# The Australian Journal of Emergency Management

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*Cover: AVHRR-derived grassland curing imagery draped over AUSLIG's digital elevation model for the ACT and surrounding areas of NSW. See article on page 32. (Rick McRae)*

## Editorial

# What should emergency managers be doing to help control the millennium bug?

With January 1st 2000 approaching fast, we are hearing much more about the Year 2000 date problem and its potential effects. At first, we were led to believe that the Year 2000 date problem, or the millennium bug as it is often called, was something that only occurred in computers. So, if we didn't own or use a computer we probably took little interest because it was unlikely to affect us. However, now that the millennium bug has been identified as a broad electronic problem, it appears unlikely that anyone will be spared from this phenomenon which threatens to attack community lifelines and place our personal safety and that of the community at risk.

How did we get into this situation? Well, it seems that when computers were in their infancy and had limited memory, computer programmers abbreviated data to save space. In particular, dates were often shortened to only two digits instead of four. For example, 1946 was stored as 46. Electronic systems that use the last two digits of a year would therefore assume dates which will always be in the 19 hundreds. So, when the year changes from 1999 to 2000, some systems may recognise 00 as 1900, or as no date at all.

But this date problem is not confined to computers. Microchips embedded in machinery and electronic devices we use every day may also be affected. This type of technology is used in traffic control devices, building management systems, fire and security alarms, water purification and life support systems, communications equipment and even home appliances.

The Year 2000 problem has potential implications for public safety agencies in two major areas. Firstly, it can impact on internal systems that use a date function. Radios, mobile phones, computer-aided dispatch, emergency management information systems, early warning systems and alarms readily come to mind. Secondly, it may cause dislocation of community lifelines that rely on any form of embedded technology. As previously mentioned, medical systems, public utilities such as power, water and sewerage, ventilation systems, lifts and emergency systems in buildings, traffic control devices fall into this category. Their failure or malfunction will have a serious impact on public safety and could lead to an unprecedented demand on emergency services.

Advice from State and Territory emergency management committees indicates that internal problems are being addressed by public safety agencies with triage being undertaken to render systems 'Year 2000 compliant'. But there appears to be little activity in regard to the identification of external events which could occur due to the inability of private and public sector organisations to identify and fix possible causes of failure or malfunction and to plan to deal with their consequences.

Time is running out. But it is still not too late for emergency managers to seize the initiative and influence the outcome of the Year 2000 date problem. Public and private sector organisations, particularly those which provide community lifelines, all have a role to play in controlling the millennium bug. They must be brought together to think holistically about the hazard and the risks it poses. The consequences of failure or malfunctioning of community lifelines will be demands for emergency services which, if not met satisfactorily, will place emergency service organisations under public scrutiny.

Emergency managers cannot allow this to happen. They can help to prevent the millennium bug from creating havoc on public safety by ascertaining the Year 2000 status in their jurisdiction, by assisting to continue to create an awareness of the problem and, where necessary, working with the community to identify where the 'bug' might be lurking, the harm it could cause to the community and by developing plans to control it.

Now is the time to take control of the bug before it takes control of us!

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# The effects of the National Competition Policy on emergency management arrangements

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## Background

On 26 February 1992 the then Prime Minister Paul Keating, in his *One Nation* statement, said 'the engine which drives efficiency is free and open competition'. Free and open competition was believed to be a keystone for the micro-economic reforms that were to deliver improvements in the Australian economy.

There were six specific elements that were major parts of the competition policy, each of which is supported by laws, policy or government action.

1 Controlling anti-competitive conduct of firms by enforcing Part IV of the Trade Practices Act.

2 Reforming regulation that unjustifiably restricted competition, examples of which were the deregulation of telecommunications, banking and domestic aviation.

3 Reforming the structure of public monopolies to facilitate competition (e.g. power and water in many States).

4. Providing competitors with access to national networks that are essential for competition (e.g. Optus access and use of the Telstra network).

5. Restraining monopoly-pricing behaviour through price surveillance by a prices and competition surveillance authority.

6. Fostering competitive neutrality between government and private enterprise by requiring government businesses to make tax equivalent payments.

John Wearne, Senior Vice President of the Australian Local Government Association, has raised a number of concerns about the impact the National Competition Policy and its impact on emergency management at the local level.

'One of the major concerns, particularly in rural areas with the introduction of Compulsory Competitive Tendering, was the potential impact of losing their capacity to respond to local situations. For example, concern was expressed about the potential consequences of outsourcing to contractors who were not locally based, or had other contractual commitments in another area. In this case essential plant and equipment that may have normally been located and available to the community at the time of an emergency may not be in the area when required. This would clearly be an unintended consequence of awarding a contract to a 'low-cost' contractor without adequate consideration of the potential need in the event of an emergency.'

Another simple illustration of the impact of out-sourcing was a result of the decision to contract out the cleaning of classrooms. Previously the school cleaners employed by education departments often carried out minor maintenance and repairs, such as changing light globes, tap washers and fixing broken desks. The contractor who put in a very competitive bid to sweep the classrooms, does what the contract demands. They sweep the classrooms according to the contract specifications for the agreed price. But the globes still blow and the taps still drip, who will fix this? The contractor will often happily accept a variation to the contract, for an agreed price.

We can measure costs and therefore it is easier to control them. It is very hard to measure value so it does not appear to figure in the calculations.

## Legislation

To increase the likelihood of implementation of an idea or concept in our society it should be based on legislation. Legislation provides the power or authority to act and an incentive.

The Trade Practices Act 1974 is the piece of legislation that has provided the power and incentives for the activities called compulsory competitive tendering, economic rationalism, national competition policy. What was the intended target of the Trade Practices Act and the purpose?

## Role of the National Competition Council

Although since 1974 the Trade Practices Act has prohibited certain anti-competitive market conduct, its application in some areas of the economy was limited. The 1993 National Competition Policy (Hilmer) Review recommended extension of the Trade Practices Act to cover all business activities.

Recognising this measure might not be enough to produce effective competition in some markets, the review addressed five additional policy elements:

• review of laws that restrict competition
• restructuring of public sector monopoly businesses
• introduction of competitive neutrality so that public businesses do not enjoy unfair advantages when competing with private businesses
• access to nationally significant infrastructure services to promote competition in related markets
• extension of prices surveillance to government businesses to deal with those circumstances where all other competition policy reforms prove inadequate.

The National Competition Council is an independent advisory body, comprised of members from private industry. This advisory body makes recommendations to the Federal Government on all governments involved in competition reforms. The three inter-governmental agreements and the changes to the Trade Practices Act form the Council's guiding principles and establish strong incentives for a nationally consistent, cooperative approach to achieving a more competitive economy.

These guiding principles establish a role for the Council in the following broad areas:

• assessment of government's progress in competition policy reform
• recommendations to governments on access to significant infrastructure services
• recommendations on whether State and Territory government businesses should be declared for prices surveillance by the Australian Competition and Consumer Commission (ACCC)
• advice to the Commonwealth when it is considering overriding State or Territory exemptions from the Trade Practices Act

- other work on competition policy as agreed by a majority of the stakeholder governments.

Governments in Australia have agreed to implement the National Competition Policy and Related Reforms. This agreement includes the Conduct Code Agreement, the Competition Principles Agreement and the Agreement to implement the National Competition Policy and Related Reforms.

Under the agreements, the Commonwealth will make special payments to States and Territories that make satisfactory progress in implementing the national competition policy reforms. If a State or Territory does not take the required action within the specified time, its share of the payments will be withheld. The National Competition Council will assess, prior to 1 July 1997, 1 July 1999 and 1 July 2001, whether the conditions for payments to the States and Territories, have been met.

| Commonwealth payments to States and Territories (estimated nominal $ million) | |
| --- | --- |
| 1997–1998 | $428,000,000 |
| 1998–1999 | $646,000,000 |
| 1999–2000 | $1,113,000,000 |
| 2000–2001 | $1,369,000,000 |
| 2001–2002 | $1,888,000,000 |
| 2002–2003 | $2,184,000,000 |
| 2003–2004 | $2,499,000,000 |
| 2004–2005 | $2,833,000,000 |
| 2005–2006 | $3,188 000 000 |
| **Total:** | **$16,147,000,000** |

## Community Service Obligations

Collateral damage, a euphemism for secondary, indirect, unintended or innocent victims of an action.

What is the collateral damage of the economic reforms?

Community Service Obligations, known internationally as Universal Services, are one of the significant victims of the National Competition Policy and its naive implementation.

What do we mean by the terms Community Service and Community Service obligations? Do we need to provide these services? How will we fulfil Community Service Obligations in the competition context? How much do they cost, and who is going to pay for them?

A definition of Community Service Obligations is 'ensuring fair and equitable access to everyone at reasonable cost to the provider e.g. the public emergency telephone number.'

But community service obligations have also, in some instances, become perverted into an ideological concept that has been manipulated by different players to support their own point of view, for example:

- commercial radio broadcasting Community Service Announcements as part of the regulator's requirement of their broadcasting licence
- transport operators asking for subsidies for providing passenger services on uneconomic routes.

These issues could be resolved if there was a single universal model, which will apply in all contexts. Or perhaps it is better seen as a dynamic concept, which needs to be considered within the context of a particular country, its stage of development and against a background of the community's economic, social and political objectives.

As a recent simple example, a local council previously collected household rubbish once a week as part of its responsibilities for public health. It now collects household rubbish once a fortnight. The costs of household rubbish removal have been contained, but at what cost to public health? Is that an indicator of the priority issues for that council?

How then do we define community service obligations in developed countries in a competitive environment? It is perhaps useful to separate the social and political objectives from the economic and legal objectives.

### Social and political:

- access to health, education, communication, security, food, water, shelter and transportation, which are essential for full participation in the community.

### Economic and legal:

- universal geographical availability, or the provision of service irrespective of where, when and by whom it is requested
- non-discriminatory access, which means that groups of recipients are treated alike in terms of quality and quantity of service.

### Maintaining Community Service Obligations

With the advent of national competition policies, providers have started to identify the cost of providing community services, particularly in the highest-cost least-benefit areas.

Where are these high-cost, low-benefit areas? Most often it is the rural or remote areas where the tyranny of distance and low volume adds considerably to the unit cost of any service. The solution in our communities at this time rests largely with community volunteers providing self-help.

But the self help capability of remote and rural communities is diminishing and enterprise and governments are more inclined to give priority to the best return on investment and or implement the 'user pays' principle regardless of the capacity of the user to pay.

So how are we going to resolve the issue of satisfying the needs of low-income groups, who have little political clout in the new competitive environment?

A major issue is that of community expectations of a level of service that has evolved with the government monopolies on supply of the community services. The expectation has been created in the community over a long time and is seen as part of their rights in return for their taxes.

Using the economic rationalism strategy the answer would appear simple; outsource the supply of services and market forces will in the end determine who best balances the level of service with the cost of providing that service. The people with the least power will initially be disadvantaged, but they will either learn to express their power or continue to be disadvantaged, which some might argue is their own problem. The possibility that the expressions of power of disadvantaged groups would cause social disharmony, dislocation and possible revolt and considerable cost to the community, is of course hypothetical.

If outsourcing will provide significant increases in the personal discretionary disposable income for most members of the community. Then it is likely that there will be a positive response to outsourcing. If there is any loss in the level of service the community must feel adequately compensated. I suspect that provided that the significant financial benefits do occur they will be accepted as a trade off for a drop in the level of services. But only until such time as they feel the need for the previous level of service and the sweetener has been absorbed in to their spending pattern long ago.

### What should be included as Community Service Obligations?

Equitable access to health, education, transport and communication are basic community expectations in our society. To this we can probably add things like emergency services, police, fire, ambulance, defence from international aggressors, and care for special needs groups. But what else is reasonable to add to the list of community service obligations. What are the criteria that it should satisfy to be included?

Criteria that may assist are:

- if it is a basic physiological need, such as water, food, air or shelter

- if it is a security and safety need, such as police or health services
- if it is a social functioning need, such as communication, transport or power
- if it is a community functioning need, such as legislation or regulation,

then these community service obligations should be universally available to the community with no discrimination and not provided on the basis of capacity to pay.

- If it is a esteem need, such as luxury private cars, pleasure boats or large houses
- if it is a self-satisfaction need, such as hobbies, amusement, entertainment or gambling,

these could be made available to the community at a premium price that will subsidise the community service obligations.

Many public enterprises, including transport, postal, energy and water authorities, have long been required by government to undertake activities that they would not engage in if guided strictly by commercial considerations. These noncommercial activities are usually directed to a government's social, industrial or developmental objectives.

The issue being addressed is not the appropriateness of community service and other non-commercial objectives. Instead we need to focus on the process and procedure for achieving those objectives, where appropriate, in a cost-effective way.

The traditional means of funding non-profitable community service is by cross-subsidisation. Concerns have been raised about the sustainability of community service policies based on cross-subsidisation through taxation. This has contributed to the widespread belief that the tide of deregulatory change permitting rapidly increasing competition poses a significant threat to community service. Moreover, this argument has been exploited by public operators as a means of preserving their monopoly position.

The principles proposed for the development and achievement of community service objectives and programs are to:

- articulate community service objectives clearly and specifically
- identify barriers to community service
- identify schemes that could cost-effectively address the identified barriers to community service
- estimate the cost of community service programs
- consider the relative merits of alternative mechanisms for funding community service
- report progress in achieving community service targets regularly and publicly

- monitor and evaluate performance in community service delivery regularly.

## The effects on emergency management

It is my proposition that emergency management is everyone's responsibility, it is not the sole responsibility of any one organisation. As it is not 'core business' for any one organisation, it is best described for most organisations as a universal or community service obligation.

I am passing judgement on the economic reform policies. I am simply raising the issue that asset and resource management in an emergency is important for the survival of enterprise, and there will need to be very clear protocols established to ensure the existing standards of emergency management are not compromised.

## Conclusion

The primary conclusion is that competition and the achievement of community service objectives are not mutually exclusive nor necessarily in conflict. With appropriate arrangements in place, competition rather than monopoly may still be the more appropriate structure to ensure the maintenance, or expansion, of community service objectives and targets. What this suggests is that rather than find expression in attempts to impede competition, the concern over community service could be more constructively harnessed and directed towards the design and installation of such appropriate arrangements as are necessary for the preservation of community service in a competitive environment.

So where do we go from here? Of course the different players will continue to look at the issues from their perspective and will hold to their view being right. Who will be the arbitrators?

The answer has to be the regulators who are empowered by the community to make decisions on their behalf. The regulators need to put into place legislation and regulations that provide a community services profile that the general community wish to sustain politically, economically and socially. We should not adopt an ideological view that competition *per se* will be detrimental to the poorest in society, nor claim that community service obligations degrade the implementation of a competitive environment.

There are also other areas of myopic market rule application that should adopt a broader view on the grounds of public interest, when the value or benefit to the community outweighs the cost of the anti-competitive implications. Examples are the incorporation of the recognition that the power transmission and communication

networks are essential facilities.

Where monopolies are broken down into business units to facilitate more competition, investors are naturally attracted to those elements that have the potential to generate the best return on their investment. The revenue generation business units are keen to divest themselves of those units that they perceive as detrimental to their bottom line, such as maintenance, safety and training, where the return on investment is less tangible.

In the long term it will become very apparent at the bottom line that these areas have been neglected, but most of the decision-makers are driven by the need to maximise the bottom line now. We need to ensure that there is an appropriate recognition of organisational synergy, that is, the output of the whole is greater than the sum of the output of the parts, and without the integration of all of the various aspects in the end, each part will fail in its isolation.

Likewise there are functions that are essential to the optimum functioning of a society. One of these functions is emergency management. It is not a natural monopoly and the sole responsibility of any one agency, organisation or level of government nor does it provide a rational target for competitive action. In the same way, we would be unlikely to contract out our national defence to the lowest bid from some mercenaries.

There are some important similarities in running a business and running a society. In running a business one has a fiduciary duty to maximise the return to the shareholder, if one does not, one is replaced. Likewise the leaders of our society need to provide the maximum services to the society or they will be replaced.

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# Cerebrally risking it

An increasing population and the exposure to natural and technological risks will demand greater attention from policy makers and hazard mitigation managers. Intuitive and reactionary responses of the past are no longer acceptable in a more aware and demanding society. Complex relationships between stakeholders and the diminishing resilience of the natural environment calls for sophisticated solutions within an ambiguous frame of reference and a reducing window of opportunity.

The interactive space between natural and the built environment is where the greatest number of risks to the pursuits of humankind occur. The urban environment possesses the most valuable of the physical infrastructure to support modern society.

For example, many people in urban areas face significant risks from flooding. Such a hazard is permanent and largely unavoidable in many established areas. Flood carries the potential for major impacts on the economic and social fabric of communities. It also frequently results in a high cost to governments through Disaster Relief payments and infrastructure repairs.

It is now essential for hazard mitigation planners and managers to assess the likelihood of the risk posed by a multitude of hazards through a process dictated by a new Australian Standard (AS/NZS 4360: 1995). This 'new' protocol defines 'risk' as 'the chance of something happening that will have an impact upon objectives. It is measured in terms of consequences and likelihood'. Failure on the part of State Government Agencies and on local government to comply with this Standard will increase exposure to litigation.

Most people have difficulty coming to grips with the term 'risk'—even those in the 'hazards industry' often misuse it. For example, 'It's odds on to happen' (a quantifiable relative measure). 'It's a sure thing' (gambling parlance that no one really believes, unless stupid). 'It's a 100-year flood' (some people think this is a flood



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that only happens once every 100 years—that is the wrong message). 'It's a 1% flood' (wrong!). 'There is an x% chance there will be a flood of x magnitude in any one year' (correct!). Although we might be accused of dooms-daying, 'risk' is a fact that is with us all in our daily lives.

'Doomsday' is defined in the dictionaries as a time when a Final Judgement will be pronounced. The difficulty is not with convincing people that hazard situations exist, but in determining when and where (so as to not to be at that location at that fatal time) the magnitude, and the cumulative effects of an event over an infinite time line. Science, through statistical analysis, allows highly educated judgements to be made about the likelihood of an hazardous event. Sometimes we try to suppress the unthinkable because the consequences are almost obscene. People are usually more concerned about the problems which confront them in their daily lives than they are about the comparatively 'low risk-high impact' life chance hazards to which they are exposed. Concern is further suppressed

if community awareness about hazards is low. Distant events too serve to reinforce the wrong belief that disasters do not happen at all locally.

Those who would advocate worst-case scenarios in their planning considerations are often regarded as unnecessarily alarmists - doomsayers. But to do less only serves to perpetuate the myth that there is no risk. Moreover, people are comfortable in ignorance. Only when an event impacts upon their quality of life will they be outraged. These people then typically demand that 'they' (those who these people perceive responsible for the event or the disaster caused) should 'do something'. This establishes the political nexus that usually precipitates interest and the release of resources. A partial resolution of the problem may then result.

Those held 'responsible' often expend vast amounts of resources in the form of time, effort and funds to spread the liability, seek consolation, or excuse their actions,

# The importance of communication in excellent crisis management

Organisations experiencing crises typically form a team of senior executives to manage the crisis. This small group of executives usually includes the chief executive officer or managing director, the chief financial officer, the senior operations manager, the senior legal counsel and other managers relevant to the specific crisis.

Since most crises are newsworthy events, reporters from the region, state, nation, and, perhaps, world, will quickly gather at the site of the crisis. They will expect statements and explanations about the cause and effects of the crisis from the very earliest moments of the event.

This responsibility is often delegated to an organisation's media relations officer. It is their job to gather and disseminate information about the crisis to reporters: What happened? Who did it happen to? When? Where? How? Why?

Organisations that cannot or do not provide information during crises force its publics, such as reporters, employees, government officials, and members of a community, to turn to other, often less credible, sources of information. Many public relations practitioners are aware of the well-known axiom that 'in the absence of information, misinformation becomes news.' These second- or third-hand sources of information can usually only speculate about the details of a crisis and, as a result, often provide inaccurate information.

Although the facts may later prove these sources wrong, the misperceptions created by these non-organisational sources during the flurry of media coverage in the initial moments of a crisis may remain with important publics and be difficult, if not impossible, to change. These misperceptions, caused by the inability of the organisation to provide quick and accurate information during the crisis, may directly translate into significant organisational losses. Inaccurate information not challenged by an organisation may cause employees to quit, customers to switch brands, shareowners to sell their stock, government agencies to increase regulation, and reporters to conduct further investigations.

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Crisis communication plans and strategies provide the means to gather and release information as quickly as possible during a crisis. Authors such as Bernstein (1986), Barton (1993), and Fearn-Banks (1996) describe crisis communication techniques in great detail. These plans often perform a valuable function by helping organisations provide accurate and specific information on very short notice to important publics demanding immediate answers to a crisis.

Managers in Australia, however, too often ignore the importance of communicating during a crisis. Communication is frequently tolerated as a secondary issue much less important than 'managing' the crisis.

Crisis communication has this low status for a variety of reasons. In many organisations, the corporate communication or public relations departments are synonymous with media relations. These departments are responsible for generating publicity or providing information. They are staffed by former journalists who are rarely seen as managers or counselors to senior managers.

This myopic view of public relations in Australia—one-way communication to reporters—can lead to very serious consequences during a crisis. Organisations that focus on 'the general public' at the expense of more specific publics such as employees, customers, government officials, shareholders, and members of the community often suffer unnecessary financial, emotional, and perceptual damage. Here are some examples:

*Employees:* Companies that do not provide frequent information to its employees during a crisis risk significant effects such as lower morale, trust, and productivity. This dissatisfaction can translate into higher employee turnover (and recruiting and training costs), as well as a higher likelihood of strikes.

*Government officials:* Organisations that ignore politicians and other government officials during a crisis risk increased supervision and regulation. A judge, for example, released a report in July 1998 that severely criticised the safety of mines in Australia. As a result, the mining industry faced several government 'proposals for a national organisation to oversee safety in the mining industry' (*The Australian*, July 9, 1998).

*Shareholders and customers:* Not providing information to these publics during a crisis can cause investors to lose faith in the organisation. They can sell their stock, in sometimes very large amounts. Even small investors can cause significant damage:

'In unprecedented circumstances for a BHP chairman, Mr. Ellis was forced to respond publicly to calls by a small shareholder who, on Monday, threatened to mount a publicity campaign aimed at bringing together an extraordinary general meeting of disgruntled BHP shareholders to vote on the chairmanship' (*The Australian*, July 1 1998).

Companies also need to immediately provide customers with explanations and information during a crisis that go beyond the basic information provided by stories in the mass media. The damage to a product's or company's reputation can be significant. Stocker (1997) found the majority of costs associated with a crisis are not legal costs or penalties:

'Sears' reputation with customers was severely damaged in 1992 when its automotive centres were accused of selling unnecessary repairs. Auto centre repairs declined by $80 million and generated a third-quarter loss. Legal fees were about $11 million. Reimbursing California for its investigation and providing mandated employee training added another $5 million. By far the biggest losses were to the shareholders and employees. The stock immediately lost 1.5 points, or about $565 million. Finally, 1993 revenues declined by $1.5 billion' (pp. 196–197).

*Members of the community:* This public is not the same as 'the general public'. It includes specific groups that form around very specific issues. One community group, for example, came together as a result of the Exxon *Valdez* crisis in 1989. This group of fishermen, landowners, and natives from Valdez, Alaska, were awarded compensatory damages of US$287 million and punitive damages of US$5 billion from Exxon Corporation in 1994. Most people agree the punitive damages awarded to this group of people would have been much less if Exxon had accepted fault and shown remorse instead of the arrogant and callous actions it took.

## Excellent crisis communication

Excellent crisis management cannot exist without excellent communication. Managers in Australian corporations, not-for-profit organisations, and government agencies need to compare their ability to communicate in a crisis against these characteristics of excellent crisis communication, identified by Marra (1992) and J. Grunig (1992).

## Pre-crisis relationships

Six characteristics consistently appear in the management and communication literature as a measure of relationships—trust, understanding, credibility, satisfaction, cooperation, and agreement—and all of them are applicable to crisis public relations. Quite simply, an organisation that has strong pre-crisis relationships with its relevant publics will suffer less damage than an organisation with weak or non-existent pre-crisis relationships.

Think of a person you have a good relationship with. You trust him or her, believe they are highly credible, agree with their actions, or easily offer your cooperation. Or if it's an organisation, you might be satisfied with its service or product or understand why it took a particular action. If it should experience a crisis, chances are pretty good you will give this company (or person) the benefit of the doubt and accept how they manage the crisis.

Arnott's pre-crisis relationships with its publics certainly helped it manage its product tampering crisis. And the high levels of trust, credibility, and understanding the Australian military had with its publics helped it successfully manage the Black Hawk disaster in 1996 and the *HMAS Westralia* crisis in 1998.

Poor or non-existent relationships work in the opposite direction — they can easily magnify the negative effects of a crisis. If you don't trust someone, or aren't satisfied, or think they have little credibility, you aren't likely to understand or agree with

their actions during a crisis. Telstra, for example, felt the effects of poor relationships with certain customers and government regulators in mid-1998 when it was accused of providing poor service. Politicians, similarly, who have poor relationships with the people they represent often can't successfully recover from crises of confidence in their ability to lead.

