Bay-class vessels or the Royal Australia Navy Fremantle-class patrol boats.

Operating principles

Underlying the Concept of Operations are several key principles and parameters.

Service provider to clients

As a service provider, Customs Coastwatch is responsive to client needs and requirements. Coastwatch does not determine threat areas or clients' surveillance interests. Each client agency is responsible for the development

of its own threat assessments and for assessing its surveillance requirements. It is the role of Coastwatch to translate identified client surveillance needs into timely surveillance outcomes.

When a client agency requests a response action to a surveillance sighting, Coastwatch coordinates all activities for that response until the client agency is able to assume control of the situation.

National perspective

The National Surveillance Centre determines the direction and focus for surveillance activities in accordance with priorities and requirements identified by client agencies. Regional Offices are responsible for carrying out the surveillance plan and for local liaison with client agencies to ensure requirements are fully satisfied.

Concentration of resources

Due to the extent of the Australian coastline, surveillance effort should ideally be concentrated in the right place at the right time. Customs Coastwatch uses client agency threat assessments to plan airborne surveillance missions that have the greatest likelihood of achieving an operational result. Coastwatch operational planners and client agencies continually reassess threat areas so that emerging threats can be adequately addressed.

Economy of effort

Each sortie is planned to gain the maximum possible benefits for the cost incurred. Optimal economy of effort is achieved through multi-tasking, including aircraft undertaking tactical operations. For example, an aircraft conducting a fisheries surveillance task would also undertake surveillance tasks for all other agencies with interests in the area being covered.

Common risk assessment methodology

The Australian National Audit Office report, *Performance Audit*

Report Number 38: Coastwatch, recommended that Customs Coastwatch implement, in association with its client agencies, a common risk-assessment process for use as the basis for ranking client taskings.

Customs agreed with the recommendation and Coastwatch has made significant progress in the development of a common risk-management methodology. The process operates on the basis of segmentation of Australia's maritime zones into a number of geographic areas. Within these areas, clients identify each of the threats relevant to their individual interests and Coastwatch allocate each a numerical risk rating. The range of scores allocated to clients' various tasks informs surveillance planners and underpin the flight programming in the Coastwatch computer application. Common risk-assessment methodology will be fundamental to the development of future surveillance contracts.

International cooperation

Since 1988, Customs Coastwatch has developed and improved procedures for conducting and coordinating civil surveillance. In many parts of the world governments conduct, or would like to conduct, operations similar to all or parts of the Coastwatch task. Requests for information are received from a range of overseas countries. Conversely, Coastwatch is aware that there are other organisations in the world from which it can learn.

Customs has strong information links with the Australian Department of Defence, the Oceania Customs Organisation, the World Customs Organization, and the United States CoastGuard. This has expanded Coastwatch boundaries in terms of information sharing and facilitating an information exchange with other countries that have mutual interests with Coastwatch.

The future

Use of technology

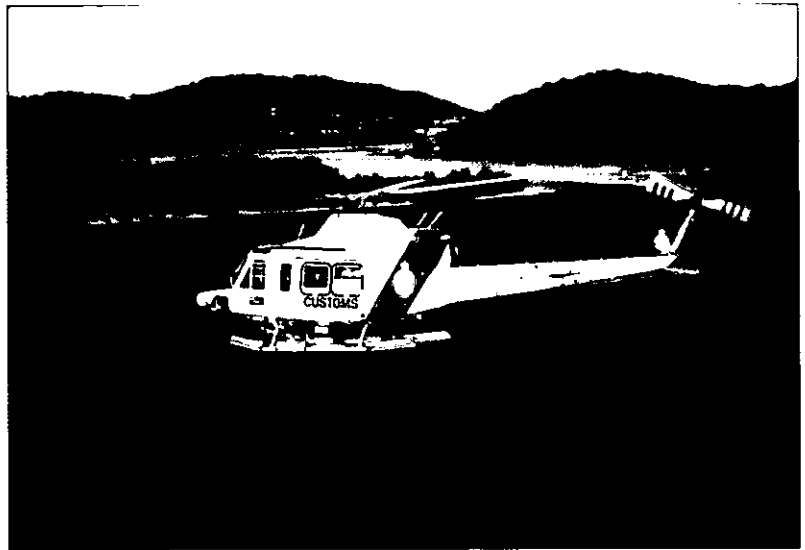
The current surveillance contracts are based on aircraft using visual, radar and electro-optical systems. In order to provide high-level service to clients, Customs Coastwatch is investigating new and emerging technologies that may be applied to surveillance.

Satellites

Trials of commercial satellite information gathering have been conducted. The trials used both radar and optical satellites. It focused on evaluating the benefits the satellites might provide for coastal surveillance activities. Of particular interest is their capacity to detect and track vessels of interest in Australia's maritime zones. The trials also assessed the impact of this technology when it is used in conjunction with other surveillance options. For example, whether the satellite data can be used to eliminate whole areas from the need for aerial surveillance. Alternatively, it could be used to direct an aircraft to a specific target requiring further investigation. This reduces the need for surveillance aircraft to carry out more extensive, and potentially less productive, searches.

High frequency surface wave radar

In conjunction with the Department of Defence, a trial of high frequency surface wave radar is being undertaken. This will assess its potential to provide continual long-range/wide-area tracking of vessels. High frequency surface wave radar is a long-range/wide-area radar system that can detect targets beyond the horizon. The Australian version is a derivative of the Jindalee (over-the-horizon radar) research and has the potential to provide detection and tracking of surface vessels and aircraft out to 300 km and over an arc of 120 degrees.



Torres Strait region Bell 412 EP helicopter

Communications

Customs Coastwatch communications capability is being enhanced through the use of the Inmarsat satellite system. Current systems have limited bandwidth and are restricted to voice communications. In addition to voice transfer, the Inmarsat satellite system allows reliable, high-speed transmission of data and imagery between fitted surveillance aircraft, the Coastwatch National Surveillance Centre, the Department of Defence and client agencies. This capability supports the National Surveillance Centre and mobile command centres in their analysis of situations and operational decision-making.

The provision of a common communications capability allows the exchange of surveillance information. In particular, communications capability between Coastwatch aircraft and those similarly fitted surface assets that might be required to respond to a sighting.

New civil maritime surveillance contracts

The current civil maritime surveillance contracts start to expire from June 2004. Customs Coastwatch has commenced a project to develop and implement

future civil maritime surveillance and response capability.

This project is considering the threats and risks facing the Australian border and how it may respond. The project seeks, through industry consultation and a tender, to establish civil maritime surveillance contract(s) for the supply of up-to-date capability to support Coastwatch's Concept of Operations strategy.

For further information contact: communications@customs.gov.au

Demographic projection as a tool for analysing trends of community vulnerability

Glavac, Hastings and Childs discuss the potential for using demographic and socioeconomic data projections to study geographical and temporal trends of community vulnerability to hazards.

By Dr Sonya M. Glavac, Dr Peter A. Hastings and Dr Iraphne R. W. Childs

This paper discusses the potential for using demographic and socioeconomic data projections to study geographical and temporal trends of community vulnerability to hazards. Several techniques are outlined, and their practical application critically discussed in relation to variables considered to be indicators of hazard vulnerability. Demographic projections for Southeast Queensland Local Government Areas were generated, mapped and discussed as an illustration of possible information outputs.

Introduction

Ferrier (1999) outlined the importance of knowing the characteristics of populations when considering issues of emergency management. He suggested that demographic data were useful in assessing community needs, resource planning, and developing targeted educational campaigns. Socioeconomic and demographic variables have also been incorporated into assessments of community 'vulnerability' to natural hazards¹. (e.g. Granger et al., 1999; Granger and Hayne, 2001). Ferrier further identified the potential value of population/ demographic projections to emergency-management planning and briefly commented on their possible sources, methods and applications in Australia.

This paper advances the theme of using population/ demographic data projections, particularly in the context of studying temporal and geographical changes in community vulnerability to environmental hazards. The opportunities, constraints and techniques

of projecting possible socioeconomic and demographic indicators of vulnerability will be outlined. As an illustration of applying projection techniques in this context, an analysis of demographic and geographical trends was produced for Local Government Areas of Southeast Queensland.

Demographic indicators of community vulnerability

The overall paradigm shifts in Australian disaster/ emergency management described by Salter (1997) include an increasing emphasis on understanding and assessing community vulnerability. Studies, including those of Blaike et al. (1994), Granger (1996), Salter (1997), Granger et al. (1999), Middlemann and Granger (2000), Granger and Hayne (2001), Zameka and Buchanan (1999), King and MacGregor (2000) and Buckle et al. (2000; 2001), identify characteristics that are deemed to reflect aspects of community vulnerability. Among these characteristics, demographic and household measures often feature. Groups commonly identified as being vulnerable include: the very young, the aged, single parent households, lone-person households and new arrivals/migrants (e.g. King and MacGregor, 2000). Levels of language skills, income and mobility are also cited in the literature (e.g. see Buckle et al. 2000, 2001). Quantification of these variables for localities is enabled via Australian Bureau of Statistics Census data, as undertaken by the "Cities Project" research (e.g. Granger et al., 1999; Middlemann and Granger, 2000, Granger and Hayne, 2001).

Measuring vulnerability is, however, not as simple as quantifying demographic information. King (1999) and King and MacGregor (2000) raised several issues involving Census-data usage, including its application to derive demographic vulnerability indicators². Furthermore, King and MacGregor (2000) and Buckle

1. In this paper, the term "vulnerability" will be used as a collective term referring to the interrelated concepts of vulnerability and resilience. According to Buckle et al. (2000; 2001), the former implies a susceptibility to loss, while the latter describes capacities to withstand or recover from loss.
2. Issues included the impacts of data amalgamation/ standardisation on resolution and relevance; the choices and weightings of 'vulnerability' variables; and the impacts of these on data analysis and interpretation.

et al. (2000; 2001) urge an appreciation of the complex and contextual nature of vulnerability and resilience, and promote the importance of many 'less quantifiable' social determinants including attitudes, values, behaviour, perceptions and social/ community networks.

Despite the limitations, socioeconomic and demographic Census data are accessible (in terms of availability & cost), systematically collected and reported, and regularly updated at a range of geographical scales. They will likely continue to provide *at least a basis* for further vulnerability analyses by providing an overview of geographical patterns and facilitating the broad monitoring of socio-demographic change. Though favouring contextual vulnerability assessments based upon needs and services, Buckle et al. (2001) acknowledge that certain socio-demographic characteristics (such as those listed above) are linked to higher *potential* levels of vulnerability. King (1999) ultimately concluded that *total population* was the key independent demographic variable for community vulnerability analyses. Cities Project documentation identifies population as "clearly the most significant element as risk" (e.g. Granger and Hayne, 2001, Appendix C.9).

This paper will continue under the assumption that Census-derived socioeconomic and demographic variables are useful inputs into vulnerability assessments, as broad indicators at least.

Demographic indicators: trends over time

The Cities Project, and most other regional vulnerability studies to date, emphasise static analyses. Community characteristics affecting vulnerability, however, change over time. King (1999) noted appreciable changes in total population, age distribution and other potential demographic vulnerability indicators for coastal Queensland over only a five year period (between the 1991 and 1996 Census).

A new set of questions arises when longitudinal change is considered. Will historical trends continue? Will new trends emerge? Are there particular regions into which 'vulnerable people' may concentrate in the future? Is management adapting to, or planning for, demographically changing communities? In answering such questions, techniques of population/ demographic projection and extrapolation may play important roles.

Ferrier (1999) identified population projections, often developed by government authorities for planning purposes, as a useful data source for emergency management planning. There are obvious strategic benefits of incorporating accurately projected data into forward planning, but projections are also valuable for "updating" Census information. The latter is important where significant regional change occurs during inter-

Censal periods, resulting in rapid "decay" of Census information (e.g. King, 1999).

Techniques for demographic projections/extrapolations

This section outlines key projection techniques, and describes the opportunities and limitations of projecting and extrapolating vulnerability-related demographic variables (mostly Census-derived). Issues of variable choice and application of outcomes to community vulnerability assessments are matters for individual practitioners in their own situation.

Population projections are not forecasts that predict the future, but rather are mathematical "what if" exercises, given assumptions about (for example) the future trends in fertility, mortality and migration. The better the assumptions the better the projections. It is important to note that such modeling is beyond simple "extrapolation", which only projects on the basis of past population trends.

There are several methods of projecting population counts, and the components of population (including particular age-groups). Typically a projection method is selected to produce the best estimate for a given point in time, at a given scale. Users of such projections should have a basic understanding of the range of the methods and their assumptions so that they can critically interpret end-products or plan information acquisition. Table 1 outlines the key techniques for generating demographic projections and briefly comments on their application.

There is no single "best" projection method, as evidenced by the lively debate in the literature about alternative methods. For example, Smith and Sincich (1992) argue for the use of simple exponential extrapolation, Long (1995) for full cohort-component projections and Ahlburg (1995) for more complex methods involving economic-demographic models. These debates are inevitably linked to the question of how far into the future projections can be made with "acceptable" accuracy. With all projection methods, however, the shorter the projection period the more reliable the projections—particularly in regions of fast population growth. Generally, projections out to five years are good in most situations. In the end, projections are only as good as the assumptions they are based upon.

Table 1. Major demographic projection techniques.

PROJECTION TECHNIQUE	BRIEF EXPLANATION AND COMMENT
Growth Rate Methods	<ul style="list-style-type: none"> • a geometric or exponential growth rate is assumed over a period of time • simple; requires relatively little data • does not project changes in population composition • best restricted to one year projections (e.g. see Newell 1988)
Cohort Component Method (& derivatives)	<ul style="list-style-type: none"> • projects populations by typically one or five-year age cohorts using fertility, mortality and migration data and assumptions • commonly used for state and national projections, but also for Statistical Divisions and sometimes Local Government Areas; most reliable for larger geographic areas • small changes in assumptions concerning input variables can result in greatly differing projections; migration data/ assumptions are key in Australia, but data are not comprehensive—objective approximations or expert systems are required to account for regional dynamics (economics, policies etc.)
(Aggregate) Time Series Analysis	<ul style="list-style-type: none"> • historical trends of population size, total fertility and life expectancy are approximated by logistic ("S" shaped) curves • due to assumptions concerning "fixing" variable limits and trends, some demographers suggest that these models provide little basis for projecting into the longer-term future (e.g. Marchetti et al., 1996); although others see some potential value (Lee et al., 1995)
Ratio (Share) Method	<ul style="list-style-type: none"> • a statewide total is used as a control to which the sum of totals from smaller areas (such as Local Government Areas) must add; projections based on multiple correlations relate city/region growth to both state growth and city density during the same period to create a regression equation. • may be problematic for fast growing large areas as it can erroneously force all areas to show growth; but is often used in conjunction with cohort component methods by many State Government Departments in Australia.
Microsimulation	<ul style="list-style-type: none"> • computer algorithms simulate the behaviour of individuals' life-course events (e.g. marriage, divorce, birth of children etc.) to make projections for the population. • data and computational demands are high; analyses are therefore based on samples, and scaled to the whole population • able to accommodate large numbers of changing life "states" (e.g. 'married with children' is a "state"); cohort component analysis is less able to do this.

Applying projection/extrapolation to demographic and socioeconomic 'vulnerability' indicators

Several of the Census-derived demographic variables that have been related to vulnerability can be projected for a given area and period by directly using demographic projection modeling (as described). These include: total population; total number of households; the proportion/ number of the very young (e.g. number of children under 5 years); and the proportion/ number of the aged (e.g. number of people 65 years & over). For other demographic and related socioeconomic variables, projections must be developed in alternative ways. Extrapolations of historical trends and/or the application of "multipliers" are options, but these

introduce further assumptions, and can limit the interpretation of results.

It is important that users of such projection modeling appreciate the complexity of demographic projections and avoid inappropriately using information gained from simply extrapolating past trends into the future. For some variables, projection may be possible, but considerable data are required beyond the Census or similar readily available sources. Household-related projections (e.g. household size, single parent households and lone person households) and socioeconomic variable projections (e.g. low income, number of cars per person, proportion of the population that rent, are non-English speaking) are examples of these.

Household-related projections (e.g. household size and structure) can be calculated through a variety of means including: modeling based on demographic trends and projections, the projection of demographic cohorts which typically head various 'types' of households ("headship rate"—an operational and relatively simple technique), and microsimulation. The most reliable and consistent sources of this type of information are generally specialist government departments³ and private consultants who engage in advanced regional modeling.

Socioeconomic factors are thought to be harder to predict than the demographic processes themselves (Keyfitz, 1981). Vulnerability-related socioeconomic variables that can be projected include: the proportion of households/ population that rent, and the proportion of the population with cars. These data are collected not only via the Census every five years but also through other agencies such as State Government departments. Possible projection methods involve time-series analysis, or using multipliers. An example of the latter would be to calculate the number of cars per person; make assumptions about how this will change in the future based on past behaviour; and apply this information to population or household projections.

Although many variables can simply be extrapolated forward, there may be limited theoretical bases behind such extrapolations. In this context, socioeconomic variables that cannot be easily projected include religion, proportion of the population that is disabled, proportion of the population that is non-English speaking, and proportion of the population that is low income. In these cases, changes rely too heavily on other factors (e.g. economic and policy factors), and/or data are not available at an appropriate resolution, and/or variables such as income and religion are reported unreliably on the Census. The Australian Bureau of Statistics' composite SEIFA indices (Social and Economic Indicators for Areas, ABS, 1998, Cat 2039.0) are similarly problematic. Though linked to vulnerability by Granger et al. (1999), Middlemann, M. and Granger (2000) and Granger and Hayne (2001), they can be difficult to interpret, are based on the relatively volatile Census counts (rather than Estimated Resident Population) and because of the way in which they are constructed, their use in some quantitative projection techniques is open to question.

Some simple rules of thumb

As described, there is a range of projection/extrapolation techniques. Each affords particular opportunities and limitations. There are, however, some simple rules of thumb that generally relate to the accuracy of projections and should be considered when deciding which projections to use.

1. The shorter the projection period the more reliable or accurate the projection. This is particularly the case for rapidly changing localities.
2. The larger the geographic area the more accurate the projection. Some regional vulnerability analyses, including those of Granger (1999) and Granger and Hayne (2001), used data at suburb and Census Collection District (CD) resolution. This is appropriate for analyses based on one point in time, but projections for small areas such as these have a very high likelihood of inaccuracy. This is because there is little data available at the CD level that has not been randomised to protect the identities of individuals. A large error component is therefore introduced that adds to the error inherently associated with small-area projections.
3. The lower the current fertility rates and the higher the life expectancies, the more accurate the projections.
4. Temporal methods that typically underlie projections are often volatile. A method that only uses a single point in time, such as only using the year 2001 to make projections for the year 2006 is likely to produce inaccurate forecasts. It is unlikely that future trends will hold the same as at that one point in time, no matter what is being forecast.

Practical considerations

Demographers routinely use a series of projections for an area to better reflect the "what if" nature of projections. The most common approach is to present scenarios, such as *high*, *medium* and *low*. Most governments receive such scenarios, from sources such as Australian Bureau of Statistics, internal government groups and/or consultants. Again, users of scenarios should understand the assumptions behind all projections so that they can critically evaluate their appropriateness for individual purposes. Where finances allow, it may be beneficial to include demographers on an interdisciplinary research team who can produce projections that are custom-designed for the question at hand, such as in emergency management. While this is not always feasible, it would have the potential to greatly improve the rigour of the analyses.

Illustration: Southeast Queensland (SEQ) projections and geographical Trends

As a brief illustration, this section presents the output from projections of demographic variables that have been linked to vulnerability. Selected variables were projected to the years 2006 and 2011 for Local Government Areas (LGAs) of Southeast Queensland and mapped using MapInfo Professional v7.0 software (MapInfo Corporation, NY). These maps depict the geography of the projected demographic changes across the region (from the 2001 Census base), which potentially could be interpreted to reflect trends in vulnerability. Note that these results are merely a guide, intended to present a simple, regional illustration of technique application and outcomes for the purposes of this paper only. They do not represent a comprehensive series of projection scenarios tailored to specific user needs, as would normally be calculated (see the preceding section). The results may vary from those of other sources due to differences in the data used, techniques and assumptions. Projections are estimates that inherently contain uncertainty.

The techniques used in generating the projections, and some comments about them, are presented in Table 2. In essence, this case study represents a practical application of demographic projection modeling, where choices between techniques have been made on the basis of factors including: the geographical resolution, data availability and limitations, and individual expertise. Census data used as bases for the projections were derived from CDATA 2001 and CDATA 96 (Australian Bureau of Statistics, 2002, 1997–1999).

The *absolute changes* in numerical totals between 2001 and the 2006 projections for the selected variables are presented in maps 2, 3, 4, 6 and 8. Maps 5 and 7 (pages 16–17) show similar data reflecting the 2001 to 2011 projection period results for the 0 to 4 years and 65 years and over age cohorts. Map 1 (page 15) is the map key. In further analyses, these data could be considered in conjunction with *rates* of change. Prominent aspects of maps 1–8 (unless otherwise stated) are briefly outlined on pages 16–17 from a geographical perspective.

Western LGAs (Kilcoy, Esk, Gatton, Laidley, Boonah)

For the period 2001 to 2006, absolute totals of: estimated resident population, number of households and number of lone person households are projected to increase in the western LGAs. These increases, however, are significantly less in absolute terms than for coastal areas. A relatively moderate increase in the number of residents 65 years and over, with the exception of Laidley, is also projected. This region further marks an area of forecast decline in the 0 to 4 years age group.

Coastal LGAs (Noosa, Maroochy, Caloundra, Caboolture, Redcliffe, Pine Rivers, Brisbane, Redlands, Logan, Gold Coast)

For the period 2001 to 2006, all coastal LGAs are projected to have marked increases in resident population, with the exception of Redcliffe City, which shows only a relatively small absolute increase. Brisbane and the Gold Coast are particular "hot spots" for growth in population, household number, and the number of lone person households. For the latter two variables,

Table 2. Demographic projection techniques used for Southeast Queensland.

PROJECTED VARIABLE	METHOD USED	COMMENT/ JUSTIFICATION/ SOURCE
Total population Population aged 65 years and over, Population aged 0–4 years	Combination of methods; but featuring ratio-share and cohort component methods for LGAs.	State and Statistical Divisions were first projected in project control totals as well as age/sex structure by cohort component method. Ratio-share method was then applied to LGAs, still producing age/sex breakdowns. This methodology is best for smaller geographic areas such as LGAs but can be problematic for fast growing areas. It is however, a relatively complicated approach. 2001 figures are based on June ERP produced by the Australian Bureau of Statistics.*
Number of households, Number of lone person households	Average household size projections were produced, where assumptions were based on changing household size.	This is a good approach where good quality population projections are available, requiring least specialist knowledge and data. 2001 figures were produced for this paper from ERP derived from the the 2001 Census of Population and Housing (Australian Bureau of Statistics)*

(*Population for 2001 was available from the Australian Bureau of Statistics, so it was used, but all other estimates are based on 2001 ABS Census of Population and Housing data converted to Estimated Resident Population, ERP. The data source was CDATA 2001, Australian Bureau of Statistics, Canberra)

these LGAs have greater projected increases than their neighbouring areas.

Increases in the 0 to 4 years cohort are projected for all LGAs to 2006, with the exception of Redcliffe City. The Gold Coast is again prominent, with a greater absolute rise than Brisbane. The 2011 projection, however, reveals a subsequent reversal in this overall trend (map 5, see pages 16–17). Forecasts of absolute declines in this age cohort, though not substantial, are revealed for Brisbane, Ipswich and Redcliffe. Projected increases are maintained on the Brisbane metropolitan fringes to the north and south, including the Gold Coast to 2011. This pattern could be related to general trends in population ageing, fertility decline and mortgage-belt developments characteristic of Australian capital cities (e.g. O'Connor et al. 2001). This requires further clarification and analysis.

The greatest absolute increases in the 65 years and over age cohort are projected for Brisbane, Logan and Redlands over the period 2001–2006. On the other hand, the projections show an absolute decline in this age group in some coastal areas including the Gold Coast and Maroochy—although the numerical decline at the Gold Coast is very small (inspection of original data). Projected further to 2011 a clear increase in this cohort for both of these LGAs is evident, in concert with the overall pattern for coastal LGAs (map 7, see pages 16–17). The need to consider the length of the projection period is thus underlined.

Transitional LGAs (Ipswich and Beaudesert)

These LGAs show mixed patterns, with some variables reflecting “coastal” trends, and others reflecting “western” trends across the projection periods.

The above offers only broad observations of the spatial variability of absolute change in selected demographic variables. Further interpretations of geographical and temporal patterns, and their relationships to vulnerability, will be prompted by individual perceptions and needs. Vulnerability assessors should consider patterns of absolute change in conjunction with rates of change in order to identify when and where hazard vulnerability “hot-spots” could emerge. These potentially mark localities commanding attention from emergency service planners and managers. This theme will be further discussed in the following section. The assessor should also be ever-mindful of the opportunities, assumptions and limitations of demographic projection methodologies and the use of demographic variables as indicators of vulnerability.

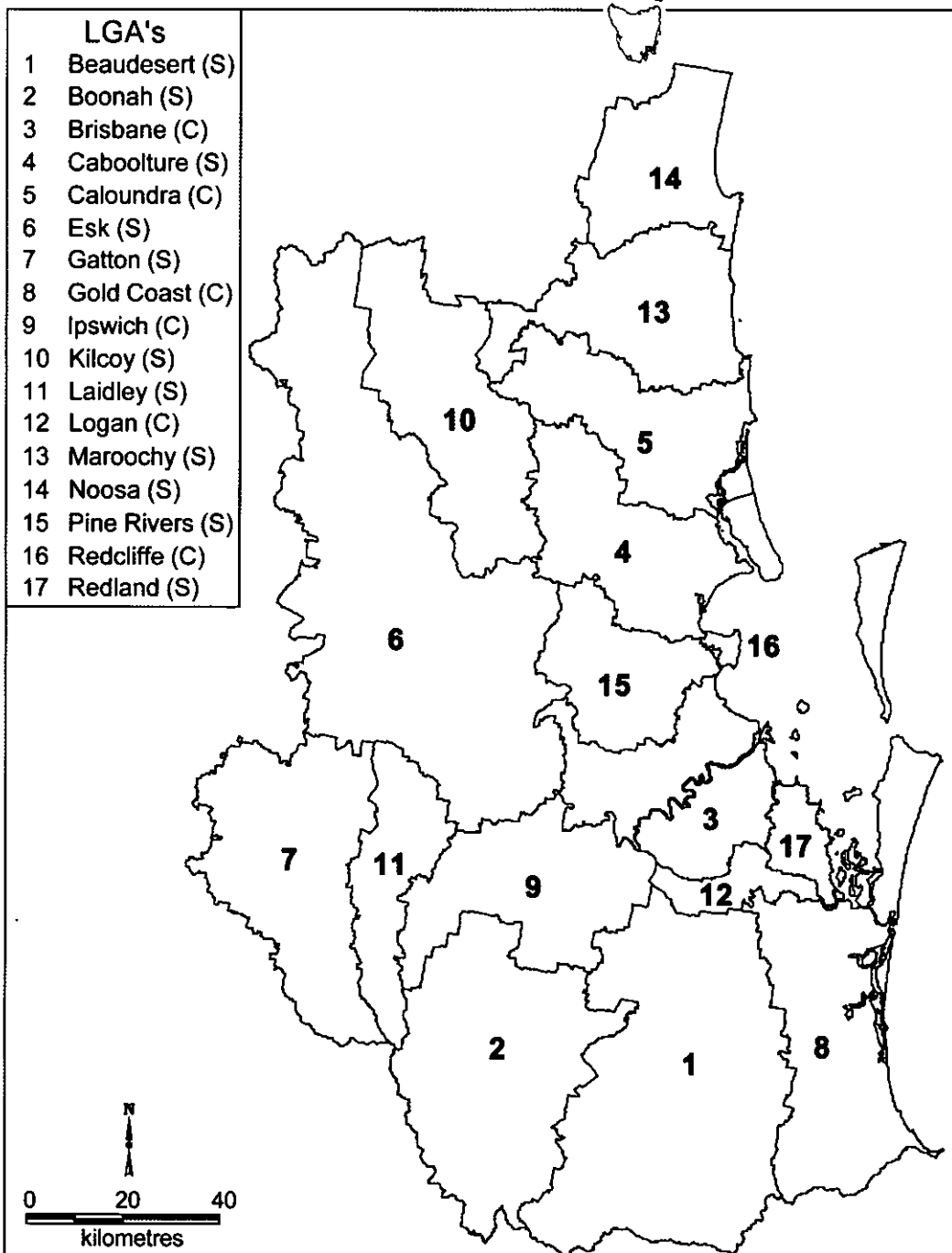
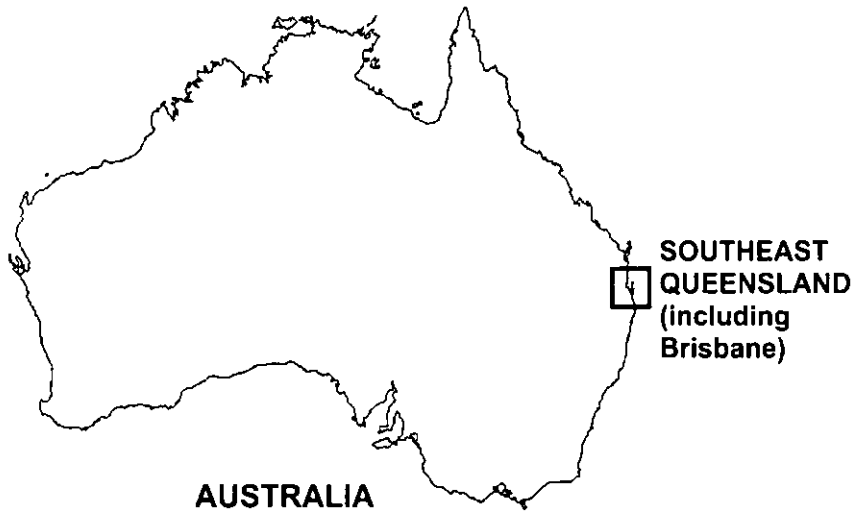
Demographic projection and vulnerability assessment

This paper recognises that community vulnerability is dynamic; changing over time as social, cultural, physical and economic landscapes evolve. As a tool, demographic

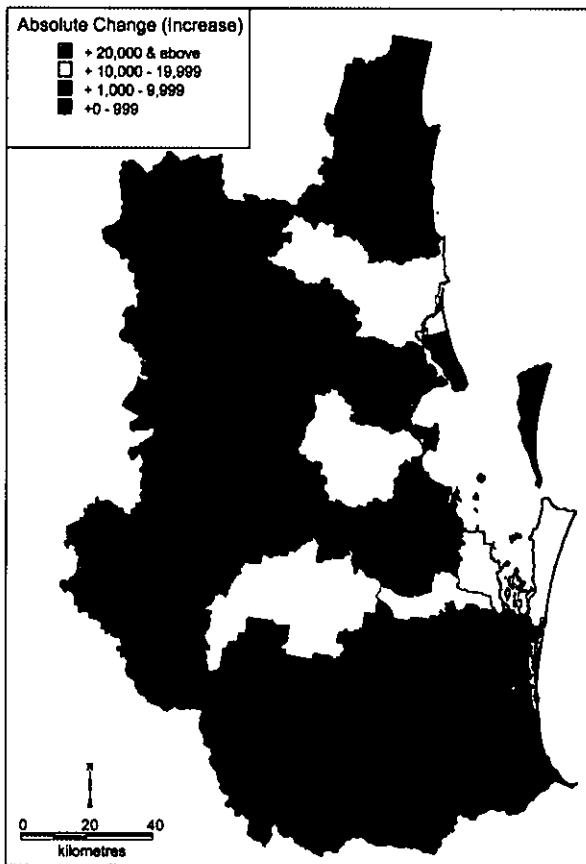
projection potentially offers opportunities for planners and managers to gain valuable planning lead-time by assisting them to anticipate the location, character and pace of demographic changes that can transform levels of community vulnerability. Balancing the “tradeoffs” of accuracy, spatial resolution, projection period, data requirements and analysis complexity, however, will be required and is best addressed in specific problem contexts. Similarly, decision-makers need to deal with the uncertainty of projected data and considering multiple scenarios. The projections of the type and scale illustrated here for Southeast Queensland can be incorporated at the strategic-planning level at regional (e.g. Southeast Queensland) or local government resolutions. In Queensland, this scale of application is now highly relevant, given the adoption of the State Planning Policy 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide. This policy places significant responsibilities on local governments to identify, evaluate and manage the risks from these hazards. Their appraisals of hazard mitigation requirements and their determinations of future emergency-management resource needs and strategies could be significantly aided by knowledge of future populations, and populations of vulnerable people, within their jurisdictions.