The research clearly indicates a crisis magnifies poor or non-existent relationships. Organisations can't build or repair relationships during a crisis, and even the most comprehensive crisis plan can't compensate for poor pre-crisis relationships. This strongly suggests managers in Australia should encourage and invest in pre-crisis communication as a cost-effective strategy to minimise damage during crises.

## Autonomy of the public relations staff

Roberts and LaPorte's (1989) 'big wheel, little cogs' crisis management analogy is another very important characteristic of excellent crisis communication. In this analogy, organisations allow and encourage its 'little cogs' to make 'big wheel' decisions during a crisis. In other words, they give middle- and low-level employees the power and autonomy to make sometimes very important decisions during a crisis.

Pfeiffer (1989), reviewing Roberts and LaPorte's research, said organisations perform well because of intense training, open communication, fierce loyalty and dedication, and the ability of 'cogs' to make 'big wheel' decisions:

'Most organisations consist of people in separate categories: big wheels, cogs, and specialists like accountants or chemical engineers. But the high reliability version is a hybrid, a mix of these roles played by the same individuals under different circumstances. The big wheels are there, but use their power rarely. The chain of command is much in evidence, orders may be barked out, and subordinates behave appropriately as spit-and-polish yes-men. But when tension is running high, all work together as specialists among specialists on an equal footing in a more collegial atmosphere. The most striking and surprising role change occurs in the white heat of danger, when the entire system threatens to collapse. *Then cogs can become big wheels. Whatever their status in the formal hierarchy, they are trained intensively every day so that—based on their experience—they can take com-*

*plete command, redirect operations or bring them to a complete halt* [emphasis added]. (p. 40)

The extent to which an organisation's communication staff can become 'big wheels' has a significant effect in determining how well an organisation communicates during a crisis. Excellent crisis communication requires the ability to provide information to an organisation's relevant publics almost immediately. Organisations, therefore, need to give its public relations staff the necessary autonomy to talk with these audiences. Organisations need to prevent delays in releasing information typically caused when public relations practitioners have little or no authority to release information themselves. Can a public relations staff do what they have to do—communicate—or must everything be reviewed and approved?

A review of a crisis experienced by global communications company AT&T in 1990 showed its public relations staff— which managed the crisis very well—had a tremendous amount of autonomy (Marra, 1992). Its mid-level public relations managers began providing information about the crisis within 30 minutes of the start of the crisis. They were able to provide information this quickly because they had the autonomy to do their job. These public relations practitioners felt very comfortable releasing information without obtaining approval from senior managers, particularly attorneys. An AT&T public relations vice president, in fact, said he didn't consult with a company attorney during the entire crisis.

The public relations staff at a large university in the Untied States, unfortunately, had an almost opposite level of autonomy. The university's director of public information required her staff to funnel all requests for information to her. The enormous number of requests, not surprisingly, prevented one person from releasing information as quickly as it needed to be provided. In addition, the director of public information was only allowed to release information that had been approved by the university's president, his vice presidents, and the school's senior attorney. A dean at the university (and a former newspaper managing editor) said it typically took a three-hour cabinet meeting to decide what information they would release on any given day during the crisis.

The ability of a public relations staff to move from 'little cogs' to a 'big wheels' during a crisis is consistent with the practicing excellent crisis communication. Organisations need to empower its employ-

ees with the autonomy necessary to make strategic decisions during crises. Without this autonomy, public relations practitioners will rarely be able to provide the immediate information required during a crisis.

## Communication culture
Organisations often have many different cultures within themselves. It is not unusual, for example, for organisations to have different unwritten 'rules' about safety, promotion, decision making, personal appearance, reimbursement, and absence from work. Mitroff and Kilmann (1984) listed several typical organisational norms: Don't disagree with your boss, don't rock the boat, treat women as second-class citizens, don't enjoy your work, cheat on your expense account, and look busy even when you are not (p. 69). In a similar fashion, many organisations also have definable communication cultures. Some organisations encourage two-way communication while others rarely or grudgingly disseminate information to its relevant audiences.

Unfortunately, few public relations practitioners recognise the important relationship between communication culture and excellent crisis public relations. Many practitioners devote significant resources to produce a crisis communications plan that is destined to fail because the technical strategies contained in the plan contradict the dominant and accepted communication philosophies used by their organisation. In other words, a great crisis communications plan won't work if 'it's not the way we do things here.'

The communication culture present at the Thredbo disaster in 1997, for example, clearly prevented various publics, particularly reporters and families of the victims, from receiving important information. Columnist Frank Devine wrote in *The Australian* that 'official dissemination of information has been a disgrace—grudging, tardy, and frequently inaccurate or untruthful.' This was caused, in large part, by the presence of a communication culture that valued defensive, one-way communication instead of a more effective (and ethical) open and two-way model of communication.

## Senior-level, strategic communication
Research has shown that excellent crisis communication often results when the top communicator in an organisation is a strategic manager who reports directly to the chief executive officer. He or she uses research to plan communication activities instead of doing what they've always done

in the past. The top communicator is also a trusted adviser and counselor to the chief executive officer. He or she sets communication policy, instead of implementing it.

Excellent crisis communication cannot occur if the top communicator for an organisation is valued for his or her skills as a technician — writing news releases, preparing press conferences, and acting as a spokesperson. The top communicator needs to be inside the boardroom during a crisis, offering strategic communication advice.

Organisations that allow attorneys, personnel or financial specialists to determine communication policy during a crisis may survive later battles in a court of law, but often fail miserably in the court of public opinion. Expert public relations practitioners can suggest what publics

> **Organisations that allow attorneys, personnel or financial specialists to determine communication policy during a crisis may survive later battles in a court of law, but often fail miserably in the court of public opinion.**

need what information, and how and when these publics should receive it. This strategic approach to crisis communication is very different (and much more effective) than the more typical tactic of providing a statement to 'the general public' through the mass media.

## The value of excellent crisis communication
Corporations, not-for profit organisations, and government agencies cannot underestimate the importance of developing and maintaining communication with its relevant publics. According to public relations pioneer Arthur W. Page, 'all business in a democratic country begins with public permission and exists by public approval' (Nelson, 1997, p. 325). This approval becomes critically important during a crisis.

Crisis management without adequate communication risks losing the support of strategic publics such as employees, customers, stockholders, and members of the community. Trust and credibility built up over many decades can be quickly and permanently lost. Walter Isaacson, the managing editor of *Time*, recognised this when he wrote an apology to readers in July, 1998 retracting a story published earlier that year:

'Our credibility is our most important asset. When we make mistakes, it's important to be open and honest about them, get all the facts out as quickly as possible and try to set the record straight. And to say we're sorry. We are.' (p. 6)

Managers in Australia need to be as equally forthcoming and recognise the danger of delegating communication to a secondary role during crises. Equally as important, public relations practitioners need to demonstrate their value to executives by providing strategic communication counsel rather than technical media relations skills.

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# The early days
# — a management perspective

by Peter Fielding
(formerly Department of
Community and Health Services)

At the time of the Port Arthur shootings I was manager of Family and Individual Support Services for the Department of Community and Health Services (DC&HS). I have had many years' experience in emergency management as a social worker, manager and lecturer in the Associate Diploma of Emergency Management course that was run, until recently, by the State Emergency Service in conjunction with the University of Tasmania.

In the immediate aftermath of the shootings, the department established a recovery centre on the Tasman Peninsula at the State Emergency Services Headquarters at Nubeena, 15 kilometres from Port Arthur. As the manager of that centre in the first two weeks following the shootings, I found myself relying heavily upon my social work background and training as we worked with the Tasman Peninsula community to meet the challenges and difficulties of the aftermath.

We found that one of the most difficult tasks was to clarify our goals in relation to the recovery effort. We were confronted by a community that had been torn apart by an act of human violence that was difficult to comprehend. As workers, we were as stunned and shocked into disbelief as the rest of the Tasmanian community. Michael White (1997), State Program Coordinator of Child, Family and Community Support, the worker responsible for overall management of the recovery effort describes the task in these words:

'At the outset the Port Arthur response was planned as a broad community recovery activity. There was considerable pressure for the response to the incident to be defined solely as a counselling response; however, initial planning aimed to provide community development as well as counselling services. This was consistent with the view that recovery had to have an explicit community focus in addition to a focus on the well-being of individuals.'[1]

Implicit in the focus on the community development aspects of the response is the notion that community recovery must be managed by the community itself. The role of recover staff is to support the community in making its own decisions about how to proceed. This following quote illustrates this point:

'We had been invaded. All those suits from the government sitting around our council table. By the end of the meeting all the suits were at the back of the room and our reps. were sitting at the council table. That's when I knew we were getting some control back over our lives.'[2]

One of the first priorities of the management team at Nubeena was to ensure that the workers involved with recovery efforts understood the broad community focus of the response. This was especially important as the workers in the teams represented a range of professions across eighty different organisations from commonwealth, state, local government and non-government agencies.

Upon arrival, the teams were briefed on the principles underlying the provision of personal services. Their role was to assess the impact of the shootings on the local community, to provide information, advice and support rather than to 'treat' symptoms of trauma. Many workers were anxious and uncertain about their role and the enormity of the task confronting them. It was important to assure them that they did not have to rush into treatment of symptoms, but to assess the impact of the shootings on the community and to be responsive to community needs and expectations. Sometimes, this meant nothing more than 'being there'. This was frustrating for many workers and raised anxiety and stress levels in those who had been keyed up to 'do' something in response to trauma.

The establishment of centres at the Taranna Community Hall and the Eaglehawk Neck Fire Station (located ten and seventeen kilometres respectively from Port Arthur) is an example of the strategies used. These centre were set up in response to strong pressure from the local council and representatives from the communities. There was a feeling amongst local residents that their needs could best be met by more localised access to services, especially counselling.

The sites attracted very few referrals during the time they operated; however both communities and the council reacted strongly to suggestions that they be closed down. No one in either community had actually expressed a personal need to access services at the two sites, but they were adamant that others in their communities would need them. The communities saw the presence of the centres as a safety net and an expression of the government's concern for their well-being. It did not matter that they were not fully utilised, they were there if people needed them.

Many workers found being assigned to these sites stressful due to low activity levels compared with other centres, such as the historic site. Briefings to these staff emphasised the importance of the symbolism of our presence there. As one worker said after returning from a shift:

'I had no idea how difficult being a symbolic gesture could be'.

The nature of the response to the shootings also generated a debate within the community and amongst professionals about the use of terminology and the different meanings given to terms such as 'counselling'. The initial media releases and the sign posting for the recovery centre all used the term 'counselling' as if it were readily understood by the community. The media informed people that counselling was available and that families, friends and work colleagues were being referred for counselling in large numbers. To many the term 'counselling' was equated with vague notions of being treated for something in much the same way you would receive treatment for a broken bone. This view was also held by some workers.

Following consultation with community groups and community task force representatives, the literature advertising the

Notes

[1] White M.1997, 'Establishing community recovery' in *Proceedings from the Port Arthur Seminar*, Melbourne, March 1997.

[2] Dr. Pam Ireland describing her impression of the first Community Recovery Task Force meeting at the Nubeena Council Chambers on the evening of Tuesday, 30 April 1996.

recovery centre's services was altered to emphasise the information, advice and support role rather than counselling.

The lesson to be learnt here is that practitioners need to vigorously debate the use of terminology, reach a position about what interventions are best suited to various stages of the recovery process and find ways of informing the public about what they might reasonably expect and benefit from in the recovery from

traumatic events. Social workers are in a unique position to inform and direct this debate.

In conclusion, I want to again emphasis the importance of the provision of information, advice and support to traumatised communities rather than focussing only on the provision of counselling. In his address to the Welfare Administrators Conference in Hobart in August 1996, Greg Burgess, the General Manager of the Tasman Council

stated:

'It was our responsibility to manage our own recovery. The department understood that. It did not come in and take over, but offered support, advice and encouragement.

When we faltered or were unsure of which way to turn, they were there with a steadying hand to guide us. At no time did we feel as if we had lost control or been taken over.'

## Letter to the Editor

# Cerebrally risking it (cont.)

or inactions) in a number of ways. Fundamental to the thought processes of those people, agencies, politicians and governments perceived responsible, are a set of understood, unwritten *laws*. Hazard mitigation (risk) planners and managers therefore need to be forever conscious of these *laws*. For the benefit of all, a non-exhaustive list is provided here.

- *The law of parsimony.* Bureaucrats often treat public moneys as their own. But the lowest tender is not necessarily the best one. Cheap solutions may only defer or exacerbate the problem.
- *The law of the plebian imperative.* One stakeholder group frequently gets its selfish wants mixed up with its needs, at the expense of other stakeholders.
- *The law of improbability.* Australians are great gamblers and it seems inconceivable that they can understand expressions of chance except when it is applied to potentials of risk.
- *The law of political expediency.* Gaining and maintaining power to the detriment of those who accidentally get in the way. Their kind of 'risk' is different (and more important they would say) than your kind of 'risk'.
- *The law of nature.* The 'greenies' would have us believe that natural environments should not be modified because people are not really part of the environment!
- *The law of ignorance is bliss.* In the military, 'ignorance' is regarded to be no excuse. It is more likely a cognitive choice not to listen, look or assimilate advice. This way, someone else should have done 'something'. But this assumes the citizen has any intelligence in the first place.
- *The law of political incredibility.* It is always 'previous government' that is blamed when something goes wrong. This way promises can be made but need never to be fulfilled. And if no one signs

off, no one else will remember who might be held responsible.

- *The law of expediency.* We live in a 'now' society. Anything that takes a bit longer to fix will be overtaken by something new. Sometimes the new 'fix' will be nothing more than the 'old' recycled with 'new' badges.
- *The law of procrastination.* If one is for crastination there is the risk of making a decision in haste and having to repent at leisure. If we crastinate long enough the problem usually resolves itself anyway.
- *The law of commercial imperative.* This means 'You have the money and I am going to get you to give it to me'. Put another way, 'Heads I win, tails you lose'. The provision of many public services cannot be economically justified by this doctrine. However, a certain standard of social equity is dictated by the will of the people in a true democratic society.
- *The law of privatisation.* That's what some governments do to your privates. Conscripted, and once they're gone they are often gone for good. The only way a society can recover is by nationalising industry (as has been done in Australia in the past) or by deferring the problem as a legacy for future generations.
- *The law of optimality.* Also known as 'just-in-time' or 'less than enough most of the time'. It relies on the parable of wanting a Cadillac in a bicycle society but having to ride a donkey instead. It is useful to see it as a conflict between the ability to pay and the human characteristic to want. In mathematical terms it is also known as 'the lowest common denominator'.
- *The law of ethicality.* This law can be regarded simply as an esoteric, archaic subject once taught by early Greek scholars and in the better private schools in Australia. Ethics may now be regarded

as obsolescent in our society.

- *Murphy's law.* 'Anything that can go wrong will go wrong.' This is simply a neurotic state of mind. Every bureaucrat knows that modern information technology and reductionism allows for all aberrations to be predetermined and pre-emptively neutralised by the Special Executive Service according to their ephemeral perception of the current political whim.
- *The law of scientific righteousness.* 'Scientists' often try to be intellectually superior and this is often without justification. They argue an inalienable right to do this or that in a 'black box' environment. They typically argue with the benefit of 20:20 hindsight and seldom ever do they have to make ' real-time' decisions affecting the lives and property of people. 'All care and no responsibility'—so long as it is done scientifically—is just not good enough.
- *Public policy.* Its misspelling was once a dirty joke. Many people still regard 'public policy' as a dirty joke. It was also once regarded as policy of the public for the public. Today it is more likely policy to have no policy (and that is a policy). More and more responsibility for deriving public policy is being privatised anyway!
- *Public service.* The public is often referred to as 'the mug punters', 'the great unwashed', 'the plebs' etc. Service is what you more commonly do not get in today's 'me' environment. The original intention was that these people were servants of the public, all that remains is that they continue to be funded by the taxpayers.

*Des Lambley*

(Signing my name to this is also a risk I suspect [assessed by an AS4360:1995 process], for there are many humourless people out there who would think that I am not at all pulling their leg in a typical Australian way. But my concern is, have I insulted everyone?)

# Back to basics — holding on to the game plan when the rules and the players keep changing

## The community and the tragedy

Following the initial shock and devastation of any disaster, the recovery journey begins.

Working with the Tasman Peninsula community as they make this journey after the Port Arthur shootings has been an extremely challenging and rewarding experience.

I joined Social Worker Biddy Searl in this job-share position as the Counselling and Personal Support Services Coordinator eleven weeks after the shootings.

The position was established by the Department of Community and Health Services to assist with the long term recovery for the Tasman Peninsula as part of the Port Arthur Incident Recovery Program.

It is difficult to summarise all that has happened during my time in this position, however this paper represents some of my personal reflections of the first fifteen months in the role, including issues both Biddy and I believe are important to share.

I remember when I first heard about the shootings at Port Arthur in April 28th, the question I kept asking myself was, 'how could it happen here?'

The question lingers today as I work with the Peninsula community. What a contrast: the total evil of the shootings and the complete peace and serenity of this place. The beauty and character of the ruins of the Port Arthur Historic Site extend right across the entire Tasman Peninsula.

The Tasman Peninsula is an isolated rural community about an hour and a half from Hobart. It is rich in history and its major industries include tourism and hospitality, agriculture and fishing.

The community has a population of approximately 2200 and has the basic amenities found in rural areas, including its own municipal council, basic medical and health services, and a district high school. The picture of the area is of a sleepy, peaceful, casual part of the world, that positively grows on you. For many of the residents, the peaceful lifestyle is the main reason they chose to live there. To realise that this was not the safe haven of their dreams was shattering.

by Susan Powell,
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Services Coordinator, Port Arthur
Incident Recovery Program.

Presented at the Australian Association of
Social Workers, National Conference,
Canberra, 21–24 September 1997.

The community, just like any other, has its own particular history, social networks, tensions and idiosyncrasies that define its unique character. It has an abundance of strengths and creativity and an amazing ability to care for each other. These characteristics pre-date the disaster and form the foundations for building the recovery.

It is important to consider the degree of trauma the disaster created in the community. Although many of those present on the day of the shootings were tourists and the impact was spread throughout Australia and internationally, the size of this community has meant that each member has been affected at some level.

For example, local people who work at the Historic Site felt the responsibility of caring for their visitors during the ordeal, and now face the scene of the shootings at work every day. Medical and emergency personnel who were first on the scene were local professionals and volunteers. Therefore, everyone is doing their own recovery: as individuals, as family members, as neighbours, as community group members, as a community unit, and as part of the world-wide group affected by this experience.

'What can I do?' 'How can I help?' 'Where do I start?' and, to be honest, 'What have I gotten myself into?' were all questions I asked myself as I began this position.

It is difficult to describe the atmosphere of the place and my feelings personally and professionally after the tragedy. Grief and trauma is personally touching at any time, but to be confronted by it on this scale was consuming. At times the enormity of the event was smothering and the task ahead seemed formidable. It was an environment that easily created a sense of powerlessness, simply because what happened was beyond anyone's comprehension.

## A working framework

To work effectively has required the development of a framework, the two main elements of which are:

• a knowledge of the phases and principles of disaster recovery and community development that provide the theoretical basis for recovery

• the nature and location of the disaster.

It is these factors that make each disaster, and therefore each recovery program, unique. They provide the practical foundations on which a community builds its recovery.

The framework has provided, at the very least, a personal and professional grounding. At most it provided a mutual starting point in the recovery process, for ourselves and the community, that:

• recognises the community as the expert in their recovery and ensures the process is community owned and driven

• provides a structure for reflecting and planning: as disaster recovery is a dynamic, intense and at times chaotic process

• facilitates a focus of undertaking a recovery journey rather than finding a recovery solution.

The functions of the position have been to:

• provide assessment, counselling and referral for individuals and families

• co-ordinate visiting community and health services

• inform and educate the community about stress, trauma and recovery

• liaise with key stakeholders to assess ongoing community needs and recovery progress

• assist with community recovery projects

• provide staff support role to local services operating on the Tasman Peninsula.

## The challenges

This has been a challenging experience as the dynamics, needs and energy levels of the community change throughout the recovery process.

The *first challenge* in delivering an effective service involves developing a working style that is compatible with the

community. The casual nature of this rural community meant that our style needed to be informal and casual too.

'Professional loitering' was a big part of the job. In other words 'just being around'. Much of our work has been done over a cup of tea, in car parks or during casual chats.

Formal appointments were the exception rather than the rule in the early days, and this pattern has continued, to varying degrees, throughout the year. This has required some creative thinking at times when trying to make contact with community members.

At the commencement of our position, the community was wary of outsiders, which was understandable considering the steady flow of counsellors, experts, media and others that had come before us.

We did a lot of networking, both formally and informally, especially during the initial stages, to develop a presence in the community. It was very important for us to get to know the community and for them to get to know us, both as individuals and as professionals. This relationship has evolved over the first year in what we have termed our 'community apprenticeship'. This process has directly impacted on people accessing services. As people come to know and trust us, they are more willing to try the service and promote it as a resource to others.

At the time of the first anniversary there was a definite shift in the community's acceptance of 'outside workers'. I think this shift signified that the community recognised our journey with them through the ups and downs of the previous twelve months. This shift has been personally and professionally satisfying, as it signifies the community's acceptance of ourselves and our work.

The *second challenge* has been developing systems that provide a comprehensive view of community needs to ensure services are appropriate and relevant.

Developing a system that will accurately identify community needs is important in an environment where needs are constantly changing and often conflicting.

This involved constant monitoring and evaluation. Methods we have used ranged from informal discussion with key individuals and groups, to formal needs analysis, meetings and written surveys. Constant face-to-face communication has been crucial.

Messages of need we have received during this process have varied from 'we don't need the service at all' and 'are you still here?', to the belief that the service will be required long term, and that no assessment is required.

During this process we have identified several areas of need in the community.

Firstly, we received constant messages of a need for counselling in the community. However this need was not reflected in numbers using the service. Reasons for this may have included:
- people not recognising their need at particular stages
- reluctance to access mainstream services because of the concept of 'counselling'
- issues around confidentiality in small areas
- lack of familiarity with service providers
- mainstream services not being appropriate to people's needs.

This required creative thinking and stepping outside 'traditional' counselling responses to develop alternate strategies for meeting need.

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Local massage services were contracted to provide free massage. This service was made available to service providers initially, but due to popularity has expanded to include anyone affected by the shootings. The Tasman Camps were set up to allow families to take a weekend break from the peninsula in a relaxing recreational environment. We also provided regular information and education about grief and trauma through community newsletters and flyers.

Secondly, it is important to recognise the needs of local service providers working in this area. Because these people are local and familiar, they have been a main source of contact for people. This has placed incredible strain on them, remembering that they are also affected by the trauma, simply because they live in the area.

These people have shown an amazing ability to soldier on through this process and part of our role is to try to support them. Ways of doing this have included a formal service providers networking group and a weekly staff self-care program.

The heightened sensitivity of people during the recovery process was another

need we had to be aware of.

Initially sensitivity was high, where something seemingly as small as the use of words like 'trigger', could cause distress. This sensitivity continues today, although not to the same extent. Other disasters and violent events spark responses in the community. People's hearts went out to those at Thredbo, and amongst the sadness of Princess Di's death there has been discussion about the antics of the media and the investment they have in maintaining sadness and grief in the headlines.

Workers need to be aware of the increased potential impact that future events will have on people's recovery from their own disaster experience. Planning for potential support during significant events such as the plea hearing, Christmas and the first anniversary has also been challenging, as the need was unpredictable.

Again, the main role for us, during these times was to provide support services. For example, providing private areas for families, answering questions, even things like finding a smokers area so people could have a cigarette without having to stand amongst the media outside the court, all helped smooth these times as much as possible. Emotional support came largely from the natural support networks that people have developed from this shared experience. Ours was a 'safety net' role as people cared wonderfully for each other during these difficult days.

We were also faced with conflicting needs between those in the community and other stakeholders external to the community, including management, political and media interests. This was not always an easy process and we had varying degrees of success. Often we found ourselves the meat in the sandwich, where we were advocating on behalf of the community and educating others about the importance of a community driven process.

In emphasising community ownership, it was important to have a working knowledge of the community, including its pre-disaster resources and history. Through this it is easier to focus on incident recovery issues and to be aware of any needs and agendas that pre-dated the disaster. Our job is to assist with the recovery process, not to create a new and perfect community.

The *third challenge* in our work has been adapting these work styles and systems according to movement through the recovery process.

Points that need consideration here are:
- although recovery extends over years the process is dynamic
- each phase of disaster brings with it different dynamics and energy levels

- movement through these phases is transient
- the rates of change in the process differ —although the rate of change for a community is incredibly accelerated by disaster, people within the community are recovering at different rates, and the community as a whole is recovering differently to the rest of the country
- significant events impact on movement through the recovery process.

It is impossible to describe this situation unless you are there, but I think adapting work styles and systems according to the stages of the recovery process is the greatest challenge of all.

The dynamic, chaotic nature of recovery impacts on your role constantly, dictating how directive or supportive your role is. On a given day we could be dealing with people at various stages in the recovery process. For example some could still be in the early stages of recovery, others may want to get on with things and forget the shootings ever happened, and some may slowly be coming to terms with the incident.

To adequately respect and encourage each person's recovery process is quite a balancing act, and at times the only indication that you have the balance right is that no-one is telling you you're doing it wrong.

## Changes during the recovery process

A brief outline of the changes we have seen in the community include:
- the initial shock of the tragedy
- a period of numbness where people seemed on 'automatic pilot'
- followed by people wanting to forget that the shootings had ever happened, (this was the feeling at the time I began the position and energy levels were particularly low)
- a build up of tension preceding events such as the plea hearing, Christmas and the first anniversary, where things seemed to stop in anticipation
- often a period of achievement for passing these milestones, followed by a period of flatness with the realisation that passing these milestones were only part and not the end of the recovery journey
- a slight rise in energy in between these significant events where community activity increased
- an emotional but peaceful day of the anniversary as people came together and supported each other as they reached the one year milestone
- a definite shift after the anniversary with people clearly stating a desire to look forward to development rather than focusing on recovering from the past
- a sense of a lack of direction, as people were tired, with little energy to search for new directions
- a recent lift in community energy, with many people looking for new directions and new projects that will bring everyone together with a renewed sense of purpose.

Throughout this time there have also been birthdays, anniversaries, etc. that have impacted on people's recovery progress.

Blending these challenges for effective service provision during this process has often felt like an adhoc, 'fly by the seat of your pants' type of role, as needs are constantly changing. This is where the framework provided grounding—reminding us that the sense of chaos was okay.

> **'This community was thrust into this process against their will and in a most horrific way and they are dealing with it in a most dignified manner, using an amazing amount of strength and skill that comes from within.'**

## Some lessons

In any working experience, there are valuable lessons that come from the challenges we face. There are some valuable lessons learnt from my experience working in this position.

### 1. The constant need to promote the need for a community driven recovery

For a recovery from a disaster like this, there has to be a recognition that the community must own and lead its own recovery effort for any recovery to be effective.

### 2. The need for teamwork

While the teamwork we have had during this time has been great and I believe successful, I also believe it relied largely on personalities and the fact that we were all in a 'sink or swim' situation.

Work also needs to be done on overcoming the 'territorialism' between public and private organisations and between professions that can prevent us reaching our potential and effect service provision to the community.

Role clarification needs to occur constantly, emphasising how we can complement each other. I think social work has equal responsibility here to promote effective team work, and to promote our skills and strengths as effective players in those teams.

### 3. The need to effectively evaluate what we are doing

The dynamic nature of recovery and informality of our work style creates difficulty in finding an adequate means of *evaluating* our work. Even though each disaster is unique, there are important lessons and trends that everyone can learn from. To effectively assess what we're doing right as well as what we're doing wrong is important to assist in giving direction to our work and to provide information for workers finding themselves in similar situations in the future.

### 4. The need to work very closely with the people in the community

To work effectively to help a community recover requires that you get right in alongside everyone else, both as an individual and a worker.

You face the ups and downs and feel the pain with them, all the while promoting total confidence that they will beat this atrocity. I think both management and ourselves as workers need to be very aware of the investment this requires and the toll that this can take as we saturate ourselves with all the emotions and dynamics of recovery. We must ensure that we look after ourselves with as much energy as we are trying to care for those around us.

## Summary

Working in this position, has been an amazing experience—it is work that energises and excites, and frustrates and exhausts.

The challenges have been thrown out one after another and my social work training has been invaluable in trying to work with this unique dynamic process to the best of my ability. The year has provided as many downs as ups, but each step has given its own rewards.

One positive to come from such an experience is to see human resilience in action.

This community was thrust into this process against their will and in a most horrific way and they are dealing with it in a most dignified manner, using an amazing amount of strength and skill that comes from within. Even during times of tiredness, frustration and anger with the whole process, never once have they given up on fighting for their rights, needs and control over their community and their recovery.

# Public education and disaster management: is there any guiding theory?

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Public education is increasingly mentioned as one of the major strategies available to disaster managers, being particularly effective at the preparedness end of the prevention-preparedness-response-recovery spectrum. In this paper, we seek some basic educational theory to underlie this aspect of disaster management.

## The need for public education in disaster management

Despite an increasing toll from disasters in terms of physical damage, human suffering and death, and personal measures such as loss of family income and psychological trauma (Palm, 1990), there exists a dominant view within western societies, and arguably still amongst disaster managers, that humanity has the capacity to subjugate nature and harness technology to provide for individual safety (Hewitt, 1983; Cutter, 1993). In other words, an increase in disasters is occurring simultaneously with increased expectations of public safety. Governments are expected to provide the general public with safety and peace of mind, perpetuating the illusion that risk is controllable or manageable (Goldstein, 1990).

It is ironic that the public demands safety yet a number of cost-effective and feasible measures to mitigate disasters are not adopted by many (Palm, 1990). Such a failure of the public to adopt disaster mitigation measures has a long record in Australia. In 1817, Governor Lachlan Macquarie issued a declaration soon after settlers' properties along the Hawkesbury and Nepean rivers were flooded yet again, despite government recommendations to create townships only on high ground above the floodmarks. Part of the declaration stated:

'... it must be confessed that the compassion excited by their misfortunes is mingled with sentiments of astonishment and surprise that any people could be found so totally insensible to their true interests, as the settlers have in this instance proved themselves.'

Similar sentiments are probably echoed, albeit in private, by many disaster managers today. Still, with official responsibility for public safety, there is significant pressure upon hazard and disaster managers to find ways to facilitate increased safety. As Rattien (1996) has pointed out, reducing loss in life and property is a compelling objective now receiving world-wide attention.

Disaster managers have a range of strategies available to address their responsibility for public safety. However, despite faith in technology, our ability today to modify natural phenomena is very limited and may remain so (Rattien, 1996). Instead, preparedness and response measures are undertaken to mitigate disasters:

'Scientists and engineers now believe that the knowledge and technology base potentially applicable to the mitigation of natural hazards has grown so dramatically in recent years that it would be possible, through a concerted cooperative international effort, to save many lives and reduce human suffering, dislocation, and economic losses.' (Rattien, 1996).

Recently, there has been a renewal of focus, at both a national and global level, upon public education as a means to disaster mitigation. The 1990s Decade for Natural Disaster Reduction emphasised the importance of governments 'educating and training their citizens to increase awareness' (Press, 1989, vii). Likewise, it is widely assumed that an educated public is more able to prepare for, and adapt and respond to, hazards, and that education for disaster reduction is complex yet essential to any properly implemented, centrally managed hazard strategy.

Nearing the end of the 1990s, there seems to be little evidence forthcoming that attitudes have changed from education being effective in facilitating public safety. In one of the most representative investigations of disaster mitigation undertaken within a western country, the Federal Emergency Management Agency of the United States (FEMA, 1996) gathered data from more than 15,000 participants from Federal, State, regional, tribal, and local government agencies, private industry, academia, non-profit research, professional, trade, environmental, and disaster response organisations, and individual citizens. The study found a dominant view that the public can become better informed about its vulnerability to natural hazards and more knowledgeable about ways to mitigate these hazards via electronic and print media, displays and brochures, presentations by Federal, State, and local agencies and professional organisations, formal courses and school curricula, mass mailings, and public notification such as newsletters and signs. It seems the majority of opinion amongst disaster researchers and practitioners is towards the value of education as an effective and practical tool for hazard management. However, although a belief in educating the public appears entrenched in management practice, precisely what the 'public education animal' looks like is hard to discern.

## Current understanding of public education

The longevity of the term may suggest that public education has sufficient heritage to warrant recognition as an educational form in its own right. Recently in Australia, national multimedia public education campaigns have been used to address a diversity of issues, including refuse recycling, reduction of household water usage, Federal Government election voting procedures, and awareness raising about the benefits of mammograms for particular age group. Public education has a particularly strong usage in regard to educating for public safety. Educational campaigns have focused on topics include road safety, toxic chemicals, speeding, drink driving, safe sex, skin cancer, health safety, fire prevention and response, what to do at the scene of an accident, Sudden Infant Death Syndrome prevention, and many more. While it may be expected that such emphasis upon public education ensures a comprehensively defined and theorised field, this does not appear to be the case.

While it is tempting to construct the last two or three decades as a period when understanding about public education in

a disaster context has advanced, the literature cannot support such a claim. An operational definition and theory of public education has remained elusive despite a commonsense understanding of public education being readily found in numerous practical instruction manuals and educational guides.

Definitions of public education are generally vague, alluding to, but not detailing, strategies and processes that inform, guide and safeguard the public. An example of a recent public education definition is Whyte and Crombie's (1995, p.95) of:

'educational activities designed to increase awareness and understanding by citizens of important issues on the public policy agenda in such domains as health, the environment, and civics.'

The Australian Senate Standing Committee on Employment, Education and Training (1991) saw it as:

'being processes by which bodies of various sorts seek to inform and educate the public at large, or specific sectors of the public, on key issues, including both campaign-style (e.g. HIV/AIDS awareness) and community involvement processes (e.g. land conservation, parenting skills).'

Finally, the Australian Counter Disaster College (1983) defined public education in a hazard context as:

'an ongoing strategy aimed at alerting the public to the consequences of a hazard impact on an unprotected community' (p.1)

Such definitions are not false but are imbued with a vagueness that makes them less than practical, a reflection of what has been a general failure to establish a concept of public education that would be useful in a disaster management context.

It is obvious that many disaster managers believe that effective public education is an important part of the management process and implement programs accordingly. Similarly, pamphlets, handbooks and training programs contain a range of advice on the purpose of public education and how to prepare for and respond to disaster. What seems to be lacking, apart from hard evidence that public education has actually reduced the scale of any specific disaster, is any integrated theory on which to base such programs. It would surely not be unreasonable to hope that an answer could be found in the area of education itself.

## Towards an understanding of public education
Robottom (1990) emphasised a need to appraise the concepts, beliefs, assumptions and values in prevailing educational theories. Such an appraisal of public education reveals it has not been accommodated as an educational form with its own intentions and delimitations. This phenomena is typical of other educational forms, such as adult education and community education. Stock (1996, p.21) emphasises that relevant theory for adult education is:

'... rather fragmented, or even compartmentalised within the several academic disciplines which feed into the study of adult education.'

While a number of educational aspects and theories offer insight, lacking is a specific public education theory. Theory remains overlapping with, consumed by, or peripheral to, other education theory. Public education, as a concept, is evolving but remains elusive and under-researched, with rhetoric lacking structure, and vagueness and contradictions rife. Existing research offers little remediation to conceptual concerns.

A useful step towards establishing an integrated theory of public education of potential value in a disaster management context is to bring together fragments of research findings that exist. While integrating all research relevant to public education in a disaster context is beyond the scope of this paper, several major issues that a theory of public education will need to accommodate have been selected and addressed. These are:

- interpretations of hazards and disasters
- a shift in focus from formal education to individual learning
- a trend towards lifelong learning
- theoretical understanding of how public education works
- world views and educational preference
- education in, about and for disasters.

## Interpretations of hazards and disasters
Until relatively recently, the view that hazards and disasters were solely physical phenomena was dominant (Hewitt, 1983; Cutter, 1993). Disasters were seen purely as isolated, random, physical events that emerged independent of humanity. As such they could be interpreted scientifically then presented to the public via 'education' as phenomena that could be understood in relatively absolute terms. In short, we understood the physical phenomena and could pass on this knowledge in a simplified form to lay people with confidence that, armed with appropriate knowledge, they would act in their own best interest and that of society as a whole. Objective understandings of hazardous events and of the educational process were in accord.

More recently, hazards and disasters have been increasingly recognised as not just external events interfering with humanity but as outcomes emerging from interactions between people and their environment (Hewitt, 1983; Susman, O'Keefe & Wisner, 1983; Kreps, 1984; Mitchell, Devine and Jagger, 1989; Cutter, 1993; Varley, 1994; Quarantelli, forthcoming). The constructivist world view inherent in this statement acknowledges that both people and environments are almost infinitely variable and both are open to a range of interpretations of their actions and interactions. Suddenly we are faced with a situation where 'scientific' or perhaps more accurately, 'mathematised' knowledge about hazardous events has increased, while our faith in absolute knowledge about both disasters and education has been destroyed. While currently at least the rhetoric lies with a view of disaster as a socially interactive phenomenon, linked with a view that social change, via such means as public education can interact with and shape disaster, we are faced with dissensus between studies of hazardous phenomena and theories underlying our understanding of both disasters and education.

## A shift in focus from formal education to individual learning
Throughout much of the twentieth century, education has conservatively focused on learning within a formal educational setting under the guidance of an external agent (Brookfield, 1983; Stock, 1996). In the 1960s and 1970s, adult education was typically interpreted as being organised post-compulsory education (Clover, 1996). It was often argued that a formal educational setting with an external instructor was still necessary for individuals to accomplish learning (e.g. Verner, 1964; Lawson, 1979; Little, 1979). Dickinson (1979) went further, arguing that learning in a natural societal setting without guidance was ineffective and possibly harmful! Brookfield (1983, p.13) suggested that during this time there was often an underlying assumption that adult learners did not possess adequate skills or judgement to learn effectively and had to 'consult those designated as 'professional' in the sphere' (p.13).

The domination of the traditional view of education as a formal and structured process was linked to an axiom of the era - that knowledge is objective and best acquired through learning from an expert (Stock, 1996). Further, at the time, the effectiveness of informal adult learning and any possible resource requirements were

not known. Adult learning in the community did not lend itself readily to investigation via traditional scientific methods and remained 'largely unchartered research waters' (p.6) with a paucity of theoretical frameworks (Brookfield, 1983). There remained a lack of research for more liberal educational types, despite recognition by many that adults continually acquire new skills and knowledge through family, recreation and occupation (Brookfield, 1983; Candy, 1991). In other words, while learning was acknowledged as occurring beyond formal institutions, the rigidity of the dominant scientific view of knowledge hindered research that could have accounted for such learning.

While a conservative view of education dominated previous decades, there were advocates of a more liberal view of education extending beyond institutions. For example, as long ago as 1976, Rogers and Groomsbridge (p.58) noted that:

> '… it is easy to overlook how deliberately and constantly many millions of adults are seeking to learn something new'

while Penfield (1975) argued that most adult education is undertaken informally. During the 1980s, the level of support for broader notions of education, beyond formal institutions, grew. Brookfield (1983) considered learning in the community in its own right, as a purposeful pursuit of knowledge and skills, occurring beyond a classroom, without a strict timetable, without institutional validity or accreditation, and as voluntary, self-motivated and self-generating. While such a view had gained legitimacy, Brookfield (1983, p.3) lamented the failure of support to translate into practical research:

> 'Despite recognising that most adult learning takes place outside educational institutions, most adult education researchers choose to concentrate their attention and research energies on the minority of adults who actually participate in formal classes.'

Raggatt, Edwards and Small (1996, p.1) suggest that emphasis has now shifted away from the notion of formal education to a new focus where:

> 'The centrepoint of discussion is learning and there is a general and widespread recognition and acceptance that it takes place in many different settings—in the workplace, the home, in groups or alone—and not only, or primarily, in formal education settings.'

Faced with an increased responsibility expected of the state to mitigate disasters, frequently through public education measures, we are also faced with a focus upon 'learning' rather than 'education' which shifts responsibility for education away from the state towards the individual. Even more paradoxically, this appears to be happening at a time when there is increasing recognition of the value of lifelong learning to allow individuals flexibility to adapt within a changing world (Raggatt, Edwards and Small, 1996).

For public education, the recent shift in emphasis from education to learning increases the importance of informal and incidental learning relative to formal education. Formal education would remain valuable as a systematic and structured learning that progresses through a hierarchy over time and is guided by an instructor (Brookfield, 1983; Newman, 1995). At the same time, the important role of informal education would gain in recognition. Informal education is organised education outside of formal institutions (Brookfield, 1983), occurring when an individual gains awareness of an opportunity to learn and deliberately uses it (Newman, 1995). It is often one-off, sporadic or participant directed (Foley, 1993) and associated with first-hand experience, real life context, deductive learning, reflective learning, incidental learning and situated-learning (Evans, 1993). Similar to informal learning, the role of incidental learning would become more prominent. Incidental learning is individual, unstructured, day-to-day learning, though not necessarily articulated as such, for example reading about hazard preparation in a newspaper or in an information pamphlet (Brookfield, 1983; Foley, 1993; Newman, 1995). An emphasis on learning rather than education prioritises learning by individuals in the community, and perhaps means that a theory of public education would be more effective when considered more broadly as public learning.

It must be admitted that the majority of adult education occurs through group, public or mass methods of education or adult safety courses. The literature on this type of disaster education seems to be pathetically sparse. While educational theory has shifted from a focus on education to learning, it is possible that in practice, including in disaster management, interpretations of effective education practice remain narrow. There is little evidence that much has changed—other than rhetoric. Certainly Clover (1996) still believes adult education, at a practical level, is being viewed in the traditional post-compulsory and formal way.

Given recent shifts in educational priorities, it seems that choice of educational practice is highly subjective, with every likelihood that priorities will continue changing. This may mean that a successful public education theory may need to address subjective interpretations of public education as they will ultimately determine the nature of implemented practice.

## Towards lifelong learning

Finding efficient ways to educate the public in relation to hazards and disasters in a world of discontinuous and often rapid lifestyle change and technological progression poses a considerable problem for disaster managers. Human progress may create new technological hazards but also potentially alters the range, frequency and severity of natural disasters by altering the physical environment. Given specific skills and knowledge can outdate, learning across the lifetime becomes essential to the functioning of individuals (Candy, 1991). For individuals to meet challenges across their lifetimes, there is a need for updating and adaptation of specific skills and for general skills allowing adaptability. Traditionally, education focused on passing on existing knowledge, skills and values, whereas education is increasingly focused towards preparing people for life, work security, rapid societal and technological changes, and pursuit of happiness, wellbeing and quality of life. Lifelong learning for the individual, and for society as a whole, offers one means to increase public preparedness for the demands of a changeable and uncertain world (Candy, 1991).

Over the last several decades, lifelong education has had a potentially important role to play in adult safety. Lacking has been an integrated approach to individual safety across the lifespan. Yet again, there seems to be little guidance available on the form that this lifelong learning should take in the context of hazards. Despite the theoretical importance of lifelong education in hazard management, Strasser, Aaron and Bohn's (1981, p.427) comment that 'the task of providing education for safe living is too often considered to be a matter of elementary and secondary school programs' still often appears current.

In accepting that learning occurs across a lifetime, the effectiveness of links between schooling and adult public education for hazards preparedness also needs to be clarified. The value of disaster education in educational institutions including schools has frequently been asserted to be potentially high (United Nations Disaster Research Organisation, 1987; Lidstone, 1992; FEMA, 1996). However, many aspects of education about hazards are not suited to children, although educators have alleged,

with little evidence, that children will influence their parents' behaviour in the context of preparing for disaster.

## Towards a theoretical understanding of how public education works

The three separate processes of awareness raising, learning through experience and attitude change have most typically been proposed as possible links between education and subsequent public behaviour in regard to hazards and disasters. While research related to all three processes has been less than fruitful, there is merit in a brief consideration of each.

Firstly, attempts have been made to link public education with awareness raising. Back in 1954, Hyman and Sheatsley studied why information campaigns fail and concluded that increasing the amount of available information did not lead to an increase in public knowledge. Since this time, evidence has not been produced to counter this conclusion. While Sims and Baumann (1983), summarising a number of relevant disaster studies, identified several studies finding a relationship between amount of information and level of knowledge, they also found many studies that did not. They concluded that a causal link between provision of information, awareness and behaviour, though appealing, was not supported on either rational or empirical grounds. They also concluded that many falsely assume that when it comes to public education for disaster 'if the public but knows the facts it will act wisely' (p.167). Similarly, Handmer (1990) argued that there is no evidence that attitudes or behaviour associated with risk have ever changed as a direct result of being provided with information. Given research has produced mixed results, it would appear that the relationship between education, awareness and behaviour is, at least, either complex or indirect.

Secondly, some researchers have attempted to explain public preparedness in terms of practical experience. Sims and Baumann (1983) reported only sporadic and often strongly conditional support for the thesis that beneficial learning can come from experience of a disaster. A major limitation to experiential learning is that the infrequency of individual experience of disasters and hazards can mean that hazard experience is typically limited or biased, not providing a sufficient basis for learning (Morren, 1983). As such, the value of experiential learning may be limited to phenomena where simulations are cost-effective and realistic or to frequent and predictable phenomena, such as technological hazards. There is also anecdotal

evidence that experience is no guarantee that learning will take place to an extent that future behaviour will be modified.

Thirdly, some researchers have attempted to explain public education in terms of attitudes. An attitude is most often considered to be affect for or against an object, predisposing an individual to react positively or negatively (Osgood, Suci and Tannenbaum, 1957; Fishbein & Ajzen, 1975; Burns, 1990; Olson and Zanna, 1993). Links between attitudes and behaviour are not always easily made, though behaviour is typically considered a consequence of attitudes (Burns, 1990). For example, failure to respond to a disaster warning could be considered a behavioural outcome of negative attitudes to the message. Again, research findings have failed to support the claim that attitude change is brought about by public education in turn changing behaviour. Fishbein and Ajzen's (1975) theory of reasoned action remains the dominant theoretical framework in the attitude-behaviour literature (Olson and Zanna, 1993). It holds that attitudes and subjective norms about actions combine to influence intentions, which then determine behaviours. Over time, increasingly complex models of behaviour have been produced in attempts to explain behaviour. Hines, Hungerford and Tomera (1987, in a meta-analysis of 128 environmental studies, reported that responsible environmental behaviour was determined by situational factors and intention to act, the latter determined by action skills, knowledge of action strategies, knowledge of issues and personality factors. The inclusion of situational factors and the increasing complexity of models over time reflects increasing recognition that attitudes alone have failed to serve as a sufficient link between education and subsequent desired change in behaviour.

Individually, awareness raising, experience and attitude change have not been shown to increase public preparedness or knowledge. A holistic focus upon worldviews—ways of viewing the world based on individuals' systems of belief—may be more fruitful in accounting for the relationship of education with the publics' disaster preparedness. Certainly Dake (1991) believes that individual interpretation of risk is associated with world views, shaped by political, social and cultural context. Unfortunately, at this stage, there is a lack of relevant research. While an understanding of worldviews as an explanation of public behaviour is lacking, more progress has been made in regard to how worldviews may influence preference for educational forms amongst disaster managers.

## Worldviews and educational preference

Worldviews, as studied through paradigms and ideologies, offer a framework for exploring why disaster educators and managers might hold different preferences for public education. A paradigm 'is a world view, a general perspective, a way of breaking down the complexity of the real world' (Patton, 1990, p.37). Similar to a paradigm, an ideology is a complete system of beliefs and concepts held by an individual or group of individuals. According to Fien (1993), such a system provides a personal orientation that is available to guide the individual in educational decision-making and explaining educational consequences. To Buss, Craik and Dake (1985), the significance of such systems is that they reflect individual preference for decisions about managing hazards.

While many classification schemes related to worldviews exist (e.g. O'Riordan, 1981; Skilbeck, 1982; Kemmis, Cole & Suggett, 1983; Ennis & Hooper, 1988), the term 'dominant social paradigm' is used by Fien (1993, p.4) amongst others to refer to the view he believes to be entrenched in society by the dominant powers, argued to be of 'nature as subservient to human needs and economic growth' (p.4). Cotgrove (1981) emphasised that education based on views aligned with the dominant paradigm does not necessarily lead to public good, whereas unorthodox methods of education may. Gough (1997) argues that the dominant rationality leads to knowledge being transmitted as 'subjective, value free, and separate from personal, political and social values'. According to Robottom, (1991) educators are likely to teach preexisting knowledge when they value rationality, science and managerial mastery and view nature as a resource for society's benefit, and nature and society as independent.

Environmental educators increasingly agree that education should foster the valuing of people and nature as interdependent instead of valuing nature as subservient to humans and economics (Fien, 1993). For disaster and hazard public education, this would mean a fostering of the view that hazards and disasters are interdependent with human action.

It remains uncertain as to the extent that disaster and hazard management practice matches rhetoric of hazards and disasters as subjective and disasters and society as interdependent. By one interpretation of curriculum, emergence of a non-dominant view is a difficult task because education moulds students' values to reflect and perpetuate dominant values. Further, Robottom, (1991) argued that educators'

beliefs are shaped by their experiences, and as such are constrained by conservative concepts and support dominant views of knowledge, educational objectives, teaching strategies and assessment. This view of education posits that the dominant social paradigm can repress alternate viewpoints and would mean hazard and disaster problems are considered solvable by using knowledge and expertise, an echo of Habermas's (1972) argument that there is a scientisation of politics, in which values and interests are depoliticised and considered as technical problems. On the other hand, according to Gough (1997), views of curriculum have increasingly included awareness of the 'socially constructed nature of knowledge' (p.97), leading to increased involvement of students in problem and situation based education. Regardless of whether a new paradigm is gaining support, the implications of this approach for understanding public education in a disaster context are clear: education practice is likely to be influenced by whether disaster management views hazards and society as interdependent or independent, and knowledge as subjective or objective.

## Education in, about and for disasters

One classification scheme of environmental education orientations distinguishes education *about* the environment, education *in* the environment and education *for* the environment (cf. Fien, 1993).

Education *about* the environment emphasises that the environment is the subject of education, aims to create understanding of issues and thus contribute to management, and values objectivity, science and humanity's ability to control the environment.

Education *in* the environment is learner-centred and based on practical experience, views the environment as a medium for education, and immerses students in the environment to increase awareness.