At the scale illustrated here, demographic projections cannot, however, greatly contribute to forward planning that involves locating facilities or resources within Local Government Areas. To achieve this, projections for smaller areas such as Statistical Local Areas and Census Collection Districts are needed. As described, this is problematical given that increasing spatial resolution will compromise accuracy and methodological simplicity. Nevertheless, where a wider regional perspective is taken (e.g. Southeast Queensland as a region, or some Queensland Disaster Districts), geographical patterns across the collection of Local Government Areas comprising the region may broadly reveal regional “hot spots” of growth or decline in vulnerability indicators, and hence where forward planning may be prudent. The Southeast Queensland case study presented in this paper illustrated the point. Such regional strategic planning is possible, for example, under the framework of Southeast Queensland’s SEQ 2021 (formerly SEQ 2001) planning initiative. The Regional Framework for Growth Management therein (SEQ RFGM 2000) does not yet, unfortunately, emphasise the inclusion of natural hazard or hazard vulnerability analyses into the planning mix (with the exception of environmental pollution, and in broadly identifying environmental constraints).

Hazard/ disaster managers themselves now strongly promote community vulnerability assessment as a key step in risk management and ultimately local and regional planning. From the viewpoint of this paper, the question is how to systematically include projected data



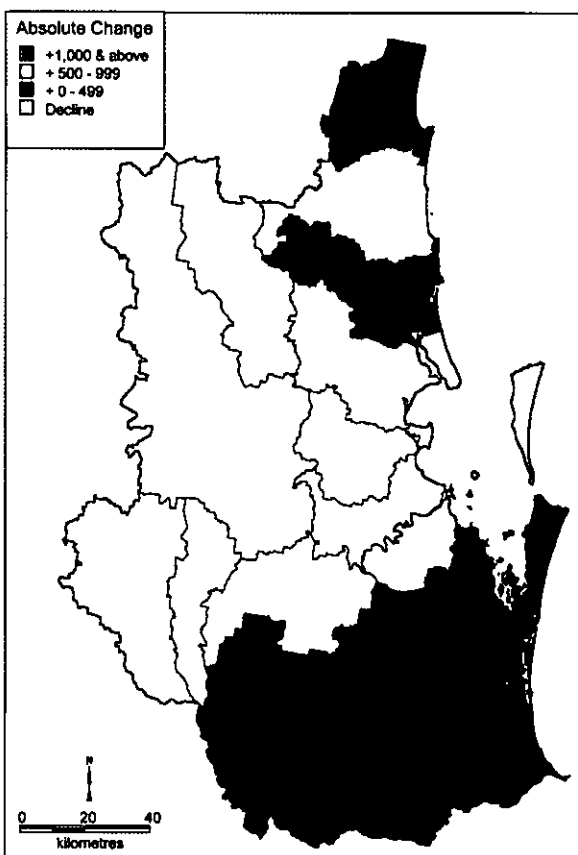
Map 1 Key to Southeast Queensland Local Government Areas.



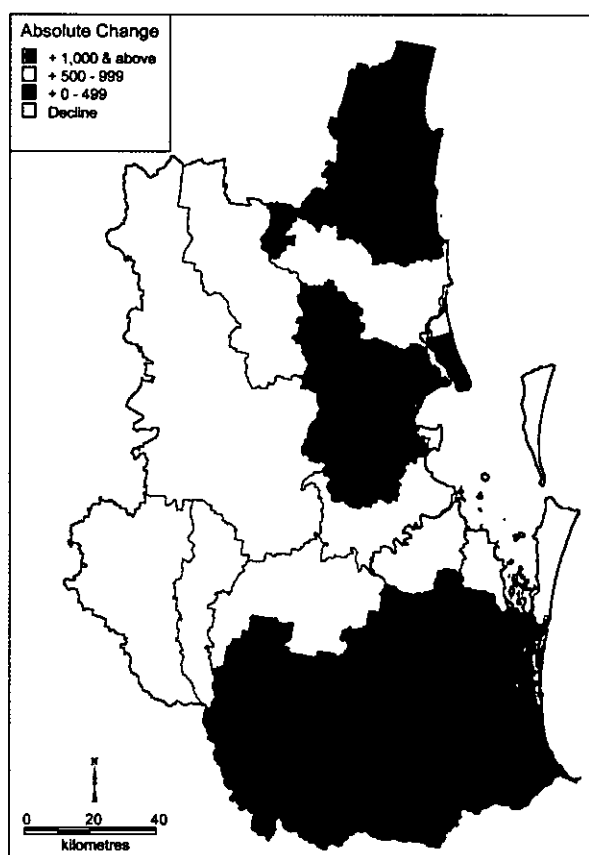
Map 2 Projected Absolute Change in Estimated Resident Population, 2001 to 2006.



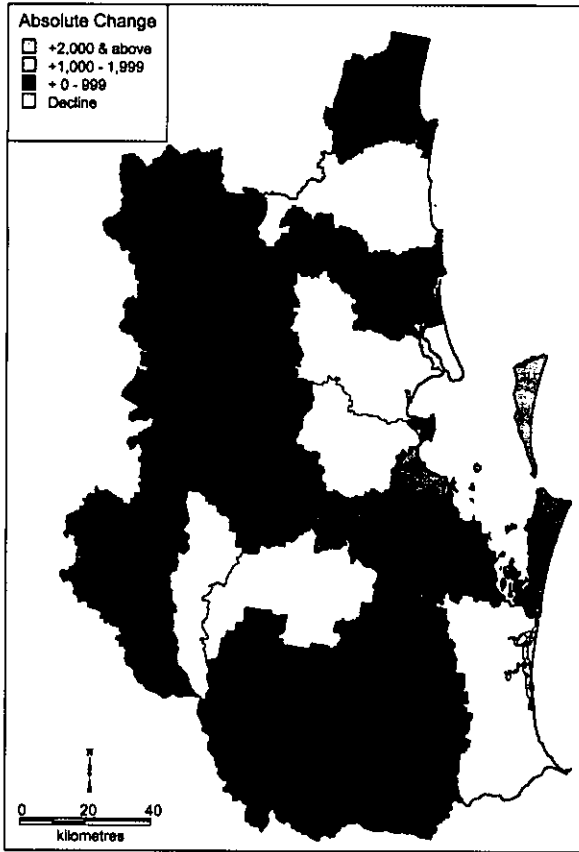
Map 3 Projected Absolute Change in the Number of Households, 2001 to 2006.



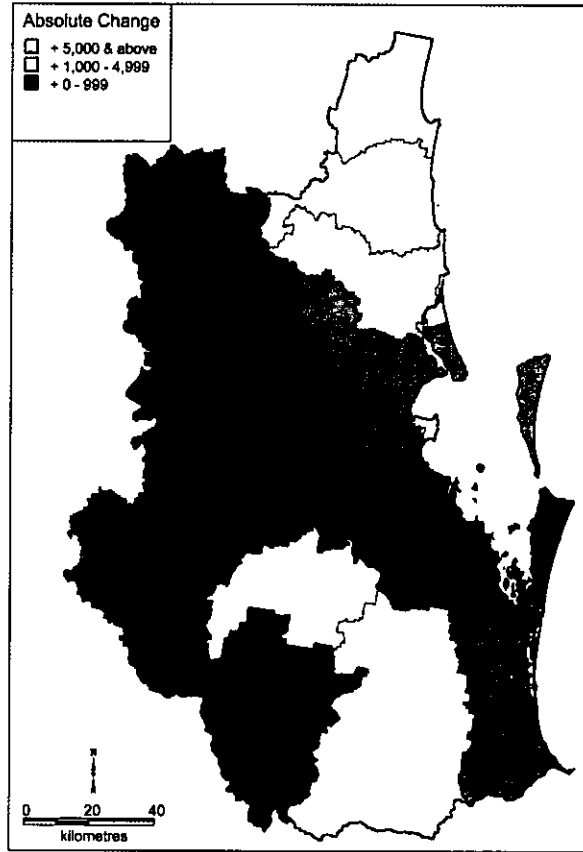
Map 4 Projected Absolute Change in the Number of People Aged 0-4 Years, 2001 to 2006.



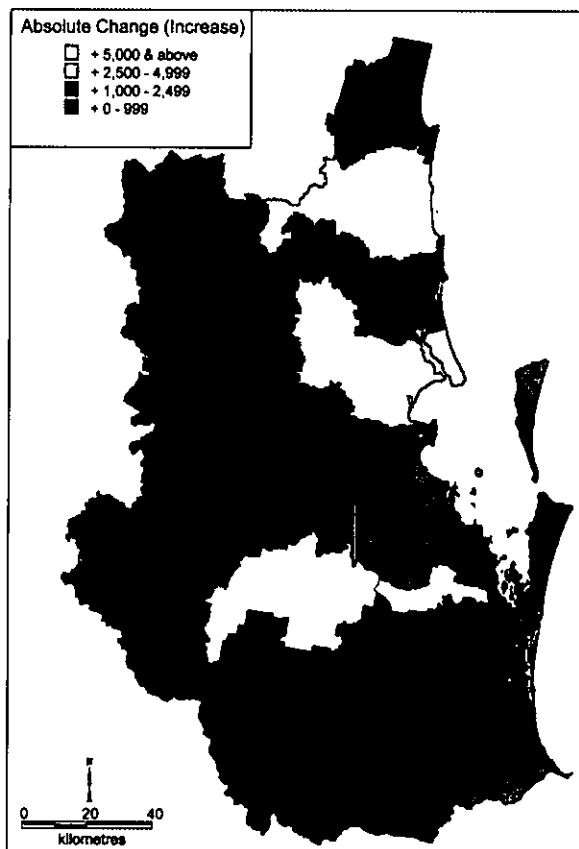
Map 5 Projected Absolute Change in the Number of People Aged 0-4 Years, 2001 to 2011.



Map 6 Projected Absolute Change in the Number of People Aged 65 Years and Over, 2001 to 2006.



Map 7 Projected Absolute Change (Increase) in the Number of People Aged 65 Years and Over, 2001 to 2011.



Map 8 Projected Absolute Change in the Number of Lone Person Households, 2001 to 2006.



Community vulnerability can be measured through demographic and socio-economic data projections

into such assessments, if appropriate. In Queensland, Zameka and Buchanan (1999) set out a risk management framework wherein indicators of community vulnerability are documented and holistically assessed at the local government level. The demographic characteristics of the community is presently an input, but the framework itself is mostly based around analysing the "present" landscape, and hence the inclusion of projected data is not particularly highlighted. Nevertheless, the integration of projections with periods aligned to key strategic-planning horizons appears to be feasible within the structure. In the context of that structure, risk evaluation, which includes rating the likelihoods and consequences of hazards affecting landscape elements, could include analyses of "projected" demographic landscapes. This may help to identify emerging risks, and those likely to rapidly change in the near future, and hence affect the nature and prioritisation of treatment options.

In documenting the geography of vulnerability in Cairns, Mackay and Southeast Queensland, Granger et al. (1999, 2000, 2001) (Cities Project) developed vulnerability indices using a ranking, then compositing, methodology based on social and demographic vulnerability indicators for suburbs and Census Collection Districts. Again, "present" data were used to gain a current snapshot. The same techniques could, however, be broadly applied to projected demographic data at least, and appropriate comparisons made with the current landscape to resolve pathways of future change. Although again, the issue of poorer projection accuracy (perhaps unacceptably so) at the spatial resolutions used by the above-cited studies is raised—amalgamation to LGA resolution would be preferable, but reduces the number of cases to consider. Rates of demographic change based upon projections could also

be included as ranking variables in the construction of the vulnerability indices to introduce a forward-looking temporal dimension.

The incorporation of demographic projections into adapted frameworks of vulnerability and risk assessment, then into strategic hazard/disaster planning at appropriate spatial and temporal scales is clearly a subject for further research.

Conclusion

This paper sought to comment on the potential use of demographic projections to forecast spatial patterns of community hazard vulnerability. It was assumed that particular demographic variables can contribute to assessments of vulnerability, at least on a regional basis. There is a range of projection methodologies available, each having advantages and disadvantages involving data requirements, assumptions and levels of complexity. In practical application, shorter projection periods (e.g. 5 to 10 years) for regions not smaller than Local Government Areas are the most reliable for demographic variables (e.g. total population and population age cohorts). Other socioeconomic indicators and indices are, if not impossible to project, difficult to project with credibility. Users must carefully consider the their information or requests in the contexts of the assumptions and limitations of projection techniques, and the decay of data reliability with decreasing spatial resolution and increasing projection period. Current challenges involve developing hazard/ disaster management, vulnerability assessment and planning frameworks that can embrace a temporal dimension, and hence systematically incorporate projected data at appropriate periods and spatial scales.

Acknowledgements

The authors wish to acknowledge Ms Peta Hyam for her work in generating the maps used in this study, and thank the referees for their constructive comments on the paper.

References

- Australian Bureau of Statistics 1998, 1996 *Census of the Population and Housing: Socioeconomic Indexes for Areas*. Australian Bureau of Statistics, Canberra, Cat 2039.0.
- Australian Bureau of Statistics 1997–1999, CDATA96, *Australian Bureau of Statistics, Canberra* (Final Release and Revisions) Cat 2019.0.30.
- Australian Bureau of Statistics 2002, CDATA 2001, *Australian Bureau of Statistics, Canberra*, Cat 2019.0.30.001.
- Ahlburg, D. A., 1995, *A Simple Versus Complex Models: evaluation, accuracy, and combining*, *Mathematical Population Studies*, Vol. 5, No. 2, pp.281–90.
- Buckle, P., Mars, G. and Smale, S., 2000, *New Approaches to Assessing Vulnerability and Resilience*, *The Australian Journal of Emergency Management*, Vol. 15, No. 2, pp.8–15.
- Buckle, P., Marsh, G. and Smale, S., 2001, *Assessment of Personal and Community Resilience and Vulnerability*, Report: EMA Project 15/2000, Emergency Management Australia.
- Ferrier, N., 1999, *Demographics and Emergency Management: knowing your stakeholders*, *The Australian Journal of Emergency Management*, Vol. 14, No. 4, pp.2–5.
- Granger, K., 1996, *The Role of GIS and Other Spatial Technologies in Natural Disaster Reduction*, Proceedings, NDR 96 Conference on Natural Disaster Reduction, Gold Coast pp. 41–47., Institution of Engineers, Australia.
- Granger, K., Jones, T., Leiba, M. and Scott, G., 1999, *Community Risk in Cairns, a Multi-Hazard Risk Assessment*, Australian Geological Survey Organisation, Commonwealth of Australia.
- Granger, K. and Hayne, M. (eds.), 2001, *Natural Hazards and the Risks They Pose to Southeast Queensland*, Australian Geological Survey Organisation, Commonwealth of Australia.
- Keyfitz, N., 1981, *The Limits of Population Forecasting*, *Population and Development Review*, Vol. 7, pp.579–593.
- King, D., 1999, *Uses and Limitations of Socio-economic Indicators in Measuring Vulnerability to Natural Hazards*, Proceedings of the Australian Disaster Conference, 1999, Canberra, pp.209–214.
- King, D. and MacGregor, C., 2000, *Using Social Indicators to Measure Community Vulnerability to Natural Hazards*. *The Australian Journal of Emergency Management*, Vol. 15, No. 3, pp.52–57.
- Lee, R. D., Carter, L. and Tuljapurkar, S., 1995, *Disaggregation in Population Forecasting: do we need it? And How to do it Simply*, *Mathematical Population Studies*, Vol. 5, No. 3, pp.217–234.
- Long, J. F., 1995, *Complexity, Accuracy, and Utility of Official Population Projections*. *Mathematical Population Studies*, Vol. 5, No. 3, pp.203–16.
- Mapinfo Corporation, Mapinfo Professional v7.0 (software), Mapinfo Corporation, Troy, New York.
- Middlemann, M. and Granger, K. (eds.), 2000, *Community Risk in Mackay: A Multi-Hazard Risk Assessment*, Australian Geological Survey Organisation, Commonwealth of Australia.
- Marchetti, C., Meyer, P.S. and Ausubel, J.H., 1996, *Human Population Dynamics Revisited with the Logistic Model: how much can be modeled and predicted?* *Technological Forecasting and Social Change*, 52, pp.1–30.
- Newell, C., 1998, *Methods and Models in Demography*, Guilford Press, New York.
- O'Connor, K., Stimson, R. and Daly, M., 2001, *Australia's Changing Economic Geography*, Oxford, South Melbourne, New York.
- SEQ RFGM 2000. *Regional Framework for Growth Management 2000, SEQ 2001*, Queensland Department of Communication and Information, Local Government, Planning and Sport, 2000.
- State Planning Policy 1/03: *Mitigating the Adverse Impacts of Flood, Bushfire and Landslide*, Queensland Department of Local Government and Planning, Queensland Department of Emergency Services, 2003.
- Salter, J., 1997, *Risk Management in the Emergency Management Context*, *The Australian Journal of Emergency Management*, Vol. 12, No. 4, pp.22–28.
- Smith, S. K. and Sincich, T., 1992, *Evaluating the Forecast Accuracy and Bias of Alternative Population Projections for States*, *International Journal of Forecasting*, Special Issue, Vol. 8, No. 3, pp.495–508.
- Zameka, A. and Buchanan, G., 1999, *Disaster Risk Management*. Queensland Department of Emergency Services, GoPrint, Brisbane.

Authors

Dr Sonya M. Glavac
National Research Council Associate
United States Geological Survey
Rolla, Missouri USA

Dr Peter A. Hastings
Centre for Social Change Research
Queensland University of Technology
Beams Road, Carseldine, Qld 4034

Dr Iraphne R. W. Childs
Centre for Social Change Research
Queensland University of Technology
Beams Road Carseldine, Qld 4034
Contact Author: Dr Peter Hastings, p.hastings@qut.edu.au

Dr Glavac has worked in the fields of population geography and demography in both Australia and the United States as an academic, and a consultant to industry and government. Drs Hastings and Childs teach and research hazard geography as academic staff at the Queensland University of Technology, Brisbane.



The utility of the World-Wide-Web for fire preparedness of residents

Bernd Rohrmann reports on expert assessment of six websites on their usefulness for informing residents about environmental hazards

By Bernd Rohrmann

The "World-Wide-Web" (WWW) is the newest – yet also least researched – tool for informing residents about environmental hazards such as cyclones, fires, volcanic eruptions or floods and for enhancing their preparedness for emergencies and disasters. In this research, a set of six websites by fire authorities (four Australian and two international) were systematically assessed by a group of fire experts, disaster researchers, cognitive psychologists, website experts and residents (N=16). Evaluation criteria included: comprehensibility, completeness of information, relevance for residents, visual appeal, layout, navigability, and suitability for relevant target groups. The results indicate that the websites are well accepted and mostly rated as useful, yet there is considerable potential for improvement. Pertinent suggestions are outlined and further research needs discussed.

1 The issue: Risk mitigation information for residents

Residents exposed to environmental hazards – such as cyclones, fires, volcanic eruptions, and floods – face difficult tasks and crucial decisions: should they stay in their home or leave, in case of an emergency? If they decide to stay: how to prepare their house and property efficiently, and how to deal with animals? If they decide to leave: when, how, and where to? Furthermore, after a disaster: how to cope with the aftermath, and how to return to normal life? Obviously these issues create a very significant need for information related to risk mitigation before, during and after emergencies.

Therefore residents need to be optimally informed about the hazard characteristics, preventative measures and appropriate behaviors during the onset of an emergency situation and after the event (Blaikie et al. 1994, Chase 1993, Covello 1990, EMA 1997, Handmer 2000, Paton & Long 1996, Salter 1998, Webster 2000). Authorities

must communicate the relevant information to residents and communities as a whole. This is also stated in the Australian/NZ Risk Management Standard. Effective risk communication is also a moral obligation, given that the health and well-being of citizens are at stake (Bennett & Kalman 1999, Willis et al. 1997). This applies to each of the three main types of aims, i.e., increasing risk awareness, decreasing risk worries, aiding risk choices.

Within information campaigns for enhancing disaster preparedness, media activities (television, radio, internet), meetings with residents, and a variety of visual communication means are used, including printed material such as information leaflets and brochures, picture series (slides, graphs, posters) and video-tapes. Internet-based information provision—such as websites run by authorities (e.g. EMA, Fire Authorities, State Emergency Services) and email-based communication means—have only recently been established and are not yet 'mainstream' procedures, even though they are widely available. It is anticipated, however, that these 'electronic' information channels will eventually become as commonplace in disaster preparedness as in many other fields of public information, communication and education. In fact, WWW-based risk communication has considerable advantages: information can be updated regularly and quickly, users can bookmark and store relevant hazard information, access is fast and blockage unlikely (unlike telephone contacts).

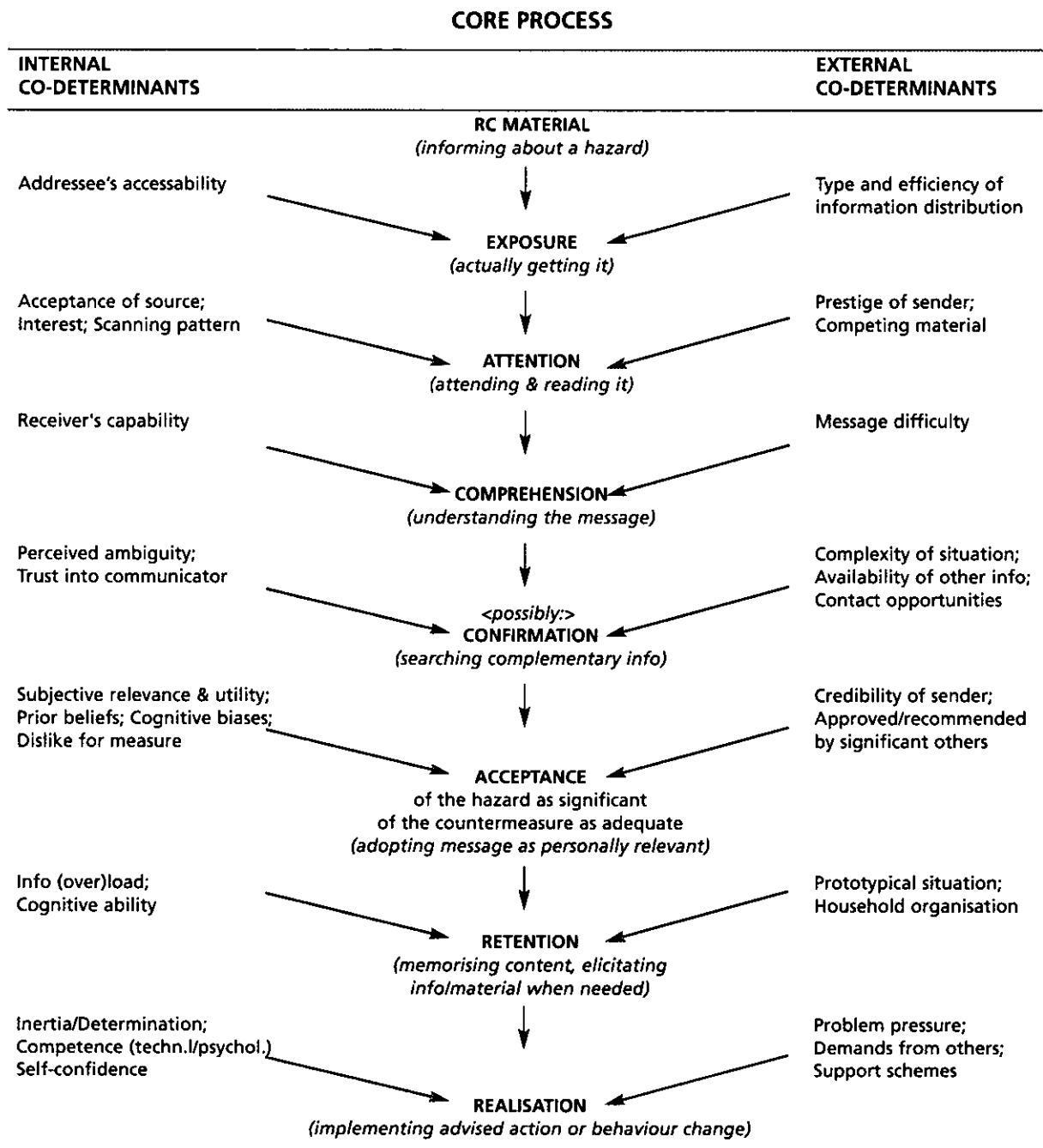
Of course, mere distribution of material is not enough—it is crucial that information efforts are effective (Fischer et al. 1991, Gaull 1997, Rohrmann 1992, 1999). This requires socio-psychological expertise about the impacts of text and visual material on risk perception and preparedness (e.g., Batistich & Chick 2000, D'Arcy 1998, Lange 1998, Lopes 1992, Rohrmann 1995, Sims & Baumann 1988) and critical effectiveness evaluation (Kasperson & Palmund 1989, Rohrmann 1992, 1998, Weinstein & Sandman 1993). Such research is still mostly lacking (Fischer 1999, Joyce 1999), and inherent problems of the internet approach (Quarantelli 1997) have not yet received much attention.

There is also the issue of user attitudes, habits and needs. Do residents actually wish to use the WWW for

enhancing their disaster preparedness, and if so, what kind of information would they search for on websites, what kind of expectations and requirements do they have, and how likely will the knowledge gained from the WWW be converted into actions? There is hardly any research on these questions (Quarantelli 1997, Rohrman in press), yet anecdotal evidence seems to indicate that for many people the value of fire websites is not salient, and that conventional information channels and means are still widely preferred. Using websites is certainly a problem for those who are not familiar with computers and the internet, and there may

be psychological barriers to internet usage as well. Consequently, it cannot be assumed that WWW-based information is efficient, regardless how proficient a website is—the efficiency of risk communication depends upon the interaction between technological features of the message and psychological characteristics of the receiver (Covello et al. 1989, Lundgren & Makin 1998, Rohrman 2000).

Figure 1. Informing about Risks: Process Components and Co-Determinants (Preconditions or barriers for enhancing risk mitigation)



2 Requirements for effective information programs

Evaluation research (cf. Chelimsky & Shadish 1997, Cook & Reichardt 1992, Fink 1993, Hinn et al. 2001, Patton 1997) has to find out not only *whether* but also *why* a program works (or not). The crucial question is: which factors determine whether hazard information – provided as text or pictorially or both – is useful in enhancing residents' preparedness? Empirical studies need to be based on a sound conceptual framework (Lloyd & Roen 2002, Mulilis & Duval 1997, Renn 1998, Rohrmann 1995, 2000, Zimmermann 1997). Therefore, a socio-psychological model for the context in which risk communication occurs and a framework for the individual steps of dealing with a material/message must first be developed. Two such models were outlined in Rohrmann (2000); one of them is shown in Figure 1 (see previous page). It identifies the relevant preconditions (or 'barriers' to effective risk communication and preparedness) for each level of an information process—that is, the response 'chain' exposure-attention-comprehension-confirmation-acceptance-retention-realisation.