Education *for* the environment emphasises sustainable living, responsibility, political action, and the developing of knowledge and skills that can empower and allow responsible decision-making.

Given the natural environmental origins of many hazardous agents, there may be some logic in replacing the word 'environment' in the account above with the word 'hazards'. Thus we might attempt to educate the public *about* hazardous agents, with*in* the context of hazardous situations and *for* hazard reduction. However, given the political nature of much environmental education and the fact that most public education for hazard reduction is funded

by the government of the day, perhaps the analogy is less than successful. Furthermore, it must be admitted that while the theoretical statements of environmental education may be persuasive, the evidence to support their efficacy in changing behaviour is less so.

## Conclusion

Though at one level, public education is a well documented field, there is a need for an integrated theory of public education of practical value in a disaster management context. There has been a lack of research investigating hazard and disaster managers' interpretations of public education as a management strategy and a lack of sound underlying educational theory.

Hopefully, this article has highlighted that a number of recent changes in understanding of education and disaster are very significant for any future developments in public education theory. Of course, additional issues not discussed here also exist and would need to be addressed. It appears any theory of public education for disaster management must address multiple priorities and be both flexible and practical—a difficult but certainly obtainable goal.

Perhaps the most significant insight afforded by this article is that any theory must account for a diversity of interpretations of public education by disaster managers. While public education has been identified as a discrete area within adult education, its meaning in the context of the disaster management process is fraught with uncertainty. Interpretations of public education are likely to influence decision-making by disaster management during preparation and response stages of disaster management. Likewise, interpretations of personal responsibility are likely to influence public response to any public education attempts and disaster warnings.

Work currently underway by the present writers endeavours to understand the qualitatively different conceptions of public education held by disaster managers will, we trust, permit some insight into the nature of public education in this area and offer some guidance not only into why educational interventions may succeed or fail, but why so much of the previous research in the area is so contradictory.

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# Initiatives for emergency services organisations: a national perspective

by Roger Jones, Director,
TEM Consultants, Mount Macedon, Victoria

This is a revised version of an address given to
InFIRE, a conference, of the International
network for Fire Information and Reference
Exchange, Melbourne, 4–8 May 1998

The 1990s have seen significant changes in the environment, or more accurately the multiple environments, in which our emergency service organisations operate, and in the organisations themselves. As always, the future of such changes is uncertain, some are likely to continue into the 21st century, while others may turn out to be ephemera and become just footnotes to history.

Would that we could accurately forecast which is which! But I suggest that many of these changes have been so significant that their effects will linger on, whether the influences, which appear to drive them today, remain or not.

So I would like to offer an examination, from a largely national perspective, of some of what I believe to be the more important of those changes. Out of this I would hope to invite your consideration of the impact of such changes on current organisational developments in the field of emergency management, and what these impacts might mean in the context of the concerns of this conference. Finally, I would like to suggest some opportunities and some challenges for our organisations into the future.

Let me make just one disclaimer, my views will be essentially the product of my own experience in the field of emergency management and of my own understandings. My crystal ball, like yours, reflects that experience and those understandings, and inevitably distorts a picture, which is cloudy enough at the best of times. But nothing venture, nothing gained.

## Our multiple environments

The total environment within which we live and work is itself a compound of many separate elements which interact in complex ways.

We would all, I suggest, recognise that the 'three Ps'—politics, people and the physical world—represent the principal environments that shape the total environment within which all our organisations must work.

## The politics

Taking first the political environment, there can be no question that the most dramatic change in that environment has occurred as a product of the way in which governments, whatever their political orientation, have increasingly chosen to go about their business. Governments today are about 'steering not rowing', more about facilitating the way things are done within their communities than actually doing them. In the process, governments are increasingly divesting themselves of functions, which they no longer see as 'core business' and which they believe the private sector can perform.

There is, of course, often an ideological element in this process and in the apparent belief that, at government level, 'the private sector can do it better', but there is also a reality in the constant demand which governments face to provide more services at ever-increasing cost, while the sources of revenue open to them are finite and often under challenge. 'Doing more with less' becomes a necessity rather than just a hobbyhorse, and yesterday's relative certainties are today's insecurities.

## The people

While they might not always wish it, people are inevitably impacted by changes in the political environment, and those impacts fall both on the people who need our services and on the men and women themselves who provide those services.

The people in the communities we serve, our 'stakeholders' and 'clients', if you wish to refer to them in such 'value-free' terms! — have undoubtedly suffered from many of the recent changes in our political environment: statistics on wealth disparities, figures on homelessness, apparently insoluble health problems in parts of those communities are just some of the indicators of adverse political impacts. Dealing on a day-to-day basis with the members of our communities, as most of members of the emergency services must, you would be only too aware of the 'down-side' effects of many of these impacts.

Our own services have, of course, had to cope directly with both the products of community change and the imperatives of political direction. Public demands for better and faster services don't sit well with the outcomes of 'down-sizing' and resource limitations, and the resultant anxieties and strains that such conflicting pressures often place on both the service-deliverer at the 'sharp end' and the service-manager in his too-often-insecure office are too frequently evident. As a positive offset to such problems, and sometimes even in spite of them, it is heartening to recognise the continuing dedication and increasing professionalism shown at all levels of our services.

## The physical world

Even the physical and human environment in which we operate has produced some uncertainties in place of the relatively fixed order of things, which we accepted in the confident 1960s and 1970s.

In those days, for example, the *El niño* (Southern Oscillation) phenomenon was unknown. However, while today we know that in this country we have just experienced one of the worst summers in our recent experience by courtesy of an *El niño* event, with its severe drought and bushfire impacts, we don't yet know whether that event falls within the expected range of climate *variability* or whether it is a portent of more threatening climate *change*. 'Global warming' might conceivably be a product of that change, or might indeed be driving it—we don't yet know whether it is even a reality!

As another example, our confidence that we were well on the way to eradicating many of the world's communicable diseases, as we had done with smallpox, has taken a battering with a resurgence of many of such diseases and their appearance in new forms. Childhood diseases, which in our community we had thought to be things of the past, such as measles and pertussis, are claiming new headlines; worldwide, diseases like tuberculosis and cholera appear to be rampant.

In a related field, some of the barriers we had confidently assumed were in place to prevent the transfer of animal diseases to humans seem to have been breached, as the link between BSE in cattle and CJD in humans overseas and our own recent experience with equine morbillivirus and bat lyssavirus appear to demonstrate. At least some of this is being attributed to an expanding world population coming into increasing contact with physical environments in which new threats have been hidden or lain dormant until people have, by choice or lack of it, moved into contact with such environments. Our world itself seems suddenly to have become more threatening.

## The information–communication revolution as part of our environment

No review of our changing environment and the impact it is having on emergency service organisations and their methods of operation would be complete without some reference to the information–communication revolution. I believe you don't have to be a Luddite to agree that:

> 'The existence of better communication facilities does not necessarily lead in itself to a better exchange of knowledge and intelligence or a greater understanding of what is occurring' (Quarantelli, 1997).

Quarantelli's recent article, from which this quotation is taken, should be required reading for emergency service organisation managers. It suggests ten problems for disaster planning, management and research ranging from the new kind of disaster that can result from computer-related system failures through the difficulties which new technologies pose for intra- and inter-organisational communication and coordination to those resulting from information overload and the rapid diffusion of incomplete or potentially-inaccurate information.

## The consequences of environmental change

I have touched on just some of the significant changes which have impacted on the environment in which emergency service organisations have had to operate in the 1990s, and we cannot yet measure the full effects of those impacts—imponderables and uncertainties abound. From a national viewpoint, however, we can already discern the direction in which those impacts are moving our organisations, many and varied though those organisations may be.

Indeed, the very diversity of the organisations which identify themselves with fire and emergency service roles is itself worthy of note, and adds its own complexities to

those brought about in a changing environment. Consider:

- some are statutory authorities deriving their roles and organisation from government legislation, while others represent private sector interests
- some have emergency response as their primary role, whether that response is to single incidents or larger-scale emergencies and disasters, while others have such a role as secondary to their principal functions and responsibilities or simply provide support to other agencies in their emergency response role
- some have a responsibility in only one area of the management of emergencies within the community, be it prevention-mitigation, preparedness and response, or recovery, while others have responsibilities in more than one, while
- some are staffed principally by full-time officers, others primarily by volunteers.

And so the list of differences goes on. The diversity of organisational functions and interests is well represented in any conference of emergency services organisations, which generally seek to offer something for all while recognising how difficult it is to find unifying themes—and thus failing to satisfy any.

In one sense, of course, it is a healthy diversity—it allows for differing view points, encourages a sharing of experience and promotes valuable inter-organisational networks. But in an environment which demands that each organisation focus on its own 'core business', espouses principles such as productivity savings and 'user pays', and enforces budget stringency and rationalisation of services, our organisations can tend to become inward-looking, constantly subject to both internal and external review, locked into a continuing process of 'down-sizing' or 'right-sizing', and inordinately anxious about the future.

Where resources are scarce or tightly rationed, the competition for such resources can become fierce and normally healthy and basically friendly interagency rivalries can turn bitter. Jurisdictional conflict can be promoted even at operational levels, feeding on 'the state and agency rivalries that exist in any attempt at systematic co-ordination and planning (in disaster management in Australia)' (Kouzmin et al, 1995).

There is, however, a potentially unifying theme that would provide a basis for promoting effective coordination while retaining the healthy aspects of diversity —the recognition that all our organisations are in fact working towards the same end, that of *the promotion and preservation of public safety.*

I would like to define public safety in the broadest possible terms, as a function which seeks to ensure that all citizens in our communities can live, work and pursue their particular interests and needs in a safe physical and social environment.

In working together towards such a goal, we will increasingly find ourselves identifying the 'core business' of our fire and emergency services as the *effective management of community risk.* A recognised common goal in public safety and a shared methodology in risk management offer both the opportunity for the development of a more cohesive and integrated approach to emergency and disaster management, and some degree of organisational protection from 'divide and conquer' policies.

## The theme of 'public safety'

> 'The public deserves a truly seamless service when it needs the assistance of public services.' (Doyle, 1996)

John Doyle was commenting on the recent experiences of the fire services in the UK when he wrote these words, and as an aside it is interesting to note that while there are many organisational differences between the UK and Australian fire services he identified many of the same environmental changes and pressures at work there as we can recognise in our own experience. His article discusses the benefits of active policies of 'benchmarking' and 'teaming' in coping with these changes and pressures.

However, a 'truly seamless service' can only be offered when all emergency service organisations recognise that their common goal of the promotion and preservation of public safety can only be reached by integrated and co-operative effort.

## Progress in the area of training

In at least one small way, this has already come to be recognised in the area of training. In July last year, the Australian National Training Authority (ANTA) sponsored the formation of the new Public Safety Industry Training Accreditation Board (PSITAB), with representation from a number of emergency service organisations including the Department of Defence. The creation of this new national body is recognition both of the existence of a national 'public safety industry' and of the need to rationalise much of the training that has formerly been planned and conducted on an agency-by-agency basis, with a good deal of overlap and duplication.

The PSITAB's first task has been to identify a range of common training requirements, which can be addressed more effectively through the development of competency-based 'training packages'. The

immediate benefits can be better training, more consistent training, increased employment flexibility and significant savings in overall 'training dollars', all in the interests of an improved level of public safety for the people of Australia.

Already, the PSITAB has identified a broad range of common and required competencies ranging from operative to management levels within the Australian Qualifications Framework. This has resulted in the development of a 'training package' of which the key elements, consisting of new public safety competency standards, assessment guidelines and relationships within the Australian Qualifications Framework have been endorsed by the National Training Framework Committee, and by March 1999 it is expected that the remaining elements of the 'package', the necessary learning, assessment and professional development materials, will also have been developed.

Yet even this initiative shows that we are a long way from acknowledging the full range of services and activities which need to be involved in order to achieve our goal of a 'truly seamless service' in furtherance of public safety. The membership of the PSITAB is heavily response-oriented; prevention–mitigation and recovery agencies have not been directly represented to date. Agencies performing functions critical to public safety in its broadest sense, such as those in human health, occupational and industrial health and safety, animal health and environmental protection areas, have been similarly unrepresented.

There can be no question that these and other agencies make a positive contribution to public safety. The threatening changes in our physical and human environment suggested earlier make it clear that their work needs to be more effectively integrated with the work of the more traditional emergency services.

While it might be claimed that the interests of these agencies are safeguarded through other industry training accreditation boards and there appear to be moves to admit some of them as 'corresponding' members of the national PSITAB (a model adopted in some of the equivalent State bodies), it is difficult to avoid the conclusion that we have not been very imaginative in our approach to public safety, even in an area as limited as training.

### 'Adding value' to single-service efforts in public safety
We should be thinking beyond such developments, in terms of 'adding value' to our present agency-by-agency efforts through

the evolution of national, State and Territory public safety policies and practices.

Formulated and publicised public safety policies can provide an envelope within which all our activities, whether directed towards prevention and mitigation, preparedness and response, or recovery, can be seen as working coherently towards the same goal, and should clearly be recognised by both governments and the public as a proper 'community service obligation' —and indeed as a significant part of the 'core business' of government itself. Integrated public safety practices will allow the fire and emergency service organisations, to demonstrate that for our part we will provide appropriate, effective, efficient, and cost-benefit-related services in pursuit of public safety policy goals.

All States and Territories in Australia now have an emergency management 'peak body' to ensure effective integration of emergency management activities (an inter-departmental emergency management committee or its equivalent). At the national level, their equivalent 'peak body' is the National Emergency Management Committee.

While they have gone a long way towards ensuring more effective agency coordination, particularly in preparedness, response and early recovery activities, they have not yet achieved any sort of 'truly seamless public safety service' to deal comprehensively and in an integrated fashion with risk in our community.

### A 'public safety charter'?
The first step in developing such a service would be the establishment of a 'public safety charter', with the respective levels of government and the emergency services themselves making a commitment to the provision of a range of integrated services to ensure the maintenance of the level of public safety, which our community has a right to expect.

Such a 'charter' would, as a minimum:
- declare public safety to be a human right and a 'community service obligation' on the part of governments at all levels (and as a recognised responsibility of local government in particular)
- specify public and private sector and citizen roles and responsibilities in public safety
- define public safety goals
- identify public safety agencies and require them to address public safety goals within their corporate plans.

### Risk management as our core business
If the theme of public safety and a 'public safety charter' can provide a much-needed

force for integration of the efforts of our emergency service organisations and promotion of their community service role, a recent joint Australian–New Zealand initiative offers an ideal vehicle for establishing a common focus for those efforts.

### The Australia/New Zealand Risk Management Standard
In November 1995, the Councils of Standards Australia and Standards New Zealand approved a new joint standard on risk management. Many would already be acquainted with this standard, but I want to suggest why the principles underlying the new standard and processes derived from them should become core business for all involved in public safety.

Engineers have long been accustomed professionally to dealing with the subject of risk in structures and manufacturing processes, and risk management is increasingly recognised as an integral part of good management practice generally. The new standard, however, extends earlier understandings of risk by placing it clearly in a *social* context, by recognising that all human activity occurs in a risk environment and that risk management processes need to be 'applied in any situation where an undesired or unexpected outcome' (AS/NZS 4360, p. 2) in such activity could be significant.

In one sense, the risk management process described in AS/NZS 4360 is hardly revolutionary, but it is this understanding of the social context of risk, the recognition that all forms of risk require the systematic application of policies, procedures and practices to eliminate, reduce and manage that risk, that makes the standard central to our activities in the public safety arena.

### The social context of risks to 'public safety'
This is best demonstrated by referring to just one 'step' in the standard's risk management process—described as 'analyse risks'. Any engineer would be quite happy with the major activities involved in this 'step'—*'determine likelihood'* and *'determine consequence'*. Combining these activities will lead to the establishment of a level of significance for the particular risk under consideration. However, let's look more closely at what is actually involved in those activities, in a public safety context.

Traditionally, these activities involved detailed examination of the sources of risk, the *hazards*. In the social context of risk, however, the elements at risk, the *vulnerabilities* of the community and of the particular individuals and social groups of which that community is composed, are at least co-equal with the *hazards* in any

analysis of the likelihood and consequence of risk. As we all know, it is not simply the piece of machinery, the industrial process, the earthquake or the flood—the *hazard* itself—which describes the risk involved, but the likelihood that the hazard will impact on people or communities and the consequences of that impact.

And clearly, planning to deal with risk in its social context needs to recognise that there are a number of options which must be pursued, including eliminating or modifying the hazard and its impact and reducing the vulnerability of people and communities.

It is this characteristic of the new risk management standard which I believe makes that standard so relevant to our joint activities in the public safety arena, and offers it as an appropriate vehicle for developing a common organisational focus. There is, of course, a rather practical and pressing reason why we should all give the standard our closest attention—as a national standard, it is a 'best practice' formulation which can increasingly be expected to be referred to in any examination or inquiry into how we have planned and operated in our organisational responsibilities for the management of risk.

## Applying the standard to public safety operations

While the standard itself is 'generic and independent of any specific industry or economic sector', it would be incumbent on any organisation, and in particular any organisation with responsibilities in public safety, to develop and implement guidelines for the application of that standard to its operations. I am pleased to note that a set of general guidelines for the application of the principles and processes of the standard within 'national emergency management industry' is currently being drafted under the sponsorship of Emergency Management Australia.

However, there is a need for some degree of urgency in completing the new guidelines and in effectively promulgating the new guidelines within the broader public safety 'industry'.

There is at present an observable tendency, perhaps more evident among those emergency management practitioners who have seen the adoption of the standard as an opportunity for the creation of a 'niche market', to attempt to apply the risk management standard's process without due recognition of the need to relate that process to the particular requirements of the community risk management context.

The first step in the standard's process, detailed in section 4.1 of the published

standard, is that of 'establishing the context' in which the rest of the risk management process will take place. There are two elements in this step that need careful interpretation if the standard is to be appropriately applied in the public safety sector—establishing the 'strategic' and 'organisational' contexts.

The standard prescribes that establishing the 'strategic' context should focus on the 'environment in which the organisation operates'. As already discussed, the public safety environment has a social context and focuses on community issues. Thus, while the standard, given its strong industrial and commercial orientation and its inevitable linkages with an engineering approach to risk management, tends to regard treatment of risk as primarily a matter of reducing, transferring or avoiding the likelihood or consequence of *hazard*, it is silent on the issue of *vulnerability*, which as I suggested earlier is critical in the community risk management context.

### 'We face a wide range of opportunities and challenges – opportunities for better service to our clients, and challenges to demonstrate the effectiveness of that service to our stakeholders.'

The 'organisational' context of public safety risk management also differs from that in which many other users of the risk management standard are likely to find themselves. The standard is clearly designed for single organisations working in an environment in which hazards are basically industry-specific. In the public safety context, multiple organisations must operate co-operatively in a community-oriented multiple-hazard environment. Each public safety organisation thus has to deal with two sets of risk management responsibilities—managing risk in the performance of its own organisational functions and tasks, and contributing to the management of risk within the community that it serves.

The two sets are not necessarily congruent, and priority given to one area may impact adversely on ability to discharge the organisation's risk management responsibilities effectively in the other. Clearly, public safety organisations need to distinguish between their single-organisation risk management requirements and their broader community risk management responsibilities. They need, therefore to provide appropriate guidelines not only for each area of responsibility but also for the resolution at both operational and management levels of conflict where this could

potentially occur in the attempt to satisfy both needs. There are some implications here for in-service organisational education and training that will need to be addressed by each organisation.

These cautionary notes aside, the new standard offers our organisations an opportunity to find common ground in our approach to the pro-active management of both organisational and community risk, and give less emphasis to what is often seen by others as an over-riding concern with reactive management to particular hazard events.

## Conclusion
At this stage in the development of fire and emergency service organisations in Australia, we face a wide range of opportunities and challenges—opportunities for better service to our clients, and challenges to demonstrate the effectiveness of that service to our stakeholders.

We can best meet both through a joint commitment to the theme of public safety and through the adoption of community risk management as our core business. We urgently need a common focus for our many and varied activities, as there is no reason to suppose that the rate of change in the environment in which we operate will slow, or that pressures for us to 'do more with less' will slacken. We therefore need to recognise, promote and build upon our joint contribution to the safety of Australians everywhere.

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# IUGG99 XXII General Assembly Inter-Association Symposium on Geophysical Hazards, Risk Assessment, Mitigation and Warning Systems

## Birmingham, United Kingdom, 22–27 July, 1999

Geophysical hazards, such as earthquakes, volcanic eruptions, landslides, floods, droughts, tsunamis, storm surges, wildfire, tropical cyclones and extreme weather events constitute major problems in many developing and developed countries.

With the growth in world population, the increasing pressure on natural resources in newly developing areas, and the increasing cost and sophistication of engineering structures and technical installations, there is an urgent need to seek to understand the potential threats posed by natural hazards and to ascertain increasing preparedness and appropriate ways of mitigating the damaging effects.

Much has been accomplished since the onset of the UN International Decade for Natural Disaster Reduction(IDNDR), which challenged all members of the International community to take a proactive stance to reduce threats before disasters strike.

In parallel with these developments, the international scientific community has been engaged in global risk management through the Inter-governmental Panel on Climate Change (IPCC). The possible hazards associated with climate change have been examined, their impacts assessed, and options for mitigation and adaptation have been considered.

The aim of this Inter-Association Symposium is to stimulate synergistic interactions between all geophysicists on common interests in the field of natural hazards, especially across disciplinary boundries. The scope seeks through contributed presentations to recognise the technical and scientific progress made during the last ten years in research related to any aspects of geophysical hazards to accomplishing the goals set forth for the Decade, including risk assessment, the application of known preparedness and mitigation approaches, and the development and use of scientific and engineering knowledge to improve warning systems, the disaster preparedness and mitigation in practise. In order to set the stage for this symposium, a series of invited keynote lectures will be presented on July 22 to evaluate the state-of-the-science in geophysical hazards and risks.

### Abstract submission

The deadline for submission of abstracts (English or French) is 15 January, 1999.

Instructions for abstract submission and format can be found at the IUCiG website: http://www.bham.ac.uk/IUGG99/ or by writing to any of the co-convenors listed below. Please specify the symposium code as 'JSP23' and the symposium title as shown above.

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# Tropical cyclone awareness and education issues for far north Queensland school students

## Storm Watchers – a cyclone awareness education package for upper primary school children

by Linda Berry and David King (Director), James Cook University Centre for Disaster Studies, Cairns

Cairns is a rapidly growing far north Queensland coastal city of about 120,000 with a booming tourist industry. Community and Tourism infrastructure are concentrated on a low, narrow and relatively flat coastal plain that is skirted by tropical rainforest covered mountains and the Great Barrier Reef. Annually, between the months of November and April the north Queensland coastal region is likely to be threatened with the impact of tropical cyclones and associated storm surges. In 1996 the resident population of Cairns, specifically the Northern Beaches communities, was surveyed in an attempt to get a clear picture of the community's perception of the cyclone risk and to gain an understanding of the *vulnerability* of this community. Areas where specific action could be undertaken to reduce community vulnerability were to be identified so that the effectiveness of emergency management strategies in the event of cyclones could be enhanced. The residents attitudes towards cyclones, together with their awareness and general knowledge and understanding of the hazard were examined. Household and individual preparedness and likely response to cyclones and storm surges was determined. Additionally the perceived risk associated with this hazard and the previous cyclone experience of individuals and households were evaluated. Also considered were the particular demographic and societal features of these communities. In all, six hundred of the communities households participated in the study, completing lengthy survey questionnaires.

Results were disturbing in that it was clearly demonstrated that the communities household residents have, on the whole, very limited experience of the cyclone hazard and that the individual perception of the risk associated with such an event is often biased and based on false premises. Households are often isolated from the

support of extended families and communities were shown to be mobile and fragmented. Demonstrated household preparedness and stated willingness to appropriately respond to cyclone warnings was shown to be limited and would very likely be inadequate in the event of a severe cyclone impacting on the area. Additionally it was noted that there exists within this population a perception that the surrounding mountains and reef physically protect the area from the destructive forces of cyclones and storm surges. Against this background additional studies were carried out to evaluate the awareness of, and general attitudes towards the cyclone hazard within the school age section of the Cairns community. In October 1996 questionnaire based surveys were administered to a randomly selected group of the area's

Primary school Year 5 students and Secondary school Year 9 students. Knowledge and, more importantly, understanding of cyclones was examined along with where, and from whom, children have acquired their knowledge. An effort was made to determine whether the students have been influenced by biases that exist throughout the adult community. Areas where informed hazard awareness education is lacking were to be identified. It was appreciated that some 10–11 year olds (the Year 5 students) may have difficulty communicating their understanding in writing so this group was given the opportunity to express their awareness with a drawing of a 'cyclone scene'.

Two hundred and seventy-seven Year 5 students participated in the survey, attempting (and in most cases successfully completing) the questionnaires. The majority of these children also produced a drawing of a 'cyclone scene'. Two hundred and thirty-four Year 9 students participated in the survey, attempting (and in most
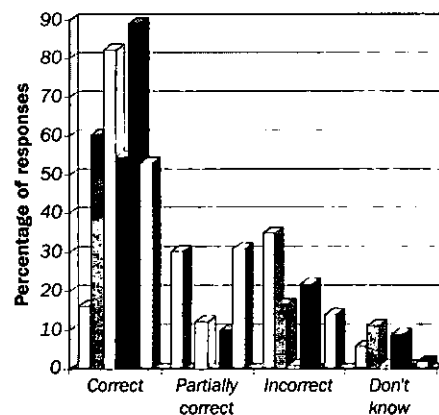


□ What makes a cyclone form over the sea?
▫ Can cyclones form over land?
□ When is the cyclone season?
■ Which way does the wind circulate in an Australian cyclone?
■ Which is more destructive, Cat.1 or Cat.5?
□ Which categories indicate a severe cyclone?

*Figure 1: General knowledge of cyclones – community households*
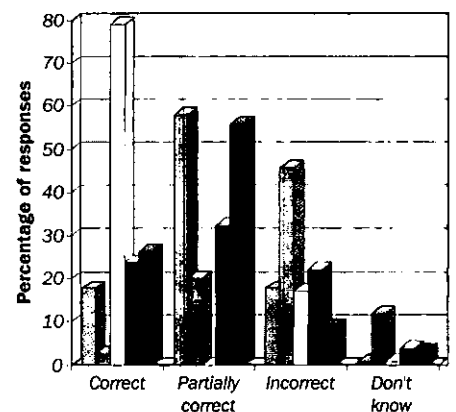


□ What is a cyclone?
▫ What makes a cyclone form over the sea?
□ Which is the more destructive cyclone, Cat. 1 or 5?
■ Which categories indicate a severe cyclone?
■ When is the cyclone season?

*Figure 2: general knowledge of cyclones – Year 9 students*

■ What is a cyclone?

*Figure 3: General knowledge and understanding of cyclones—Year 5 Students.*



■ What is a storm surge?
■ What causes a storm surge?
□ When does storm surge occur?
▫ Any conditions that cause surge to be greater?

*Figure 4: General knowledge of storm surge —community households.*



■ What is a storm surge?
□ What causes a storm surge during a cyclone?

*Figure 5: General knowledge of storm surge —Year 9 students*

cases sensibly completing) the questionnaires.

## Knowledge and understanding of cyclones and storm surge

The majority of students, in both groups were able to correctly or partially correctly answer general knowledge questions and demonstrate at least some awareness, although usually not a good understanding, of cyclone processes Storm surge is universally less well understood. This result is broadly consistent with findings from the 1996 community household study.

Year 5 students were simply asked '*what is a cyclone?*' If they described a storm and a consequence it was considered a good understanding had been demonstrated (e.g. 'a big wind that can blow the roof off'), while a response such as 'lots of wind and rain' demonstrated some awareness.

To demonstrate some awareness of storm surge this younger group of students were required to include flooding with sea water in their response.

All students were asked how much they '*... think they know about cyclones*', where they got their information and how much they had learned at school. Overall responses indicate that students think they know a little, but not much, about cyclones with the majority getting their information primarily from television and their families, having learned little or nothing at school. This is despite the fact that some hazard and cyclone awareness material is included in the curriculum in all the regional schools surveyed!

## Previous cyclone experience

A sound general knowledge and understanding of hazards, in combination with previous personal experience, are the key determinants that contribute to the formation and shaping of an accurate perception of the 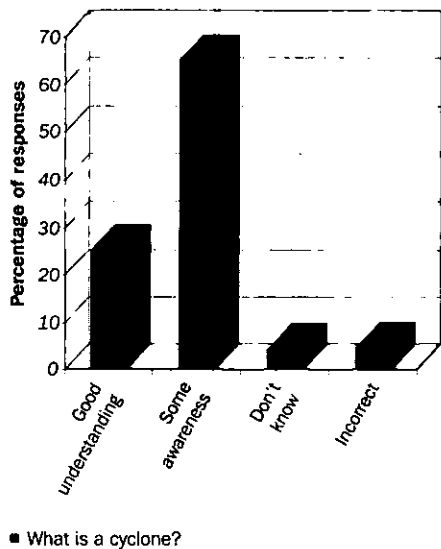risk associated with any hazard event (Miletti & Sorrensen 1987; Smith 1996), However adequate general knowledge does not necessarily translate into a sound *understanding*, which is very much
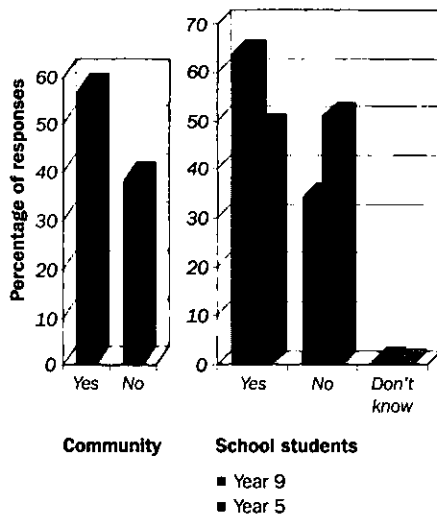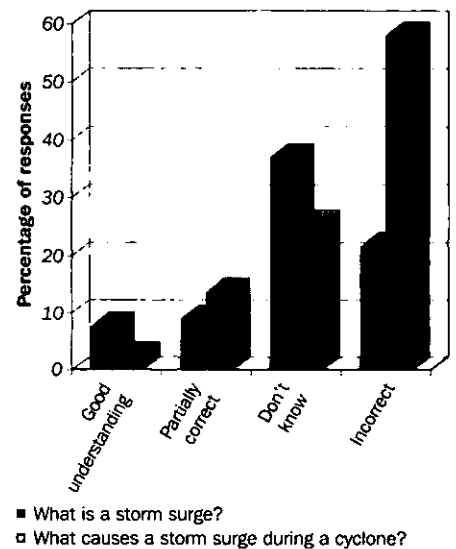
dependent on how this information is *internalised*, that is, how it is accepted and believed by the individual.

Throughout the literature it is generally accepted that cyclone experience profoundly affects the individuals perception of the risk associated with these events. (Miletti & Sorrensen 1987; Smith 1996) Most powerful is direct personal experience, followed closely by the experience of family members and then that of neighbours and close friends. Perceived risk is a powerful decider of what precautionary behaviour individuals will undertake when faced with the threat of cyclone impact and how they will respond to warnings. Community household residents in Cairns Northern Beaches communities and both groups of Cairns school students were asked if they had experienced a cyclone (*'have you ever been in a cyclone?'*) and if so to identify the storm by name or by place and approximate date. In excess of fifty percent of each group reported previous experience. Great care must be taken however when interpreting this result as the *quality* of the experience cannot be assumed. Many households identified cyclone Joy, which did not make landfall in the region and several students identified experiences that they could not possibly have had, for example Cyclone Tracy, Darwin 1975. The meaning of this result is still being investigated, however it appears likely that some children are actually constructing an experience, or a false memory, from what they have internalised from the experiences of those close to them.

Experience of regional cyclones can also be considered in terms of length of residence. The longer a resident has lived in the area the more likely it is that they have been exposed to the threat of regional cyclones. Longer-term residents have also



■ What is a storm surge?

*Figure 6: awareness and understanding of storm surge — Year 5 students.*



**Community    School students**

■ Year 9
■ Year 5

*Figure 7: Previous experience of cyclones.*

had more opportunity to build strong neighbourhood and community networks and have developed friendships with other residents that have had direct personal experience of cyclones impacting the region, this is likely to reduce their vulnerability and enhance their resilience in the event of a cyclone threat. On the other hand however, they have also had longer exposure to local stories and folk tales about regional hazards. In 1996 almost seventy percent of the residents living in the Cairns Northern Beaches communities, thirty five percent of Secondary school students and forty percent of the Primary aged students, had moved to the region since 1991 when Cyclone Joy (the last severe cyclone warning) threatened the area.[1]

## Household isolation

The Community household study demonstrated that the areas Cairns residents were not only relatively inexperienced in relation to the regional cyclone hazard but were further disadvantaged in that a significant proportion are relatively isolated. Sixty two percent of surveyed households have no close relatives living in the Cairns region and sixty one percent have no relatives living in Far North Queensland. These residents are unlikely to enjoy readily available family support that enhances the ability to cope in times of need. Additionally fifty percent of the areas household residents are isolated within their own communities not knowing their neighbours well, if at all.

## Perceived risk

Individuals and communities make decisions on how they will prepare for, and respond to, the threat of hazards based on the level of risk they perceive to be associated with these events (Granger 1993; Mileti & Sorrensen 1987; Smith 1996). Part of this perception is based on the estimated likelihood of the event occurring - and its probable frequency and intensity. An understanding of the hazard together with the level of loss an event is likely to inflict also influence one's risk perception. A decision as to what level of risk is *acceptable* is then made—either consciously or subconsciously. In 1996 Cairns Northern Beaches Community residents revealed a high level of misperception and misunderstanding of the cyclone hazard, the potential secondary risks, and the effect of the surrounding topography (Berry, 1996). Analysis of the schools surveys indicates that many of these common misperceptions are also widely accepted by the younger members of the community. When directly asked whether they were '... *concerned that any dangerous substances or*

*fauna may not be adequately contained in the event of a severe cyclone crossing the coast near Cairns'* more than fifty percent of both the community households and Year 9 students responded in the negative.

The reality of the situation is that if a severe tropical cyclone with an associated storm surge of 2 metres above the high tide level (or 3 metres above AHD)[2] were to impact the Cairns area much of the heavily populated coastal plain would be inundated with sea water to a level above floor height. This would include sixty one percent of accommodation dwellings, eighteen percent of all private dwellings (some 28,041), eighty two percent of businesses and commercial practices, fifty three percent of community facilities, sixty two percent of emergency services buildings, eighty two percent of logistics (bulk gas, fuel, storage and transport), sixty five percent of health services, eighty eight



■ Year 9 students
▫ Community households
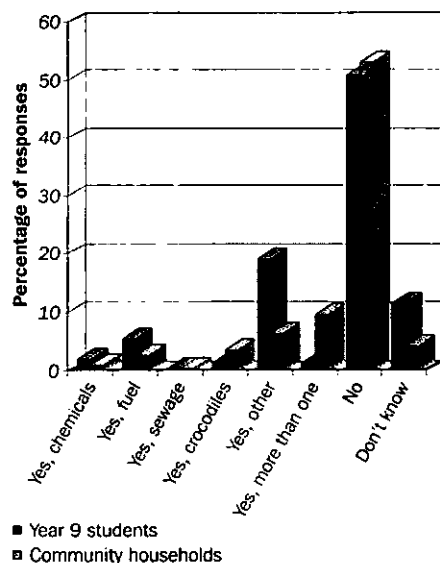
*Figure 8: Other hazards perceived to be associated with cyclones*

percent of power utilities, and forty four percent of telecommunications (Centre for Disaster Studies, 1997). The likelihood of the services that are provided from these facilities being severely or totally disrupted is very high. The potential for contamination of flood waters and the coastal environment with fuel, fertiliser and other chemical pollutants is a very real possibility. Added to these threats is the location of sewage treatment facilities and crocodile farms (with more than 5,000 crocodiles in captivity) in the low lying near-coastal region, both these facilities may release hazardous product into the coastal environment. The community does not generally demonstrate an awareness of the risk of such secondary hazards.

One of the more alarming findings of the Community household study was the confirmation that the perception that the

area is naturally protected from cyclone impact is widespread. Forty percent of respondent household residents stated that they believed the area to be protected, most usually by the surrounding mountains or the Great Barrier Reef. This perception has now been shown to be stronger amongst the regions secondary school students with fifty one percent registering positive responses to the question *'do you think that Cairns is protected to some degree from a direct cyclone hit?'* Many of these students provided detailed explanations as to why they believed this to be the case. It is interesting to note here that in a survey carried out immediately post Cyclone Justin, [currently in an analysis stage] there is an indication that this perception is strengthening over time and that perhaps as much as 60 per cent of the community now believes the area to be protected. This is despite the fact that all residents surveyed



■ Year 9 students
■ Community households
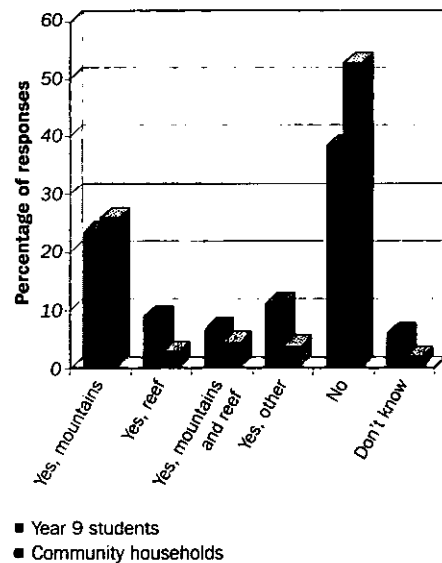
*Figure 9: Perception that the area is protected*

in the post Justin study experienced the landfall of cyclone Justin with the eye passing directly over the study area!

Stories that the area is naturally protected and that a cyclone won't hit Cairns have been part of the local folk lore for some time. These stories are believed more readily by the longer term residents who draw on past examples of 'near misses' to confirm these stories in their own minds.

Notes:
[1] A cyclone *threat* includes the cyclone advice messages and warnings, household and individual preparation, individual and community experience, reaction and response and, if appropriate, recovery.

[2] AHD – Australian Height Datum (Mean sea level at Cairns. This is approximately 1 metre below the highest tide level such that 3 metres above AHD is only 2 metres above the high-tide level. The Highest Astronomical Tide is 1.78 metres above AHD).
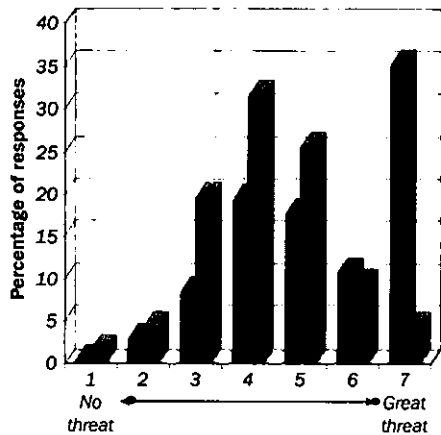
Figure 10: Perceived cyclone threat in community household residents and Year 9 students



Figure 11: Perceived storm surge threat in community household residents and Year 9 students.

In the drawing below the storm is seen to be passing between the house and the tree. Note that the cyclone is named 'Cyclone Tracy'.

Very few of the illustrations included impact to the total environment, that is, human, natural and built.

## Discussion

The students questionnaire responses in combination with the drawings demonstrate generally that they have very limited real understanding of cyclones and the storm surge risk. Most of their information is acquired from the electronic media, film and television, and from families. Direct personal experience is very limited, which is to be expected at this stage, however the families upon whom many depend for information are also relatively inexperienced and, as has been shown, very likely to be biased in their own perceptions of the cyclone risk. Consistency in responses across survey groups has confirmed that

Shorter term residents are generally more likely to be undecided as to whether they will accept local myths or not.

Both the Community Household residents and the Year 9 students were asked to estimate what level of threat they perceived the cyclone hazard posed to them and their communities. The adult community indicated that they generally perceived the threat to be significant while the students tended to 'sit on the fence' with the majority of responses being middle range.

All students were asked how much they *worried* about cyclones and how much they thought that their *parents worried* about cyclones. Responses illustrate that, in both cases the younger students are more concerned than the older students. This result is not unexpected when the number of Year 9 students that believe the area to be protected is taken into consideration. Year 5 students were not directly asked to estimate the level of risk they perceived to be associated with cyclones and storm surges, instead they were invited to draw a 'cyclone scene'. Not all students partici-

pated in this task, however the majority did. Many of the drawings were obviously influenced by the film 'Twister', a Hollywood blockbuster about Tornados that had been only recently released and was receiv-



ing a lot of media attention. Drawings almost universally depicted environmental damage as a result of the storm, approximately half showed damage to the built environment with roof damage and broken windows being the most common destruction. Very few indicated preparatory behaviour e.g. taped windows, some even had clothes on washing lines and dogs tied to trees or parking meters. It is interesting that very few of the illustrations included people, although when they did they tended to be victims and most often children. Very few showed emergency services personnel or equipment. The few drawings that included flood water were from Yarrabah Primary School.[3]
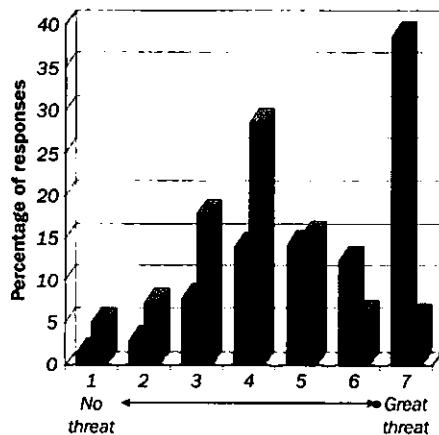
many of the prevailing attitudes towards cyclones, and risk perceptions are generalised throughout the regions residents, and that mispreceptions are not being dispelled with information and cyclone awareness material currently available

Note:

[3] Yarrabah is a predominantly aboriginal community that is located on a relatively isolated peninsula south of Cairns city and is remote from some of the services readily enjoyed by the Cairns community. Most dwellings in this settlement are on a narrow, low-lying coastal strip and are extremely vulnerable to flooding in the event of a storm surge. The community is also very 'close-knit' and information and descriptions of past experience can be 'passed on' within the community residents.
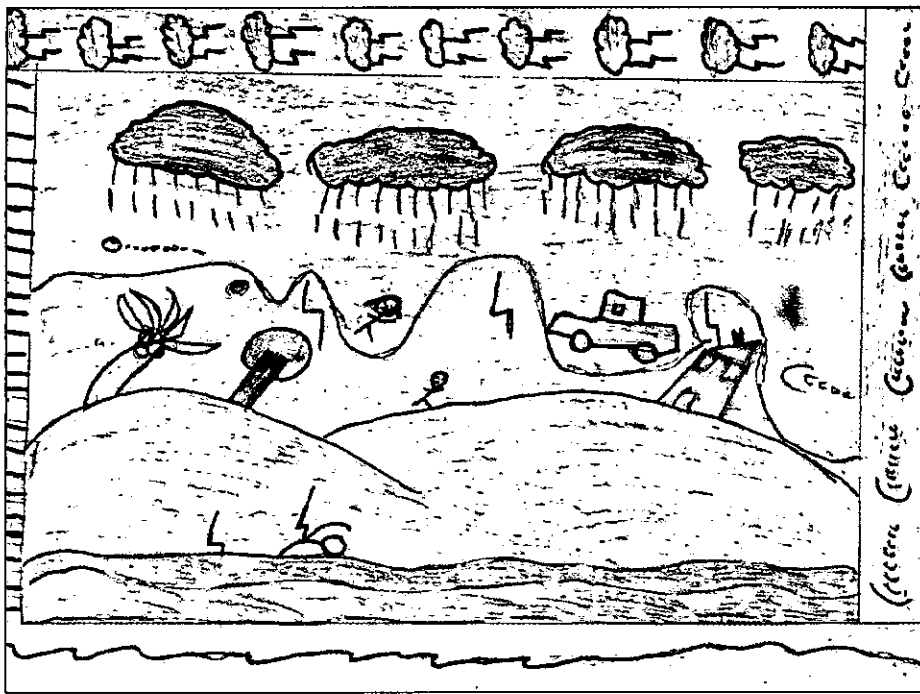
either throughout the community or in curriculum studies in schools

The studies confirm that public education campaigns, that have focussed on cyclones and cyclone processes and how to physically prepare households in the event of a cyclone warning advice being issued have been relatively successful. Residents generally demonstrate that they know what a cyclone is and what physical tasks they *should* complete to prepare their households in the event that a cyclone threatens the region. Knowledge of storm surge was not as well demonstrated.[4] However, in terms of explaining the cyclone risk so that an accurate understanding and perception of the risk prevails in the community, the cyclone awareness campaigns and school curriculum studies have apparently not been so successful. Local myths about the area being naturally protected continue to enjoy relatively wide acceptance. Household residents often described a reluctance to trust emergency managers in the event of cyclone emergency, preferring to rely on their own judgements and assessment of the situation (Berry 1996). These findings indicate that in all education campaigns a

higher priority must be given to demonstrating and explaining both the reality of the cyclone risk and the roles and responsibilities of all members of the community from household residents to emergency service managers and the expectations of them in times of 'disaster'.



## Storm watchers

A need for focused cyclone-awareness education for both groups of students has been clearly demonstrated in this study. Some hazard awareness education already exists as part of some school curriculum studies however, it is apparent that some students are able to avoid this with early subject selection or because limited re-

source material is available. In an effort to provide a useful resource for primary school students the James Cook University Centre for Disaster Studies in cooperation with the university's Flexible Learning Unit and with funding support from the Bureau of Meteorology Research Centre have developed and produced *Stormwatchers*, an interactive CD-Rom game.

This educational package has been designed to instruct children in appropriate preparatory behaviours for the cyclone hazard and to inform them of what they can expect of a cyclone experience. Students are offered a choice of 5 different cyclone scenarios which they must work through to prepare for a cyclone. Children in the scenarios are faced with a range of experiences and social situations so most students playing the game will have something to identify with.

The five children featured in the game are:
- Liam, who lives in a house in the hills. He has to prepare house for high winds and ensure that animals are taken care of.
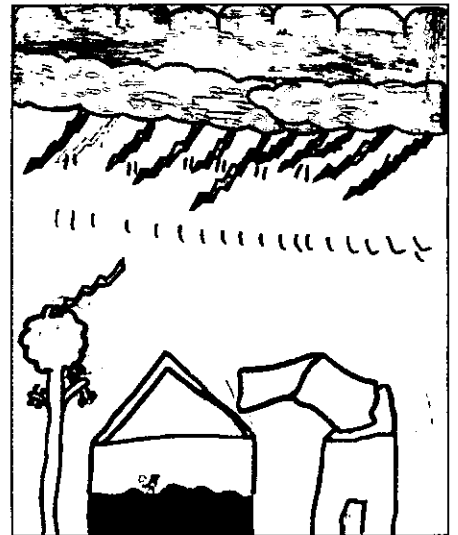


- Betty, who lives in a house by the beach that is threatened with storm surge. She has to prepare for evacuation to her Aunty's house.
- Sandra, who lives in a caravan, and must purchase her emergency kit items and prepare to evacuate to a shelter.
- Willy, who lives in a house by the river, and must prepare for the possibility of flooding.
- Anita, who lives in a unit in town—her mother is at work when the cyclone warnings begin so she must prepare on her own and find the safest place in the house to shelter.

Each scenario requires the student to ensure emergency kit items are collected and offers a mini-game as a reward for collecting all the necessary items. Real video footage is included while the storm is passing to help students to understand what they can expect to experience in a cyclone. At this time a quiz is offered as a challenge to test cyclone and basic geographical knowledge. Interested students can find more detailed information, relating to the quiz in the fact book. Students are guided through the game with the help of 'Stormy' the cockatoo.

*Stormwatchers* has been designed to be accessible to all students in upper primary classes in Queenslands schools, irrespective of their level of computer experience and literacy skills. All these students should have access to a computer that can support the game package. Game scenarios are very easy to work through and children are rewarded and encouraged along the way. Each scenario should be able to be completed in 15–20 minutes. A small instruction sheet accompanies the game along with a suggestions for work sheets that may be of use to teachers interested in follow-up activities. This game is relevant to a range of children in a variety of circumstances and, although it has been developed based on the demonstrated needs of children in the Cairns community it is applicable to children living in any Queensland (or northern Australian) cyclone- or flood-prone community.

Additional funding has now been provided by Queenslands Emergency Services Division to produce 1500 game packages for distribution to all primary schools in Queensland. These will be available for schools to introduce into classrooms before the 1998–'99 cyclone season.

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# Letter to the Editor

I was interested in your editorial in the Autumn 1998 issue of the journal which drew attention to the culture of 'anti-research' and the large gap between researchers and practitioners.

I was the co-ordinator of the Centre for Information and Research on Disasters and Natural Hazards (CIRDNH) which functioned at the Chisholm Institute of Technology (now the Caulfield Campus of Monash University) from 1979 to 1987 (Nick Carter was the Chairperson).

CIRDNH had as one of its main aims the promotion of closer liaison between researchers and practitioners, but progress towards that aim was limited, and it is disappointing that according to your editorial there has been little improvement in this regard more than a decade later. My paper 'Credibility of Disaster Research' (CIRDNH 1987) addressed issues raised in your editorial in some detail.

Despite this lack of progress, the growth of the Macedon publication from a simple newsletter into a generally excellent journal, and the accompanying Internet, library and seminar support should provide a basis for enhancing the very necessary increased understanding between researchers and practitioners in emergency management.

I am pleased that the vision we had in the late 1970s for a national clearinghouse and a forum for discussion has eventuated at Macedon, along with centres at James Cook and Macquarie Universities.

As outlined in an article by Roger Wettenhall *(Disasters* 8:2, 1984) the lack of ongoing funding and opposition from some government sponsored bodies led to closure of the Centre at Caulfield, but a Committee operated for some time, and I maintain my personal interest in this field.

Congratulations on the journal, it fills an important need.
Yours sincerely,
Ian Murray,
Senior Lecturer in Human Services
Monash University
Caulfield Campus

# Urban Search and Rescue Association of Australasia (USARAA) develops new web site

Following the USAR course held in Canberra (November 1995) the Urban Search and Rescue Association of Australasia (USARAA) was formed. This association consists of the majority of participants who attended the first course, and hopefully subsequent courses run in Australia, and is intended to provide a forum for the exchange of ideas and information relating to USAR.