Appraisal criteria are the centrepiece of an evaluation study. They need to be chosen systematically so that both the substantive objectives and the communication approach of a program are reflected. Usually, 'content', 'process', and 'outcome' criteria are distinguished, and practicality aspects deserve attention as well. In Table 1, a list of pertinent risk communication features is presented.

Authorities choosing between communication means, like brochures, videos, websites, information meetings and so on will have a range of utility considerations, such as: how effective for increasing knowledge and enhancing preparedness is a campaign likely to be? How costly? How easy to distribute? How much information may be wanted by residents? How quickly can materials become outdated?

Obviously only data gathered from the receivers of risk communication efforts can clarify whether a program was effective and successfully achieved its goals.

Table 1. Assessing risk communication effectiveness.

Type of criteria—and examples relevant for websites
<p><i>Content evaluation</i></p> <p>e.g., correctness & completeness of information; comprehensibility of the messages; usefulness of graphs/pictures/drawings; concordance with information needs; feasibility of proposed activities; potential to capture and maintain attention; presentation style;</p> <p><i>Process evaluation</i></p> <p>e.g., possibility of sending and receiving feedback; facilitation of a learning process; addressee's activities re confirmation of information; relevant target audiences reached;</p> <p><i>Outcome evaluation</i></p> <p>e.g., provided information studied a/o discussed in household; websites 'bookmarked'; information search intensified; acceptance of hazard messages a/o suggested actions; increased/ improved understanding of bushfire/preparedness issues; change of beliefs (mental models) regarding bushfire preparedness; reduced information need; commitment to improve bushfire preparedness (behavioral intention); preventive measures conducted/ realised (house; property; evacuation planning changed; increased confidence in information source (i.e. fire authorities);</p> <p><i>Practicality aspects</i></p> <p>e.g., technical or practical preconditions for receiving material; 'printability' and ease of storage of the information/materials; availability of information updates via other communication channels;</p>
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

Source: adapted from Rohrmann 1992 & 1998

Table 2. Projects re fire risk information and education—1997–2002.

	TOPIC	STUDY TYPE	PUBLICATION
[A]	Community group work	Survey + focus groups	Rohrmann 1999, 2001
[B]	Flyers & brochures	Survey Expert appraisal + focus group Experiment	Lange 1998 Rohrmann 2000 Wilson 2002
[C]	Videotapes	Focus groups	Rohrmann 2000
[D]	Websites	Expert appraisal + focus group Survey	{This study} {Rohrmann in prep.}

3 Empirical appraisal of websites about fire hazards

3.1 Research plan

The research to be reported here is part of a series of studies on “Fire safety information and education means”, listed in Table 2.

The investigation of websites consists of two parts, (1) an expert appraisal of fire websites and (2) a survey about residents’ expectations and experiences (currently under way).

The plan for sub-study (1) was as follows:

Research aim:

Assessing the usefulness of major websites about fire safety and preparedness, based on criteria which reflect both expert and layperson perspectives. The focus is on information needs of residents.

Method:

Expert ratings based on a detailed catalogue of substantive and procedural assessment criteria (standardised instrument). Additionally, exploratory open-ended questions.

Assessed websites:

Four Australian and two international websites.

Assessment criteria:

Substantive quality: comprehensibility, relevance for residents, completeness of information, visual appeal. Suitability for relevant target groups (professional or private users). Technical website features: layout and navigability.

Assessors:

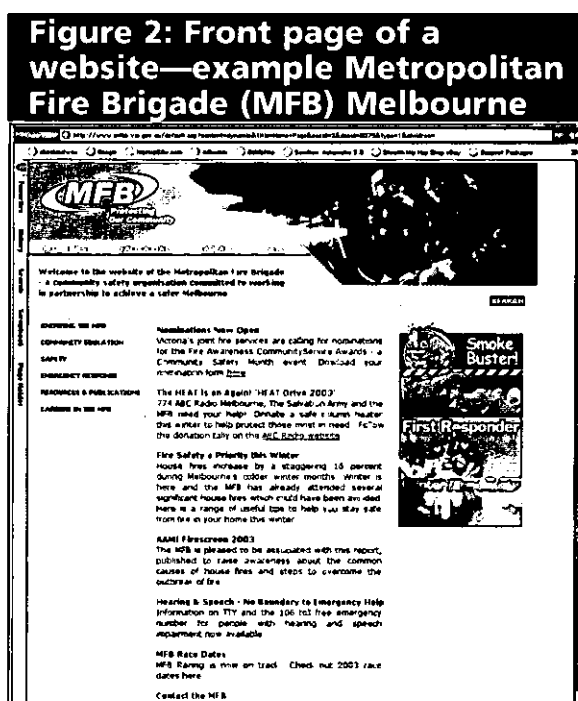
Fire experts, fire researchers, disaster researchers, cognitive psychologists, website experts, residents who are WWW-literate (N=16, 2 or 3 participants in each group).

3.2 Selected websites

The six chosen websites are listed in Table 3. They include websites dealing with bushfires (forest fires) and urban fires. The two overseas websites – one Canadian

and one US-American one – were chosen for comparison reasons.

The websites differ considerably in their style and purpose. None of them are solely or explicitly geared to the ‘general public’ but all include information for residents or employees. As an example, the frontpage of one of these websites is shown in Figure 2.



Source: <http://www.mfb.vic.gov.au/default.asp>

3.3 Website appraisals: main results

The data for the main quantitative evaluation aspects are presented in Table 4. In addition to the individual scores, means across all six websites and mean ratings for the three sets of criteria are given.

These results can be summarised as follows:

- Substantive quality: while the understandability of these websites’ content is rated quite positively (overall mean for criterion B2 is 3.7 on a 5-point scale) and their trustworthiness acknowledged (mean for B17 = 4.1), most other aspects are rated as only average, and they are not seen as very motivating

Table 3. Project AWF assessment of websites of fire authorities: selected websites.

Country Fire Authority Victoria	Australia	www.cfa.vic.gov.au
Melbourne Metropolitan Fire Brigade	Australia	www.mfbb.vic.gov.au
NSW Rural Fire Service	Australia	www.bushfire.nsw.gov.au
ACT Firebreak	Australia	www.esb.act.gov.au/firebreak/firebreak.html
Canadian Forest Service	Canada	www.nofc.forestry.ca/fire
American Redcross	USA	www.redcross.org/disaster/safety/guide/fire.html

Table 4. Assessment of websites on fire safety preparedness ratings.

Q #	EVALUATION ASPECT	CFA	MFB	NSW	ACT	ARC	CFS	all websites MEAN	SD
B1	Interesting to look at	3.2	3.7	3.1	2.7	2.7	2.7	3.0	0.9
B2	Understandability	4.2	3.9	3.9	2.7	4.1	3.1	3.7	1.1
B4	Visual appeal	2.9	3.3	2.9	2.5	2.4	3.0	2.8	1.0
B5	Helpfulness of pictures/illustrations	2.2	3.4	1.6	1.9	1.5	2.2	2.8	1.2
B7	Comprehensiveness	4.0	3.6	3.4	2.4	3.8	2.6	3.3	1.9
B9	Length (1=short, 5=long)	3.1	3.1	3.1	2.0	3.1	1.9	2.7	1.0
B11	Good examples given	2.9	3.6	2.9	1.8	3.7	2.4	2.9	1.4
B12	Clarity of fire safety actions	3.3	3.9	3.6	2.4	4.1	2.9	3.4	1.3
B13	Own (residents') info need met	3.3	3.6	3.3	1.6	3.9	2.2	3.0	1.2
B15	Extent motivation for preparedness	2.6	3.0	2.3	1.6	3.0	2.0	2.4	1.0
B16	Difficulty remembering info (<i>reversed</i>)	3.4	3.1	2.7	2.1	3.5	2.9	3.0	1.2
B17	Seen as reliable source of information	4.3	4.5	3.9	3.9	4.3	4.1	4.1	1.0
<i>Mean B1-17:</i>		3.3	3.6	3.1	2.3	3.4	2.7	3.1	
A3	Organisation of the website	3.6	3.5	3.3	3.4	3.2	3.3	3.4	.9
A4	Ease of navigation	3.6	3.7	3.2	3.4	3.9	3.8	3.6	1.0
A5	Ease of locating relevant information	4.2	3.4	3.4	2.9	4.3	1.9	3.3	1.3
<i>Mean A3-4-5:</i>		3.8	3.5	3.3	3.2	3.8	3.0	3.4	
B21*	a) Suitability of website for residents	3.6	3.9	3.9	1.4	4.1	1.8	3.1	1.4
	b) Suitability for employees	2.1	2.7	2.7	1.3	2.3	1.3	2.1	1.1
	c) Suitability for high school teachers	3.5	2.5	2.5	1.9	2.5	1.9	2.6	1.1
	d) Suitability for high school students	2.9	2.7	2.7	1.7	2.5	1.8	2.5	1.0
	e) Suitability for university students	2.9	2.8	2.9	2.6	2.5	2.0	2.6	1.1
	f) Suitability for public authorities	2.3	3.1	3.1	2.9	2.7	2.6	2.8	1.3
	g) Suitability for journalists	2.7	3.2	3.2	2.3	2.8	1.8	2.6	1.1
	h) Suitability for researchers	3.0	2.8	2.8	3.9	2.2	3.4	3.0	1.2
<i>Mean B21*:</i>		2.9	3.0	3.0	2.2	2.7	2.1	2.7	
C1	Recommendable to lay people	3.6	3.4	3.4	1.3	3.5	1.7	2.9	1.4
C2	Better than brochures	3.4	3.4	3.4	2.3	3.2	2.6	3.1	1.2
<i>Weighed mean across all aspects:</i>		3.3	3.5	3.1	2.5	3.3	2.6	3.1	

*Data are mean rating from 16 raters

KEY:

CFA Country Fire Authority Australia

MFB Melb. Metropolitan Fire Brigade

ACT ACT firebreak

NSW NSW Rural Fire Service

ARC American Red Cross

CFS Canadian Forest Service

(mean for B15 = 2.4). The visual quality (criteria B1, B4, B5) is assessed as 'medium'. Only one of the websites is perceived as 'good', in terms of meeting the information needs of people.

- Technical website features: the assessment of layout and navigability are assessed as medium to good for all sources.
- Suitability for relevant target groups: the raters were quite critical in this regard (overall mean for the six websites regarding 8 potential targets is 2.7). Two of the sites are clearly not useful for residents or any other kind of laypeople.
- The overall mean differences between the 6 websites are considerable (ranging from 2.5 to 3.5). The websites of the three major Australian fire authorities covered in this study, Victoria's Country Fire Authority, Melbourne's Metropolitan Fire Brigade and NSW's Rural Fire Service (NSW-RFS) are all rated in the upper range, on par with the fire information website of the American Red Cross (ARC). An advantage of the ARC and the NSW-RFS websites is that information for both forest/bushfires and urban fires is offered.

Finally, did the assessors "think that the website is better for getting informed about fire safety than brochures"? Four were seen as slightly better, but the two others were not (cf. criterion C2, mean = 3.1). Nevertheless, this appraisal substantiates the potential of WWW-based fire preparedness programs.

3.4 Results from exploratory interviews

Within the open-ended part of the data collection, the considerations underlying the participants' assessments were explored. In one task they were asked to rank-order the six websites for overall quality and then identify the reasons for their rating. The results are summarised in Table 5.

As these responses show, there is no single dominating reason—as users have high expectations for the combination of content and presentation style. It seems, though, that substantive quality is especially important for experienced web users, while newcomers often struggle to find their way through elaborate websites and therefore particularly value good navigation features.

In sum, most websites are rated as useful, yet for all, quite a number of shortcomings were noticed by the assessors. One principal problem is the mixture of material for different addressees—for example, residents are unlikely to be interested in annual reports, while professional users generally do not need to read about community matters. The frontpages of the six websites are not optimal in reflecting such heterogeneous interests and directing different target groups accordingly.

Table 5. Assessors' reasoning.

REASONS FOR ASSESSORS' WEBSITE RATINGS—QUALITATIVE DATA

Respondents' favourite website: main reasons for liking it

- Comprehensive and meets needs of different people;
- Good visual appeal; helpful pictures;
- Clear; concise; understandable;
- Addresses necessary action for fire preparedness;
- Easy to navigate and locate relevant information;
- Internal and external links well organised;
- Up-to-date.

Main reasons for disliking the least favourite website

- Information not relevant to residents; limited to specific groups;
- Lacks information on important issues;
- Too much information; too technical;
- Language difficult to understand;
- Visually not appealing;
- Unsatisfactory layout makes navigating difficult;
- Outdated sections.

Table 6. Resident requirements.

MAJOR REQUIREMENTS FROM A RESIDENT'S POINT OF VIEW

Re *CONTENT* features:

- information on how to prepare for fire events
- on decision-making re evacuation (criteria for staying or leaving the residence)
- on fire safety in public places such as schools and the workplace
- contact details (phone/letter/fax/email) for the institution should be complete

Re *PRESENTATION* features:

- appealing graphics
- large easy-to-read text
- pictures to add visual appeal and to enhance the salience of fire hazards

Re *WEBSITE* design:

- clear frontpage structure
- fast downloading
- efficient navigating within the website
- links to related institutions.

4 Conclusions for designing websites for the public

Websites provided by fire authorities have to suit a multitude of users, ranging from professionals to laypeople, with very different levels of substantive knowledge. The current inquiry was focused on the perspective of residents in fire-prone areas who want to inform themselves about fire hazards and improve their preparedness. With such a clientele in mind, some suggestions have been outlined, summarised in Table 6. Furthermore it would be useful to systematically separate 'corporate' purposes from parts which aim at fire information and education—these need to be consistently tailored towards residents as users.

The use of fire websites by the general public is still at an early stage, but this will very likely soon change. Thus it seems advisable for authorities to optimize this relevant instrument for risk communication and disaster preparedness. Evaluation studies are vital for achieving this (cf. Burgess & Houghton 2002, Smith 2001), as is the advice of professional web designers (e.g., Nielsen 2000).

5 Needs and plans for further research

The focus of the current investigation was message and media features, as reflected in content evaluation criteria. In order to widen the scope of this research, process and outcome criteria need to be studied using a longitudinal approach, and samples of users with different backgrounds need to be investigated. Relevant research questions include:

- Regarding user features:

Which type of people are likely to utilize WWW-based risk communication? Do they mainly 'surf' before, during or after disasters? Is information for non-English speakers warranted?

- Regarding information content:

What are residents' core information needs regarding websites, compared to other information means? How do we address the needs of children and the elderly?

- Regarding website design:

Which website styles do WWW 'newcomers' prefer? What is the role of pictures and graphs?

Several of these topics will be addressed in the continuation of this project; a survey with residents is already underway.

A further issue is the interrelationship between different risk information means/procedures. For example, videos could be linked with websites, and brochures designed to compliment electronic information means. Obviously the WWW cannot be a 'stand-alone' approach to enhancing fire preparedness; therefore it is important to optimise the linkage between all elements of a program.

References

- Batistich, T., & Chick, L. (2000). *Using the internet as an education tool*. Paper presented at the Natural Hazards Management Conference, Napier.
- Bennett, P., & Kalman, K. (1999). *Risk communication and public health*. Oxford: Oxford University Press.
- Blaikie, P., Cannon, T., Davis, I., & Wisner, B. (1994). *At risk—Natural hazards, people's vulnerability and disasters*. London: Routledge.
- Buckle, P., Mars, G., & Smale, S. (2000). New approaches to assessing vulnerability and resilience. *The Australian Journal of Emergency Management*, 15, 8–14.
- Burgess, S., & Houghton, I. (2002). *Evaluation of selected NSW government websites: A user perspective*. Sydney: Faculty of Social Sciences, University of Technology, Sydney.
- Chase, R. A. (1993). Protecting people and resources from wildfire: Conflict in the interface. In A. W. Ewert, D. J. Chavez, & A. W. Magill (Eds.), *Culture, conflict and communication in the wildland-urban interface*. Boulder: Westview Press.
- Chelimsky, E., & Shadish, W. (Eds.). (1997). *Evaluation for the 21st Century*. Thousand Oaks: Sage.
- Cook, T. D., & Reichardt, C. S. (1992). *Qualitative and quantitative methods in evaluation research*. Beverly Hills, CA: Sage.
- Covello, V. T., McCallum, D. B., & Pavlova, M. (1989) (Eds.), *Effective risk communication*. New York: Plenum.
- Covello, V. T. (1990). A review of obstacles to public understanding and effective risk communication. In W. Leiss (Ed.), *Prospects and problems in risk communication* (pp. 1–49). Waterloo: University of Waterloo Press.
- D'Arcy, J. (1998). *Technically speaking: A guide for communicating complex information*. Columbus: Battelle Press.
- Emergency Management Australia (1997). *Hazards, disasters and survival: A booklet for students and the community*. Dickson: Department of Defence, EMA.
- Fink, A. (1993). *Evaluation fundamentals, guiding health programs, research, and policy*. London: Sage.
- Fisher, A., Pavlova, M., & Covello, V. (1991). *Evaluation and effective risk communication*. Washington: EPA.
- Fischer, H. W. (1999). Using cyberspace to enhance disaster mitigation, planning and response: Opportunities and limitations. *The Australian Journal of Emergency Management*, 14, 60–64.
- Gaull, E. S. (1997). Show me the results! *Fire Chief*, 41, 74–81.
- Handmer, J. (2000). Are flood warnings futile? Risk communication in emergencies. *Australasian Journal of Disaster Studies*, 2000-3 <<http://www.massey.ac.nz/~trauma>>.
- Hinn, D. M., Benson, A. P., & Lloyd, C. (Eds.). (2001). *Visions of quality: How evaluators define, understand, and represent program quality*. London: JAI.
- Joyce, E. B. (1999). Disaster information on the web: providing an efficient index to current and reliable information. In EMA (Ed.), *Australian Disaster Conference, Proceedings*, Canberra.
- Kasperson, R. E., & Palmund, I. (1989). Evaluating risk communication. In V. T. Covello, D. B. McCallum, & M. T. Pavlova (Eds.), *Effective risk communication. The role and responsibility of government and nongovernment organizations* (pp. 161–191). New York: Plenum Press.
- Lange, B. (1998). *Appraisal of bushfire materials: a field study*. Unpublished thesis, Dept. of Psychology, The University of Melbourne.
- Lloyd, M., & Roen, K. (2002). 'When you smell smoke': 'Risk factors' and fire safety in action. *Health, Risk and Society*, 4, 139–154.
- Lopes, R. (1992). *Public perceptions of disaster preparedness presentations using disaster damage images* (Working report 79): University of Colorado, Institute of Behavioral Science, Natural Hazards Research and Applications Information Center.
- Ludgren, R., & McMakin, A. (1998). *Risk communication: A handbook for communicating environmental, safety, and health risks*. Columbus: Battelle Press.
- Mullis, J. P., & Duval, T. S. (1997). The PRE model of coping and tornado preparedness—moderating effects of responsibility. *Journal of Applied Social Psychology*, 27, 1750–1766.
- Nielsen, J. (2000). *Website usability: A designer's guide*. Indianapolis: New riders.
- Paton, D., & Long, N. (Eds.). (1996). *Psychological aspects of disasters: Impact, coping and intervention*. Palmerston/NZ: Dunmore Press.
- Patton, M. Q. (1997). *Utilization evaluation: The new century text*. Thousand Oaks: Sage.
- Perry, R. W., & Green, M. R. (1982). The role of ethnicity in the emergency decision-making process. *Sociological Inquiry*, 52, 306–334.
- Powell, D., Leiss, W. (1998). *Mad cows & Mother's milk: The perils of poor risk communication*. Montreal: McGill-Queens University Press.
- Quarantelli, E. (1997). Problematical aspects of the information/communication revolution. *Disaster Prevention and Management*, 6, 94–106.
- Renn, O. (1998). The role of risk communication and public dialogue for improving risk management. *Risk, Decision and Policy*, 3, 5–30.
- Rohrmann, B. (1992). The evaluation of risk communication effectiveness. *Acta Psychologica*, 81, 169–192.
- Rohrmann, B. (1995). Effective risk communication for fire preparedness: A conceptual framework. *The Australian Journal of Emergency Management*, 10, 43–48.
- Rohrmann, B. (1998). Assessing hazard information/communication programs. *Australian Psychologist*, 33, 105–112.
- Rohrmann, B. (1999) Appraisal of information material on disaster preparedness. In EMA (Ed.), *Australian Disaster Conference, Proceedings*, 251–256.
- Rohrmann, B. (1999). Community-based fire preparedness programs: An empirical evaluation. *Australasian Journal of Disaster Studies*, 99–1 <<http://www.massey.ac.nz/~trauma/issues/1999-1/rohrmann.htm>>
- Rohrmann, B. (2000) A socio-psychological model for analyzing risk communication processes; *Australasian Journal*

of Disaster Studies, 2000-3. <<http://www.massey.ac.nz/~trauma/issues/2000-2/rohrmann.htm>>

Rohrmann, B. (2000). Critical assessment of information on bushfire preparedness for residents. *The Australian Journal of Disaster Management*, 15, 14-20.

Rohrmann, B. (in press). Bushfire preparedness of residents: Insights from socio-psychological research. In: Cary, G., Dovers, S., Lindenmayer, D. (Eds.), ANU Fire Forum 2002, Canberra: CSIRO Publishing.

Salter, J. (1998). Risk management in the emergency management context. *Australian Journal of Emergency Management* 13, 22-28.

Sims, J. H., & Baumann, D. D. (1988). Education programs and human response to natural hazards. *Environment and Behaviour*, 15, 165-189.

Smith, A. (2001). Applying evaluation criteria to New Zealand government websites. *International Journal of Information Management*, 21, 137-149.

Webster, J. (2000). *The complete bushfire safety book*. Sydney, Random House.

Weinstein, N. D., & Sandman, P. M. (1993). Some criteria for evaluating risk messages. *Risk Analysis*, 13, 103-112.

Willis, W. J., Okunade, A. A., & Willis, J. (1997). *Reporting on risks: the practice and ethics of health and safety communication*. Westport: Praeger.

Wilson, N. (2002). Examining the utility of visual and text elements in fire safety brochures. Unpublished thesis, Dept. of Psychology, The University of Melbourne.

Zimmermann, R. (1997). A process framework for risk communication. *Science, Technology, and Human Values*, 12, 131-137.

Author

Associate Professor B. ROHRMANN
University of Melbourne, Dept. of Psychology, Vic 3010, AUSTRALIA
Phone: +61 3 83446349 Fax: +61 3 93476618
Email: rohrmann@unimelb.edu.au
Website: <http://www.psych.unimelb.edu.au/staff/rohrmann.html>



Structural and personal social processes in disaster

George Silberbauer discusses the changes to an individual's social reality caused by disaster

By George Silberbauer

The way in which we perceive and interpret our experience of the world around us is a cultural product. It is systematic, but selective, including some events and phenomena, and excluding others as irrelevant or false. It is, thus, an incomplete, somewhat inaccurate reflexion of reality.

Nevertheless, it is adequate for most of our 'normal' needs; it enables us to make enough sense of what happens for us to be able to live as reasonably competent members of the groups and society to which we belong.

This culturally-specific account of reality is a sort of combination of tribal myth and open conspiracy. Our beliefs, attitudes and expectations are guided by it, but we also participate in its formulation, maintenance and amendment. For these processes we are dependent on frequent social interaction with others to learn, and affirm and/or correct our personal versions of Received Wisdom about how to account for, and interpret our experience of reality, i.e. to provide us with sufficient information about the current construct of reality.

As well as the physical damage a disaster does, it also causes critical disruption of the victims' customary relationships and patterns of social interaction. Not only is this emotionally distressing but it also contradicts their expectations of normality, thereby invalidating much of their Received Wisdom, leaving them in a state of painful uncertainty.

Furthermore, a disaster impedes the normal the flow of information as well as that which the unexpected, novel and unprepared-for post-disaster circumstances require. Victims are thus precipitated into a crippling information-deficit that increasingly inflicts psychologically damaging diminution of sense of identity, highly stressful uncertainty about future action and prospects, and difficulty in reaching decisions because of the imponderability of key

factors. Consequently the processes of recovery and rehabilitation are greatly hindered.

Post-disaster information-deficit can be ameliorated by appropriate preparation. Relevant prior experience, whether personal or vicarious, is of the highest value and can be imparted through appropriate training and public education (To illustrate: the Victorian Country Fire Authority's programmes of Bushfire Blitz and Community Fireguard have proven value in post-disaster recovery as well as in preventing, or mitigating bushfire damage.) In the absence of adequate preparation, victims will be principally, perhaps wholly reliant for information on those who render them assistance. In either case a copious flow of relevant, timely and understandable information is an essential element of assistance and its provision should form part of any disaster preparation. As the harm done by information-deficit progresses in a quasi-exponential manner, early and effective mitigation of post-disaster information-deficit is an urgent priority.

1. Introduction

There is reasonably clear comprehension (but indifferent quantitative assessment) of the physical and economic harm that disasters do to their victims. However, the psychological problems are less well understood, and we are only beginning to grasp the nature and extent of the social consequences. These various aspects of disasters are interrelated and are mutually compounding. Some psychological reactions are manifestations of, and responses to critical social dislocations occasioned by the disaster. In that sense, social factors are causal vectors of some of the psychological harm. Unless they are remedied, accurate identification and alleviation of those mental and emotional disturbances will be impeded.

The organising principle of this paper is the concept, information (see definition included in this paper). It relates to the psychological, social and cultural aspects of what happens to disaster victims and is the theme that connects these logically and coherently. In an operational context, this approach enables disaster managers to identify, make sense, and keep track of the



Victims are forever changed by their experience and must adapt to their changed circumstances by building a new set of functional equivalents

psycho-social and cultural harm done to victims, and of their progress towards recovery and rehabilitation. If understood by victims, it ameliorates some of their confusion and distress and points the way to their further recovery.

What is lost in a disaster cannot be restored. Victims are forever changed by their experience and, if they are to recover, must adapt to their changed circumstances by building a new set of functional equivalents of what previously existed. The more coherently and completely they can replace the lost old with the accessible new, the more successful is their recovery and rehabilitation. This paper describes the shock of dissolution of victims' identity, sense of Self and customary and socially-construed perception of reality following disruption of accustomed social structures, and discusses recovery processes that facilitate victims' construction of substitute functional equivalents.

What is a disaster?

Whatever its agency, a disaster is something that happens to *people*, affecting their persons, emotions, perceptions, expectations and capacity to lead their lives in their usual manner. Depending on the role of the individual during, and after the event, there are different perceptions of it. What is relevant here is the *victim's* perception that a disaster brings about radical and intolerable disruption of the order and functions to which she or he is accustomed but, temporarily or permanently, does not have the capacity to adapt to the

changes caused by the event. Recovery and rehabilitation lie in developing adaptive capability.

A disaster may have a gradual onset, e.g. drought, famine, economic or political dissolution, or be sudden in its impact, e.g. earthquake, flood, epidemic, fire, an act of public violence.

What does it do?

Most disasters cause personal *physical harm* people are killed or injured and survivors are shocked by the experience. Many suffer progressively worsening exhaustion as increased workloads, physical deprivation and emotional strain take their toll. *Economic loss* is suffered when property and other assets are destroyed or damaged and their utility or enjoyment diminished, and when the organisational framework of normal economic activity is disrupted. *Psychological traumata* include impaired cognitive, intellectual and emotional competence and control. Victims suffer emotional distress, e.g. grief, anger, confusion, anxiety, and the uncertainty about identity and sense of Self that follows social dislocation.

Although a sudden disaster is an event, many of its effects are the results of processes set in train by the event. Depending on their level of personal and institutional resilience, victims will have greater or lesser autonomous capacity to halt, and reverse these processes. However, early, appropriate assistance from competent and capable others will help to limit the damage and, where resilience is low, will be essential to initiate and maintain victims' own counter-measures.

Mechanistic *social disruption* is caused by the unforeseen absence of key personnel in relationship networks and by survivors' inability to perform their customary roles because of loss of, or damage to property and other assets, including infrastructure essential to communication, and interruption to the delivery of normal goods and services. Such disruption may extend beyond the geographical area of the disaster, increasing its total impact-space. Causation is linear and it is an empirical phenomenon that can be objectively assessed. Recovery is a matter of replacing the missing personnel and restoring assets.

The inability of victims to make the exchanges that are expected of them leads to structural dissolution. This is a more pervasive and intractable form of social disruption than Mechanistic Social Disruption, as it interferes with the victims' accustomed means of expressing their personal and social identities. Further, it is incorporeal, non-mechanistic and subjective, non-empirical and non-linear in its causation and its effects. If unchecked, Structural Dissolution may worsen in quasi-exponential fashion with the passage of time. Mechanistic disruption and structural dissolution are mutually causal and compounding. However, it is heuristically convenient to distinguish them. Both arise from psychological, cultural and social predispositions endemic in the affected population, aspects of which are discussed below.

2. Culture and society

Having few instincts to guide behaviour, humans depend, instead, on learning most of which comes from others. If we are to interact coherently with one another, it is essential that we do so in a context of shared knowledge, beliefs, values, meanings and mutually-comprehensible aspirations. We need not share these with complete uniformity, but with enough in common for each to understand where the other is 'coming from' and 'going to'. The shared corpus of knowledge, etc. comprises a large part of a social group's *culture*, i.e. the learned behaviour, and its products that are characteristic of that group. (The membership of a social group may be only Robinson Crusoe and Man Friday, a household, an association or organisation, or as large and disparate as a nation-state see below for comparisons of these.)

Social theory has coined conceptual tools for understanding and explaining social behaviour. Although very useful, they are abstractions and their meanings vary somewhat with context. They should not be mistaken for what actually happens inside our heads, and between one another.

Culture is the product of individual discovery and invention which is sifted by a consensus of that individual's social group for inclusion in its 'received wisdom', or is rejected as irrelevant ("this committee is

not concerned with the number of eggs laid last summer in that Blackbird's nest outside"), trivial ("George has reinvented the wheel—again") or false ("disasters don't happen"). Such consensus is reached in the context of existing culture, to which the novel element must conformably relate, and of a measure of social solidarity sufficient for its effective communication and bestowal of appropriate cachet and acceptance.

Although it appears likely that humans are 'hard wired' for sociability, its expression within any specific group is another learned trait and achieving solidarity is an uncertain endeavour. The human 'style' is to create bounded social groups (i.e. in which members are distinguished from outsiders) within which interactions are patterned by approximate prescriptions of behaviour to which shared meanings are attributed. Interactions consist of exchanges of valued entities in the forms of energy, materials and information.

Energy ("the capacity to perform work") is delivered to the recipient mechanically in the form of physical services performed, chemically contained in food and fuel and as radiation transmitted by power-grids, etc.

Materials include all concrete objects, including food and fuel.

Information. In its ordinary sense, information is knowledge of a particular fact or circumstance gained or given through communication, investigation or instruction. A wider meaning, more useful in the present discussion, is derived from the mathematician's use of the term: information is that which reduces uncertainty. Information may be false, or valid, i.e. any knowledge that enables one to distinguish the correct or, if you're into fuzzy logic, optimal choice among alternatives of action, identity, value and/or meaning. It may be *intrinsic*, i.e. already possessed by the individual, or derived from another source, i.e. *extrinsic*.

In the exchanges that constitute the substance of relationships, there is approximate prescription of which entities may be exchanged with whom, and how, and in what forms. Their values and meanings attributed in the context of each exchange are also approximately prescribed as are the behaviour accompanying the exchanges, and the sequences of response to each step in the series. (Thus, while it was once appropriate for me to give my wife a birthday present of alluring lingerie and receive a fond kiss in return, the same exchange between me and a fellow fireman might lift the collective eyebrow of our brigade. Furthermore, access to resources that form the substance of exchange is differentially allocated among individuals. (The garments should come from a shop in which I have made payment, and not from the neighbour's washing-line.)

A *relationship* is expressed (my present to my wife), or created (I buy the apparel from the salesperson in that little boutique) between individuals when they interact, i.e. make an exchange. The *quality* and *intensity* of a relationship are approximately prescribed by the social structure in which it occurs. Prescription of *quality* may be strict, with the types of exchange between participants quite narrowly defined (e.g. between professional and client). Other relationships (e.g. friendships) are more nebulously prescribed, leaving it to people to negotiate the appropriateness of exchanges within a broader field of choice. The *intensity* of a relationship is the frequency with which interaction occurs and/or its emotional significance (affect) on the participants. Such is human sociability that frequent interaction of one type between individuals is likely to accrue emotional content and to proliferate to other types (e.g. I become friendly with my regular newspaper-seller and, eventually, with his family). Relationships are not automatically self-sustaining, but depend on continued interaction, or the hope of interaction that will bring exchanges that, even if not very rewarding, are less unrewarding than any visible alternative.

Symmetry of relationships, i.e. that the quality and intensity be about equal for the participants, is seldom exact, but gross imbalance sooner or later creates a strain (e.g. as with 'users' and 'bludgers'). A requirement of symmetry is reciprocity that something of equal value be given in return for what is received. Reciprocation may be direct, i.e. recipient reciprocates to giver (my neighbour and I greet one another) or generalised, when recipient passes on something of appropriate value to some to some other party (I make a charitable donation in the giver's name), or negative (a thief steals possessions and receives a custodial sentence).

The types of exchanges prescribed for an individual constitute the *status* she or he holds in the group. Put another way, it is the sum of her or his rights and obligations. Statuses are commonly ranked by their relative *power* (i.e. the capacity that exchanges give the person to move others to act according to her or his will). A person's *role* is her or his performance of prescribed exchanges, i.e. exercise of the rights and obligations. (Clearly, this implies the participation of others, with whom there is *role reciprocity*). *Prestige* is the value placed on status, or role performance. Thus there can be high status with low prestige (politician of your choice) or low status and high prestige (Garbo of the Year). Status may be *ascribed*, i.e. is dictated by the social structure (e.g. kinship, citizenship), or *achieved* by the appropriate actions and behaviour (e.g. qualifying for a trade, marriage). Ascribed statuses are generally predictable and are more often permanent than are those that are achieved.

Social formations vary in their *scale*, which is partly a function of the size of the population within which occurs the full range of roles, and of the median role-density (i.e. number of hats worn by a member). Thus, the smaller the scale, the greater is the number and variety of roles of each member *vis-a-vis* any other member. In an isolated village or on a remote, small island the population is necessarily largely self-dependant (i.e. nearly all the range of roles is filled by locals). The schoolteacher may be the spouse of the shopkeeper, parent of one or more pupils, member of the local council, sibling of the nurse (who does not-always minor surgery, midwifery and counselling and dispenses drugs that would make the Australian Medical Association's hair stand on end) and so on, in a dense network of cross-cutting, emotionally rich, mutually-influencing relationships with frequent face-to-face interaction. There is scope for negotiation of the rules of exchanges and their content and compromise and substitution of established practice can often be decided without causing confusion. Much of experience is shared and the people acquire extensive knowledge of one another which, in turn, informs them about themselves. If there is a high level of confidence in the expectations of the population of one another's role performance, and of their reactions to one's own, it is likely to be a healthily-functioning society with strong solidarity among the members. (If not, it's pure hell.) Lest this appear as Rousseauesque romanticism, it must be noted that the safety-net that small scale provides is matched by a hard ceiling.

In a large-scale social formation, e.g. Melbourne, roles are dispersed among a much larger number of people, many of whom have only single-role relationships with one another and the majority have no direct contact at all. Such contact as occurs is mostly infrequent, fleeting, anonymous and of little emotional significance. Mutual knowledge is slight, or non-existent and role-performance is largely mechanistic and impersonal. There is less confidence in expectations of others' role performance and that which exists is derived from faith in structural prescription rather than from knowledge of the individuals' characters. There is seldom opportunity for the type of negotiation of roles that is seen in small-scale social groups. Yet there is a measure of solidarity, as is shown in responses to appeals for emergency, or charitable help and other support for fellow Tasmanians, Territorians, Australians, etc., and in the customary gestures of recognition on discovering that those other tourists in Bangkok are also Melburnians (horrors!... but one must be civil). This is indicative of a vague sense of *community* an abused term that, here, is intended to mean a population among whom there is a significant measure of shared identity and a propensity for common purpose.



In a community there is a significant measure of shared identity and a propensity for common purpose

Within these extensive social systems there are groupings that vary along a continuum of scale, e.g. households, neighbourhoods, schools, workplaces, clubs and other associations in which members interact within a network of more varied and intense relationships. Any given individual will probably belong to several of these, each with its set of statuses. In contrast with the village and island examples, it is unlikely that there will be many links between a member's several groups, other than her or his alliance with it. There is, thus, limited scope for reinforcement of individual roles, or for reconciliation of a member's various roles, having the effect of somewhat fragmenting the persona and restricting the individual's amount and variety of coherent information about Self.

All social formations have *sanctions* that are applied to their members to express and reinforce behavioural prescriptions by rewarding the conforming (positive sanctions) and punishing the wayward (negative). Many are formal (e.g. wages and Queen's Birthday Honours, or capital punishment and library fines) but more are informal (e.g. prestige, favour, or disrepute and adverse prejudice).

In short, the social system and its culture operate to tell me who I am, who you are, what to do, and how we should behave towards one another. It has ways of making both of us listen and conform. When its operation is significantly disrupted by a disaster, the entire basis of the human life-support system is threatened.

3. Fragile reality

Let us assume, as did Plato, that 'out there' is the totality of reality, only fragments of which are known to us. We rely on sense-data (i.e. what is seen, heard, smelt, tasted and felt) for information about our surroundings. Not all of it is accessible; some information is beyond the physiological and dimensional limits of our senses, being too small or too faint, or lying outside the spectra of our sensitivities, or too distant in space or time. Thanks largely to language, we are able to partially overcome these limitations of our senses by including others' accounts of events and phenomena that we miss and, although vicariously experienced, to incorporate them in our personal knowledge and beliefs about the universe. (N.B the universe starts at your navel now, and extends infinitely in time and space to embrace everything that is, was and shall be.)

The filter of cultural conditioning (i.e. specific to each social group) further restricts information about our surroundings; culture defines for us what is insignificant, irrelevant or false, which we ignore, reject, or do not sense, e.g. most white Australians, hard-put to track even a railway-line, are quite blind to the indications left by an animal or person walking over a piece of ground and, if they were pointed out, would be unable to make any sense of them. Yet those signs are easier to see, read and interpret than are the little black marks on this page.

As well as being incomplete, any society's perception of the reality of the universe includes much that is error. Clearly, perceived reality should bear some resemblance to actuality, but social man is startlingly tolerant of evidence that contradicts belief. I could never

understand the firm insistence of Kalahari bushmen, who are superb field naturalists, that steenbok breed only in spring. This small antelope is avidly hunted for its meat and in all seasons the Bushmen were regularly confronted by foetuses in all stages of development in the gravid females they killed, as well as by the sight of the fauns with their mothers. In the world of western medicine, until Struan Sutherland gave us pressure-immobilisation in about the 1970s, professionally-endorsed first-aid treatment for snake bite included a variety of measures that were completely useless, and often harmful. Cytology had the human chromosome number wrong until 1956 and for more than half a century hordes of anatomy students were failed for not finding the mythical 24th pair, and countless individuals classified as abnormal for not presenting them. (Scientific folklore has it that the mistake arose from a printer's error in the paper that originally reported the number in the late nineteenth century.)

The learning on which we depend to guide our behaviour occurs in a societal context and maintaining the necessary coherent interaction requires a common frame of reference, i.e. a shared perception of reality. Incomplete and frequently mistaken as it is, each society's way of construing its experience of the universe serves its members well enough to meet their ordinary survival needs. A flat earth was quite satisfactory until seafarers ventured far enough out to sea for land to sink astern below the horizon and, as wider observation more stridently challenged established belief, the ensuing geocentric universe was replaced by a heliocentric one, and so on. But, as poor Galileo found to his cost, agreement is more important than accuracy. The necessity for a shared frame of reference leads us into a conspiracy to endorse Received Wisdom as Truth.

Much of learned knowledge and behaviour require frequent reinforcement if they are to be retained. Furthermore, we live in an intensely dynamic, inherently unstable social environment and we require a constant flow of information to keep up with the complex, incessant change. New extrinsic information must be incorporated with what is intrinsic, correcting gaps and/or errors in the latter. The inputs are not systematic or of uniform quality, but random and fragmentary. There is seldom adequate information to allow rational certainty or time in which fully to reflect on that which is received. Our grasp of reality is, thus, more fragile than we are happy to acknowledge.

Instead of investigating the validity of new information and the conclusions it leads to, the common solution is to economise and accord authority to selected sources of information and take on trust what comes from them. The readiest-to-hand memories of one's own experience are often the chosen source. But even this mother-lode of sagacity is surprisingly easily drawn into doubt by

conflicting, but untested inputs from Received Wisdom. It is our habit to accept as truth that which the Most Significant Other has proclaimed.

Significant Others are the oracular loved ones, members of skilled trades and learned professions, demagogues and the other people to whose statements and opinions we variously ascribe authority. Their foremost qualification is credibility. Credibility may be an aspect of social status, e.g. the proverbial policeman tells me the proper Greenwich time. It may be demonstrated by competent performance or appropriate experience, or accorded in a sort of chain reaction: e.g. I have faith in the opinion of A, who tells me that trustworthy B considers C to be reliable. Consequently I, too, have faith in C, even though I may not know B.

With great gaps in the information about what is around us, we often misinterpret the environment, getting our facts wrong and attributing wrong meanings to some that we get right. Yet, Thomas Kuhn to the contrary notwithstanding, science and other forms of knowledge do progress – measured as the discerning of valid and significant associations between phenomena and events – but there is a long way yet to go. And not everybody's knowledge and science progress at the same rate. Chaos, i.e. an event of unknown causation, is intolerable to us, so we comfort ourselves by ignoring or suppressing it, or by inventing myths like 'blind fate' a.k.a. 'chance', witchcraft, or your chosen brand of climate change. What we perceive as 'reality' is a cognitively dissonant, spotty mixture of valid approximations, invalid information and ignorance masked by the label, 'irrelevant'. Cruel experience will correct some of the errors ("I'm sober enough to drive") but we have largely surrendered critical objectivity to favour current popular belief; as stated above, in general the truth is what the most Significant Other says it is.

We are conditioned by the experience of a relatively smoothly working social system to sets of habitual actions and responses. The actions and responses of others serve to validate, or coherently amend our values, beliefs and expectations.

4. Paradise lost

By its nature, a disaster is beyond the control of those whom it afflicts. Even when defences have been prepared against its probable occurrence (e.g. bushfires and floods in Victoria), but are overwhelmed, the event contradicts and invalidates the expectations of ordinary, everyday life. On a small scale such contradiction is a common thing we are accustomed to being surprised. But a disaster goes far beyond surprise; it is a shocking upheaval of normality.

Performance of normal role-sets is impeded or prevented and, instead, victims are precipitated into new roles for which they are largely unprepared. They are confronted



Victims are precipitated into new roles for which they are largely unprepared

by behaviour, including their own, that no longer has its old meaning, and by new forms of behaviour with uncertain meaning. Misleading media and other folklore images of their experience compound their confusion. With lost possessions go potent symbols of status, prestige and individuality. The accustomed flow of information about identity and Self is disrupted, replaced by ambiguous signals to the victim about who, and what she or he is.

The undermining of identity, the singularity of the victim's personal experience of the disaster and its consequences, the unfamiliarity of the situation and the unexpectedness of almost everything combine to refute much of her or his socially-constructed reality.

Interruption of normal exchanges through loss of, or damage to goods and facilities for delivering services, the emotional strain of the event, and having to contend with the difficulties of arising from the disaster can destabilise relationships. If the threat is not averted by active counter-measures or by the inherent resistance and/or resilience of the relationships, and they collapse, the ensuing loss of solidarity increasingly compounds the personal and structural harm caused by the disaster. Dysfunction of intimate relationships can do more damage than the event itself.

5. Regaining paradise

However much assistance is given, recovery remains an essentially autonomous process. It follows that victims' capacity for effecting their own recovery will be enhanced by alleviation of the debilitating effects of having been unhinged from their accustomed security of reality, including identity and Self.

The work of Victorian Country Fire Authority Critical Incident Stress peer teams is an example of helpful, very early alleviation. Their clients' distress is much reduced by 'talking it through', during which the commonality of their experience and reactions to it become apparent, thus affirming their personal version of reality and reassuring them of the normality of their (to them, peculiar) reactions. Analogously, disaster victims' distress about their own emotional states, new roles and general confusion can be lessened by comparable intervention that serves to re-engage them.

The peers are volunteers, the CFA bearing their transport and other costs. When requested, they usually attend in pairs at the scene or when the crews return to their stations, and informally discuss the incident with the whole group. They receive a small amount of training, during which the limitations of their role is clearly established. Emphatically they are not there as therapists but, where desirable, might refer members to professional help and facilitate the contact. Their principal qualifications are a capacity for empathy and 'having been there', i.e. having been through critical incidents themselves, which serves as a badge of credibility and enables their clients to accept them as Significant Others. Such acceptance is critical, for it is very difficult for victims to communicate with those whom they see as 'living in another world', and not in their own, post-disaster one. Prior experience also legitimises, and makes sense of their intrusion into the victims' privacy.

The success of this service suggests that it could usefully be extended as a general facility for immediate post-disaster short-term deployment. Suitable volunteer

personnel could probably be found among the various emergency services, simplifying selection, training and communications.

Where there is good opportunity for frequent face-to-face interaction a quasi-tribal solidarity often arises spontaneously among survivors. This can be a vehicle for countering the disruption of the pre-existing social organisation but it is an ephemeral and fragile condition, so the moment must be seized early in the recovery process and intervention be delicately handled. Typically there is a lessening of the customary barriers between households and other groupings in the affected population, who come to see themselves as 'all in the same boat'. Perversely they feel stigmatised by their status as victims, but come to see it as a badge of distinction, making them somehow special. In the abrupt absence of customary hierarchies and other structures, the victim population is a socially amorphous, egalitarian community. Leaders of action and opinion arise suddenly and unpredictably. Emotions are volatile and there is a high potential for quick crystallisation of opinion, driven by unassuaged grief and anger and unresolved confusion. Survivor guilt is common. Unless a more positive lead is given (helping others is a sovereign anodyne) it is likely to be expressed in activities like scapegoating, which is a cruelly wasteful and self-destructive pursuit.

In the absence of any fragment of pre-disaster leadership among the survivors, emergent leaders are likely to be 'self-starters'. If they lack wisdom and experience, or have unsuitable motives for putting themselves forward, their leadership can be harmful, giving rise to jealousies, schisms, frustration and quite serious interference with recovery assistance. Unobtrusive, but firm intervention by those running the recovery assistance is needed to back the right horse and support their choice by according authority.

The 'tribe' can be an effective network for two-way communication but, as there is a marked propensity to rumour-mongering, information directed to survivors should be reiterated in verbal and written forms and media statements should be checked for their concordance with that information. It is important that everybody be seen to receive the same information and the more of it that is imparted to groups and at gatherings where questions can be asked and answered, the better it will be understood and used. As there is often marked synchronicity of phases of response and consequent unity of perception of the situation, the information should be tailored to suit the needs, and level of acceptance of the victims (e.g. accurate casualty lists should come before detailed instructions about design criteria for new housing). The well-intentioned should be restrained until their particular form of assistance can actually be put to good use—it simply causes distress for the Gardening Association to dump

replacement trees and shrubs on people who lack sufficient water even to wash themselves and must watch the kind donations wither and die. As far as might humanly be possible, politicians should be restrained from making the extravagant promises to which they are prone after disasters disappointment is more damaging than is deprivation.

As much of the recovery work as they are capable of should be left to the survivors. Mutual assistance does lasting wonders for morale. It restores a sense of Self, establishes healthy relationships and gets the tasks done. Disaster management's principal role is to provide information, materials and unobtrusive guidance. Within the restrictions of privacy, much of counselling can usefully be done in groups. It is economical of specialist personnel, fosters indigenous mutual support and reassures those who mistakenly see their own distress as a unique weakness. Each such group also provides a forum for negotiation of roles, values, etc., facilitating the process of structural reconstruction

To sum up, a disaster may be seen as causing a critical deficit of information among survivors. With inadequate means of resolving the deficit they are left in profound uncertainty about their accustomed experience and expectations of reality, including themselves, their relationships and most, if not all of the several roles that each of them normally performed. Their recovery entails constructing a new reality to make sense of their post-disaster situation and to enable them to adjust their expectations and behaviour to accommodate it and proceed with their rehabilitation, i.e. to adapt by replacing what is lost with its functional equivalents. Disaster management can assist in these processes by providing suitable personnel who can make personal contacts and communication vectors, by facilitating a copious flow of relevant information suited to each stage of recovery and by providing such material aid as is needed. A certain amount of gentle and unobtrusive manipulation of emergent social structures is likely to be beneficial.

Author

George Silberbauer. 19.3.1931. Educated Pretoria Boys' High School, Stellenbosch, London and Monash Universities, Gray's Inn, University of South Africa, University of the Witwatersrand., BA, Postgrad. Dip. LI., Higher Civil Service Law, BA(Hons), PhD. 17 (Maritime) Sqdn, SAAF. HM Colonial Service, District Commissioner, Ngamiland, Kasane, Ghanzi, and Bushman Survey Officer, Bechuanaland Protectorate (now Botswana). Senior Lecturer, Dept. of Anthropology & Sociology, Monash University (retd.). Research includes: development of new grazing areas, Ngamiland, Botswana; development of crocodile hide industry, Okavango Swamps; culture, social organisation, languages and socio-ecology of Bushmen of the Kalahari; socio-ecology of Western Desert Aborigines; social and cultural impact of Ash Wednesday fires; aspects of the Berrima/Enfield fire and the 1997 Dandenongs fires. Frequent lecturer, workshop and seminar participant, EMA, Mt. Macedon. Member, Community Recovery Sub-committee, Victorian State Emergency Recovery Planning Committee. Consultant to Shire of Yarra Ranges on fire alert. Firefighter, Upper Beaconsfield Rural Fire Brigade, CFA.



The missing links in community warning systems: findings from two Victorian community warning system projects

*Robyn Betts identifies the missing links in warning systems
development through analysis of two recent Victorian projects*

By Robyn Betts

This paper confirms the identification of principles that have been developed by Handmer (2001) to determine the effectiveness of community warning systems and suggests that there are also processes which link these principles defining the relationship that the principles have to each other. The research and explanations of community warning systems to date has been extremely limited with a focus on warning technology solutions and descriptions of warning system operations. Effective warning systems have been defined as 'total' or integrated systems but the linkages that connect and define the relationship between the warning system elements have not been clearly identified or analysed. Two recent Victorian projects that have involved the development and implementation of community warning systems have also provided research opportunities to explore these 'missing links'. These links are supporting the value of a bottom-up approach to community warning system development involving community engagement and are reinforcing the place of both theoretical principles and process in community warning system development.

Introduction

The existence of community warning systems confirms the presence of people living with risk. The impact of an emergency on a community where there has been little or no warning to that community often prompts public criticism and has reinforced the public's perception

about the necessity and value of receiving early warning and information communication.

The review of the Kempsey Flood 2001 reported in Risk Frontiers—NHRC newsletter (March 2002, Vol 1, Issue 3) identified the concerns that the public had about the way in which warnings were communicated and the public's expectations that they would receive timely and accurate warning information from the emergency services.

The Victorian State Coroner's report into the 1997 Ferny Creek bushfire that claimed three lives, identified the importance of "early warning to residents in areas of particularly high fire risk." (Betts, 2001)

The development of warning systems has evolved from the continuing need by emergency managers for accurate predictive information through which emergencies can be managed. The research into flood warning systems has confirmed the advantages of the public being provided with warning information as part of a process to share the responsibility of risk management between emergency services, local government and community.

Warning systems have been developed to reinforce the importance of emergency preparedness as well as being an essential component in the emergency response to hazards such as flood, cyclone, earthquake and storm surge.

Emergencies which are defined as having minimal warning time such as wildfire, flashfloods and industrial incidents have, in contrast, stimulated a debate about the efficacy of community warning as an essential component for 'survival' and emergency management. The debate has revolved around an emphasis on community participation in emergency preparedness through community education and the development of household emergency preparedness and survival



Community warning system research has previously focused on the hazards of flood and cyclone rather than emergencies that have little or no warning time

plans in isolation of the need to provide the public with emergency warning and alert information.

The limited research on community warning systems where the community has been consulted (a bottom-up approach), has identified that the existence of warning mechanisms such as a siren or radio message process can promote perceptions of public confidence about community safety. (Betts, 2001, Parker, 1999)

The research into community warning systems has, over the past ten years, provided descriptions of warning technology solutions and highlighted the challenge to refine the accuracy of predictive emergency information. Community warning system research has also focused on the hazards of flood and cyclone rather than on emergencies that have little or no warning time. The development of evaluation methodology that would enable the analysis of community warning system efficacy as components of emergency management has been minimal (Betts, 2001, Parker 1999). The majority of the research conducted has adopted case study descriptions of a warning system's operational procedures.

The exception to this has been the continuous exploration undertaken by Handmer to identify 'success principles' of flood warning systems (Handmer, 2001.

Parker and Handmer, 1998.). These principles have included:

- the public's access to both formal and informal sources of warning information
- the value of 'shared understanding' between the public and emergency managers about the warning message and process
- inter-organisation cooperation
- the recognition of local needs.

It is only recently that two projects in Victoria which have been set up to develop community warning and information systems have taken up the opportunity presented by Handmer's explorations. The ability to underpin each of these project plans and activities with applied research methodology has also provided opportunities to analyse the value of Handmer's warning system success principles. Significantly the methodology has enabled the linkages connecting these principles to be explored and defined. It is suggested that the exploration and definition of these linkages has assisted the construct of 'community warning' to be evaluated within an integrated and systemic framework of emergency communications.

Two Victorian projects developing community warning systems

Ferny Creek fire alert siren evaluation

The evaluation of the Ferny Creek Fire Alert Siren (Betts 2001) used a strategy of participation research that enabled the processes and principles of this fire alert siren's development and operation to be mapped and analysed. A multi-agency and community-working group initiated and facilitated this project. The project aimed to adopt a community engagement process and supported the development of inter-agency partnerships. The evaluation strategy was developed in collaboration with the working group and was implemented alongside the development and initial trial operation of the fire alert siren. This enabled the Project's evaluation to address:

- The impact of the community communication strategy
- The process of the activities and communication of the Project's working group—including the working group's communication with the Ferny Creek community
- The impact and consequences of the fire alert siren's development and operation on the safety and bushfire survival behaviour of the Ferny Creek residents.

Coode Island community warning and information system project

Coode Island is an industry site located within the Melbourne Port vicinity and is used as a chemical storage site for chemicals used in the manufacturing industry. Coode Island is surrounded by other industries that also use hazardous and dangerous chemicals.

The project was set up to develop a warning and information system for the communities residing near the major hazard facilities sited on and around Coode Island. It incorporated many of the findings from the evaluation of the Ferny Creek Fire Alert Siren and also aimed to define and explore those processes which would link together the principles of community warning systems.

This project has undertaken significant community consultation (resident survey, community group focus discussions, one-on-one interviews) and has focused on stakeholder partnership and communication and the coordination of stakeholder emergency management plans as part of the municipal emergency management plan to improve the safety, confidence and preparedness of the community. This focus provided a contrast to the dominant direction of community warning system development whereby the focus is usually on the design and implementation of community warning technology solutions.

Both projects have significantly contributed to the identification and analysis of the 'missing links' that support the systemic processes of community warning and information communication.

The links between the public and the community warning system

Handmer states "*if people at risk are to take action then warning messages must mean something to them.*" (Handmer 2001, pg 7) Consultation with the community by public sector organisations such as local government and emergency services has been influenced by the assumptions that the public does not have the 'expert' knowledge to actively contribute to planning decisions, that the public aren't interested in contributing to the planning process and that the public want to be told what they need to do. Community consultation has tended to be dominated with resident surveys whereby members of the public are asked for an opinion about a specific issue. This level of community consultation however is still regarded as a tokenistic approach to community participation (Bishop and Davis, 2002). It maintains the community as 'passive recipients rather than being active players' (Esplin, 2001), and continues to support a top-down model of community participation (King, 2002).

The principle of 'developing shared understanding' about the message and expectations of community warning requires an understanding of the population at risk. (Handmer et al) The Ferny Creek Fire Alert Siren working group aspired to involve the specific community in the development of the alert siren's design and operation. The working group included community representatives who had an enthusiastic commitment to the introduction of an early warning system for the area. These residents' consistently communicated updates about the project to other residents within the community. A Resident Sub-committee was recently established to support the continuing management of the alert siren system.

The working group's community communication strategy initially included a resident survey conducted to seek the identification of a preferred alerting procedure and to gauge the level of bushfire survival preparedness evident within that community. The communication strategy enabled a number of public meetings to be convened and a door-knock campaign to disseminate community safety and preparedness information to be conducted. The strategy also provided for the production of newsletters to communicate the operation system of the fire alert siren and to reinforce the bushfire survival and preparedness messages of the fire service and local government.

The public meetings held prior to the siren becoming operational also reinforced the importance of bushfire survival planning and preparedness and emphasised the

relevance of the alert siren as only one component within a plan which would include a range of preparedness and survival actions. The Ferny Creek project's working group used an analogy of a jigsaw puzzle to demonstrate that the fire alert siren was only one piece in a preparedness and survival plan.

In spite of the community communication strategy, the initial evaluation revealed that the community residents didn't have an accurate or shared understanding of the fire alert siren during the first year of operation, consequently the range of resident actions which would occur as a result of the siren sounding indicated that not all residents identified the value of the fire alert siren as a contribution to their own bushfire survival plans. They did however regard the fire alert siren as providing a contribution to the safety of the broader community.

The working group identified the importance of the Community Fireguard program conducted by the CFA and telephone trees as other sources of survival and emergency information and supported the community engagement process for this project. The follow-up evaluation conducted at the conclusion of the 2002 fire season has revealed that in spite of the best intentions by some committed residents, the existence of Community Fireguard has not had the ability to engage all of the residents within this community and the telephone trees do not seem to offer all residents access to local information and support.

The initial evaluation strategy adopted a process to conduct direct and semi-structured interviews with the community residents. This personal contact combined with a 'door-knock' campaign initiated by the local government as part of a community communication strategy was regarded by the residents as a valued opportunity to discuss the fire alert siren and other aspects of bushfire survival planning. This process was identified as a constructive element to involve the community and provided an opportunity for residents to 'have a voice'.

The Coode Island Community Warning and Information Project took up the challenge to 'engage the community' and set up a process to achieve a shared understanding of a proposed warning message by initially exploring the culture and needs of the community. The findings from the Ferny Creek Fire Alert Siren evaluation identified that more localised information about the community was required to define the context within which to design and operate a community warning system.