USARAA now has a web site where the current newsletter, back issues of newsletters, photos of Australian training, and links to other Urban Search and Rescue sites can be found.

The address is:
http://www.users.bigpond.com/
Pat_Kirsty_Jones

The contact for the USARAA is:
Pat Jones
22 Hurtle Avenue
Bonython
ACT 2905
Fax: (02) 6293 2677
E-mail:
Pat_Kirsty_Jones@bigpond.com

# Australian earth data on-line
## A new on-line source of imagery for disaster management

by Rick McRae, ACT Emergency Services Bureau, and Prame Chopra, Department of Geology, Australian National University

## Introduction

When a broad-scale natural disaster strikes —flood, wildfire or earthquake—one of the most frustrating things for incident managers is not knowing the full extent of the impact. Information flow is difficult enough at the best of times, but when people feel compelled to 'get their hands dirty' there are few people left to focus on the backroom tasks.

One of the best 'overview' tools is a remotely sensed image. By definition, the sensor is remote, away from the disruption of the disaster, and able to function to full capacity. Imagery can be from a range of sources these days. Sensor platforms can be on satellites or they can be airborne. They can record different parts of the electro-magnetic spectrum: visible; infra-red; radar, etc. Each has its limitations and strong-points. They vary in the information collected, and the resolution at which it is collected. The time to acquire the imagery may be days for some satellite systems or an hour or so for some aircraft systems. Once acquired, the data have to be transferred to where they will be processed and interpreted, using techniques ranging from the Internet to a weighted drop bag. Once collated, the data have to be processed and interpreted. This latter task requires skilled personnel linked to the emergency management teams.

Some areas have put considerable effort into developing systems for 'routine' work —the airborne infra-red used in Victoria for mapping wildfires and the AVHRR imagery system in northwest Australia used for mapping the progress of the many dry season burns are good examples. However real-time use of new data during disasters has always been difficult due to the problems of: timely data collection; processing; and dissemination to where it is needed. Many of the most memorable remotely sensed images of Australian disasters were done retrospectively.

## Scoping a typical problem

An indication of the problems that have prevented widespread use of image data in emergency response work can be gained by studying a hypothetical example. If, for example, we wanted to obtain a useful satellite image of a flood to support real-time decision making, what steps would be needed?

1. Ask the right question. If that question is 'can a satellite image show us where the flood is now, so that we can plan for the next shift's tasking' then we are getting close to the mark.
2. Find out what sensors can delimit flood waters. This is easy if your organisation has a remote sensing expert on staff. Otherwise you need to find one. This may not be easy if it is 2 o'clock on a Sunday morning.

> **'One of the most frustrating things for incident managers is not knowing the full extent of the impact. Information flow is difficult enough at the best of times, but when people feel compelled to 'get their hands dirty' there are few people left to focus on the backroom tasks.'**

3. Choose a sensor based on the time of next fly-over and the likelihood of cloud cover obscuring the scene (a problem for visual bands).
4. Get a copy of the image datafile. In principle this is getting easier with Internet technology but problems such as how the data are going to be paid for and how it is going to be securely transferred still arise.
5. Process the image. An organisation that routinely handles imagery will have on-hand the hardware, software and trained staff to do this. For other organisations there may be difficulties and delays. Moreover, without care imagery can be misinterpreted, which can lead to erroneous decisions being made.

## AEDOL

A consortium of organisations interested in Internet delivery of digital spatial data has been formed in the ACT to focus on many of these problems. Australian Earth Data On-Line, or AEDOL as it is known, includes the Australian National University, Praxa Pty Ltd and the ACT Emergency Services Bureau, and is facilitated by the Technik Group. The work of the consortium has been underwritten by ACT AusIndustry and the Federal Department of Industry, Science and Tourism's Information Technology On-Line program. Additional in-kind support has been provided by the consortium members.

The AEDOL consortium has now developed a working prototype system which show-cases many of the key components of a comprehensive Internet delivery system. This prototype can be accessed through AEDOL's site on the World Wide Web (http://aedol.anu.edu.au). The prototype (see *Figure 1* next page) provides free access to a number of spatial data sets thanks to the support of the Australian Centre for Remote Sensing (ACRES), the CSIRO Marine Labs and the Australian Land Information Group (AUSLIG). These data sets include Landsat Thematic Mapper imagery, SPOT panchromatic scenes, AVHRR images and a number of vector datasets from AUSLIG and the Digital Chart of the World including roads, rivers and creeks, and towns and cities. At this stage the data are limited in spatial extent because AEDOL is providing free access as part of its proof-of-concept aims. The AEDOL prototype also includes an integrated WWW commerce engine to demonstrate the architecture and functionality of a full commercial system.

AVHRR data can already be provided one hour after it has been acquired by CSIRO in Hobart. Using the ER-MAPPER package, AEDOL can merge geographic data and satellite data. An application being developed would take AVHRR coverage of a local government area and drape it over a high resolution digital terrain model to give an oblique 'aerial view' (*see Figure 2* next

page). The user can then use the terrain to aid in interpreting the image. This is vastly superior to the interpretational tools that are currently available to most users.

## The future

The current version will only demonstrate how the system can work. We are seeking funding for the next stage of development, which would take us to a comprehensive system which will include:

- The use of secure credit card transactions to pay for data.
- Pay-by-the-pixel. Current systems require a minimum purchase, and it has been shown the for a small parcel of land, pay-by-the-pixel can reduce costs by as much as three orders of magnitude.
- A Java based web page that does many image manipulation tasks on-line. It is possible to do first-approximation analysis without training or technical skills.
- Stored user profiles, which make it easier for the returning user to go straight to the information needed.
- Stored algorithms, which can be re-run for any user and which take the latest data and manipulate it in a standard way to give a standard product.
- Data transfer on-line. AEDOL is already an approved distributor for some remotely sensed data, and can go from acquisition to suppling users in a short length of time.

Whether AEDOL progresses or not, it is inevitable that in the near future we will be able to use such systems for accessing many different types of spatial data. Many agencies are involved in collaborative development towards such systems. AEDOL and similar systems will provide the information infrastructure needed for the future. Internet technology is so flexible that, rather than competing, these systems will be cooperating.

Emergency managers will have a vast array of raw data available for immediate delivery at a reasonable cost. A range of value-adding companies will intercept the data for us and manipulate it to be exactly what we need and pass it on to us. We may not even notice that they will add their costs to the single transaction charge we see on the credit card balance sheets. We will get onto a web page and say we want information about a flood at some location and get a current map of it that our computers can read straight-away.

## Conclusions

More information on AEDOL's capabilities is available on the web site: (http://aedol.anu.edu.au). Watch this site as we develop it to meet more of the needs of emergency management.
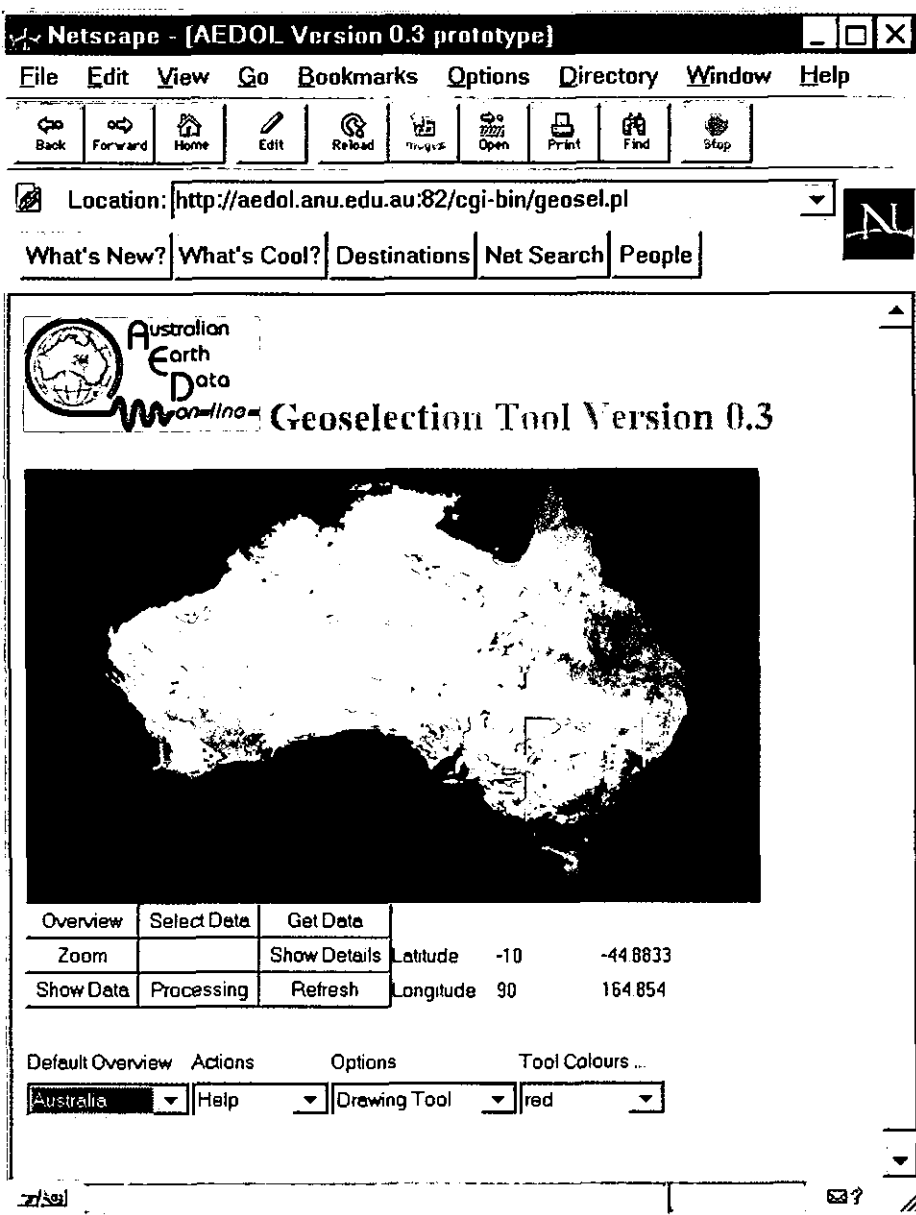


Figure 1: An example of an AEDOL web page.
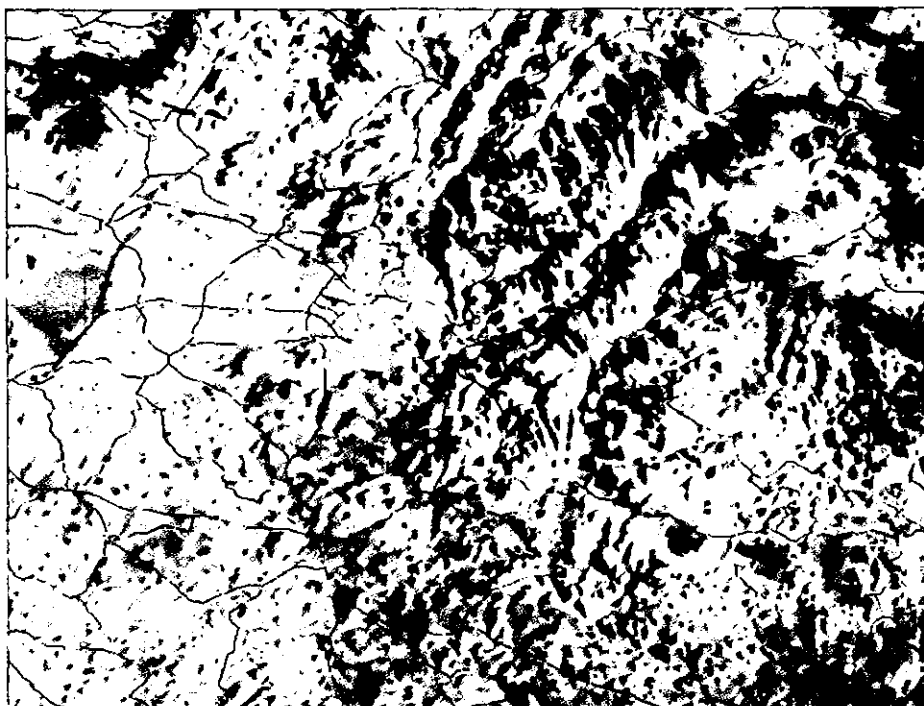


Figure2: AVHRR-derived grassland curing imagery draped over AUSLIG's digital elevation model for the ACT and surrounding areas of NSW. Red represents water (and cloud). Blue is the tree cover. The gradation from yellow to orange shows increasing grassland flammability.

## Emergency management projects

EMA seeks bids annually for project funding up to $20,000 each for its Emergency Management Projects Program. Eleven projects which have been approved for 1998–99 are:

**Queensland:**
Hervey Bay engineering lifelines
**New South Wales:**
Macleay Basin flood threat
Lismore flood warning sirens
**Victoria**
InterCAD messaging
National standard aviation material for rural firefighting
Understanding community response to wildlife threats
**South Australia**
Medical emergency response in rural SA
**Western Australia**
An integrated approach to planning
**Tasmania**
Hazardous material emergency manual
Emergency services volunteer forum
**Northern Territory**
Lifeline inventory and evaluation.

Further information can be obtained on the EMA homepage at http://www.ema.gov.au/srchframe.htm or from Mal Houston on (02) 6266 5309, e-mail mhouston@ema.gov.au.

In June an agreement was signed in Canberra by Paul Officer, Director, Ministry of Civil Defence, New Zealand and Alan Hodges, Director General EMA. The aim of the agreements is to strengthen emergency management cooperation between Australia and New Zealand, and opens the way for the development of procedures for mutual response to disasters in either nation. This is an important first step to develop procedures for the exchange and loan of personnel and equipment, and the exchange of information and other assistance that may be appropriate from time-to-time and during disasters. The first formal meeting under the terms of the agreement will be held in October this year. Further information can be obtained from Alan Hodges on (02) 6266 5183, e-mail ahodges@ema.gov.au.

## Urban search and sescue

In May 1998 the chair of the National Urban Search and Rescue (USAR) Steering Committee, Mr Trevor Haines, attended the annual International Search and Rescue Advisory Group (INSARAG) meeting in Portland, Oregon, USA. The aim of the group is to facilitate the development of procedures for response to international disasters involving structural collapse usually caused by earthquake or terrorist activities. The outcome of the 1998 meeting was a draft manual for International Search and Rescue Response (ISARR) containing all aspects of team response including training, management, team structure and Standing Operating Procedures. The final manual should be available in mid-1999 and while it is designed for international deployment of specialist teams, it should be a useful tool in the development of a national USAR capability.

For further information contact Trevor Haines, tel: (02) 6266 5169 or e-mail: thaines@ema.gov.au

## AusAID review of south-west Pacific disaster management support

As advised in the Winter edition of the AJEM, AusAID recently conducted a review of its south-west Pacific disaster management activities. The outcome is that AusAID will provide funding, along with other donors, to a Disaster Management Unit (DMU) to be established within the South Pacific Applied Geoscience Commission (SOPAC) in Fiji. The DMU will essentially manage the region's disaster management program and will employ a variety of service providers to conduct program activities.

For further information contact Phil Stenchion, tel: (02) 6266 5441 or e-mail: pstenchion@ema.gov.au

## Disaster management course at the Centre of Excellence in Hawaii

The USA Centre of Excellence in Disaster Management and Humanitarian Assistance, located in Hawaii, conducted a course on Introduction to Disaster Management for Pacific Island nations in Honolulu from 29 June to 3 July 1998. The course was attended by delegates from a number of countries both north and south of the equator.
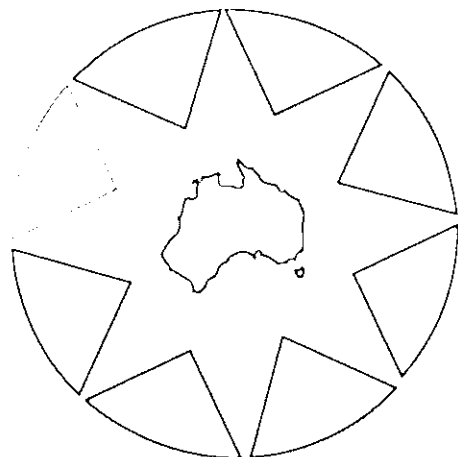
### ABC TV series goes to air in October 1998

The television series, 'Hazards, Disasters and Survival', reported in the last edition of AJEM began screening on the ABC in October 1998. The Australian IDNDR Program, EMA and the ABC jointly produced the series which seeks to develop personal emergency management skills and an overall culture of disaster prevention and preparedness. The series comprises six 15-minute episodes on specific natural hazards (Severe Storm, Lightning, Tornado; Bushfire; Cyclone, Storm Surge; Flood; Heatwave; and Earthquake, Landslide). Videos of the series will also be available for use in classrooms, homes and presentations.

For more information, contact the Australian IDNDR Secretariat, PO Box 1020, Dickson ACT 2602. Phone: +61 (0)2 6266 5408, fax: +61 (0)2 6266 5029. Email: idndr@ema.gov.au. Internet: http://www.ema.gov. au.

**Adult education**: October 26 *(Mondays)* 7.15 a.m. *(each week for 6 weeks)*

**School education**: October 30 *(Fridays)*, 11.45 a.m. *(each week for 6 weeks)*

**Repeat Adults**: December 14 *(Mondays)*, 7.15 a.m. *(during school holidays)*

### New IDNDR projects for FY 1998–99

Eighteen new projects were approved for funding in financial year 1998–99 under the Australian IDNDR Program, from a total of 72 received from all parts of Australia and the South Pacific. This is in addition to projects which carry over from previous years and ongoing commitments for IDNDR education and awareness programs. For more information about these projects or how to apply for IDNDR funding, contact the Australian IDNDR Secretariat, PO Box 1020, Dickson ACT 2602. Phone: +61 (0)2 6266 5408. Fax: +61 (0)2 6266 5029. Email: idndr@ema.gov.au. Internet: http://www.ema.gov.au/

- Identifying and preparing the 'Special Needs' population of Hervey Bay, Queensland for disasters (AU$8,500)
- Development of a travellers' guide to bushfires in Western Australia – brochure (AU$3,100)
- Development of a marine safety training video on severe weather and tropical cyclone education (AU$10,000)
- Adaptation and implementation of Introduction to Disaster Management Workshops for use at the community level and in the local language, Tuvalu (AU$10,000)
- Development of a public health emergency management resource manual and food safety training kit (AU$5,000)
- Feasibility study on the Queensland Flood-Related Road Closure Notification and Forecasting System (AU$10,000)
- Support for Fiji cyclone preparedness and awareness training through Awareness Community Theatre (AU$10,000)

- Development of a framework for understanding and monitoring levels of preparedness for wildfire (AU$10,000)
- Support for Niue Disaster Management Office activities (AU$10,000)
- Sponsorship of a workshop on *'Mitigating the Impact of Volcano Collapses and Related Tsunamis'* in the south-west Pacific region, Papua New Guinea (AU$10,000)
- Development of a *'Storm Tide Threat in Queensland'* brochure for counter-disaster and land use planners and engineers (AU$2,500)
- Development of a 'Measure for Community Resilience to Disasters' (AU13,000)
- *'Are You Ready?'* booklet of educational materials for Geography Action Week 1999 (AU$11,870)
- *'Water Water Everywhere'* – secondary school inquiry-based workbook on floods (AU$11,550)
- Lifelines risk assessment of the Botany area, NSW and development of a national model for integrated utility lifeline risk (AU$30,000)
- Development of a spatial data infrastructure and geographic information system capability to underpin disaster management activities in the South Pacific region (AU$30,000)
- *'You are the Manager'* – natural disasters CD-ROM resource for primary school students and teachers (AU$18,000)
- Key strategic issues in developing a total flood warning service for remote communities (AU$7,000–14,000)
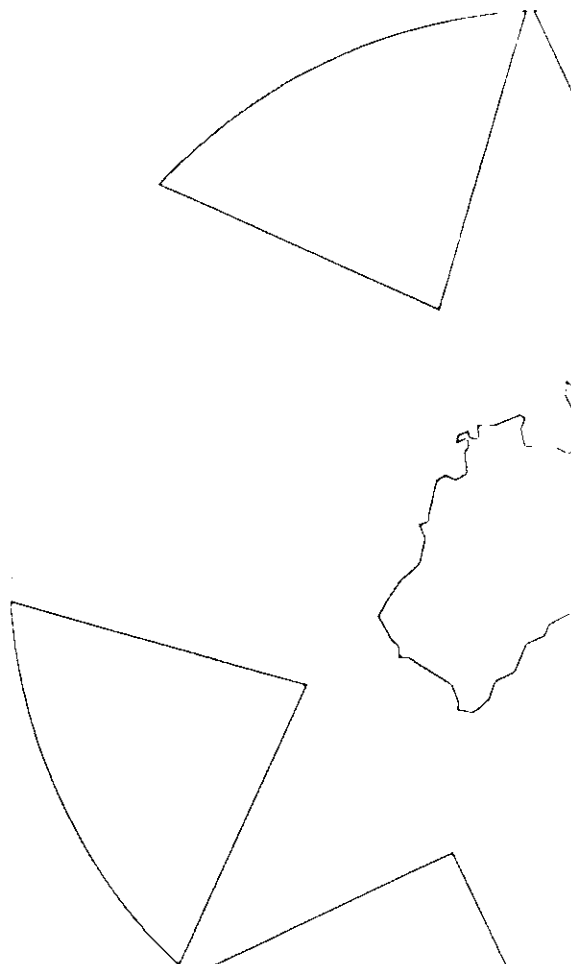
# Publications news

## New and revised publications now available from EMA

- **Emergency! Don't be scared, be prepared.**
  (DL size, colour pamphlet)

  This new community awareness and education publication takes a generic, all-hazards approach to advice on how to prepare a household or workplace emergency plan and the items needed in an emergency survival or evacuation kit. It also explains the new Standard Emergency Warning Signal and provides professional advice on how to help cope emotionally during and after a major emergency. The pamphlet, which was developed by EMA in conjunction with the National Community Awareness Advisory Group, features colourful illustrations including the established cartoon characters from the on-going flood, bushfire, severe storm and cyclone TV community service announcements funded by IDNDR. Copies are available through State/Territory Emergency Services.

- **Natural Hazard Awareness for South Australians**
  (colourful, B2 size, community-awareness poster).

  This new poster map texturally and graphically depicts the history and statistics of major natural hazard impacts and disasters in the State. It was funded by IDNDR and produced by EMA as part of a series to cover all States and Territories. It is available (free) through SES SA, 31 Flinders St, Adelaide, SA, 5000

- **Helping Communities in Australia and the South Pacific Reduce Natural Disasters**
  (DL size, colour pamphlet).

  The emphasis of this new publication is on people, prevention and preparedness activities which have been funded or inspired by IDNDR, rather than actual disasters. The content has been structured along the lines of the IDNDR strategic plan, goals and themes. It emphasises projects in the region, and national and international links/partnerships. Copies available from EMA and through State/Territory Emergency Services.

- **Australian Emergency Manual Series: Part III: Emergency Management Practice**

  **Volume 1: Service Provision**
  - Manual 1: *Emergency catering*

  **Volume 3: Guidelines**
  - Guide 1: *Multi-Agency Incident Management*
  - Guide 2: *Community and Personal Support Services*

- **Mt Macedon Papers Series**
  - **Mt Macedon Paper Number 5/1997**: Record of the Disaster-Mitigation Workshop.
  - **Mt Macedon Paper Number 6/1997**: Record of the Safe Crowd Management Workshop.

  Mt Macedon papers are available from EMA Canberra or EMA Mt Macedon.

- **Directions in Volunteer Development in Australian Emergency Services** (separate 24 page Executive Summary and 76 page full Report, A4 size books.) Commissioned by the CFA (Vic) and with financial assistance from EMA. Copies are available from the CFA and EMA.

EMA addresses for publications orders (check above for appropriate EMA Office or State/Territory authority):

Emergency Management Australia, PO Box 1020, Dickson, ACT 2602, Australia, or Australian Emergency Management Institute, Main Rd, Mt Macedon, Vic 3441, Australia.

## Developments on the Emergency Management homepage

The *Australian Journal of Emergency Management* is now on-line in Acrobat (PDF) format for your convenience.

EMA provides funding under its *Australian Disaster Research Grants Program* to enable researchers and practitioners to undertake studies immediately after a disaster. The final reports of the research undertaken so far are now accessible on the EMA homepage. So far these are:

- The Thuringowa Floods Post Disaster Survey is a report prepared by David King of the Centre for Disaster Studies — James Cook University Queensland for EMA, the Department of Emergency Services and the Bureau of Meteorology. The report is a full summary of the background, methodology, perception and awareness occurrences surrounding the devastating floods in Townsville, 1998.

- 1998 Queensland Gulf Flood Report. This report was prepared by Linda Berry of the Centre for Disaster Studies — James Cook University Queensland for EMA, and the Queensland Emergency Services.

All these reports are in Acrobat (PDF) format.

*Seminars and Conferences* have recently been updated. Access is currently provided via year and by continent. A search engine is being constructed to enable easier access to specific events.

The *Site map* has been greatly extended for easier navigational purposes. The user can access virtually the entire site from this section and can also view all of the contents of the EMA homepage at once.