Although the Coode Island project also used a community survey tool as an initial phase of a community consultation process, the survey was structured to collect a broader range of information than the survey delivered to the Ferny Creek community. The Coode Island community survey asked open-ended questions which:

- identified the culture of the residential community surrounding Coode island
- prioritised the perceptions of risk as defined by the residents
- identified the formal and informal communication sources which residents used on a regular basis
- clarified the residents expectations of the major hazard industries, the local government and the emergency services and
- identified how residents would accept a warning message.

The questionnaire was extensive and demanded a considerable commitment from the residents but it achieved a 14 per cent response rate (a sample size of 700). It provided a significant understanding about that community's culture, needs and understanding of risk and warning information. The findings from this phase of the community consultation strategy have been supported by the follow-up one-on-one interviews and discussions with local organisations such as child care centres, schools, and local businesses.

Overall the community consultation strategy designed for the Coode Island project aimed to set up structures that would allow for continuous two-way dialogue between the community members and the stakeholders. This was achieved with a field worker being contracted to regularly meet with community groups and organisations such as child care centres and aged care facilities, undertaking a number of one-on-one interviews with community residents and utilising the local government's processes of community participation. A strategy to engage with culturally diverse community groups was achieved through the development of dialogue and information presentation with adult students from Community English classes.

These strategies of community engagement and consultation were an initiative of the major hazard industries to set up site specific community consultation committees and produce and disseminate community/industry newsletters.

The focus of the community consultation strategy has been to build a level of trust between the stakeholders and community, establish processes which would maintain opportunities to regularly link the industries, local government and emergencies with the community, and build the industry's understanding about the community's culture, needs and current knowledge and perceptions of risk and emergency warning and management procedures.

This broad approach to community consultation and engagement did not focus on the design of specific warning technology but on strengthening those principles that have been associated with effective



community warning systems. The process of community engagement has been time consuming and at times it has been difficult to measure its tangible effectiveness. However the approach has defined and established the linkages between the principles of shared understanding, social trust, local context and formal and informal communication.

The links between community warning systems and community culture

The case study description of community warning systems confirms the localised impact of the hazard and subsequently the role of the community warning procedures. The review of the 2001 Kempsey flood found that various types of warning messages were delivered depending on the timing of the flood the differing needs of both the residential and business communities and the available resources. (NHRC 2002)

The IDNDR statement of guiding principles for effective early warning consistently acknowledged the value of local involvement and local knowledge in the planning of community warning systems. (1997). Knowledge of a community's culture however presents the development of a community warning system with more than just emergency risk management information. Community culture is a rich tapestry of social networks, norms, customs and informal and formal information channels. The utilisation of this knowledge can significantly assist the incorporation of community warning principles into an integrated system. The dilemma for the emergency management sector has

been the elusiveness of processes that would enable access into a community's culture and a long-held view that this type of information has not been required in the domain of emergency management or community warning

The community consultation process provides an opportunity to discover the social networks and dynamics of a community. In both the Ferny Creek and Coode Island projects, the use of detailed questionnaires, which explored the resident's sense of place within the community, was as important as the residents' perception of risk and emergency preparedness. The Ferny Creek project included this approach as part of the evaluation whereas this approach was a major component of the community consultation phase within the Coode Island project.

Using face-to-face interviews, focus group discussions and exploratory meetings with local community organisations were research tools which enabled quality information to be accessed.

The follow-up evaluation of the Ferny Creek Fire Alert Siren, conducted in 2002 involved the direct interviewing of residents. The results of this particular process has identified that women and children seem to actively take on the responsibility to practice bushfire preparedness and response actions and it was discovered that as a group they were more likely to be at home during the day when it was probable that bushfire incidents could occur.

The discussion with some residents also identified the ways in which new residents to the area accessed information about the community and about bushfire survival planning, the responsibilities which residents had toward their pets—(this was a factor which influenced some of the residents decisions to 'stay or go') and the way in which the residents in this community communicated with neighbours, family and authorities. This information will be incorporated into the continuing development of the bushfire survival community education campaign in the Shire of Yarra Ranges and provides further knowledge to enable the Ferny Creek fire alert siren to remain relevant to the lives of the residents within this community.

The community consultation process of the Coode Island project discovered the connection of residents to the local shopping areas (particularly Yarraville Village) and the community safety role that 'good neighbours' provided to residents. The exploration discovered that almost half of the residents within a community area were out of their area during the day and that many of these residents had children who attended local schools. In an emergency this particular group of residents stated that their first priority would be to ensure the wellbeing of their children. Imagine the number of telephone calls that local schools could receive if an emergency occurred!

The Coode Island Project has extended its understanding of community culture through the engagement of culturally and linguistically diverse community groups and the identification of 'vulnerable groups' such as aged care facilities. Recently the development of Geo Information Spatial maps have recorded elements of formal and informal information networks operating within the community thereby assisting the industries and local government with their decisions about emergency management, community education and community warning procedures.

The tools analysing community culture and linking these cultural elements with community warning principles have become a social mapping process. Social mapping is able to describe the demographics of a community and has the potential to explore the role, power structures and dynamics of networks within a community. It can enable detail to be collected about formal and informal communication processes and explore the community's history. The technique of social mapping is currently being explored as a mechanism to understand the social capital of communities (Stone 2001) and at this early stage it seems to be supporting the exploration of community warning principles and subsequently the design of a warning system which is responsive to community needs and interests.

The links (and conflicts) between stakeholder policies, community needs and community warning systems

Handmer (2001) identified that warning systems appeared to fail when there was a neglect to establish a shared meaning and co-operation between the different groups. He indicated that the communication between the groups should be about negotiation.

The results of both the Ferny Creek Fire Alert Siren evaluation and the Coode Island Project indicated that the communication processes were more than the establishment of interpersonal goodwill and commitment between personnel representing the different organisations. It was about reconciling the policy differences and expectations of the stakeholder organisations.

The Ferny Creek Fire Alert Siren Project had a turbulent beginning with the highlighting of a fundamental policy difference between the key stakeholders. The CFA's focus on bushfire survival relied on residents developing preparedness plans and making a choice to either stay and defend their home during a bushfire or to leave their home early—preferably make a decision to be away from their home on days of total fire ban. This strategy was introduced to avoid a situation of unsafe residential evacuation and to consider the rapid onset impact of a bushfire.

This approach to bushfire survival did not include a response to a fire alert system that CFA believed could increase the possibility of unsafe evacuation during a fire. The Police involved in the Ferny Creek project, believed that a community based warning system would have no bearing on their decisions to warn and inform the community about bushfire survival. The Police's role to provide the community with warning communication and to coordinate public evacuation operations is incorporated within Victoria's State Emergency Response Plan. The local government's focus was to support the needs of residents in the Ferny Creek area.

Residents living in this specific location of Ferny Creek were not able to hear the local CFA brigade siren during the 1997 bushfires and radio reception was identified by residents as being extremely poor in certain locations of this community. The residents believed that without some form of warning system, they would again be vulnerable to bushfire.

The opposing positions between the CFA, Police and local government and residents prompted the members of the working group to find some other common ground which would enable them to undertake this Project. The working group members agreed to the development of a fire alert siren being a trial and the group made a commitment to put aside their organisations' policy positions and to work on the



A communication chain operates across and between organisations and communities

process of working together. One resident commented that this presented 'a melting pot of ideas'. (Betts 2001). The group's agreement to a community communication strategy (including community education) and to the promotion of the fire alert siren as only one component of bushfire survival diminished the influence of the basic differences between the groups. However it remains to be seen if interpersonal cooperation and negotiation is sufficient to support the success of the fire alert siren's operation or if organisational policy will override the best intentions of inter-agency cooperation.

The influence of conflict between organisation and stakeholder policy has been a consideration when planning a process to achieve inter-organisation cooperation for the Coode Island Community Warning and Information System project. The project's initial planning phase involved an assessment of 'policy and priority positions' for the industry's, emergency services (MFB and Vic Police), government departments, local government and for the various community consultative and action groups.

The establishment of 'shared meaning' and cooperation required more than inter-personal dialogue and negotiation. The partnerships and shared meanings have only been achieved through consistent opportunities for debate between groups (the industry forums provided this opportunity) and the identification of opportunities for consultative communication, joint activities and shared information. There appears to have been value in the project's initial focus being on the needs and interests of the community rather than focusing on a 'warning technology' solution being discovered. Conflict

and opinion differences have been openly tackled allowing for the development of policy compromise as well as inter-agency cooperation and goodwill.

The links between the 'chain of communication' and community warning procedures

The existence of both official and unofficial warnings and the acknowledgments of detection, monitoring and forecasting procedures between emergency agencies confirm the presence of a communication chain that operates across and between organisations and communities. The disconnection and fragmentation between these communication networks (Handmer and Parker 1998) however suggests that a communication chain, which supports the management of an emergency, is very rarely free of gaps and breakages.

The concept of a 'communication chain' and the links which join these concepts have been described as the combination of official and unofficial warning systems but to date there has been insufficient exploration of this communication chain to define the processes and assumptions which underpin it.

The evaluation of the Ferny Creek Fire Alert Siren identified the existence of official and unofficial sources of information for the community, some of which were warning messages and others that provided a continuing source of information throughout the emergency. During an emergency, residents reported that they would access neighbours, scanners, radio, TV, direct communication with emergency services and personal judgements as information sources. The fire alert siren has become another added source of information, not an end in itself.

The emergency services and the local government also had their own communication procedures that were used, within their own organisation and across organisations. The evaluation findings however have identified that currently these chains of communication suggest limited understanding about the information needs of specific groups and each of the emergency service's communication protocols don't as yet seem to incorporate the warning and information needs of the community.

The initial evaluation identified that during its first season of operation, the Ferny Creek Fire Alert Siren was not operating as part of an integrated emergency communications system. The working group acknowledged this finding, and has since conducted an exercise to explore the chain of communication that would occur if the area experienced another bushfire. This exercise has confirmed the presence of official and unofficial warning communication processes. It has also noted that access to relevant information from these sources could be unpredictable depending on the resident's knowledge of bushfire preparedness and

planning and their connection to the local community. The fire alert siren is a trigger to not only seek further information but also to implement whatever plans or actions the residents may make in emergency situations. In an extreme situation, there may not be sufficient time to access further information. The residents reported that in a bushfire they become totally reliant on major media reports as a source of continuous information throughout an emergency and this source of information relied on the emergency services' recognition of the community's needs and their ability to transfer the necessary information from the fireground, to the police and then to the media.

The continuing work being conducted on this chain of communication will identify the communication role of local government, the communication processes between the fire service and police, the links with other emergency services such as the SES and the protocols that determine how the major media report the emergency. This exercise challenges the meaning of communication effectiveness in emergency management. The focus of communications is often solely on the management of the emergency either within or between specific emergency services. The operation of community based warning and information systems will continue to challenge this focus.

The transfer of information outside of this circle from the emergency services to the community, local government and media often appears to be a much lower priority. The community residents' hunt for accurate and relevant information to reinforce their decisions to act can then become a frustrating process.

The stakeholders involved in the Coode Island Community Warning and Information System Project have also recently undertaken a similar exercise. This exercise is not complete and it has initially revealed a number of questions and issues that need to be resolved by the stakeholders. These include:

- Who has the responsibility to deliver warning and continuous information to a specific community and to the organisations within that community? Is it only the responsibility of the Police or does industry also share that responsibility?
- In a major incident the issue of timing is critical to the response of the emergency services, the assessment of the emergency and the delivery of information to other stakeholders (other industries, local government etc) and to the community. Can the implementation of the current communication procedures be timely and how can they be improved to improve their efficiency?
- The importance of providing warning and ongoing information ('real time' information) to the community needs to be valued in a similar way by all the stakeholders, including industry, emergency services and local government.



The importance of providing warning and ongoing information ('real time' information) to the community needs to be valued in a similar way by all the stakeholders, including industry, emergency services and local government.

- An effective emergency communication system needs to ensure that its communication processes to the community are inclusive, responding to the information needs of culturally diverse communities and individuals.

The 'chain of communication' supporting an emergency community warning and information system needs to have agreed values between stakeholders about the importance of the communication process as well as the focus of the communication messages. It relies on congruence between the emergency response communication of the emergency services and the information delivered to the community. It is vital that the local government establishes its role and responsibilities within these processes. The communication chain is not however a linear set of procedures which operates sequentially but it is a system of communication processes which are all inextricably linked to each other and which culminate in an effective management of the emergency and the demonstration of a safe, informed and confident community.

Conclusion

The Ferny Creek Fire Alert Siren has provided a unique opportunity to extend the previously limited descriptions and analysis of community warning and information systems. The evaluation methodology allowed for Handmer's principles of effective warning systems to be critically analysed and further developed. The Ferny Creek project identified the development of a process which established a working group which had equal status between all stakeholders including the community but which also demonstrated the complexities involved in the engagement of the broader community and the development of a truly integrated system of warning and ongoing information communication. The project strongly suggested in its evaluation that an integrated system of community warning and information relied on 'linkages' between the core principles and operational procedures. These linkages were introduced by Handmer (2001) and Handmer and Parker (1998) but the lack of community warning system evaluation in Australia has meant that the linkages have not been sufficiently defined or explored until now.

The Ferny Creek project was the first case study to commence this process and the opportunities gained from this project and used within the work being undertaken at Coode Island has enabled this exploration to continue.

The linkages have been defined as the communication and partnerships processes between stakeholders—the debate to establish shared values and trust, and acknowledging the influence of culture and context for both the represented organisations (emergency services) and the community. This is a continuing issue for both

projects and the processes to achieve these outcomes will probably continue to evolve. The linkages assist the establishment of a 'bottom-up' approach to warning system design where there is a focus on the needs and interests of the community rather than just on technological solutions.

The challenge has been to work within the framework of principles and linkages to establish a practical process through which to develop and implement a community warning and information communication system. This paper has discussed two important case studies which have provided a significant step to meeting this challenge.

Bibliography

- Betts, R. (2001) *Ferny Creek Fire Alert Siren Evaluation Report*. The Office of the Emergency Services Commissioner, Victorian State Government.
- Bishop, P and Davis, G. (2002). Mapping Public Participation in Policy Choices. *Australian Journal of Public Administration*, 61(1): 14–29, March.
- Esplin, B. (2001). Unpublished Presentation on *Community Participation and Emergency Management*, The Office of the Emergency Services Commissioner, Victoria
- Handmer, J (2001). Are Flood Warnings Futile? Risk communication in emergencies. *The Australasian Journal of Disaster and Trauma Studies*. Volume: 2000–2 New Zealand International Decade for Natural Disaster Reduction (IDNDR). (1997). *Guiding Principles for Effective Early Warning*. Emergency Management Australia, Australia.
- King, D. (2002). *Understanding the Message: Social and Economic Impacts of Weather Generated Natural Hazards*. Invited paper, Presented to AMOS Conference, University of Melbourne Feb 2002
- Parker, D (1999). Criteria for Evaluating the Condition of a Tropical Cyclone Warning System. *Disasters*, 23(3), 193–216, U.S.A.
- Parker, D and Handmer, J. (1998). The Role of Unofficial Flood Warning Systems. *Journal of Contingencies and Crisis Management*, Vol.6 Number 1, March 1998. U.S.A.
- Risk Frontiers – NHRC. (2002). The Business of Warning. Article from *Risk Frontiers quarterly newsletter*, March 2002, Volume 1, Issue 3. Macquarie University N.S.W.
- Stone, W (2001). *Measuring Social Capital, Towards a theoretically informed measurements framework for researching social capital in family and community life*. Research Paper 24, Australian Institute of Family Studies, Commonwealth of Australia.

Author

Robyn Betts is the Manager of Research Projects in the Office of the Emergency Services Commissioner, Dept of Justice, Victoria. Robyn is currently working on a number of projects that focus on the development of integrated systems of emergency communications between emergency services, industry, local government and the community. Robyn has a particular interest in developing appropriate models of evaluation to determine the effectiveness of emergency communication and warning systems.



Flood action plans— making loss reduction more effective in the commercial sector

Andrew Gissing argues that flood action plans can overcome low flood preparedness but research shows they are often poorly developed

By Andrew Gissing

Warning systems frequently fail to produce maximum potential benefits. Research results from the Kempsey, 2001 flood suggest businesses responded poorly to warnings because of low flood preparedness. Flood action plans could overcome this problem. If comprehensive flood action plans had been developed before the flooding of Kempsey in 2001, damage could have been reduced by an estimated 80 per cent. However, research into the development of flood action plans in Inverell, Lismore and Adelaide has shown that plans are often poorly developed and that further flood education is needed to improve their development.

1. Introduction

Well-prepared persons after receiving sufficient flood warning are able to avoid substantial flood damages. With this principle in mind, global spending upon flood warning systems has grown in an effort to combat increasing global flood losses. However, recent research suggests warning systems frequently fail to deliver maximum potential benefits. An evaluation of warnings delivered to businesses during the Kempsey, NSW, Australia, 2001 flood showed businesses largely responded poorly as a result of low flood preparedness (Gissing, 2002). It was concluded that flood warning performance is dependent not only upon the efficiency and effectiveness of a warning system, but also the preparedness and ability of a community to respond to flood warning. Focus upon improving flood response is important, since effective response may be the only defence against extreme floods. To achieve improved response from better warning systems, enhanced preparedness is required.

Attempts to increase flood preparedness have been focused on the community as a whole, without

distinction between the commercial, residential or industrial sectors. However, Smith (1998) argues that the greatest benefits of loss reduction programs in financial terms exist in the commercial and industrial sectors due to their greater potential losses.

The Kempsey 2001 flood caused 2.5 million dollars damage, much of which could have been avoided if businesses had understood flood warnings and implemented effective loss reduction strategies. Wright and Smith (1999) recommended adoption of flood action plans tailored to individual businesses to boost flood preparedness and reduce flood losses. Flood action plans detail actions to be taken in advance and over the duration of a flood. The purpose of planned actions is to reduce direct damage and ensure business continuity by attempting to minimise demands on time, personnel and resources. Flood action plans empower businesses to take some ownership of their flood risk and implement self-protection initiatives.

Little research has been conducted into the development and effectiveness of flood action plans. This paper discusses the development of flood action plans in the commercial sector and evaluates their effectiveness in the Australian cities of Inverell, Lismore and Adelaide (Figure 1). The paper concludes by discussing the potential benefits of flood action plans to Kempsey businesses.

2. Development of flood action plans

Numerous stakeholders can be involved in the development of flood action plans including business owners, business managers, customers, suppliers, employees, local government, insurance companies, landlords and emergency services. Each of these persons and organisations has an interest in the continuity of a business. These stakeholders should encourage and be involved in the development of a flood action plan.

The effective development of a flood action plan involves five stages consisting of awareness, flood audit, planning, implementation and review (Figure 2). The process is a continuous cycle involving a feedback process.

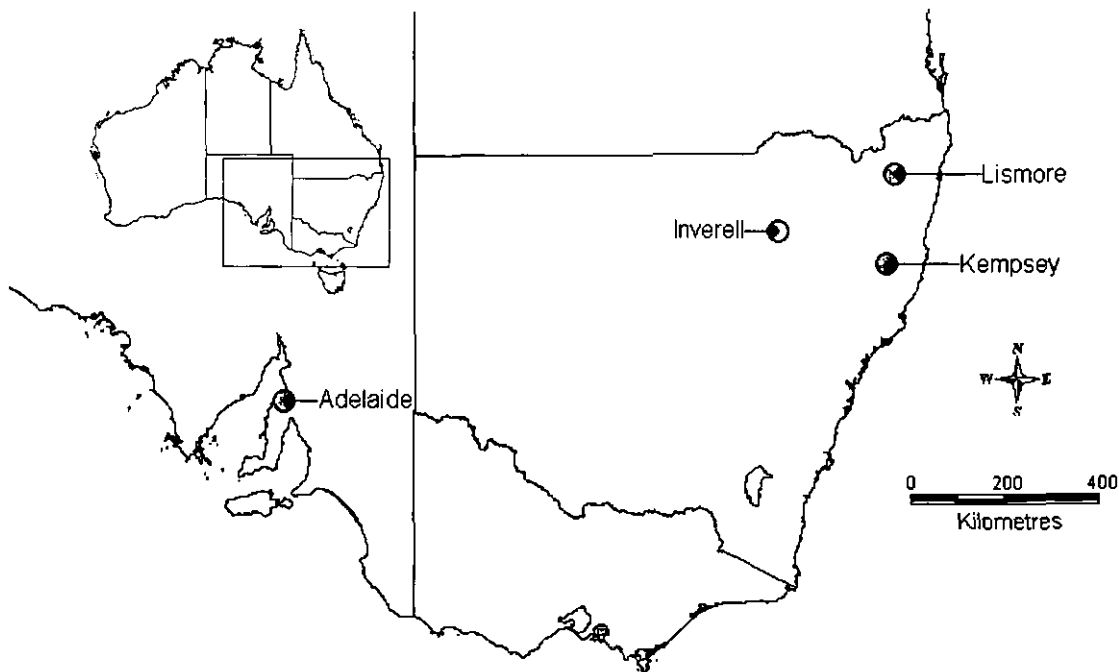


Figure 1 – Locations of study areas

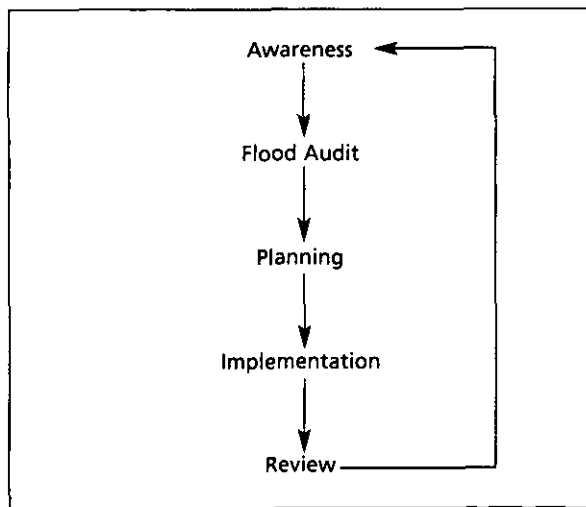


Figure 2 – Stages in Flood Action Plan construction

Awareness

It is critical that a business is able to identify its flood risk. As an initial step in the development of a flood action plan, businesses must be made aware of their risk and encouraged to take mitigating actions. In communities where floods frequently occur awareness will likely be high and needs only to be reinforced. However, some communities where flooding is less common remain largely unaware of their flood risk; for example, Keswick Creek in Adelaide. These communities require regular awareness programs. Though the construction of awareness programs is beyond the scope of this research it is important that they include:

- Information on how to reduce flood risk, including details on flood proofing and flood action plan development
- Encouragement to create a flood action plan
- Where to receive further information

Flood audit

A flood audit is an investigation of flood risk faced by a business. A business's flood risk is a combination of the likelihood of flooding and the vulnerability of a business to flooding (Department of the Deputy Prime Minister U.K, 2002). To assess risk the audit process comprises two parts: hazard assessment and vulnerability assessment.

Hazard assessment is an evaluation of flood hazard confronting a business. The assessment aims to deliver accurate flood information about individual businesses. Information about businesses to be determined includes:

- Ground elevation
- Probability of flooding
- Depth of previous or design floods over floor
- Appropriate evacuation routes
- Potential building flood entry points
- Velocity of flood water

This information aims to enable businesses to make informed choices about their flood hazard. The information should enable businesses to relate river heights to their floor level, assess likely flood levels within their buildings, the risk of structural damage to their building and choose the safest evacuation routes.



Vulnerability assessment evaluates the extent flood hazard may impact upon a business.

Vulnerability assessment evaluates the extent flood hazard may impact upon a business. This involves assessing the vulnerability of a business to building and contents damage as well as business disruption. The assessment should identify the following:

- Critical products, services, records and operations
- Hazardous materials
- Flood prone contents and structures
- Potential effects of damage on stakeholders
- Likely financial costs
- Resources, personnel and time available to make preparations
- Level of insurance cover

The combination of hazard and vulnerability assessments results in a total risk assessment. The assessment provides managers with knowledge of their business's flood risk. Risks identified must be addressed in the planning stage; hence the audit serves as the main guide in the plan's development.

Planning

Planning involves the development of a pre-defined course of action to reduce flood risk (LeBreton and Henning, 1961). There are five stages in the planning process; risk prioritisation, strategy development, procedure development, testing and consultation and documentation.

Risks identified in the flood audit must be prioritised in accordance with the plan's objectives. Priority should be given to risks that may critically affect the continuity of a business, pose a significant potential tangible or intangible loss or increase a business's vulnerability.

Strategies must be developed to reduce the potential flood risk identified. These may include flood proofing, re-positioning or protection of vulnerable contents and recovery arrangements. Insurance may be used as a means of risk spreading, but is frequently unavailable to flood-prone businesses.

Two forms of flood proofing exist; wet and dry. Wet flood proofing aims to improve the resistance of a building and its contents to flood. This typically involves the use of flood resistant materials and raising electrical wiring. Dry flood proofing aims to prevent water from entering a building. Measures used include permanent or temporary flood barriers to block building openings and the installation of non-return valves to prevent sewage back flow (Department of the Deputy Prime Minister U.K, 2002). Contents can be positioned to reduce vulnerability. This involves either permanently elevating vulnerable contents or removing or lifting contents directly prior to flooding.

Businesses can make arrangements well in advance of a flood to speed recovery and minimize business disruption. This often involves temporarily relocating activities offsite. This may range from switching phone calls to an alternate location to the establishment of satellite facilities or reciprocal aid arrangements with similar businesses elsewhere.

Strategies should be evaluated based on criteria. It is important to balance the level of protection offered, the costs involved and the potential level of damage avoided.

Procedure development involves determining actions to implement risk reduction strategies. Planners at this stage must determine what actions are necessary, who

Table 1. List of typical flood action plan actions.

PREPAREDNESS	RESPONSE	RECOVERY
<ul style="list-style-type: none"> • Review insurance • Update plan • Conduct training • Purchase and maintenance of emergency equipment • Maintain employee phone list • Backup computer records • Elevate important documents and store duplicates offsite • Elevate vulnerable contents • Install permanent flood proofing 	<ul style="list-style-type: none"> • Listen to radio • Remove vehicles • Lift or remove contents. • Stay clear of deep fast flowing water. • Re-direct communications • Turnoff utilities • Sandbag or install flood shutters • Seal wall and floor vents • Contact stakeholders • Remove records and cash • Secure building • Evacuate along the predetermined route 	<ul style="list-style-type: none"> • Hose out • Have utilities professionally checked before turning on • Assess damage • Remove damaged contents • Restore business • Advertise re-opening • Restore vital records

should complete actions, when to complete actions, what resources are needed and, if complex, how to complete actions. Actions should be separated into three phases, preparedness, response and recovery.

The preparedness phase comprises actions to be taken well before a flood, the response phase actions to be taken after the receipt of evidence indicating likely flooding and the recovery phase actions to be taken to re-open a business. Table 1 gives examples of actions comprising these phases of a flood action plan. Actions should be ordered according to the priorities previously established, taking no longer to be completed than the limited time available. Care must be taken to ensure the established procedure is compatible with other emergency plans if any.

Drafting the plan involves the documentation of established procedures and associated details. The three phases of the plan should be listed separately. The plan should also entail additional information including:

- Contact details of emergency services, business owner, manager, staff, suppliers and insurance agent
- List of emergency equipment and location
- List of design and historical flood heights above floor
- Location of where plan is to be kept
- Details of persons in charge of implementing the plan
- Details of who is in charge of performing certain actions
- Criteria to invoke the plan

Testing and consultation enables planners to establish whether plans are realistic. This may involve simulations or group discussions with stakeholders. These exercises provide important feedback to planners about the effectiveness of their plans and how they could be

improved. Improvements should be incorporated and the final plan documented. The document should be simple containing sufficient information for personnel to complete procedures.

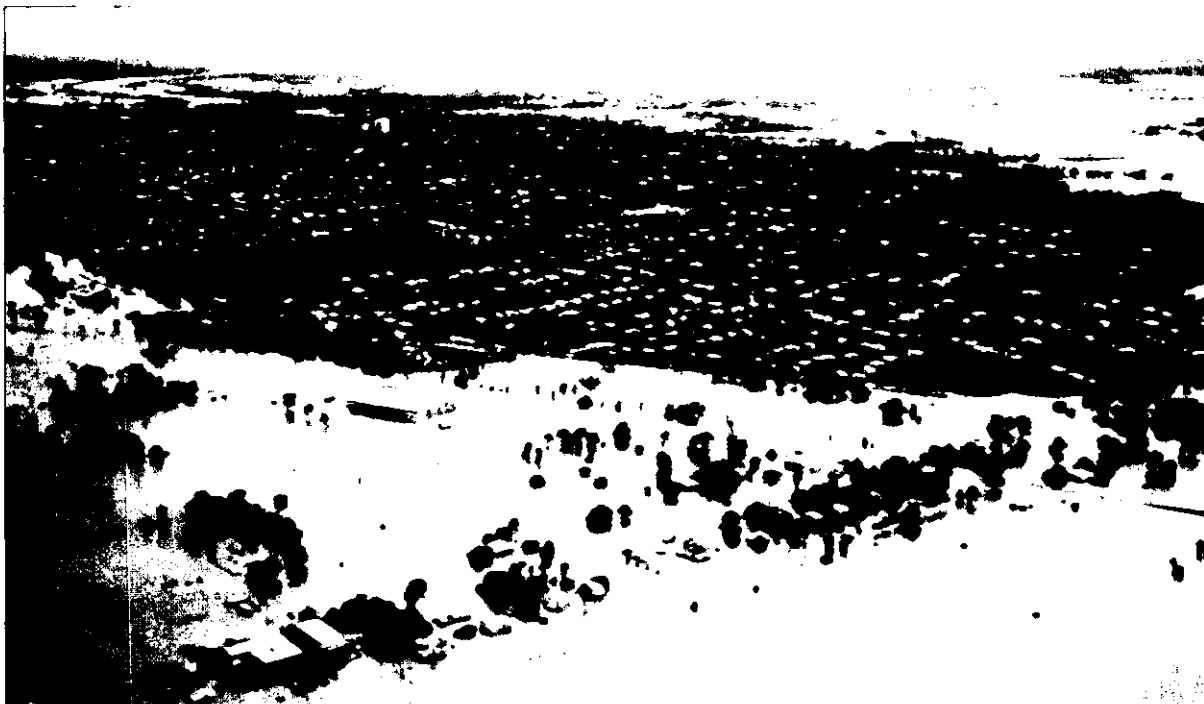
Implementation

Implementation is more than just putting the plan into action: it involves integrating the plan into the organisation (FEMA, 1996). Implementation involves three stages; distribution, training and performance.

Distribution of the plan throughout the organization is essential. The plan must be prominently displayed to ensure all employees have access. It is also important that copies of the plan are kept offsite.

Training ensures that all employees have knowledge and understanding of the plan. Staff should be taught who is responsible for what and how to perform tasks. This may involve group discussions, simulations or quizzes. Training gives employees an appreciation of what a flood situation may be like and prepares them to cope with the stress, uncertainties and demands they may be confronted with (Maslen, 1996). Training should be conducted regularly and new staff trained during their induction. Training will produce important feedback and ensure the plan's effectiveness. Without training, a business, even though it has a flood action plan, is not prepared to manage emergency and recovery procedures (Maslen, 1996).

Performance involves carrying out tasks designated for completion before a flood. The performance of these tasks should be ongoing and only cease periodically for the performance of emergency and recovery procedures.



Efforts have recently been made to encourage the creation of flood plains in Inverell, Lismore and Adelaide

Review

Review involves critically examining all elements of a plan; ensuring the plan functions as intended, remains up to date and incorporates needed improvements. Reviews are critical to maintain performance, ensure lessons are not lost and to account for changes in risk. Reviews should be completed at least yearly and after the following (FEMA, 1996),

- Training drills
- Flood
- Changes in personnel or their responsibilities
- Changes in the layout or design of a building
- Changes in policy or procedure
- Changes in the catchment

Employees should be briefed on changes made and trained accordingly if needed.

3. The Flood Action Plan experience

To examine the development and effectiveness of business flood action plans, research was conducted in the Australian cities of Inverell, Lismore and Adelaide. In all three cities efforts have recently been made to encourage the creation of flood action plans.

Inverell, situated upon the Macintyre River, has a population of 10,000 persons (Australian Bureau of Statistics, 1996). The catchment above Inverell is approximately 730 square kilometres in size consisting of steep slopes with quick runoff (Pryor, 1999). Comprising an estimated 250 commercial properties all of which are flood prone, Inverell's business district was last flooded in 1991. Estimated

to have an Average Recurrence Interval of 50 years, floodwaters rose rapidly, giving businesses only several hours to prepare. Damage to businesses was variable totalling an estimated \$15 million (Markar and Joy, 1994). Post-flood, local authorities realised that damage could have been lower if businesses had been more prepared. In response a number of decisions were made including requiring the submission of a flood action plan as a necessary part of development approval on flood-prone land (Pryor, 2002).

Lismore located at the junction of Leicester Creek and Wilson's River, has an urban population of approximately 30,000 (Australian Bureau of Statistics, 1996). The catchment area above Lismore is in excess of 1,400 square kilometres. Approximately 700 commercial and industrial premises are built in flood prone areas, many without raised floor levels. Since 1857 over 130 floods of varying sizes have occurred. The worst of these occurred in 1954 and 1974, the latter being the subject of intense research by Smith et al. (1979). Most recently, flooding was recorded in February 2001. The flood was the 13th highest on record, with an Average Recurrence Interval of approximately six years. A survey of 39 businesses by Risk Frontiers revealed that seven had suffered no significant damage whilst some others had estimated their losses in the tens of thousands of dollars (Leigh and Gissing, 2001). Lismore has a substantial floodplain management plan involving the distribution of property specific hazard assessments including floor height and ground height data, contact phone numbers of emergency services and evacuation procedures (Lismore City Council, 2002).

Keswick Creek is a small urban catchment, 32 square kilometres in size, located in the southwest inner suburbs of Adelaide. This urbanised catchment is at risk of flash floods, characterised by rapid stream level rises and short duration inundation. Though no major floods have recently occurred, a 1984 flood study revealed flood risk to approximately 170 commercial properties (WBCM, 1984). Wright (2001) estimated the total flood loss exposure of these businesses for a 100 year Average Recurrence Interval flood at \$100 million. Roughly half of the damages were assessed as being avoidable if flood-proofing measures were introduced and a further 15 per cent if an effective flood warning service was introduced. Little flood awareness exists within the catchment. As part of an Adelaide University research program some businesses have been warned of their risk and encouraged to take mitigating actions. The program has involved door knocking, community meetings and a small number of flood audits.

4. Methodology

Face-to-face interviews with business managers were conducted in each city during July, 2002. Interviews were used to complete a questionnaire about flood preparation. Participants were asked common questions relating to plan development, documentation, procedures, training, review, awareness, costs and benefits.

In total 153 questionnaires were completed, 68 from Inverell, 73 from Lismore and 12 from Keswick Creek. In addition to questionnaires, interviews were conducted with local government officials and emergency managers. These interviews obtained information on the development of flood action plans. To assess the content of plans additional information was also obtained from Inverell Shire Council.

5. Results

Businesses claiming to have developed either a documented or undocumented flood action plan totalled 86 per cent of the total survey sample. Plans were most prevalent in Lismore with 97 per cent of businesses having developed a flood action plan. Businesses were prompted to develop plans by previous flood experience, occupational health and safety regulations, council regulations, encouragement by emergency services and the value of business contents. In Lismore the development of a flood culture as a result of frequent flooding has fostered responsible actions to reduce flood risk. Businesses have accepted that floods are a part of business, with many acknowledging that planning is the key to business survival.

"Floods are a part of life. We had three floods in one year once."
(Lismore shopkeeper)

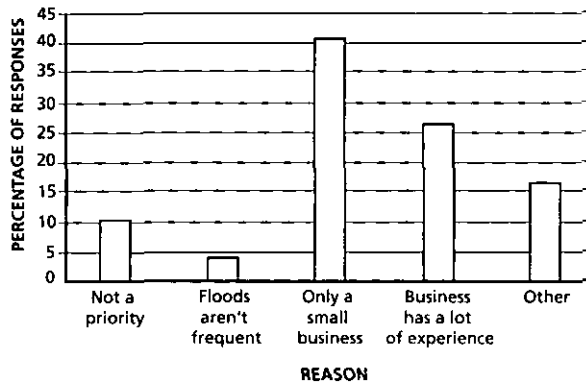


Figure 3 - Reasons for not documenting plans

"Only those who are not prepared get caught."
(Lismore shopkeeper)

"Wouldn't survive without a plan."
(Lismore shopkeeper)

"You know you live on a floodplain, you do something about it."
(Lismore shopkeeper)

Businesses that had not prepared plans did not see flood preparation as a priority, although many acknowledged that if floods were more frequent planning would become important. A small number of businesses viewed flood preparation as pointless, believing that little could be done to prevent flood damage or that floods would no longer occur because of mitigation works. In a few cases businesses did not wish to accept responsibility for flood risk minimisation, believing it to be the responsibility of government.

"Floods only come twice every century, don't worry about them, just cop them on the chin."
(Inverell Shopkeeper)

"Flood, isn't that what the State Emergency Service is for?"
(Inverell Shopkeeper)

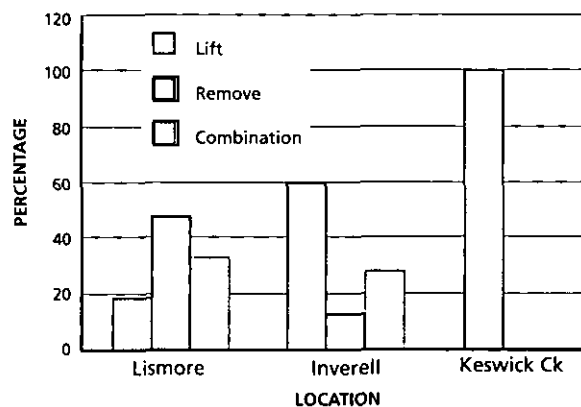


Figure 4 - Proportion of businesses lifting or removing contents

Of those businesses that had developed flood action plans only 25 per cent had documented their plans. Reasons given for failing to document plans are given in Figure 3. Many businesses with few employees believed that documentation was pointless, as only a small number of persons would need to use it; this was particularly clear in owner-operated businesses. Some businesses that had extensive flood experience believed that documentation was unnecessary, as employees had experienced the plan's implementation in previous floods. Many businesses that had documented plans did so to enable the plan's implementation in case management was unavailable during a flood. This points towards the potential failure of undocumented plans if persons with knowledge of the plan are unavailable during a flood.

Documented plans were typically kept in the administration office of a business, either on a wall or in a filing cabinet. However, in a few cases where council regulations had required documentation of the plan, it had been lost. Only a small number of businesses mentioned that they stored duplicates offsite. Not all businesses with documented plans allowed free access to the plan by all staff. In Inverell 93 per cent of businesses allowed access by all staff, though only 70 per cent of businesses in Lismore and 60 per cent of businesses in Keswick Creek allowed access by all staff.

The content of plans was primarily focused upon response procedures, largely neglecting preparedness and recovery phases. Response procedures identified by questionnaires included sandbagging, sealing doors, lifting or removal of contents, listening to the radio, installing flood shutters, removal of vehicles, disconnection of utilities and evacuation of employees and customers. The proportion of businesses planning to remove contents rather than lifting them (Figure 4) is dependent upon anticipated flood conditions. In Inverell and Keswick Creek where flood heights are typically shallow, many businesses plan only to lift contents above the expected flood height. However, in Lismore where flood depths can be far greater, many businesses plan to remove contents. In many cases plans involve removing contents to higher floors inside a building. This often requires an agreement between the business manager and the owner of the building's upper floors.

An analysis of 27 documented plans submitted to Inverell Shire Council indicated that 24 of these plans contained response procedures, only 7 contained recovery procedures and no plans listed preparedness procedures. All submitted plans contained contact details of key staff. The detail of these plans varied considerably, most following the structure recommended by Inverell Shire Council. Table 2 indicates the percentage of documented plans submitted to Inverell Shire Council containing the listed content.

Table 2. Content of plans submitted to Inverell Shire Council.

CONTENT OF FLOOD ACTION PLANS	YES %
Radio station to listen to	60
Contact phone number of emergency services	20
List of previous flood heights in the building	75
Flood height at which flooding commences in the building	25
Evacuation routes	33
Points of flood entry	27
Criteria to invoke plan	25
List of emergency equipment and location	40

Of the small number of businesses discovered during surveying that incorporated preparedness procedures; few had documented their intended actions. For these businesses preparedness procedures involved annually insuring their business against flood, checking emergency equipment or replenishing sandbags. Lismore businesses were asked if they kept copies of important records; 64 per cent suggested that they did.

Though it is difficult to give an accurate estimate, a greater percentage of businesses incorporated recovery procedures in their plans. Planned actions were fairly basic, consisting of damage assessment, washing out, cleaning up and checking utilities. To encourage the recovery of sales, advertising and post flood sales were often planned. One business on Keswick Creek has a reciprocal arrangement with a competitor to continue supply of their products in event of disaster (Wright, 2002).

A high proportion of businesses with plans prioritise actions. Survey results indicated that 80 per cent of businesses with plans prioritise response actions. But survey results showed that only approximately 30 per cent of businesses assign a length of time to complete actions.

Only 30 per cent of businesses conducted any form of flood training, indicating that new plans may not be well tested. Training was found to be irregular, being conducted during the induction of new employees. However, two large Inverell businesses conducted regular training to rehearse the installation of flood shutters. Only one business claimed to have completed a simulation of the business's plan. Often businesses claimed to only train management staff, ignoring other staff members. Some Lismore business managers suggested training was unnecessary as many of their employees already had substantial flood experience. Large businesses were more likely to undertake training than small businesses.

Table 3. Advantages and disadvantages of flood action plans.

ADVANTAGES	DISADVANTAGES
<ul style="list-style-type: none"> • Do not have a threshold level • Inexpensive • Environmentally friendly • Increases flood awareness • Increases preparation efficiency • Flexible • Encourages owners to take responsibility for their flood risk • No landlord-tenant conflict • Can be effectively implemented in new and existing businesses 	<ul style="list-style-type: none"> • Dependent upon receiving warning • Dependent upon flood warning accuracy • Dependent upon resources being available • Only as good as the information behind the plan

Approximately 60 per cent of businesses claimed to have updated their plans since their development. Some businesses claimed that their plan was updated yearly, whilst others updated their plan irregularly, prompted by a flood or changes in personnel or floodplain characteristics.

Plans were relatively inexpensive to develop and document. Prices for professionally developed plans range from \$600 to \$800 (Jones, 2002). Businesses that developed their own plan, spent between a couple hours to a week on its development. Some businesses sought advice from government, emergency services, employees and neighbours whilst developing their plan.

It is difficult to quantify the monetary benefit of developing a flood action plan. All ten Lismore businesses that were asked if their flood action plan enabled preparations to be made faster responded in the affirmative. Businesses gave estimates of time saved, ranging from one hour to six hours.

Flood action plans were identified in both new and existing developments. Flood action plans in many existing buildings were the only practical option available to reduce flood risk. Flood action plans,

unlike structural flood proofing measures, do not require the approval of the landowner, therefore making them attractive to leaseholders.

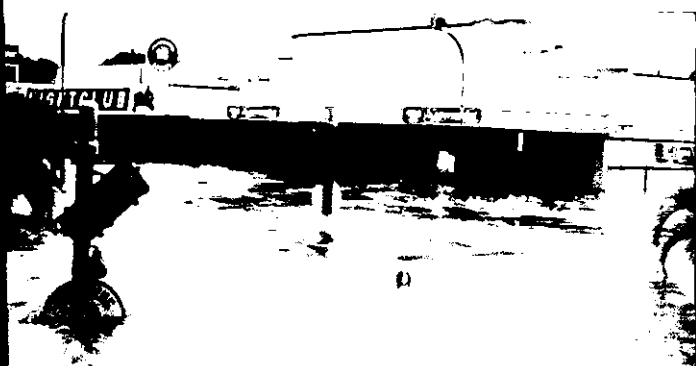
It is clear that individual property hazard assessments distributed by Lismore City Council have increased the level of flood awareness within the business community, in comparison to Inverell where no such information is distributed. Survey results showed that 90 per cent of businesses are aware of the gauge height at which their business initially floods. This compares to only 25 per cent of Inverell businesses.

The heavy reliance of flood action plans on timely and accurate flood warnings was identified as their greatest shortcoming. Flood warnings are the information source that managers typically use to decide to invoke their flood action plan. Without receiving warning, businesses at best will be able to prepare for flood to a limited extent. Currently a flood warning service is not available to effectively warn all businesses on the Keswick Creek floodplain.

Potential benefits for Kempsey

Only 54 per cent of businesses had developed flood action plans prior to the Kempsey 2001 flood. Of these businesses none had documented their plan. As a result businesses largely were inadequately prepared to deal with a flood.

Damage surveys conducted after the flood identified that damage to stock and equipment comprised 80 per cent of contents damage indicating that planning could have effectively reduced flood losses. The unrealised benefits of well-developed flood action plans during the 2001 flood were calculated by estimating the ratio of movable contents and structure to total damage. The approximate ratio was equal to 0.8 indicating that effective flood action plans may have reduced direct damage by a further 80 per cent. This would reduce the estimated actual to potential ratio for the Kempsey 2001 flood to



Only 54 per cent of businesses had developed flood action plans prior to the Kempsey 2001 flood

10 per cent, close to the ratio calculated for the Lismore 2001 flood of 6 per cent. Further reductions would have been possible if businesses had introduced wet and dry flood proofing measures.

6. Conclusion

Flood action plans clearly have the potential to improve response to flood warnings and hence decrease damages suffered as a consequence of flooding. Planning for flood has advantages over other approaches as well as some disadvantages, as outlined in Table 3.

In reality, survey results indicate that initiatives to introduce plans such as business flood audits have increased the flood awareness of businesses and enhanced their knowledge of appropriate actions. Disappointingly, plans in Lismore, Inverell and Adelaide have been poorly developed and implemented. However, substantial damage reductions during the Lismore 2001 flood may suggest otherwise. It is suspected, though, that these reductions are primarily the result of Lismore's substantial flood experience and that such savings would not be possible without plans in less experienced communities such as Inverell and Adelaide. The small percentage of businesses in these locations conducting training suggests that businesses may be poorly prepared to activate their plans.

The poor development and implementation of flood action plans indicates that they should not be used as a means to achieve development consent, as argued by Keys and Oppen (2001). Instead, plans should be used as a method for individual businesses to reduce flood risk and enhance business continuity. To this end, the creation of such plans should be encouraged by local governments and emergency services.

Education on how to develop and maintain flood action plans is currently lacking in Australian communities. The ideas presented in this research may be further developed and communicated to businesses to help planners develop more effective methods of flood loss-reduction. This is likely to be a role for the State Emergency Service.

Acknowledgments

Professor Russell Blong, Director of Risk Frontiers provided guidance with this paper. Christopher Wright, Manager of the SA Bureau of Meteorology Flood Warning Centre, Chas Keys, Deputy Director General of the NSW State Emergency Service, Libby Cumming and David Pryor of Inverell Shire Council and David Ingle Smith provided valuable insights into flood action plans. The project was funded by the Macquarie University postgraduate research fund.

References

- Australian Bureau of Statistics., 1996, *Census of Population and Housing*. Australian Bureau of Statistics, Canberra.
- Department of the Deputy Prime Minister United Kingdom., 2002, *Preparing for floods*. Department of the Deputy Prime Minister United Kingdom, [www.safety.odpm.gov.uk/bregs/floods]
- Federal Emergency Management Agency (FEMA)., 1996, *Emergency Management Guide For Business & Industry*. Federal Emergency Management Agency, Washington D. C.
- Gissing, A., 2002, The Business of Warning. *Risk Frontiers Newsletter*, vol. 1, no. 3, pp. 1-4.
- Jones, D., 2002, *Personal communication*. David C. Jones (Consulting Engineers) Pty Ltd., Inverell.
- Keys, C. and Oppen S., 2001, The consent authority and the combat agency: a perspective on the interaction between councils and the State Emergency Service in floodplain management matters. In: *Proceedings of the NSW Floodplain Management Authorities 40th Annual Conference*, Wentworth.
- Leigh, R. and Gissing, A., 2001, The February 2001 Lismore Flood. *Natural Hazards Quarterly*, vol. 7, no 1, pp. 1-2.
- Le Breton, P. and Henning, D., 1961, *Planning Theory*. Prentice-Hall, Inc., Englewood Cliffs, New Jersey.
- Lismore City Council., 2002, *Lismore Floodplain Management Plan (Draft)*. Lismore City Council, Lismore.
- Marker, M. S., and Joy C. S., 1994, The Cost of February 1991 Flood Damage in Inverell. In: *Proceedings of the NSW Floodplain Management Authorities 34th Annual Conference*, Inverell.
- Maslen, C., 1996, Testing the plan is more important than the plan itself. *Information Management & Computer Security*, vol. 4, no. 3, pp. 26-29.
- Pryor, D., 1999, Inverell's Floods - A Range of Problems a Range of Responses. In: *Proceedings of the NSW Floodplain Management Authorities 39th Annual Conference*, Tamworth.
- Pryor, D., 2002, *Personal communication*. Inverell Shire Council, Inverell.
- Smith, D. I., 1998, *Water in Australia, Resources and Management*. Oxford University Press Melbourne.
- Smith, D. I., Den Exter, P., Dowling, M. A., Jelliffe, P. A., Munro, R. G. and Martin, W. C., 1979, *Flood damage in the Richmond Valley New South Wales: An assessment of tangible and intangible damages*. Centre for Resource and Environmental Studies, Australian National University, Canberra.
- WBCM., 1984, *South Eastern Suburbs of Adelaide: Stormwater Drainage Study*. WBCM Adelaide, South Australia.
- Wright, C. J., 2001, *Flash Flooding in an Urban Environment, Causes effects, potential damages and possible remedies, with particular reference to Keswick Creek in the inner suburbs of Adelaide*. Master of Engineering Thesis, Department of Civil and Environmental Engineering, University of Adelaide, Adelaide.
- Wright, C. J., 2002, *Personal communication*. Commonwealth Bureau of Meteorology, Adelaide.
- Wright, C. J. and Smith, D. I., 1999, How to capture the benefits of a flood warning? In: *Proceedings of the Australian Disaster Conference 1999*, pp. 299-304.

Author

Andrew Gissing, formerly of Risk Frontiers is a Planning and Research Officer with the New South Wales State Emergency Service. Email Andrew.Gissing@ses.nsw.gov.au

We are all vulnerable

John Handmer suggests the issue of 'vulnerability' should be turned around and approached positively as resilience or as the capacity to cope with change.

By John Handmer

The fact that we are all, in one way or another, vulnerable, is of limited value to emergency managers. Priorities need to be identified, and we need assessment methods to achieve this, as opposed to approaches where everyone is found to need support. Clear identification of the purpose and scale of any vulnerability assessment, along with acknowledgement that the details of vulnerability may be inherently unknowable, are seen as prerequisites for this task.

Some relevant definitions and approaches to measurement are reviewed, and suggestions made for moving towards an improved approach for Australia and comparable countries. Among other things, it is suggested that the issue of "vulnerability" should be turned around and approached positively as resilience or as the capacity to cope with or adapt to change. This should be politically more acceptable than a focus on the negative connotations of vulnerability. It would also be consistent with the approach being taken by global climate change researchers—a group with much profile and influence.

We are all vulnerable

We are all mortal, and vulnerability is something mortals are endowed with. In the same way, we are not omniscient and therefore must live with uncertainty about the future. Not surprisingly much human effort is dedicated towards managing that uncertainty in ways that reduce or appear to reduce vulnerability. This is the case whether we buy insurance, or depend on the beneficence of a higher being.

People can do many things to reduce their vulnerability and the more they do the more resilient they become in the face of (most) hazards—or to use expressions gaining currency, the greater their coping or adaptive capacity. A case can be made that as a nation Australia has become increasingly resilient, in contrast to the situation in many of our near neighbours (in Melanesia and Indonesia for example) where resilience has

declined steadily over the last decade or so. For convenience, resilience is assessed in this context in terms of the conventional macro "outcome" indicators of life expectancy and infant mortality, as well as employment, education, income and welfare provision (consistent with the UNDP's – United Nations Development Program – Human Development Index, see www.undp.org/hdro/), and the not so conventional but critical issues of continuity management and absence of warfare on our territory. I would assert that this pattern of international comparison holds up well across Australia and the south-west Pacific with the possible exception being remote communities (communities being defined here as settlements or neighbourhoods) in Australia. It is also valid across scales apart from the individual and household levels where there is immense diversity.

If we can see that there are large and growing differences between societies in terms of resilience and if we can suggest ways that communities or individuals can become more or less resilient, then it should be possible to measure resilience.

However, if the opening line of this paper is correct there is a need for focus: if everyone is vulnerable, what should the priority be? The limited resources available for public policy objectives should be directed at those who are the worst off, in other words those who are most vulnerable or the least resilient. The question becomes: how to identify this group or these people? And then how to develop policies and programs that meet their needs? This paper examines some of the issues, definitional questions and approaches to measurement. It suggests directions for improvements.

Vulnerability, resilience and risk

Before examining approaches to measurement, it is useful to set out some definitions and related issues. Here, I rely mainly, but not solely, on definitions published by EMA (Emergency Management Australia www.ema.gov.au) and based on the Australian/New Zealand risk management standard (AS/NZS 4360: 1999 www.standards.com.au/catalogue/script/search.asp). Risk is seen as a function of hazard (itself defined as the geophysical phenomenon), the assets and people exposed to the hazard, and the vulnerability of what is exposed. Vulnerability is seen as a function of

susceptibility to loss and the capacity to recover. This capacity is termed resilience by EMA and it is here I depart from their terminology. The definition is sound but I prefer to use the term resilience generally in place of vulnerability because of its positive connotations of coping capacity. (That said, I acknowledge that there may be useful distinctions from a policy perspective between vulnerability, resilience and capacity; and there are often political or administrative reasons for defining certain groups as vulnerable or resilient—but these issues are not pursued here.) This general use of “resilience” appears to be supported by the UN International Strategy for Disaster Reduction (ISDR) which defines resilience as (www.unisdr.org/unisdr/Annex%201%20Terminology.pdf (2002)):

“The capacity of a system, community or society to resist or to change in order that it may obtain an acceptable level in functioning and structure. This is determined by the degree to which the social system is capable of organising itself and the ability to increase its capacity for learning and adaptation, including the capacity to recover from a disaster.”

The ISDR defines “capacities” as the opposite of “vulnerability”.

This is broadly similar to the concept of adaptive-capacity which has been co-opted and developed by the global coalition of climate change researchers (see the Intergovernmental Panel on Climate Change at <http://www.unep.ch/ipcc/>). (The term has long been used by geographers in a broadly similar way.) In the climate change context, “adaptive capacity” is defined as a purposeful adjustment in response to actual or predicted climate change with the aim of moderating the impact. However, the world is full of surprises and proactive adaptation needs to be conceptualised broadly to include capacity to cope with the unexpected. Given the collective public profile and influence of climate change researchers, it makes sense to consider adopting a broad interpretation of their terminology.

The definition of risk set out above is now very widely employed and is illustrated in the “risk triangle” (see below).

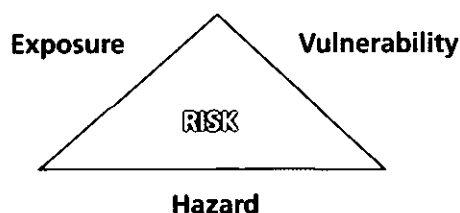
(Also see www.ga.gov.au/urban/factsheets/risk_modelling.jsp for an explanation of this definition.) The idea being that the area of the triangle represents the “risk”, while the sides of this triangle represent the

hazard (eg flood water), exposure (eg housing on a floodplain), and vulnerability (eg there is no warning system and much of the housing is occupied by people who are long-term unemployed). Altering any side of the triangle (hazard, exposure or vulnerability) alters the risk. Exposure and vulnerability will generally be much more complex and difficult to define than the hazard. The concept is very useful in an analytical sense, especially for risks over which there is little argument, but has its limits. For example, where do the issues of trust and fairness fit? These are central to an understanding of contemporary risk debates.

Where complex risks are concerned the limits of the triangle become more apparent. The so called “natural hazards” of floods, droughts and so on can seem complex enough, but hazards emanating from socio-technical systems will often be much more counter-intuitive, resistant to quantification and even to precise definition (see Table 1). These more complex hazards may have no clear spatial or temporal boundaries, and no agreed solutions. Ignorance may be profound creating problems for a strictly quantified approach. Examples of such hazards would include, the human form of BSE (Bovine Spongiform Encephalitis), GMOs (Genetically Modified Organisms), terrorism, many contaminants including those of a radiological nature, and large scale financial fraud. Their attributes make it very difficult for individuals, groups, communities and emergency managers to assess vulnerability and coping capacity.

Table 1. Some characteristics of complex unbounded risks.

- largely invisible;
- they resist definition in space and time;
- there may be a climate of fear;
- concern and anxiety may increase over time;
- often things do not gradually get better;
- compensation as in restoration may be impossible – the impacts may be irreversible and large scale;
- attempts at mitigation may make things worse;
- someone may be blamed – someone profits;
- typically ignorance is profound – there may be no acknowledged history. Sound quantification may be impossible.



Assessing vulnerability and resilience

Some attempts at vulnerability assessment map aspects of the geo-physical hazard. The people’s vulnerability is defined in terms of the physical properties shown on the maps. They tell us something of the hazard, which is an essential part of risk under the definitions widely employed in Australia. Often infrastructure, buildings and some

demographics may be shown. These are important parts of the elements at risk exposed to the hazard. But they do not tell us about people's resilience or coping capacity. This approach to assessment often relates to a single hazard: eg "vulnerability to flooding". The approach may be very useful in some planning and mitigation contexts, but it is less about vulnerability and more about hazard and exposure.

Other typical approaches to vulnerability and resilience assessment are set out in the list below. In examining definitions for their utility and when debating the merits of different approaches it is important to be clear about both the scale being addressed, and the purpose of the definition (or indicator of vulnerability or resilience). At many meetings on this subject over the last few years definitions useful at a local operational level were often confused with those useful at a more macro policy level as well as with those intended for analysis and research. Any attempt at analysis or the development of general indicators of resilience can be undermined by quoting cases where individuals or households do not fit the analysis or indicator. Such cases are of central importance during local operations, but may not be relevant to a broader analysis. (For one approach to identifying local vulnerability see www.dhs.vic.gov.au/emergency/recman/publication.htm.) Many researchers are interested in the root causes of and processes underlying apparently low and high levels of coping capacity. These may go well back into history, and at the current state of knowledge may have limited direct relevance to policy and operations. However, they are part of the continuing enquiry into vulnerability and resilience.