An *Australian Emergency Management Glossary* is now accessible through the Publications section of the site. The aim of the glossary is to provide a list of emergency management and related terms and definitions. Terms included are technical terms likely to be encountered by emergency management workers, and include terms from a number of specialist but related fields. Complementary to the Glossary a **Thesaurus** is also available to assist in accessing information contained on the EMA library catalogue.

The **Links** section continues to grow and has been updated to provide users easy access to all forms of Emergency Management organisations and groups. This includes a wide range of emergency global Internet sites, and News and Media access as well.

## PSITAB update

The Public Safety Industry Training Advisory Board (PSITAB) is the national body through which emergency management training products are developed. This body has the development processes funded by the Australian National Training Authority (ANTA), validated by the emergency management industry and products finally endorsed by the ANTA.

The emergency management sector has a set of competencies which have been endorsed by ANTA for the development of training materials (teaching, learning and assessment tools).

The products will be developed by May 1999 in the following priority areas:

- manage the organisation's public safety context
- Identify, analyse and evaluate risk
- determine selection criteria for intervention strategies
- determine intervention strategies
- manage intervention strategy implementation
- develop and organize public safety campaigns
- control multi-agency emergency situations
- command agency personnel within a multi-agency emergency response
- coordinate resources within a multi-agency emergency response

Emergency Management Australia will identify those areas where the Commonwealth should be involved as a training provider. These courses are likely to be in niche 'public interest' areas that meet the criteria of contributing directly to national emergency management capability or supporting a Commonwealth policy priority.

## What's on at AEMI

### Psychological Preparedness Warning and Public Education Workshop

*15–19 February 1999*

The aim of this workshop is to review and develop psychological preparedness content which would complement and augment existing warning messages and public education materials. The result would be some standard multi-hazard material which could be widely distributed and used as well as some hazard specific material which would acknowledge and be sensitive to human perception and response differences to different hazards.
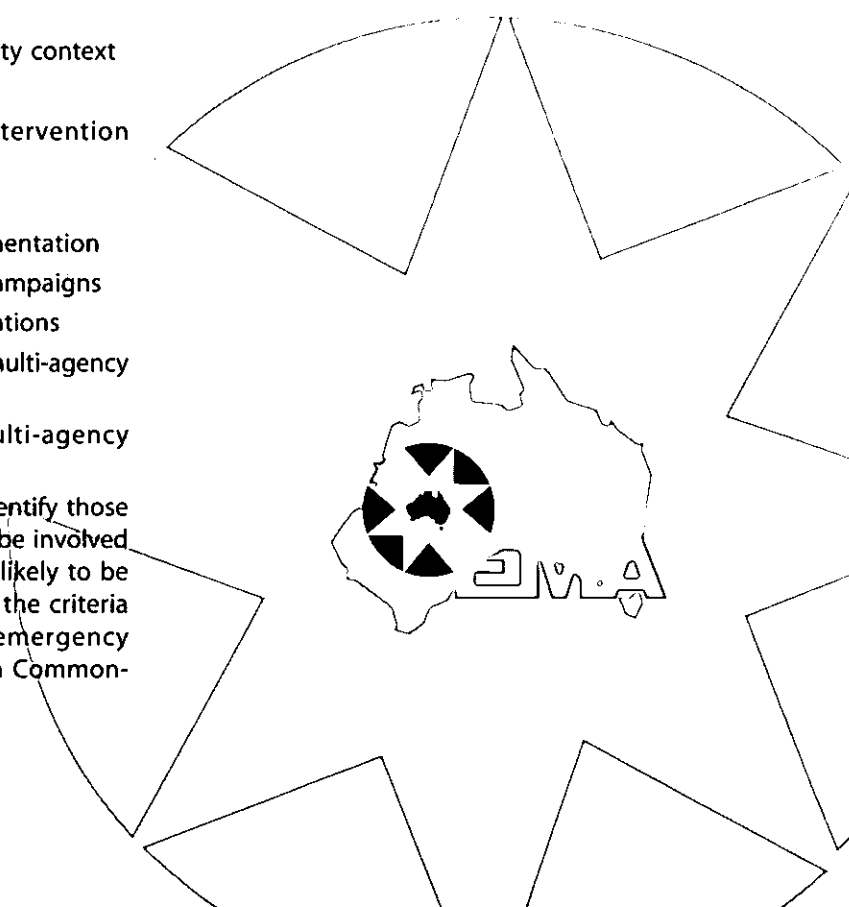
# 'Taking it to the streets': Operation Bushfire Blitz

## A case study in community awareness, information and education

by Michael Hill,
Project Manager,
Operation Bushfire Blitz,
Country Fire Athority

Victoria and bushfires are synonymous. Bushfires repeatedly devastate Victorian communities with extensive property and life losses. In the past 20 years alone, over 5,000 buildings have been destroyed and more than 60 lives lost. Since the turn of the century over 330 lives have been lost to bushfires. The cost of this type of devastation is enormous both from a social perspective and also from an economic perspective.

Every year parts of Victoria face the prospect of bushfire and every year the community, the emergency services and other agencies prepare and then brace themselves for the weather conditions that are conducive for bushfires.

The lead up to this summer was no different in this respect. However, what was different was the intense efforts of the CFA, other agencies and local government to work with the community to ensure, as far as possible, their safety from bushfire. All available indicators were pointing to the fact that this summer was likely to be the one that provided an unprecedented risk in Victoria. The type of year that comes along once every twenty years or more. In fact the last time the indicators looked this severe was in 1983 when an El Nino event had influenced weather patterns producing drought conditions and spells of very hot weather.

Operation Bushfire Blitz was designed to reduce community vulnerability to bushfire and encourage active participation by the community in their own safety. Operation Bushfire Blitz was the centerpiece of CFA's diverse but integrated suite of information and education strategies to effectively manage the bushfire risk. These strategies recognise that managing a complex fire environment requires:

- a high level of awareness of the risk to the extent that an immediate need to act is realised
- quality education and information from which decisions can be made, delivered to meet the communities needs.

Bushfire Blitz was a high-intensity short-term (8 week) community education program designed to be delivered to residents at the local street corner, face-to-face, on 'their turf'. Street corner meetings were hosted by local brigades, in conjunction with Operation Bushfire Blitz community consultants.

### The bushfire risk 1997-98
The bushfire risk in Victoria is known to have two critical dimensions.
1. The nature of the *hazard*, in this case the bushland areas in urban interface and forest areas. The volatility of the hazard (i.e. the bush) is influenced most significantly by seasonal rainfall and daily weather variations particularly the wind, temperature and humidity.
2. The extent to which communities are *vulnerable* to the bushfire hazard, by virtue of their location, attitude to bushfire, level of preparation, planning, and their capacity to manage.

Risk can also be described as having 'unrealised potential'. When the potential of the risk is realised through an event, the consequences can be described as disastrous. A disaster is defined by the office of the United Nations Disaster Relief Coordinator as 'a measure of the vulnerability of a community to a specific hazard' (Salter 1992, p1). Petris and Potter (1995, p17) argue that 'the magnitude of a bushfire disaster is largely a function of the extent to which the actions and behaviour of people make them particularly vulnerable in the event of a fire'.



### El Nino and bushfires
'El Nino' is a recently identified weather phenomenon that is responsible for a number of diverse weather events on both sides of the Pacific Ocean. Forest fires have been raging in Indonesia, there have been widespread droughts in Papua New Guinea and in North and South America floods have claimed lives and destroyed towns.

In south-eastern Australia generally, and in Victoria more specifically, El Nino is associated with low rainfall and drought conditions. During the spring of 1997-98, Victoria was in the grip of an extreme El Nino event which produced very low rainfall totals. *Figure 1* (next page) shows the urban-bushland interface areas around Melbourne with a cumulative rainfall for the nine month period, January to September 1997, as the lowest on record and therefore below that received during 1982 leading up to the Ash Wednesday fires.

Rainfall deficiency was a critical factor in predicting the severity of the bushfire hazard. When long term rainfall was an-

**SE Australian rainfall Deciles**
**1st January to 30th December 1997**

Newcastle

Mildura

Sydney

Wollongong

Canberra

Horsham

Melb

Sale

**Rainfall Decile ranges**

Portland

Highest on record

10 Very much above average

Bernie

8-9 Above average

4-7 Average

Strahan

2-3 Below average

Hobart

1 Very much below average

Lowest on record

*Distribution based on Gridded data*
*Product of the National Climate Centre*

*Figure 1: Rainfall from 1 January 1997 to 30 September 1997*

alysed in the lead up to summer, around September, it was clear that even if average rainfall returned for the rest of the summer, and understanding that there was only a small chance that this could occur, Victoria would still be drier than 1982.

## Fire behaviour implications

The dominating weather patterns have a strong effect on the way a bushfire behaves. Experience from previous major fires and current research all pointed to the following factors:

*Bushfire will be more severe.* They will be more frequent, occur over an extended 'fire season' beginning earlier in the summer, and with the right weather conditions spread more rapidly than usual.

*Bushfires will be more intense.* Fire intensity is directly related to the damage potential of a bushfire. The greater the intensity, the more difficult it is to suppress a fire, the more damage it will inflict, and the more vulnerable a community in the path of the fire will be.

The landmark fire season in recent Victorian history was in February 1983 when the 'Ash Wednesday' fires consumed many parts of Victoria. Fire intensities during Ash Wednesday reached 100,000 kilowatts per metre. The losses associated with Ash Wednesday in Victoria were 47 lives, 2090 houses, the social cost cannot be estimated but many people still bear the physical and emotional scars from 1983.

In New South Wales during 1994, fire intensities reached 60,000 kilowatts per metre and in January 1997 in the Dandenong Ranges intensities in the order of 30,000 kilowatts per metre contributed to the loss of 3 lives and 41 homes.

*Bushfires may be uncontrollable.* In major bushfire situations such as occurred in 1983 the limits of traditional fire prevention and suppression become apparent (Petris and Potter 1995). During the Ash Wednesday event it was found that firefighting forces were overwhelmed and that a controlled response was impossible. Even with its vast firefighting forces of over 2,000

fire vehicles and aircraft, it could not hope to protect every single person in high intensity bushfires. The equation is simple ... in most communities there is on average one fire appliance for every 1,000 residents, therefore many people will have to face bushfire on their own.

## The situation today

The situation in 1997–98 was different to that faced in 1983. A study of the circumstances surrounding civilian deaths during the Victorian Ash Wednesday bushfires by Krusel and Petris (1992) identified three groups of victims, and three critical factors that influenced their vulnerability. Summarised these factors were a lack of understanding, recognition of immediate threat and capability. In principle the community in partnership with agencies should be able to prevent all of the deaths that occurred in 1983 with targeted initiatives.

However any initiative to reduce community vulnerability requires more than a reliance on agencies. It also requires self reliant and self-aware people who have the knowledge, motivation and capacity to manage the risks in their own communities as an active partner with fire management agencies. While the CFA play a major role in facilitating improved fire management there are many others that also have a responsibility. CFA have concentrated heavily on forming partnerships with local government, industry, agencies, the community and individuals so that the total system functions effectively leading to improved safety for the community.

## Vulnerable communities

The magnitude of the bushfire risk is derived from an analysis of the extent to which the actions and behaviours of *people* make them particularly vulnerable in the event of a *bushfire.* Therefore the identification of high risk communities was vital to ensuring efforts were targeted and effective from awareness and education through to the ability to respond to fires if they occurred.

A series of spreadsheets and spatial analyses identified that the majority of losses occurred within 100 kilometres of Melbourne, mostly in areas known as the urban/bushland interface. In other words where city meets bush. In the interface area's surrounding Melbourne the probability of death associated with bushfire is six times higher compared with rural areas. The primary strategic target was therefore Melbourne's urban bushland interface.

Urban bushland interface areas are characterised by relatively large populations living in areas of heavy fuel loads, rugged topography, and poor access. A high
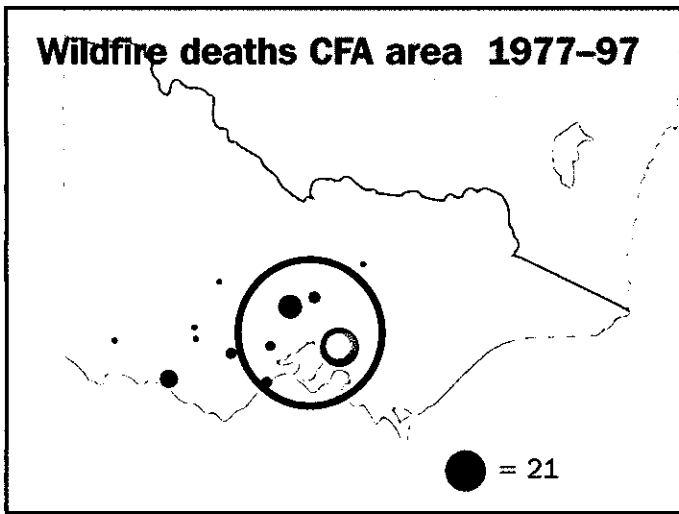
Figure 2: Wildfire Deaths 1977–97
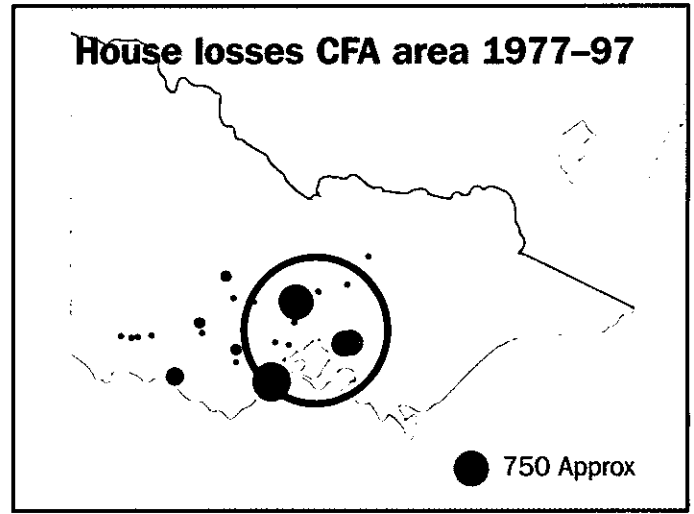


Figure 3: Wildfire House Losses 1977–97

proportion of the inhabitants are people who are looking for a semi rural quality of life whilst being close to the city. Many people who live in these urban bushland areas are commuters who have very little experience in living in the bush or fending for themselves in a major fire (Miller 1984).

In addition constant population shifts, urban growth and industrialisation on the outskirts of metropolitan Melbourne, and on the fringes of regional centres, pose significant challenges. For example, increases in population in the outer Melbourne areas over the last 5 years have been in the range of 10% and 25%. This directly raises the complexity of the community awareness and education task.

The communities who reside in urban bushland areas are no longer uniform and homogenous in their make-up. Growing population diversity means that brigades are serving a multitude of customers, and they now demand choice and accountability, especially if things go wrong. Those moving into growth areas generally expect government agencies to look after them and this holds true for emergency and safety services.

This provides a challenge for the CFA who have derived an approach to bushfire management that focuses heavily on social solutions to safety and creating a partnership with the community, rather than a total reliance on technological solutions. Research clearly demonstrated that able bodied people who are well prepared and have a basic understanding of bushfire, have the capacity to defend their families and houses successfully (Wilson and Ferguson 1984). For those who do not fit this profile the CFA encourages leaving their homes early on critical fire weather days before fires start. Last minute panicky evacuations are a recipe for multiple life loss and these are actively discouraged at every opportunity.

The next phase of the analysis introduced the use of bushfire intensity maps. The intensity and rate of spread of a bushfire, both important indicators of loss potential, are dictated by a number of interrelated bio-physical variables including weather, topography and vegetation.

Fire intensity has been described as the most important determinant of house survival in bushfires and is measured as the rate of heat release per unit length of fire front, usually expressed as kilowatts per metre (kW/m). Fire intensity can be calculated spatially in a geographic information system (GIS).

CFA's GIS Group had extensive data on hand to quickly calculate potential fire intensity within a 100 kilometre radius of Melbourne. An algorithm was developed which overlaid fire intensity, population and housing data from the 1996 Australian Census to produce several maps identifying 150 towns and villages with the highest loss potential. These communities became the target for 'Operation Bushfire Blitz' (Figure 4).

Even though by this phase of the study many communities had been identified as being at risk from bushfire there remained the problem of identifying which parts of



Figure 4: 150 towns and villages with 'highest-loss potential' were identified and targeted by analysing bushfire potential, population density and housing statistics
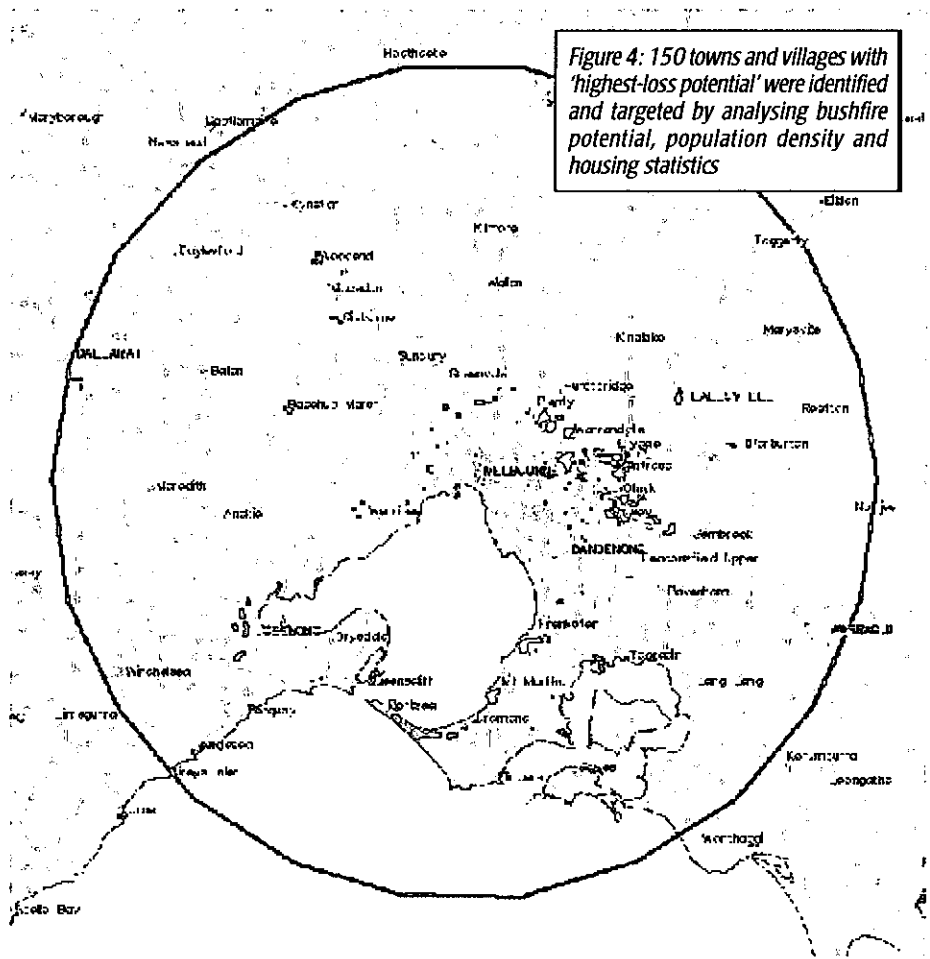
a town were most at risk. The urbanised areas of most small towns are in many ways like suburbs in the city. Houses stand next to one another with carefully watered gardens and relatively low vegetation loads. The intrusion of fire fronts into these areas is rare with the exception of attack from wind borne embers produced by bushfires. By comparison, houses become isolated on the outskirts of towns and are more likely to be immersed in flammable vegetation. The risk of house loss from bushfire may change from low to extreme within a few streets.

To meet this problem the CFA GIS group produced large scale fire intensity maps for each of the towns and villages which had been identified in the previous analysis. The potential fire intensity theme was this time overlaid with digital road networks.

In this manner streets and roads were identified that in the event of a fire were likely to sustain extreme fire intensity, thus increasing the risk of life and property loss. Over 150 town maps were produced and distributed within 2 weeks to brigades, who then targeted specific streets for Bushfire Blitz meetings.

## The challenge

The challenge for the CFA in partnership with the community and other agencies is to develop and implement a diverse but integrated suite of strategies to effectively manage the bushfire risk. These strategies recognise that managing a complex fire environment requires:
- that social and cultural changes must be made within and outside CFA
- identification of high risk communities
- an acceptance that fire prevention and mitigation is everyone's responsibility
- an understanding of all the factors that contribute to community vulnerability
- an understanding of the extent to which the CFA can facilitate a reduction in community vulnerability
- attention to targeted awareness and education programs that actively involve people and provide information from which people can make informed decisions about their own safety.

## CFA's awareness and education approach

CFA's research had indicated that despite all efforts people were having difficulty in translating written information and advice into action to improve their own safety. Therefore much of the information went unheeded. Silberbaur (1990, p10, pers. comm.) expresses the view that information contained in publicity material is 'clear, reliable, readily applicable and widely ignored'.

Petris and Potter (1995, p24) suggest that 'as the most appropriate bushfire safety strategies will vary according to each individual's particular circumstances—lifestyle, environment and governing values—a more effective method of achieving behavioural change may be one that allows two way communication between fire management agencies and individuals.' Beckingsale (1994) describes this two way communication approach as the participation paradigm.

CFA had for some time recognised that merely resorting to bigger and better publicity campaigns was unlikely to provide the total solution, but also recognised that any education program is next to useless if nobody knows about it. An integrated awareness-education strategy was developed to ensure high levels of

> **There was a need for the CFA to develop a program with specific characteristics, that could fill the identified service delivery gap. Bushfire Blitz was specifically designed to be delivered at the local street corner, to communities, face-to-face on 'their turf'.**

awareness were translated through local level education programs into practical actions and behavioural changes that improve the safety of individuals.

The CFA's extensive publicity campaign used all available means to deliver safety messages, raise community awareness and publicise programs. The CFA used all forms of the media extensively, developed an Internet site, conducted media briefings attended by major media outlets, worked with non-English speaking communities, conducted a radio phone in partnership with ABC radio and attended numerous displays and field days. The CFA's publicity efforts were unprecedented this year.

At the education end of the spectrum significant effort had been directed towards the 'Community Fireguard' education program. Community Fireguard is a program that facilitates small groups of neighbours towards the development of bushfire safety strategies that vary according to each individuals particular circumstances, lifestyle, environment and governing values. However, while Com-

munity Fireguard has experienced unprecedented growth over the last eighteen months and has proved very effective for those who were involved, further analysis revealed three critical issues:
1. The number of Community Fireguard groups across Victoria was very small when compared to the analysis of vulnerable communities.
2. There were time, space and resource limitations that restricted the delivery of Community Fireguard in all the identified vulnerable communities, and the style of the program did not lend itself to a short but intensive community awareness and education effort.
3. A small proportion of people in vulnerable communities new about Community Fireguard. Evidence for this came from a series of public meetings, often attended by hundreds and sometimes thousands of residents in high risk areas such as the Yarra Ranges, where when questioned about the existence of Community Fireguard only a handful of people responded on each occasion.

## Bushfire Blitz

Bushfire Blitz was born out of the need to fill the service delivery gap between broad-scale publicity, such as television and radio, and highly-focused education activities including Community Fireguard (*Figure 5*).

There was a need for CFA to develop a program with specific characteristics, that could fill the identified service delivery gap. Bushfire Blitz was specifically designed to be delivered at the local street corner, to communities, face-to-face on 'their turf'. This delivery style aimed to:
- deliver to a large number of targeted vulnerable communities in a short period of time
- make the risk real and immediate and the information relevant to each individual by using real examples
- promote action that is practical and achievable and promote the concept of community interdependence
- facilitate two way communication with residents and a practical 'hands on' approach
- deliver at the street level and complement existing brigade community education activities
- be cost effective and able to be marketed effectively to community and stakeholders
- target specific at risk communities and streets
- demonstrate that the CFA are committed to community safety by coming to the street corner and meeting the need of the customer.
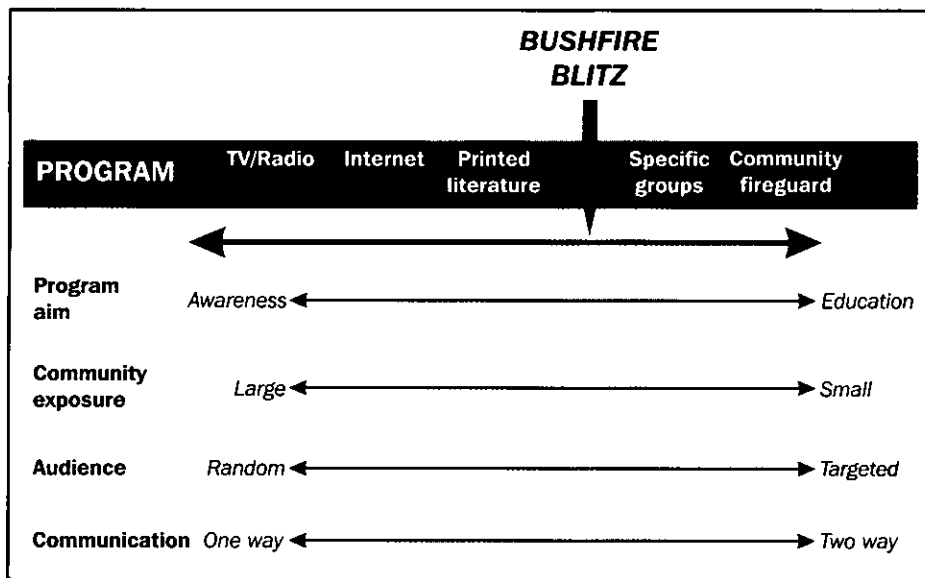
*Figure 5: Awareness-education services and Bushfire Blitz*

## Fire brigades and the local approach

Operation Bushfire Blitz was developed to facilitate the provision of bushfire awareness and education services to the community and also to support volunteer brigades. The program was designed to complement the range of activities that brigades undertake to prepare the community for bushfire. The CFA considered brigade support so important to the success of the program that a decision was taken not to conduct Bushfire Blitz where there was no local brigade support.

Support for Bushfire Blitz was very high, with 250 brigades actively participating in the program. Street meetings were hosted by the local brigade, in conjunction with the Operation Bushfire Blitz community consultant. Residents were invited to participate in street meetings, usually by way of a letter, in groups of approximately three streets at a time. The meetings were designed to be interactive and specifically tailored to the local street situation. Meetings were held at predetermined locations in one of the streets for approximately 1-1½ hours, included a 'street walk' and covered the following issues:

- facts about the bushfire risk
- personal and family safety
- preparing your home
- helping your neighbours
- risk identification and practical solutions
- planning what to do on high risk days
- what residents can expect from the fire brigade
- Community Fireguard.

## Managing Operation Bushfire Blitz

Bushfire Blitz was managed by a Project Manager and a part-time administrative assistant. Project coordination on a state-wide basis was achieved through the Project Manager. The CFA is managed through 12 decentralised areas, each with its own management team. Each area has an Area Risk Manager, who was responsible for community education activities within that area.

*Program Coordinators:* to assist the Area Risk Manager with the local administration of Bushfire Blitz, a program coordinator was appointed specifically to work with brigades and the Bushfire Blitz community consultants who were recruited to deliver the program. In addition it was the responsibility of the program coordinators to arrange the street corner meetings with the local brigade, notify residents of meetings, assign community consultants to meetings and oversee the performance of community consultants.

Seven Program Coordinators were recruited from the volunteer ranks of the CFA for a period of approximately 12-16 weeks.

*Community Consultants:* fifty-five Community Consultants were also recruited from the ranks of CFA volunteers for a period of eight weeks. Their role was to deliver the street corner meeting in conjunction with the local brigade.

*Recruitment:* choosing the most appropriate people for Bushfire Blitz was particularly important and therefore the recruiting process was a critical part of the project. CFA decided to outsource the recruiting to a third party recruitment and employment specialist, Skilled Engineering. This was done for two reasons:

1. CFA did not have the capacity to recruit 55 people in a very short period, and Bushfire Blitz was viewed by the State Government and CFA as a critical community safety initiative.

2. CFA had used the expertise of a third party employer on a similar project recently and was pleased with the results.

CFA worked closely with Skilled Engineering to ensure that the recruitment process reflected its needs and that the people recruited had the necessary skills and abilities to carry out the Community Consultant role effectively. One of the key elements in recruiting Community Consultants was the decision by CFA to employ volunteer members. This worked particularly well because of CFA cultural factors, a knowledge of fire behaviour and in many cases an empathy with the local community and brigade.

*Training:* Program Coordinators and Community Consultants attended a two-day training course that focused on the following elements:

- Fire behaviour and weather
- House survival
- Personal survival
- Practical solutions
- Personal presentation and communication
- Facilitating a Bushfire Blitz meeting, understanding the script and key messages.

Each Program Coordinator and Community Consultant was supplied with Blitz polo shirts and a cap, specifically designed for the program.

## The performance of Bushfire Blitz

### Bushfire Blitz activity

Over eight weeks, 33,303 people attended 1408 street corner meetings and a further 10,000 people attended public meetings across Victoria's higher-risk communities.

CFA estimates that as many as 250,000 people have received the benefit of Bushfire Blitz when family and neighbourhood flow-on effects are factored in to the programs impact. One of the most rewarding outcomes of Bushfire Blitz is that it has achieved a level of community development and interdependence that goes far beyond the direct benefits of fire safety.

During Operation Bushfire Blitz, 250 brigades have improved the relationship with their communities. CFA have received numerous letters of support from the community and there has been an increased demand for Community Fireguard and increased recruiting for local brigades.

### Fire events

During the 1997–98 bushfire season two fires occurred which directly threatened residents in areas where Bushfire Blitz had been in operation. Evidence collected by the CFA indicates that residents were better prepared for bushfire than in previous years. At fires occurring in Macedon and Kalorama under critical fire weather conditions, most residents understood what needed to be done, were calm, had

prepared adequately and had decided to stay and defend their property.

The most significant outcome this year is the fact that for a high risk year no lives were lost and only 10 houses destroyed. Interestingly these houses were lost in an area where Bushfire Blitz or Community Fireguard did not operate. When compared to other similar risk years this is an exceptional result, and one which can be largely attributed to the education and awareness programs conducted this year.

While there have been improvements in the CFA approach to bushfire management including the rapid attack of ground forces and the use of the skycrane aircraft it is clear that the significant difference between this year and others was the implementation and success of Operation Bushfire Blitz.

Bushfire Blitz cost the public of Victoria $400,000, or the approximate value of two homes in the Dandenong Ranges. The fires at Macedon and Kalorama last summer directly threatened more than a dozen homes (value approximately $2.4m), none of which was lost.

### Independent evaluation

In 1998 the CFA engaged independent consultants, Strahan Research (1998), to evaluate CFA's 1997–98 bushfire education and awareness campaign, including Bushfire Blitz. The scope of the evaluation included:

- inputs and preparation for the campaign
- outputs and implementation of the campaign
- outcomes and impact of the campaign.

The research was conducted in the form of a community survey and randomly targeted 600 residents in high bushfire risk areas. Specifically the research aimed to assess the:

- extent of exposure to the CFA campaign messages
- acceptance of key messages
- impact of the campaign on perceptions of risk and motivation to take precautions
- perceptions of the effectiveness of the key awareness and education elements of the campaign, including Bushfire Blitz
- perceptions of the CFA.

The key general findings were:

- The majority of respondents (92.2%) recalled seeing or hearing something about the bushfire risk over the last summer.
- The general level of awareness of bushfire risk was found to be high with 89% of respondents believing a fire was likely to occur in their area, with most people (63%) perceiving the risk as higher than

last year and many (26.8%) believing the risk was the same as last year.

- Most respondents rated their level of preparation as the same (46%) or greater (53%) than last year.
- The 'stay or go' message was not well understood with 53% intending to leave once a fire was in the area, 43% planning to stay and defend their homes and 3% intending to leave the area on high risk days. Interestingly over 56% expected some form of official warning of fire and 32% expected to find out about a bushfire by the presence of smoke and ash.
- The CFA is seen as committed to and an integral part of the community, by the community and the media (98% and 100% respectively).
- The respondents believe that the CFA are taking new initiatives in relation to

> **'Bushfire Blitz cost the public $400,000, or the approximate value of two homes in the Dandenong Ranges. The fires at Macedon and Kalorama last summer directly threatened more than a dozen homes (value approximately $2.4m), none of which was lost.'**

bushfire, increasing from 62% in a similar survey question in 1997, to 87% in 1998. It is reasonable to conclude that this increase is mainly attributable to Operation Bushfire Blitz as it was the only new initiative launched in the summer of 1997/98.

The key findings relating to Bushfire Blitz were:

- Although all forms of disseminating messages were rated as effective respondents rated Bushfire Blitz as the most effective in terms of raising awareness (90.7%), providing useful information (94.8%), informing people where to get information (84.6%) and motivating residents to prepare for bushfire (87%).
- Respondents (95.5%) overwhelmingly agreed (83.9% totally agreed and 11.6 agreed) with the messages that they received about bushfire from the Bushfire Blitz meetings.
- The main message respondents took from the Bushfire Blitz meetings was to prepare and take precautions (47.8%). Others recalled the main message as planning for fire (22.3%) and stay or leave (13.9%).

- As a method of improving the program 4.8% of respondents indicated that there should be better promotion of Bushfire Blitz meetings.

### The future

The CFA is evaluating the effectiveness of all its activities conducted during the summer period , ranging from awareness and education through to operational response. What is clear is that no one program has provided all the solutions in isolation. It is the full suite of integrated programs and activities that provides real benefits to the community.

The blitz style of information and education program has been successfully applied to the risk of bushfire. However it does potentially have applications for other risk environments and community safety initiatives.

While the losses from bushfire were low this year the CFA are continuing to ensure that everyone involved with bushfire management are working cooperatively to achieve even higher levels of community safety.

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# The Scarman Centre

# Learning the lessons of disaster

by Dr Simon Bennett, Lecturer in Risk Studies, Scarman Centre for the Study of Public Order, University of Leicester

The world is a risky place. Millions of years ago the dinosaurs were made extinct by a meteorite impact. A few months ago, it seemed that we might suffer the same fate—a giant meteorite appeared to be heading straight for us.

Natural disasters abound. There are floods, earthquakes, dust storms, tornadoes and hurricanes. And to add to our woes, since the Industrial Revolution we have suffered an increasing number of man-made disasters, ranging from new 'wonder' drugs that deform, poison and kill to chemicals that contaminate drinking water supplies and strip away the ozone layer, bridge collapses, train and airplane crashes and multiple car pile-ups.

Often, technologies intended to improve our lives do just the opposite. Technology, you might say, is Janus-faced. But it would be incorrect to see our situation as hopeless. According to the German philosopher of science, Ulrich Beck, the modern era is characterised not only by a multiplication of risks and hazards, but also by an increasing public awareness of such phenomena—and a willingness to protest our condition.

It is in this context of increasing risk and risk consciousness that the University of Leicester, through the Scarman Centre for the Study of Public Order, runs its two year distance-learning MSc in Risk, Crisis and Disaster Management.

## The Scarman Centre Initiative on Risk, Crisis and Disaster

One of the great tragedies of our time is that we fail to learn from our mistakes. Disasters happen. Inquires are held. Lessons are there to be learned. But months or years later the same kind of disaster occurs again. It was this unhappy pattern that led the Scarman Centre to develop its MSc in Risk, Crisis and Disaster Management. (There is also a Diploma, which dispenses with the end of course dissertation).

The MSc mixes theory with real-life case studies. This innovative approach has two objectives. First, to encourage the student to critique their present beliefs about risk, crisis and disaster management, and secondly, to encourage the student to learn from successfully managed crises, and disasters (what you might call unsuccessfully managed crises). In offering an intellectual analysis of risk and crisis alongside practical case study work, the Scarman Centre MSc may be unique in Britain.

## Course structure and administration

There are six teaching modules. Each module contains nine 9,000-word units.

The intellectual theories of risk and crisis, such as that of 'risk communication' are described in *Module 1*.

*Module 2* introduces the student to some of the current debates in risk management and investigates the relationship between risk and security.

*Module 3* covers research methods—a vital precursor to the 20,000 word dissertation submitted by each MSc student at the end of the course.

*Module 4* contains seven detailed disaster case studies, such as a description and critique of the Dutch Emergency Services' response to the 1992 crash of a cargo-carrying Boeing 747 Jumbo Jet into a block of flats close to Amsterdam's Schiphol airport.

*Module 5* introduces the concept of 'social construction'. This module is premised on the assumption that different parties to a disaster experience the event in different ways, and that successful disaster management requires an understanding of this dynamic.

*Module 6*, the final module, provides some of the world's most prominent disaster theorists with an opportunity to propose a 'best practice' for their specialism. The module includes units on post-traumatic stress syndrome, land-use planning and optimum evacuation procedures for endangered urban populations.

The MSc's first students will graduate in 1999. It is expected they will be the first of many to benefit from this unique, challenging and badly-needed course.

## Biography

Dr Bennett was educated at Neath Boys' Grammar School, South Wales. He obtained a BA (Hons) in Public Administration from Sheffield City Polytechnic, an MA in Communications and Technology and a PhD in Industrial Sociology from Brunel University, London. His research interests include the iconisation of scientific and technological developments and artefacts, and differential constructions of scientific and technological risk and hazard. He has just published a study of the 1996 FBI investigation into the TWA Flight 800 disaster in the United States. He is a member of the Emergency Planning Society and of the British Sociological Association. His hobbies are sailing, gliding and watching rugby.

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# *Risk Management:* an international journal

The management of risk and uncertainty are major concerns for modern business and society. In a dynamic and rapidly changing world organisations must find more effective ways to forecast risk, to better manage the response, and develop organisational resilience to interruption and different types of crises and disasters. Indeed, the consequences of getting things wrong can be serious including lost opportunities, lost business, loss to the environment, and even loss of life.

Risk management is now firmly on the agenda, part of the vocablulary of every successful organsation, and a core part of the management function. Organisations and governments around the world are appointing risk mangers, establishing risk departments and devising risk strategies. Wholly quantative approaches are giving way to new methods which include qualitative tools tailored to specific needs. Universities and colleges are responding with courses and research in different aspects of risk management.

The aim of this journal is to develop the subject matter of risk management and bridge the gap between practice and research. It aims to develop new thinking and good practice for those involved in different aspects of the risk business. The journal will facilitate the exchange of expertise across countries, disciplines and professions. The fundamental criterion for a paper's inclusion will be that it will generate ideas for the theory and practice of risk management.

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# NDM announces call for papers

The publishers of *Natural Disaster Management* are now officially inviting proposals from authors who are interested in writing a paper for inclusion in the book. *NDM* is the official commemorative book of the International Decade of Natural Disaster Reduction (IDNDR) 1990–2000, the United Nations initiative to reduce the negative effects of natural disasters.

Government agencies, national authorities, corporations, universities, professional and scientific institutions and individuals have joined forces over the last eight years to fight a continuing battle against the damaging effects of natural disasters. They have combined resources and, through a sharing of knowledge and expertise, have made a dedicated effort to achieve advances in, among others, scientific discovery, technological development, information dissemination, human resource management and risk management.

Alongside the IDNDR secretariat of the United Nations, NDM is supported by a number of organisations,

including UNESCO, World Health Organisation, World Meteorological Organisation, the International Federation of Red Cross & Red Crescent societies and Emergency Management Australia. Alan Hodges, Director General of EMA, is a member of the book's Editorial Advisory Board.

An editorial nomination form can be obtained from the publishers by sending an e-mail to ndm_uk@msn.com or telephoning +44 116 251 5123.
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# Stormwater drainage responsibility in Sydney

The Sydney Water Corporation is one of the largest corporatised water utilities in the world and it figures prominently in the lives of every citizen and visitor to Sydney. Sydney Water is responsible for a vast range of functions, from interception, storage, the delivery of safe drinking water, waste water disposal, to the management and maintenance of stormwater drainage. Operating licences have been granted to a number of monopoly water utilities in Australia in recent years, and this helps separate the operation functions from regulation. In the case of Sydney Water the charging regimes are regulated by the Independent Pricing and Regulatory Tribunal. From time-to-time the Tribunal publishes a Discussion Paper and invites submissions on specific issues prior to conducting an inquiry, and makes a determination on a new pricing structure (which is normally upward).

It can be seen from the following submission to the Tribunal that people need to be vigilant to ensure that 'history is not rewritten' purposely to the disadvantage of consumers, rate-payers, and in this instance occupiers of land subject to flooding from a sometimes inadequate stormwater drainage system in the Sydney metropolitan area.

The moral of the story is that one must stand back to observe the whole, otherwise the incremental uncoordinated focus on discrete public policies can cumulatively impact unfavourably on hazard mitigation planning and management. While these consequences are not necessarily the original intention, it behoves those of us who have the time, opportunity and inclination to maintain a watching brief over public policy in the interests of the community, and the fine work carried out by our front-line emergency service staff.

The following letter was recently forwarded to the Independent Pricing and Regulatory Tribunal. While substantial sums of money are being collected by way of a stormwater drainage levy, flood mitigation work has been limited, leaving many property owners near storm drains continuing to be at risk from flooding.

QUOTE:
Dear Independent Pricing and Regulatory Tribunal

by Des Lambley

Re: Review of Sydney Water Corporation's Stormwater Charges and Expenditures: Call for Public Submissions, Sydney Morning Herald 19 December 1997

The following comments are submitted for consideration as part of this review. I wish to place on record my concern about a number of misleading assertions produced in the Information Paper, and assist IPaRT in being truly independent in its Determination.

## Introduction

Background detail is provided to place the subsequent critique in its proper context. It is shown that stormwater has been a responsibility of Sydney Water for a very long time. Concern is expressed about the failure to address the primary function of a stormwater drain, and of the low priority accorded to this responsibility by Sydney Water. Misplaced emphasis in this Review and in a subsequent Determination will only encourage Sydney Water to continue to suppress this responsibility. IPaRT should not be seen as condoning or endorsing this action. There is evidence of misinformation, disinformation and poor data being published in a number of Sydney Water's statutory documents. Customers need to know how widespread this practice is. The customer needs to be assured that IPaRT's Review will not be misled with false data and advice. The customer needs to believe that such a Review is incisive and robust, driving greater transparency within this monopoly utility.

Concern is expressed about the poor representation in IPaRT's Information Paper about Sydney Water's focus on stormwater responsibilities. Operating Licence compliance audits are wrongly quoted to project the image that Sydney Water gets a 'thumbs up'. If the auditors words are compared with those quoted in the Information Paper, it can be seen that Sydney Water is not the 'good corporate citizen' that might otherwise be implied.

The situation is shown to be even more convoluted, and made obscure rather than transparent, by virtue of the mechanisms

applying to the Operating Licence and Environmental Plan, and their annual audit. Close reading of the annual compliance audits, the Licence Regulator's covering submissions, and the Minister's Tabling notes illustrates that the interpretation of these documents has been cause for concern since Sydney Water was corporatised on 1 January 1995.

It is argued that the issue of cross-subsidies for stormwater drainage funding has a precedent that now seems to bind both Sydney Water and IPaRT.

Customers have cause to be suspicious of Sydney Water's motives and honesty when it is shown that the close nexus with Australian Water Technologies (AWT) results in a subsidisation funded in part by Stormwater Drainage levies.

The comparison of various quotations from published material suggests that AWT is little more than a feint operation used to obscure the real structure and overheads of the parent company. IPaRT must truly be seen by Sydney Water's customers as their advocate in rooting out such deception.

## Background

The Metropolitan Water and Sewerage Act (10 June 1890) established an authority in Sydney empowered to control, regulate, operate, harvest water, distribute, treat and dispose of waste including stormwater. Specifically, Part I, clause 2 said that a sewer was, "*any sewer or drain of what kind so ever whereby any liquid refuse or any water shall be carried of*". Clause 5 (13) provided for the drainage from roads and streets into sewers. The legislation enabled the Water Board to construct common drainage to the ocean. It also specified that waste waters carried in these drains were to be freed from all excrement and other foul or noxious matter that would pollute the receiving waters. While this was progressive legislation, and more honoured in the breach than in the observance over the intervening 100 years, the recent corporatisation of Sydney Water has not changed these responsibilities.

In introducing the Corporatisation Bill into Parliament in 1994, the Hon. RJ Webster, the Minister then responsible for the Sydney Water Board, said the environmental groups had welcomed the
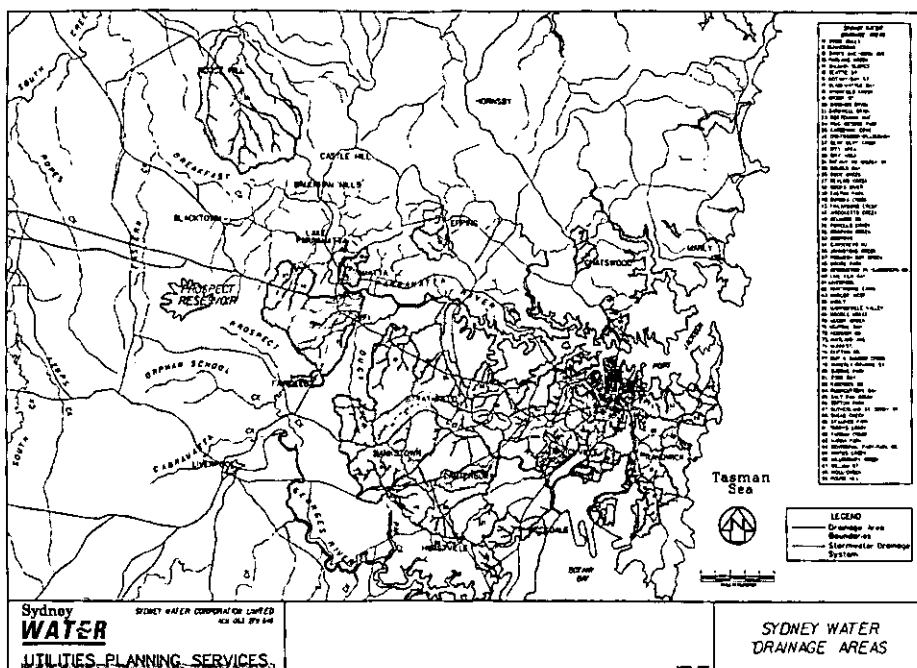
*Sydney Water drainage areas: It is not understood why drainage areas 1 to 9 are omitted from this statutory document.*

legislation as a *'world precedent for water management'* and that Sydney Water would be required to give *equal weight* to commercial, environmental, social and public health aspects of its operation. Transparency of operations, effectiveness and efficiency, along with a customer focus were other important objectives. These principles remain.

As a consequence of those legislative changes, the Water Board (Corporatisation) Act 1994, makes Sydney Water Corporation responsible for the trunk drainage part of the stormwater infrastructure in the older parts of the metropolitan area and at Rouse Hill. Sydney Water is audited each year for compliance with the requirements enunciated in the legislation, its Operating Licence and other subordinate documents. Sydney Water is obliged by clause 3.2 of the Operating Licence to *'provide, operate, manage and maintain the stormwater drainage system transferred to Sydney Water under Part 3 of the Act ...'*

Clause 1.2(c) of the Operating Licence and clause 2.4 of Sydney Water's Customer Contract acknowledges a responsibility for providing a trunk stormwater drainage service for the transportation of stormwater in the systems under its control in accordance with the relevant terms set out in the Contract, the Operating Licence and the Act. Sydney Water charges property owners for these services (*vide* Operating Licence clause 6.2) where the land is within a declared stormwater drainage area as defined in Sydney Water Corporation's *Drainage Areas Map, April 1997* (Schedule 2 of the Operating Licence 1994).

## Wrong emphasis: equal weight

IPaRT's Information Paper places a great emphasis on the pollution element of stormwater, hence a number of references to the Environment Protection Authority, even though people (as just another organism) must be regarded as part of the greater 'environment'. Conversely, nothing is said about how the State Emergency Service Act underpins the responsibilities of the State Emergency Service in respect of flood matters, including the binding of the Crown (s.6) and the protection of people and property from flooding. Section 10 of the State Emergency and Rescue Management Act 1989 requires the portfolio Minister to ensure *'that adequate measures are taken by government agencies to prevent, prepare for, respond to and assist recovery from emergencies'*. The State Emergency Service Act designates the State Emergency Service as the lead combat agency (read primary regulator) for flooding in New South Wales.

The primary function of a stormwater drain is to transport stormwater so that it does not pose a threat to life and property. It is only as a consequence of this primary role that it becomes the transporter of pollutants. It is therefore proper to try and ensure that water so carried *'be freed of material that would pollute the receiving waters'*.

I considered it important for IPaRT not to perpetuate the myth that stormwater drainage has no flood mitigation function or that this function is unimportant. The Foreword to the Information Paper makes no mention of a 'flood' context and the document itself provides a biassed emphasis on the pollution element by this omission.

This is probably unintentional on the part of IPaRT.

Sydney Water's *Drainage Areas Map* identifies one dry detention basin (presumably with a flood function) in Marrickville and a total of 7 wet/dry basins (presumably with a multi-purpose flood function, including 4 GPTs) at Rouse Hill.

## Misinformation, disinformation or poor data?

Sydney Water's *Annual Report* (1995) says it is responsible for *345* kilometres of stormwater drains, but Sydney Water's *Annual Environment Report* (1996) says the length is *440* kilometres, and the *Annual Report* (1996) says it is *510* kilometres. This is a variation of 165 kilometres or a massive 33% inaccuracy—in Statutory Reporting Documents! The 1995 licence regulation audit report indicated the distance is *354* kilometres. To make this even more hilarious, IPaRT's *Information Paper* (p.35) now says there are *506* kilometres of stormwater drainage under Sydney Water's control.

There seems to be many different stories told by many different people within Sydney Water who are either careless with detail or ignorant about the extent of the stormwater drainage asset. There would be concern if drainage levies were not expended on the same length of stormwater drainage serving customers from whom drainage levies are extracted. Such inaccuracy can only erode public confidence in other data published by Sydney Water. It contributes to an untrustworthiness. This is even more important for IPaRT as it has to carry-out a review and hand-down a determination that may be based on selective or doubtful data presented to it by the Sydney Water Corporation.

## Transparency

Details about income from the Drainage Levies and the expenditure on stormwater drainage construction and maintenance cannot be identified in any meaningful way from any of