Some approaches to assessment:

- The *macro indicators* listed at the start of this paper may be useful in some contexts, although they may disguise many inequities and pockets of low resilience and their coarse nature reduces their operational utility. They highlight that ultimately much about vulnerability concerns development and social organisation at the macro scale. Other macro indicators would report on the quality and availability of emergency services;
- The "list" approach. Many attempts to measure vulnerability come close to measuring everything (or at least everything for which measurement seems easy) on the perfectly reasonable grounds that everything is relevant. Everything may well be relevant in different circumstances as resilience is to some extent specific to situations, and at the local operational level it is necessary to know which individuals and households need assistance. But the pragmatics of policy, management and operations, all set within constrained budgets and competing social, economic, health and security interests, require that we focus on a small number of factors and that public policy effort concentrates on those people and places most in need;



Particular groups of people are assumed to have little resilience or coping capacity within the ambit of public policy

- International uniformity. Other attempts use indicators because they have been used traditionally or because they are used internationally. This approach can assume that an appropriate indicator of vulnerability to famine in Bangladesh or Mali, is also appropriate in Melbourne. That may be the case, but I have seen no evidence that similar indicators are valid at the operational level across cultures and societies. Macro indicators at the societal or national level such as those mentioned at the outset above may however be valid for analysis and for priority setting at a large scale. The initial work on the UNDP's *World Vulnerability Report* is in this category, in that it should enrich understanding of the complexity and forms of vulnerability.
- *Self assessment*. One approach which may work cross-culturally is that of asking those at risk to identify their own vulnerabilities and capacities—in conjunction with a program to identify local risks and mitigation options. This is an important part of an approach promoted by the IFRC (International Federation of Red Cross/Red Crescent Societies) and set out in their 2002 *World Disasters Report* www.ifrc.org/PUBLICAT/wdr2002/chapter6.asp

Some indicators of vulnerability may be based on stereotypes with little research support, whereby particular groups of people are assumed to have little resilience or coping capacity within the ambit of public policy. Elderly people are frequently seen as a vulnerable group, but during the recent Victorian gas crisis, it appears that they generally coped better than younger people; Melbourne's large population of women from the Horn of Africa was thought to be a special needs group, but officials now report that as a group they appear to be particularly adaptable and resilient. The policy context is important, for example young children may

Table 2. Possible indicators of resilience at the household and community Level. These are presented as static, but in all cases trends and stability would be important. (Ranked from most important first.)

VARIABLE	LOGIC	POTENTIAL INDICATORS
Livelihood security	Ability to absorb losses through an assured supply of employment, income or other strategies	Wealth, income security
Access to crisis support – formal and informal.	Rich or poor, crises demand support from kin, the state or insurance. Much work esp. in social capital suggests that active networks are key. But emergent networks may be just as effective. Must be visible to be noticed.	Welfare access, insurance coverage, health and emergency service coverage and quality. Household structure. Personal networks. Visibility.
Housing quality	Housing can protect us from most hazards, provides identity and well-being.	House age, condition, insurance, locally appropriate (eg raised), or safe refuges.
Self assessment of resilience.	Psychological state, strong coping ability, and awareness of personal networks, are important factors enhancing resilience. Even if these factors could be measured externally, self assessment may be the most useful approach.	Interviews, well-being indicators. Strength of informal ties and life skills

be very vulnerable, but are generally very well supported in Australian communities.

Some suggestions

Drawing on many papers on the subject, the workshops run over the last few years on vulnerability indicators in Australia and UK, and other debates, I suggest some key variables in Table 2 which might be useful for identifying groups with low levels of resilience to environmental and social change in Australian society. These groups are not devoid of resilience and there would be some circumstances where they might cope better than most. As indicated earlier, purpose is important for any assessment. Here the purpose would be to identify those groups which would benefit the most from having their resilience enhanced. Generally, in a post-disaster recovery operation, the responsible authorities would need to conduct detailed local investigations to ensure that especially vulnerable individuals were not overlooked.

Evidence is needed for most of the suggestions and is being compiled from the research literature. It may be that a fundamental basis of resilience is local (or community) livelihood security (eg see Working Paper 2 at www.benfieldhrc.org/.) Without this communities may become entirely dependent on welfare where that is provided.

It is important to appreciate that detailed accurate assessment of resilience or vulnerability is an illusion. The whole area is immensely complex with actual resilience shifting according to the details of the situation, which can change rapidly around the group or community under consideration. Immediately after the events of 11 September 2001 in the United States, many Australian Moslems and people of Middle-Eastern descent overnight found themselves the target of abuse and suspicion. Events far away with which they had no connection had an immediate impact on their capacity to cope with living in Australia by making their lives more dangerous. This highlights the power of labelling, and serves as a warning about the potential for stigmatising communities and identifiable social groups.

From a research and operational perspective it can be very difficult to come to grips with the informal networks, relationships, knowledge and state of mind that may be more important to resilience than formal positions and access to resources. We can map many of these network attributes and linkages under normal day-to-day circumstances, but during a crisis emergent networks may be critical to coping. These may be dormant or invisible normally and therefore difficult to identify. Examples would include connections with neighbours.

Table 3. Other variables in resilience.

VARIABLE	LOGIC	POTENTIAL MEASURE
Dependency	Communities with a high degree of reliance on formal or informal social services will have less resilience.	Percentage of population unemployed including children. Trends would be particularly important here.
Isolation – social and physical	Isolated, less visible groups have less access to crisis support and personal networks.	
Environmental justice	Some groups find themselves in contaminated or otherwise very risky locations—with no avenues for justice.	Self appraisal

Other factors that appear to be important are set out below. They are not included in Table 2 as it seems that they are, or can be, included in the indicators already listed. Factors that may be particularly important in poorer countries would include the strength of civil society and institutions, and broader human rights concerns. These have not been included here as the focus is on Australia and comparable countries.

Counter arguments

Arguments against the suggestions set out above are considered here. These counter arguments fall into two categories: that the points made may be wrong or seriously deficient; and secondly, that key issues may have been overlooked.

The paper defines resilience and vulnerability in generic terms. However, most definitions treat the subject implicitly if not explicitly, in the context of some defined hazard: for example, a community may be resilient in the face of bushfires, but not in the face of economic change. The argument in the paper is that there are underlying generic attributes which make people and communities more or less resilient to most if not all hazards and stresses. At the community and larger scales, I believe it is likely that generic attributes underlie resilience. However, the household and individual levels are very circumstantially dependent and resilience is more likely to be hazard specific. It may be that as everyone does need support from at least some hazards and in some circumstances, emergency managers need to find ways of dealing with this, rather than attempting to identify high priority groups as in this paper. This is where the current approach of undertaking case-by-case post-disaster assessments may be the best approach—when properly supported by pre-event planning.

Much of the material set out in this paper is based implicitly, if not explicitly, on the concepts of social capital and community. These are poorly defined, and often not defined at all even though used extensively in policy and debate. Some writers reject them completely

(see Kit Carson "Is communalism dead? at www.rsointernet.com/anzsoc/start/programabstracts.pdf.)

There is no question that the debates should continue and that the terms need clarity. However, from a practical viewpoint the terms are so widely used and embedded in policy and operational thinking that it is pragmatic to continue to use them while the intellectual discussion continues. Another argument is that in Australia the local community is often not important to household livelihood security.

It is possible that livelihood security may be of limited relevance in rich countries, especially those like Australia with reasonably comprehensive welfare systems—which should guarantee a reasonable livelihood. However, some wealthy countries have limited welfare, and everywhere there are significant gaps in provision. In addition, for most people welfare is no substitute for other forms of income—in particular because of the low level of welfare and the dramatic change to lifestyle sudden dependence on welfare may entail. (As an aside, some of those who commented on the drafts of this paper believe that the Australian welfare system is becoming increasingly limited with potentially negative impacts on resilience.)

Self-assessment may be criticised as being subjective, inaccurate, or tied up with other agendas. Regardless of whether this is the case or not, subjective assessment may be exactly what is wanted if it provides reasonable insight into coping capacity.

The second general category of counter arguments concerns factors other than those listed. Some of these factors may be very important in resilience, but it is not clear that they would be of any operational use, nor is it obvious how public policy could deal with them. These factors include the role of globalisation in making communities more or less able to deal with crises and major change; and the whole issue of root causes which may be embedded in the history and development of the people involved. Where poorer developing countries are concerned, these two issues may be closely linked. Human rights have been mentioned, but then set aside

in the context of countries like Australia. However, there appear to be connections between a rights based approach and vulnerability (www.apu.ac.uk/geography/radix/humanrights5.htm), and a case could be made that they should be included.

What can be done?

Almost every aspect of the field of vulnerability and resilience assessment and management is contested and demands attention—even the basic terminology. The paper has argued that there are viable generic indicators of resilience, and this conclusion offers some suggestions on terminology and assessment. But there is also another major challenge for those in the field not dealt with here: that is to conceptualise coping capacity for the less visible, unbounded and apparently emerging risks such as BSE and terrorism.

The initial suggestions set out in Table 2 (and 3) above could be refined for use in identifying areas of relatively low resilience and capacity. Some issues needing at least partial resolution are suggested below:

- Accept that assessment of resilience will always contain an element of uncertainty. The small scale details of resilience may be inherently unknowable—especially in the case of complex communities undergoing constant change. Even if they could be determined with precision the assessment could be dated immediately as circumstances changed.
- Identify the assumptions underlying much work and policy on vulnerability and resilience, and search for evidence for these.
- Concentrate on the identification of key variables for resilience assessment, and search for appropriate indicators in existing data sets. This needs to be driven by a clear purpose with an understanding of the appropriate scale: is the work for local operations, policy implementation, or research and analysis—and in the last category, are we interested in research with immediate application or in examining the historical, and possible future, evolution of resilience?
- Develop approaches to assessing community and household coping capacity—and the role of the concept of social capital in this.
- Are globalisation and other macro trends having significant impacts on the resilience of Australian communities?

We are all vulnerable, but we are also all resilient, and we all have adaptive capacity. Building resilience and capacity is politically appealing and a practical policy response to communities in difficulties—labelling or stigmatising communities as particularly vulnerable or incapable is not usually politically appealing and is often strongly opposed by the communities involved (unless there are significant financial benefits). It may also send the wrong message if the policy aim is to encourage people and communities to take more responsibility for their risks. “Vulnerability” can be seen as negative and

disempowering in contrast to the more positive concepts of “resilience”, “coping capacity” or “adaptive capacity”. As the term “adaptive capacity” is used and promoted by the global climate change community – a group with considerable profile and influence – it may be worthwhile for others to consider adopting the expression.

Acknowledgements

This paper was originally prepared for a workshop on vulnerability indicators organised by Philip Buckle and held at the Victorian Department of Human Services, Australia. An earlier version of the paper was placed on the Radix website (www.apu.ac.uk/geography/radix/resources/vulmeeting-pbmelbourne11.doc). I would like to thank Ben Wisner (London School of Economics) and Philip Buckle (Victorian Department of Human Services/Cranfield University) for their useful critical comments on the earlier draft; and Robyn Betts (Victorian Office of the Emergency Services Commissioner), Heidi Ellemor (RMIT University), Andrew Coghlan (Victorian Department of Human Services/EMA), and two referees for comments and suggestions on this expanded version.

*The Centre for Risk and Community Safety is a collaborative centre between RMIT University, Emergency Management Australia and CRES at the Australian National University (www.gs.rmit.edu.au/research/risk.htm).

Author
John Handmer
Centre for Risk and Community Safety*
RMIT University
John.handmer@rmit.edu.au
www.gs.rmit.edu.au/research/risk.htm



EMA Update

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

KNOWLEDGE MANAGEMENT & BUSINESS

Community Awareness Activities

The Knowledge Management & Business division of EMA presented a paper at the Communities at Risk conference in Fiji detailing the community awareness materials developed for Tuvalu and the process used in their development. As a direct result of this presentation and acknowledging EMA's role in assisting the National Disaster Management Office of Tuvalu in developing a community awareness program, EMA – in conjunction with SOPAC – has been invited to undertake a similar project in Niue by their National Disaster Management Office. This project commences in late November.

*For further information contact: Christine Jenkinson
Phone: +61 03 5421 5241;
email: christine.jenkinson@ema.gov.au*

Landslide Awareness

The *Landslide Awareness – A3 fold out colour pamphlet* – developed by EMA in partnership with Geoscience Australia has been revised and features a new look, comprising layout, images and focus of content and information.

*Copies of this pamphlet are now available. For further information contact: Cate Moore Phone: 03 54 21 5296;
email: cate.moore@ema.gov.au*

The Australian Emergency Manuals Series

The Disaster Recovery Sub-committee of the Community Services Ministers' Advisory Council (then the Standing Committee of Community Services and Income Security Administrators) and the Australasian Society for Traumatic Stress Studies, with funding under the National Studies Program of EMA, formed a steering committee identifying key areas to be addressed. Participants at a subsequent workshop represented a cross-section of managers and service providers from a range of government and non-government agencies involved in the delivery of psychological services. The following two Australian Emergency Manuals are the result of that workshop:

Psychological Services in the Disaster Context—Emergency Managers Guide. Produced as guidelines offering insights, principles and strategies in key facets of assessment and delivery of psychological services. It aims to prevent unnecessary suffering, facilitate recovery, ensure ethical practice and to protect disaster-affected people and support workers in their respective roles. They were developed to supplement the information available in the existing Australian Emergency Manuals Disaster Recovery and Community and Personal Support Guidelines.

Psychological Services in the Disaster Context—Mental Health Practitioners Guide offers practitioners insights, principles and strategies in key

facets of assessment and delivery of psychological services.

*For further information contact: Grahame Parker
Phone: 02 6266 5218; email: grahame.parker@ema.gov.au*

EMATRACK—Australian Disaster Database

The EMA Australian Disaster Database, EMATrack, was recently relocated onto a new software platform enabling it to be accessed via the EMA website. It is now available. EMATrack contains disaster event information dating from 1622 until the present day.

For further information contact: Grahame Parker Phone: 02 6266 5218; email: grahame.parker@ema.gov.au

EMA Library

Staff of EMA and the Lionel Murphy Library have selected a new Library Management System. The software will hold the EMA library catalogue making it available to staff on the intranet and to remote clients on the Internet. This new library management system will improve our service capabilities and allow for the capture of new formats such as photos and electronic documents. An intensive period of data extraction, conversion, parameter setting and training occurred this quarter. The implementation activities will continue through September 2003.

*For further information contact: Linda Hansen
Phone: 03 54 21 5224; email: linda.hansen@ema.gov.au*

Knowledge Networks

Over the past 3 months the EMA website averaged 280,000 hits per month. Approximately 20 per cent of these come from the United States, and 3 per cent each from Europe and Asia/Pacific region. This demonstrates EMA's strong online presence, both locally and overseas.

EMA KM&B hosted a visit from ARK Group Intranet Site Visits in June. KM&B staff presented to the delegates on various aspects of our Knowledge Management Intranet. The visit was very successful and increased the already high standing of EMA's Knowledge Management and networks profile in the larger corporate environment.

The new EMA Conference Centre website went live in July as did the new online EMATrack Disaster Database. The 2-year project to redevelop and transfer EMA's websites from Defence to the Attorney-General's Department is now complete. Online forms, a Bulletin Board and Forum for Education & Training and a new strategic plan for the EMA Intranet, are some of our current development projects.

*For further information contact: John Laurie
Phone: 03 54 21 5280; email: john.laurie@ema.gov.au*

PLANNING & OPERATIONS

National Registration and Inquiry System

The National Registration and Inquiry System (NRIS) committee met at Mount Macedon during 14–16 April 2003. The committee consisting of representatives from all States and Territories meets annually to consider development in NRIS and to review activations over the last twelve months.

A milestone was achieved in that Queensland has now formally adopted NRIS resulting in the system being used by all States and Territories. The utility of NRIS was demonstrated during the recent ACT bushfires in January 2003 when several thousand Registration and Inquiries were processed under very difficult conditions. NRIS is now Web based and further developments to make the system more user-friendly and adaptable at the local level should be incorporated in the next twelve-months.

For further information contact: Don Patterson, Assistant Director Specialist Capabilities, email don.patterson@ema.gov.au

Nuclear Powered Warship Seminar 11–13 June 2003

A seminar attended by Commonwealth and State agencies responsible for the planning and support to visits by Nuclear Powered Warships was conducted at Mount Macedon during 11–13 June 2003. The seminar, which is held every two years provides

an opportunity to re-examine special plans for visits by Nuclear Powered Warships, and to receive briefings on current radiation protection protocols that are followed when visits occur. Visits are permitted at Brisbane, Melbourne, Hobart, Perth, Gladstone and Darwin.

For further information contact Don Patterson Assistant Director Specialist Capabilities, email don.patterson@ema.gov.au

National CBR Working Party Meeting 9–11 April 2003

The National CBR Working Group met at Mount Macedon during 9–11 April 2003. The working party, which includes the Chairman of State CBR committees, and representatives from Commonwealth agencies that have a key role in the event of a deliberate CBR incident, finalised the national coordination document relating to CBR incidents and this has been forwarded for review by State emergency management agencies. The working group also provided further guidance relating to CBR equipment being provided through the CBR Enhancement Program. The working party is scheduled to meet again in October 2003.

For further information contact: Don Patterson Assistant Director Specialist Capabilities, email don.patterson@ema.gov.au

EDUCATION & TRAINING

Program of Activities for the Financial Year 2003–2004

There have been some changes to the POA due to changes in priorities. The Response Management course scheduled for piloting in December 2003 has been postponed until 2004. There are also some other minor changes.

For up-to-date information please refer to the website, www.ema.gov.au.

Graduate Certificate in Emergency Management

The curriculum for the EMA Graduate Certificate in Emergency Management was nationally accredited through the Victorian Qualifications Authority in July this year. The accreditation panel, consisting of industry representatives and a curriculum specialist, commended EMA on this initiative noting the appropriateness of this program for effective practice in emergency management. The program will be delivered over a two-year period with residential blocks at the EMA institute complemented with print and online materials as well as work based projects.

Delivery will commence in 2004 with the first residential component being held in May. Access will be through State and Territory nominating authorities (see EMA web site www.ema.gov.au)

For further information contact: margery.webster@ema.gov.au or on 03 54 215 283

Senior Management Professional Development

The AEMC at its meeting on 3 July 2003 endorsed EMA's initiative to begin development of a Senior EM executive PD program. The initiative is designed to address issues not considered in other forums but essential for EM Executives to successfully manage the situations with which they are confronted in the changing EM environment. Participants will be from the wider EM community, including Emergency Services and other agencies and organisations in the public sector.

The program will address specific aspects of complex and multi-faceted emergency management roles and tasks and foster the development of core competencies that are fundamental to emergency management performance at the highest levels. Content detail will

EDUCATION & TRAINING CONTINUED

be developed through consultation with the target audience. State-of-the-art learning methods and tools will be used to involve participants in challenging simulated environments.

For further information contact: Dudley.mcardle@ema.gov.au or on 03 54215 234

Competency Based Assessment and Recognition of Prior Learning (RPL)

With the move to competency based assessment of nationally accredited programs, it is now possible to receive formal recognition of competency acquired through past work experience or training. This formal recognition is known as Recognition of Prior Learning (RPL).

To receive an RPL, you must be able to demonstrate that you meet the outcomes of the competency units or accredited programs. In other words, you must be able to present evidence that demonstrates that you meet the performance criteria of the competency. This evidence can take the form of assignment or work-based project reports, third party reports from colleagues or supervisors, or an interview with our assessor.

Receiving an RPL at EMA

You may apply for an RPL at EMA via two avenues:

1. Those participants who completed the following programs at EMA between July 1, 2000 and December 31 2002:
 - Understanding Emergency Risk Management
 - Implementing Emergency Risk Management
 - Course in Emergency Coordination Centre Management
 - Course in Exercise Management

may be eligible for an RPL for equivalent competency units from the Advanced Diploma of Public Safety (Emergency Management), free of charge. To receive an RPL, participants must still provide evidence and/or undertake workplace assignments to establish competence. Information about course alignment with competency units is available on the EMA website.

Applying for an RPL via this avenue is available until March 2004.

2. Those that did not complete the above programs at EMA since 1 July, 2000, but believe they are eligible for an RPL due to their previous work experience or training, may apply for an RPL by providing evidence demonstrating their competence of a particular competency unit or accredited program. There is a cost for an RPL assessment in this instance

Applying for an RPL at EMA

An RPL Application Form, including benchmarks for assessment, is provided on request. Email assessmentofficer@ema.gov.au to request an application form.

Formation of AEMC Remote Indigenous Communities Advisory Committee

The needs of Australia's Indigenous communities have received increased recognition by the Emergency Management sector in recent years. Remote Indigenous community needs were identified as a key issue by the Council of Australian Government's (COAG) review of National Disaster Relief and Recovery Arrangements. Prior to this, the Australian National Audit Office (ANAO) in its report on Commonwealth Emergency Management Arrangements (2000) raised this as an important area. At the September 2002 meeting of State and Territory Emergency Services Ministers, it was agreed that efforts to build community capacity within remote Indigenous communities would be enhanced by the adoption of a broader, national approach to emergency risk management. This point received further emphasis at the Emergency Services Ministers' Meeting on 30 May 2003.

With the support of the States and Territories, EMA has facilitated a series of activities and meetings in this important area. A national consultation on the issues facing emergency management in remote Indigenous communities was initiated by EMA in August 2000. Since then the Remote Indigenous Communities Steering Committee was established and a number of activities and projects in this area have identified priorities for research and development and opportunities for collaboration. The Committee recognises there is a need to have a continuing high level of input from end users.

Given the importance of this area the AEMC has formalised the existing Remote Indigenous Communities Steering Committee into the AEMC Remote Indigenous Communities Advisory Committee. The role of the committee is to act as a clearing house/broker for activities relating to remote Indigenous communities in the States and Territories and to provide advice to EMA where appropriate. The Committee will not have a role in operational matters and will focus on capacity building. It will comprise representatives of the emergency management and Indigenous communities sectors in the States and Territories.

For further information contact Heidi Ellemor, ph 03 5421 5288, email: heidi.ellemor@ema.gov.au

DEVELOPMENT

2003 Australian Disaster Conference

This landmark three-day Conference will run from Wednesday 10 September to Friday 12 September 2003 at the National Convention Centre in Canberra. Last presented in 1999 with the theme *Disaster Prevention for the 21st Century*, the 2003 theme is *Community Safety is Everyone's Business*.

The Conference features a range of presentations, from international speakers from the United Nations, to national leaders such as Defence Chief General Cosgrove, to State leaders including Michael Kinnane, Director General of Queensland Department of Emergency Services, together with a wide variety of local government, community, volunteer, academic and industry advocates.

There will also be pre and mid-conference workshops, 'poster session' segments and over 100 interactive information sessions presented by well respected people in the emergency management community.

EMA thanks the following organisations for their special support of the *Safer Sustainable Communities—2003 Australian Disaster Conference*:

- Geoscience Australia (GA)
- Bureau of Meteorology (BoM)
- Department of Transport and Regional Services (DoTaRS)
- Insurance Australia Group (IAG)

The delegate registration fee is \$350. The concurrent pre-conference workshops are an additional \$25 each and the Conference Dinner is an additional \$99 per delegate. Please note that the dinner venue has changed to the National Convention Centre Ballroom.

Visit the Conference Website: www.ema.gov.au/disasterconference

ALGA—EMA Local Government Emergency Management Capability Development Project

Australian Local Government Association (ALGA) and EMA have partnered in a project to enhance emergency management capability at Local Government level. EMA have provided funding of \$200,000 to ALGA to manage the project. ALGA sought proposals from each State and Territory for projects that develop relationships between EM agencies and Local Government. The funding will also provide for the development of a web based interactive education tool for Local Government staff and Councillors to focus on their emergency management responsibilities.

For further information contact: Paul McAlonan
Phone 02 6266 5438, email: paul.mcalonan@ema.gov.au

Disaster Loss Assessment Guidelines and Seminars

EMA is conducting educational seminars in the use of the Disaster Loss Assessment Guidelines. The guidelines were developed in conjunction with the Queensland Department of Emergency Services and are now being promoted as a nationally consistent tool.

Two seminars were conducted recently, the first was in Townsville on 12 June and the second in Adelaide on 23 July. Participation at both seminars was excellent with 40 attendees in Townsville and 80 in Adelaide. At both seminars, the respective Minister for Emergency Services, The Honourable Michael Reynolds of Queensland and The Honourable Patrick Conlon of South Australia opened the proceedings and provided their support to the process of determining economic loss during disaster, either potential or actual. There was a large cross section of organisations represented at both seminars including emergency management agencies, State and Local Government, insurance industry and academics.

The key presenter at both seminars was Professor John Handmer, Director of the Centre for Risk Community Management at RMIT. Professor Handmer developed the methodology detailed in the EMA "Disaster Loss Assessment Guidelines". EMA will be seeking interest from other States and Territories to host Disaster Loss Assessment Seminars to introduce their key personnel to the methodology.

For further information contact: Paul McAlonan
Phone 02 6266 5438, email: paul.mcalonan@ema.gov.au

Australian Emergency Management Volunteer Forum (AEMVF)

The AEMVF met in Sydney on 9 July and worked through a very large agenda that included items such as the cost of personal protective clothing and equipment, insurance issues, enhancing the AEMVF website, reporting AEMVF business to government, research into the cost of being a volunteer, the AEMVF paper for the Disaster Conference, and the new legislation to protect volunteers from dismissal. A summary of the Minutes will be available on the EMA website in August.

A sub-committee was created to scope a research project to examine the direct and indirect costs of volunteering to individuals within the emergency management sector.

The Australian Emergency Management Committee (AEMC) meeting held in Adelaide on 3 July 2003, agreed that the Chair of the AEMVF (Hori Howard) should provide a report on AEMVF developments

DEVELOPMENT CONTINUED

at future AEMC meetings. This is a very significant step because it enables volunteer issues to be brought directly to the attention of senior government representatives.

*For further information contact David Winterburn
Phone: 02 6266 5009
Email: david.winterburn@ema.gov.au*

Emergency Management Projects Program 2003/2004

The EMA Projects Program aims to foster projects that help improve Australia's capabilities for preventing or dealing with natural or technological hazards and disasters. From the 115 applications received for financial year 2003–04, the Program will provide funding for 10 projects from a range of locations across the nation. The projects are outlined on the EMA website.

The projects encompass a wide range of topics including school education and research projects. One of the projects this year is the construction of a website that will have listings of current and previous cyclone surveys from Australia and around the world. Jordahna Haig from The Centre for Disaster Studies at James Cook University manages this project.

Products of the 2002–2003 EMA Projects Program are currently being disseminated to the executive officers

of state emergency management committees (or their equivalents) in each State and Territory, and are also available from the EMA Library at Mt Macedon.

*For further information contact Rheannon Nicholson
Phone: 02 6266 5497
Email: rheannon.nicholson@ema.gov.au
Or visit the website: www.ema.gov.au*

2003 Safer Communities Awards

With the closing date for entries of 8 August, organisers are arranging for judging panels to meet and select State and Territory winners. These 'first round' winners will be announced in September. All will be eligible for national awards. The national winners will be announced at a ceremony at Parliament House, Canberra, on 6 November.

The Awards recognise best practice and innovation that help to build safer communities. They cover organisations and individuals working in risk assessment, research, education and training, information and knowledge management, prevention, preparedness, response, and recovery.

*For more information contact David Townsend
Phone: 02 6266 5223
Email: david.townsend@ema.gov.au
Or visit the website: www.ema.gov.au*

CONFERENCE DIARY

INTERNATIONAL

2003

SEPTEMBER

Date: 6–13 September, 2003

Location: Warsaw, Poland

Title: Ecoflood Conference: Toward Natural Flood Protection Strategies.

Details: A key objective of this conference is to bring together specialists from various disciplines who work with flooding to gain a comprehensive understanding of the key issues surrounding floods, including the effectiveness of using wetlands for flood mitigation, the costs and benefits involved and, interdisciplinary recommendations for natural flood defences.

Enquiries: Conference information is available from ECOFLOOD, Department of Nature Protection in Rural Areas, Institute for Land Reclamation and Grassland Farming (IMUZ), Falenty, 05-090, Raszyn, Poland; tel: +48.22.7200531; email: ecoflood@levis.sggw.waw.pl; website: <http://www.imuz.edu.pl/imuz.htm>

Sponsor: Institute for Land Reclamation and Grasslands Farming (ILRGF).

Date: 7–10 September, 2003

Location: Minneapolis, Minnesota

Title: Dam Safety 2003—North America.

Enquiries: ASDSO, 450 Old Vine Street, 2nd Floor, Lexington, KY 40507; (859) 257-5140; fax: (859) 323-1958; email: info@damsafety.org; website: www.damsafety.org/conferences.cfm?content=annual

Sponsor: Association of State Dam Safety Officials (ASDSO).

Date: 8–20 September, 2003

Location: Rapid City, South Dakota

Title: Sixth Annual Conference: Innovations in Disaster Psychology—Time for a New Paradigm?

Details: Sessions include general disaster psychology, research, disaster psychology for children, and international disaster psychology. The conference format includes small group discussions and plenary sessions summarising small group activity.

Enquiries: Complete information is available at DMHI, University of South Dakota – SDU 114, 414 East Clark Street, Vermillion SD 57069-2390; tel: (800) 522-9684; website: <http://www.usd.edu/dmhi/conf03/>

Sponsor: Disaster Mental Health Institute (DMHI).

Date: 10–12 September, 2003

Location: Vail, Colorado

Title: 46th Annual Meeting: Engineering with an Attitude.

Details: Of special interest to Hazard Center folks are programs on seismic hazards, landslide and debris flow hazards, environmental hazards and remediation, risk assessment and geology, slope stability and more.

Enquiries: Contact Julie Keaton, AEG, PO Box 460518, Denver, CO 80246; tel: (303) 757-2926; email: aegjuliek@aol.com; website: <http://www.aegweb.org>

Sponsor: Association of Engineering Geologists (AEG).

Date: 10–12 September, 2003

Location: Davos, Switzerland

Title: Third International Conference on Debris-Flow Hazards Mitigation, Mechanics, Prediction and Assessment—Europe.

Enquiries: Dieter Rickenmann, Swiss Federal Research Institute WSL, Z=Fcrcherstrasse 111, CH-8903 Birmensdorf, Switzerland; tel: +41 17 39 24 42; fax: +41 17 39 24 88; email: rickenmann@wsl.ch. For general conference information: email: DFC3_Inf@wsl.ch

Date: 16–19 September, 2003

Location: Beijing, China

Title: Third International Conference on Continental Earthquakes (ICCE)—Asia

Detail: The Conference is postponed until after the Saporro 2003 IUGG Assembly, June 30–July 11, 2003 (see <http://www.jamstec.go.jp/jamstec-e/iugg/>) to make it more convenient for participants from outside eastern Asia.

Enquiries: Wang Ahiqiu, Organizing Secretary, III ICCE, China Seismological Bureau (CSB), No. 63, Fuxing Avenue, 100036, Beijing, China; tel: 86-10-8801-5514; fax: 86-10-6821-0995; email: icce@peoplemail.com.cn

Date: 16–18 September, 2003
Location: Karlsruhe University, Germany
Title: International Workshop on Wind Effect on Trees—Europe
Detail: The workshop will provide a forum for physicists, foresters, engineers, physiologists and ecologists to examine new developments in the field of wind storm damage.
Enquiries: Mrs. Dipling C. Frank, Institut für Hydromechanik, Universität Karlsruhe, Kaiserstr. 12, 76128 Karlsruhe, Germany; email: wind2003@uka.de
Sponsor: Institut für Hydromechanik.

Date: 22–24 September, 2003
Location: Ancona, Italy
Title: ERES Fourth International Conference on Earthquake Resistant Engineering Structure—Europe.
Enquiries: Conference Secretariat, ERES 2003, Wessex Institute of Technology, Ashurst Lodge, Ashurst Southampton, SO40 7AA, U.K.; tel: 44(0) 238 029 3223; fax: 44(0) 238 029 2853; email: gcosutta@wessex.ac.uk

Date: 27 September, 2003
Location: London, Ontario
Title: Dealing with Disaster—North America.
Details: Emphasis will be placed on the understanding of the interaction between social and environmental factors.
Enquiries: tel: 0011/0018 519 661 3234; email: ssdoyle@uwco.ca

OCTOBER

Date: 14–16 October, 2003
Location: Moscow, Russia
Title: First World Forum on Children in Complex Emergencies.
Details: The forum will discuss and adopt a model for national and regional plans to assist children in emergencies through 2010 as requested by the 27th United Nations Special Session Resolution, "A World Fit for Children."
Enquiries: Contact: World Forum Organizing Committee, Children's Hospital #20B, Polyanka Str. 20, Moscow, Russia 119180; email: roshal@lampport.ru; website: <http://www.childrendisasters.org>
Host: Union of Pediatricians of Russia and International Charitable Fund for Children in Disasters and Wars, with the support of the Government of Russia and other organisations.

Date: October 17–2 November, 2003
Location: Mexico City, Mexico
Title: International Association of Geomorphologists (IAG) Regional Conference.
Details: The conference is designed for geomorphologists and professionals from associated disciplines interested in geomorphic hazards and environmental topics related to disasters. The goal is to foster an exchange of techniques, experience, knowledge, and ideas about geomorphic hazards.
Enquiries: Contact Irasema Alcantara-Ayala, Institute of Geography, UNAM, Circuito Exterior, Ciudad Universitaria Coyoacan, 04510, Mexico, D.F; tel: (+525) 56 22 43 39 ext. 45 466; email: IAGMEXICO2003@igiris.igeograf.unam.mx; website: http://www.smg.igeograf.unam.mx/smg/soc_geom.html.
Sponsor: IAG and Mexican Society of Geomorphology.

Date: 20–22 October, 2003
Location: Albuquerque, New Mexico
Title: New Mexico Environmental Health Conference.
Details: This year's regional conference includes an issue track on emergency and disaster management, along with tracks on environmental health innovations, community health protection, and special areas of environmental interest.
Enquiries: More details are available from Tom Duker, tel: (510) 314-0324; email: tducker@mercury.berncor.gov; website: <http://www.nmehc.org/>
Sponsor: New Mexico Environmental Health Association (NMEHA).

Date: 25–30 October, 2003
Location: North Charleston, South Carolina
Title: Terrain Data: Applications and Visualization—Making the Connection
Details: This conference will focus on the evolving technology, applications, and standards that have been developing over the past two years. There will be sessions on homeland security, disaster response technology, research and development, and more.
Enquiries: More information is available from Terrain Data Conference 2003, ASPRS, 5410 Grosvenor Lane, Suite 2003, Bethesda, MD 20814-2160; email: kimt@asprs.org; website: http://www.asprs.org/terrain_data2003/index.ht
Sponsors: Imaging and Geospatial Information Society (ASPRS), National Aeronautics and Space Administration, National Imagery and Mapping Agency, National

INTERNATIONAL *continued*

Oceanic and Atmospheric Administration, and U.S. Geological Survey.

Date: 29 October 2003
Location: Columbus, Ohio
Title: Contingency Planners of Ohio 2002 Annual Business Survival and Recovery Seminar—North America
Details: The meeting will be preceded by an informal networking session and vendor exhibit on October 28 and followed by a Disaster Recovery Planning Review.
Enquiries: Joni McLean, President, Contingency Planners of Ohio; email: cpohio@geocities.com; tel: (614) 249-0397. For information about the disaster recovery course, contact: Disaster Recovery Institute international. website: www.dr.org; tel: (703) 538-1792.

NOVEMBER

Date: November 1–4 2003
Location: Florida, North America
Title: Annual Meeting of the International Association of Emergency Managers (IAEM)
Enquiries: IAEM, 111 Park Place, Falls Church, VA 22046; (703) 538-1795; fax: (703) 241-5603; email: info@iaem.com

Date: November 4–7 2003
Location: Washington DC North America
Title: Sixth annual conference of the Global Disaster Information Network.
Details: The theme of the conference is: 'Delivering the goods: GDIN's contribution to disaster mitigation, prediction, response and recovery.'

Date: 11–13 November, 2003
Location: Washington D.C.
Title: Contingency Planning and Management Conference East.
Details: This conference is geared toward those who work with developing, maintaining, and implementing business continuity plans. Educational sessions, disaster simulation exercises, and networking opportunities are included.
Enquiries: Complete details are available from CPM, 84 Park Avenue, Flemington, NJ 08822; tel: (908) 788-0343; website: http://www.contingencyplanningexpo
Sponsor: Contingency Planning and Management (CPM).

Date: 13–14 November, 2003
Location: Tokyo, Japan
Title: First International Conference on Structural Health Monitoring and Intelligent Infrastructure (SHMII-1).
Details: The conference will address progress in the development of building, transportation, marine, underground, energy generating, and other civilian infrastructures that are periodically, continuously or actively monitored.
Enquiries: Conference information is available from the SHMII-1 2003 Secretariat, c/o the Department of Urban and Civil Engineering, Faculty of Engineering, Ibaraki University, Nakanarusawa-cho, 4-12-1, Hitachi, Ibaraki 316-8511, Japan; tel: +81-294-38-5172; email: shmii-1@mx.ibaraki.ac.jp; http://www.civil.ibaraki.ac.jp/shmii/
Sponsor: Ibaraki University.

Date: 16–20 November, 2003
Location: Orlando, Florida
Title: The 2nd International Wildland Fire Ecology and Fire Management Congress held jointly with the 5th Symposium on Fire and Forest Meteorology.
Details: This conference includes sessions on fire ecology, wildfire management and suppression, fire technology, social aspects of fire, remote sensing and fire, and more.
Enquiries: Detailed information is available from AMS, 45 Beacon Street, Boston, MA 02108-3693; tel: 617-227-2426; email: amsmtgs@ametsoc.org; website: http://www.ametsoc.org/AMS/meet/FAINST/5fire2fireeco.html
Sponsors: American Meteorological Society (AMS), Association for Fire Ecology, International Association of Wildland Fire, Society of American Foresters, Nature Conservancy.

Date: 19-22 November, 2003
Location: Leon-Guanajuato, Mexico
Title: 14th Mexican National Conference on Earthquake Engineering.
Details: The theme for the congress is "Challenges for earthquake engineering in the twenty-first century." The conference is directed toward professors, researchers, students, practitioners, building officials, institutions from the private and public sectors, and all others working with topics directly related to earthquake engineering research, teaching, design and construction.
Enquiries: Complete information is available from Angelica Mendoza-Reyes, Camino Sta. Teresa No 187, Local 9, Col. Parques del Pedregal, Delegacion Tlalpan, 14 020

Mexico; tel: (52-55) 5606-1314;
email: smis@mx.inter.net; website:
http://www.smis.org.mx

Sponsors: Mexican Society for Earthquake Engineering (SMIS), College of Civil Engineers of Leon, and the Society of Structural Engineers of Guanajuato.

2004

FEBRUARY

Date: 4–8 February, 2004

Location: Los Angeles, California

Title: EERI Annual Meeting 2004.

Details: Information is available from EERI 499, 14th Street, Suite 320, Oakland, CA 94612-1934; tel: (510) 451-5411; email: eeri@eeri.org; website: http://www.eeri.org

Sponsor: Earthquake Engineering Research Institute.

Date: 6–19 February, 2004

Location: Cairo, Egypt

Title: Seventh International Conference on the Geology of the Arab World

Details: This conference will address new research contributions from the earth sciences and their environmental, industrial, and development applications in the Arab world. There will be a session on environmental hazards.

Enquiries: Conference information is available from the General Secretary, Geology Department, Cairo University, Giza, Arab Republic of Egypt; tel: 002 02 567-6858; email: gaw7@hotmail.com or melsharkawi@hotmail.com; website: http://gaw7.netfirms.com/

Sponsor: Geology Department of Cairo University.

Date: 16–20 February, 2004

Location: Philadelphia, Pennsylvania

Title: EC04 Conference

Details: Relevant sessions include slope stabilization, community and government partnering, and natural disaster recovery.

Enquiries: For conference information, or information about abstract submission, contact IECA, P.O. Box 774904, Steamboat Springs, CO 80477; tel: (970) 879-3010; email: ecinfo@ieca.org; website: http://www.ieca.org

Sponsor: International Erosion Control Association (IECA).

APRIL

Date: April 13–17, 2004

Location: New York, New York, North America

Title: Fifth International conference on Case Histories on Geotechnical Engineering

Details: This meeting will provide a forum for geotechnical professionals from around the world to present their research findings.

Contact: www.umn.edu/~eqconf/5thCHConf/

Sponsor: University of Missouri-Rolla Civil Engineering Department.

AUGUST

Date: August 1–6, 2004

Location: Vancouver, British Columbia, Canada

Title: 13th World Conference on Earthquake Engineering (13WCEE)—North America

Details: This meeting will provide a forum for geotechnical professionals from around the world to present their research findings.

Contact: 13th WCEE Secretariat, c/o Venue West Conference Services Ltd., #645-375 Water Street, Vancouver, British Columbia V6B 5C6, Canada; tel: (604) 681-5226; fax: (604) 681-2503; email: congress@venuewest.com

Sponsor: Canadian Association for Earthquake Engineering.

Date: August 15–22, 2004

Location: Florence, Italy

Title: 32nd International Geological Congress (IGC).

Details: This meeting will provide a forum for geotechnical professionals from around the world to present their research findings.

Contact: Chiara Manetti, Università degli Studi di Firenze, Dipartimento di Scienze della Terra, Via La Pira, 4 50121 Firenze, Italy; tel/fax: +39 055 2382146; email: cmanetti@geo.unifi.it; Note: The 32nd IGC includes a Topical Symposium on "Natural Hazards and Mitigation of Geological Risks"; for more information, contact Tina Nunziata, email: conunzia@unina.it, or Attia El-Sayed, email: elsayedat@mans.edu.eg. There will also be a session on "Geological Data and Seismic Hazard Maps"; for details, see website: http://www.bghrc.com/Geolhaz/Syposium/info.htm, or contact Ioannis Papanikolaou, email: i.papanikolaou@ucl.ac.uk

AUSTRALIA

ACT

SEPTEMBER

Date: 10–12 September 2003
Location: Canberra, Australia
Title: Safer Sustainable Communities – 2003 Australian Disaster Conference – Australasia.
Details: This year's theme is Community Safety is Everyone's Business.
Enquiries: Conference Secretariat, Einstein & Edison, PO Box 42, Yarralumla ACT 2600; email: enquiry@einsteinandedison.com.au
Sponsor: Emergency Management Australia.

NSW

SEPTEMBER

Date: 4–6 September, 2003
Location: Sydney, Australia
Title: 4th International Conference for Emergency Nurses.
Details: The College of Emergency Nurses Australasia or CENA (formerly the ENA), have merged to become a national body and are hosting the 4th International Conference for Emergency Nurses on the 4–6th September 2003 at the Crown Plaza Hotel, Coogee Beach, Sydney, Australia.
Enquiries: See our website for further details: www.ena-inc.aust.com

TAS

SEPTEMBER

Date: 19–20 September, 2003
Location: Hobart, Tasmania, Australia
Title: National Pre-Hospital Conference (ACAP2003)
Fresh Perspectives; Expanding Horizons.
Description: Sub-themes for the conference include: Technology in the Pre-Hospital environment; Expansion of the role of the paramedic; Health care in the rural environment: What is our role? and Where does paramedic education go from here?
The Australian College of Ambulance Professionals (ACAP) Tasmanian Branch invites submissions. There are two categories of papers—major presentations (up to 30 minutes) or free papers (up to 15 minutes). The due date for major presentations is April 30th, 2003 and for free papers is May 30th, 2003. Papers that do not tie in with the theme of the conference will also be considered on their merits. Please feel free to submit more than one paper.
Enquiries: Dale Edwards,
email: Dale.Edwards@dhhs.tas.gov.au;
tel: (03) 6434 6876 (W);
mob: (0418) 736 986.

NOTES FROM THE FIELD

Conference demystified emergency management practice and challenges

By Scott-Andrew Smith

The 2003 West Australian Emergency Management Conference from 27–28 March this year fulfilled its aim to demystify issues surrounding emergency management and to spotlight major emergencies such as Bellevue and the lessons that Western Australia has learned from it. In her welcoming address, the Minister for Emergency Services, Michelle Roberts MLA said, "local government and communities must take action to reduce the impact of emergencies by understanding the risks in their community."

West Australia is faced with a broad range of emergencies ranging from cyclones and bush fires to transport and industrial accidents. The conference provided an opportunity for international and local speakers and delegates to focus what is happening in Western Australia and what external influences at the national and international level are impacting the State. The overarching theme of the conference was to have a 'warts and all' look at Western Australia's emergency management capability. More than 150 emergency management professionals attending the conference participated in all areas of the conference program. Their

positive feedback indicated that a conference helped them to understand contemporary issues in emergency management as well as to demystify recurring challenges.

Key Issues

- Networking and professional development opportunities for emergency management practitioners are valued and supported by sponsors, government, and non-government organisations.
- Organisations and individuals must be given opportunities to show case best practice in emergency management that demonstrate a Whole of Government approach towards safer communities.
- It is important that achievements and initiatives that support community-centred emergency management must be promoted to the wider emergency management community.

Highlights

The program included keynote presentations by 15 speakers across a diverse range of emergency management topics—all central to the theme of demystifying emergency management. A series of six workshops were facilitated by emergency management practitioners providing delegates with opportunities to engage in a diverse range of issues that affect emergency management practice. A conference dinner was hosted by Emergency Management Australia and was well attended by 130 delegates and partners.

Keynote Speakers

Mervin Harrower (Director, Provincial Emergency Management Programs, Ministry Public Safety and Solicitor General, British Columbia, Canada) was the international speaker at the 2003 conference. Mr Harrower's comparative presentation highlighting key achievements including best practice approaches and lessons learned from the provincial perspective including the delivery of response and recovery emergency services to First Nations in British Columbia. Primary responsibility for emergency management in the Canadian Government structure rests with local and provincial governments.

David Templeman (Director-General, Emergency Management Australia) delivered a passionate presentation that focused on the national emergency management scene and identified contemporary issues and future challenges to those working in the emergency management sector. Central to Mr Templeman's presentation was the underlying theme that the environment that emergency management works within has changed significantly in recent years.

Larry Graham JP MLA (Member for Pilbara and Deputy Chair of the Community Development and Justice Standing Committee) presented the Committee's findings and recommendation that an Emergency Management Act should be introduced into West Australian Parliament as soon as possible. Mr Graham stated that the Committee's report on Emergency Services Legislation believe than an Emergency Management Act will

make emergency management in Western Australia more effective.

Russell Stevens (AFESA Director Fire Services Metropolitan), *Lindsay Gillam* (Manager Pesticide Safety Section, Department of Health), and *Ken Raine* (Manager Pollution Management, Department of Environmental Protection) highlighted the major emergency management issues and lessons learnt from an operational perspective from the Bellevue Fire. The Bellevue Fire had a major impact on the people of Western Australia, State Government agencies and local government.

Sharna McKechnie (FESA Community Development Officer and coordinator of the All West Australians Reducing Emergencies 'AWARE' program) teamed with six AWARE Scholarship holders:

John Balcombe	Shire of Northam
Sebastian Camillo	City of South Perth
John Edwards	Shire of Donnybrook-Balingup
Fran McAllen	Shire of Irwin
Glenn Sargeson	City of Bayswater
Mike Scott	Shire of York

and provided delegates with an update on the progress of the AWARE Emergency Risk Management program including a showcase of the current emergency risk management projects being undertaken by local governments. The EMA-FESA funded the AWARE emergency risk management program was launched in 2002 and has created considerable interest within West Australian local governments.

Bruce Brennan (Deputy Commissioner—Operations, WA Police Service and Chair of the West Australian Critical Infrastructure Project Committee) demystified the key elements of the

West Australian Critical Infrastructure Project and outlined the initial assessments completed by the Committee. The project includes a review of the prevention, preparedness, response and recovery aspects of critical infrastructure risk within Western Australia and was tasked by the State Emergency Management Committee.

Kevin Cuneo (FESA Director Capability Development) made a presentation that demystified the consequence management arrangements and the interface with crisis management arrangements for chemical, biological and radiological (CBR) emergencies within Western Australia. CBR emergencies arise through the deliberate use of a CBR agent to cause harm or disruption to the community. The Fire and Emergency Services Authority (FESA) is responsible for the consequence management arrangements for a CBR event within Western Australia.

David Templeman MLA (Member for Mandurah and Chair of the Community Development and Justice Standing Committee) noted in the closing address the importance of the 2003 West Australian Emergency Management Conference though the attendance of the Minister for Emergency Services to open the conference and the diverse background of delegates. In addition to thanking all keynote speakers, sponsors and the conference management team, Mr Templeman encouraged delegates to make the most of the remaining networking and learning opportunities at the conference dinner and workshops.

Workshops

The second day of the conference featured a series of workshops aligned to strategic areas for West Australian emergency management stemming from the State Emergency Management Committee and other government committees. The format

and content of each workshop differed were facilitated by Emergency Management Services staff.

Recovery Services provided delegates with an opportunity to demystify what happens during the recovery process in the aftermath of an emergency. The practical application of the State Recovery Emergency Management Plan was examined including the roles played by the Recovery Services Group and its member organisations. Participants were invited to share their first-hand experience with the recovery process and offered constructive suggestions for improvements to the current arrangements.

Working with Indigenous Communities included presentations by Noel Nannup (Manager—Heritage Centre, Department of Conversation and Land Management), Mara West (Indigenous Consultant) and Kim Bridge (Indigenous Consultant). The focus of the workshop included an indigenous perspective of the relationships and connections to the land and environment; the role of women within an indigenous community; and the 1905 Act and its impact on contemporary indigenous society. Delegates were encouraged to identify and discuss practical strategies for working with indigenous communities and gain an understanding of the diversity of such communities.

Public Information included four presentations that focused on (i) what is public information; (ii) how public information works now; (iii) deliverance and community expectations; and (iv) critical incidents and information management: the USA experience. The panel included Gary Foley (Regional Director, Bureau of Meteorology), Jenelle Provost (FESA Manager Media and Public Affairs), Colin James (Councillor, Shire of Mundaring), and Roger Armstrong (Senior Fire Planning Officer, Department of Conservation and Land Management).

Mitigation Issues had as a focus the key challenges in engaging organisations, including emergency service agencies and local governments, in strategies toward increased investment in hazard mitigation as a whole-of-government, whole-of-community responsibility. Delegates were invited to share examples where mitigation has made or could make a difference and review ways to foster mitigation in local communities and harness government support for the concept.

Council of Australian Government (COAG) and Natural Disaster Relief Arrangements (NDRA) focused on the key issues and recommendations from the reviews by the Council of Australian Governments (COAG) on mitigation and Disaster Relief Arrangements in Australia and the Ministerial Taskforce on the State Natural Disaster Relief Arrangements (NDRA). Participants were provided with an opportunity to discuss any issues or concerns relating to either the COAG Review and the State Natural Disaster Relief Arrangements with Ms Jo Harrison-Ward (FESA Executive Director, Emergency Management) and Mr Nick Barker (FESA Manager Policy and Planning, Emergency Management.).

Lifelines Services was an interactive workshop that encouraged participants to define what they thought the lifelines services involved. Delegates heard from representatives from some lifelines agencies on their respective organisational capabilities and cooperative efforts in an emergency management context. Facilitators encouraged participants to consider what the role of the various lifelines services includes when undertaking recovery in a community affected by disaster, and the importance of the lifelines being included when planning in an emergency management context.



Demystifying emergency management

Emergency Management Australia conference dinner

Emergency Management Australia hosted the Conference Dinner that was attended by 130 delegates and their partners. Mr David Templeman, (Director-General, Emergency Management Australia) and Mr Bob Mitchell (FESA CEO) thanked the keynote speakers, workshop facilitators, sponsors and conference management team for their contribution to a very successful conference program. A Formula Ford Tuition Day donated by Fleetcare was raffled by the Minister for Emergency Services and delegates were entertained by Perth quartet *Little Black Dress*.

Conference sponsors

FESA would like to thank the following organisations for their sponsorship of the 2003 West Australian Emergency Management Conference:

- *Emergency Management Australia*—sponsor for the 2003 West Australian Emergency Management Conference Dinner
- *Police and Nurses Credit Society*—sponsor of the Police and Nurses Credit Society Morning Tea Breaks
- *Fleetcare*—sponsor of the Fleetcare Afternoon Tea Break
- *QANTAS*—official airline of the 2003 West Australian Emergency Management Conference.

The sponsorship provided by these organisations enabled FESA to keep conference registration fees to a minimum thus making the conference affordable for volunteer and non-profit organisations.

For more information, please contact Scott-Andrew Smith, FESA Manager Training and Development, Emergency Management Services, telephone 08 9323 9418



AJEM now indexed by APAIS

The Australian Journal of Emergency Management is now indexed by the Australian Public Affairs Information Service (APAIS).

APAIS is a renowned subject index to scholarly articles in the social sciences and humanities published in Australia, and to selected periodical articles, conference papers, book and newspaper articles on Australian economic, social, political and cultural affairs. APAIS is available at all reputable libraries across Australia and selectively indexes refereed academic papers. This means articles published in AJEM now have a far greater reach to a much wider community.

APAIS is...

An organised list of published information sources (usually journal articles), giving either citations for where readers might find information sources or databases of the full information itself.

An electronic database is an organised list of published information sources (usually journal articles), either giving directions (a citation) to where you can find the full information or containing the information itself (full-text databases).

Each information source has an individual record. Each record is made up of fields. Each field contains a different piece of information about the source. The database searches for information contained in these fields.

<http://www.nia.gov.au/apais/>



Australasian Libraries in Emergency Services

Australasian Libraries in Emergency Services (ALIES) is a cooperative network of emergency service agency libraries that promotes and supports the information requirements of the Australasian emergency management community by promoting and facilitating the sharing of information across a diverse base of the emergency management services within Australia and New Zealand.

Prior to 1991, emergency services librarians in Australia were mainly located in isolated libraries that rarely communicated with each other or shared resources. With the advent of special library computer systems in 1991 contact between librarians became easier. Following a visit to the Australian Counter Disaster College library early in 1991, by librarians Coralie Jenkin, CFA and Nina McPherson, MFB with the ACDC librarian Rob Fleming, librarians began to look at ways they could pool their knowledge of other emergency services libraries and share information and resources. A committee, consisting of librarians from disaster, ambulance, police and fire disciplines was established to prepare a workshop.

The first Australian Emergency Service Librarians workshop was held at Mt Macedon from 8–13 September, 1991. This was the first workshop of its type in Australia and gave participants their first opportunity to meet, develop co-operative arrangements and gain an awareness of the resources of the libraries within the emergency service field.

Following the workshop, the Victorian emergency services librarians met quarterly at various libraries and shared information about changes and progress in the information services they provided to their respective organisations. This group continues to meet today. Large distances between libraries in other states makes this type of interchange difficult.

The second Emergency Service Librarians workshop was held at Mt Macedon from 25–29 October, 1993 and again focused on co-operation, management and enhancement of professional skills. At this workshop ALIES (Australasian Libraries in Emergency Services) was formally established.

The third ALIES workshop was held from 15–17 April, 2002 with recommendations that a directory of ALIES libraries be placed on the EMA website and a list server for the ALIES network be developed for more efficient exchange of information. The emergency management community across Australia can now visit the ALIES website at www.ema.gov.au.

ALIES received EMA approval to hold an annual workshop at Mt Macedon and the fourth workshop was held from 22–24 April, 2003. One of the requirements of the ALIES workshop was to showcase two case studies on knowledge management from emergency services organisations in Australia. Anne Pickles, Information Co-ordinator, NSW Fire Brigade provided a paper entitled "A knowledge management infrastructure for the NSW Fire Brigades" and Jenny Power, Library Manager, Australian Federal Police delivered a paper on the knowledge management and her organisation's Intranet website. *(Continues over the page)*

Internet | Extranet | Schools | Conference Centre | Disasters Database

Home | Contacts | News & Media | Corporate Information | Emergency Management |
 EMA Library | Education & Training | Communities | Volunteers | Publications | Research
 Ajem | Archive | Projects & Grants | Seminars & Conferences | Links | Search

EMA **Disasters** **Recovery** **Disaster** **Lessons Learnt** **Safer Sustainable**
 Community Information Resources Conference Communities Awards

(Continued from previous page)

At present, the ALIES workshop committee is working on the next workshop scheduled for 5-8 April, 2004.

Members of ALIES are:

- Australian Federal Police Library
- Australian Institute of Police Management Library
- Country Fire Authority Information Service, Victoria
- Emergency Management Australia Information Centre
- Emergency Services Library, South Australia
- Fire & Emergency Services Authority of Western Australia
- Metropolitan Fire Brigade Library and Resource
- New South Wales Fire Brigades Library Information Centre, Victoria
- New South Wales Police Service, Library Services,
- New South Wales Police Service, Library Services, Sydney Goulburn
- New South Wales Rural Fire Service
- New Zealand Fire Service Information Centre
- New Zealand Police Library
- Northern Territory Police, Fire & Emergency Services Library
- Queensland Department of Emergency Services Library
- Queensland Police Service Library Services
- St John Ambulance, Western Australia
- South Australia Police Library
- Tasmanian Ambulance Service Library
- Tasmania Fire Service Library
- Tasmania Police Department Library
- Victoria Forensic Science Centre Library
- Victorian Institute of Forensic Medicine
- Victoria Police Academy Library
- Victoria Police Centre Library
- Western Australia Police Library

Internet zone

NEW EMATrack ONLINE AT:

<http://www.ema.gov.au/disasters>

The Emergency Management Australia Database of Australian Disasters (EMATrack) is now available online. This database covers disasters within Australia, from earliest records to the present day. The data is fully searchable and its redevelopment and publication as an interactive resource is just the first stage in its renaissance. The next stage, due for completion mid 2004, will see the ability to generate complex reports and will provide options for loss assessment and costing calculations.

EMATrack

Welcome to the Emergency Management Australia Database of Australian Disasters.

To use this Resource:

- See "Introduction" for explanatory notes
- Select the required view from the top menu bar
- Click on the Event ID# for full details for each event
- Use "Advanced Search" to customize or refine your queries

Under development for later development:

- Impact Assessment Function
- Loss Assessment Function
- Advanced Reporting Function

Comments and enquiries, please email EMATrack

Emergency Management Australia is not responsible for any data to which the user may be referred. Please Emergency Management Australia is a not-for-profit organisation and cannot be held liable for any damages or compensation claims that may arise from the use of the website. See the terms of service for more details.

Home | Introduction | Advanced Search | My History | My Home | My Categories | My Links

Page last updated: Thursday 17, July 2003

Emergency Management Australia
 180 000 000 000, Australia Capital Territory 2601, Australia
 180 000 000 000, Australia Capital Territory 2601, Australia
 180 000 000 000, Australia Capital Territory 2601, Australia
 180 000 000 000, Australia Capital Territory 2601, Australia

REGISTER NOW
www.ema.gov.au
Don't miss this great opportunity



Safer Sustainable Communities
2003 Australian Disaster Conference
"community safety is everyone's business"



National Convention Centre, Canberra 10-12 September 2003
Enquiries: www.ema.gov.au/disasterconference or phone +61 (0)2 6232 4240

Hosted by:

With assistance from:

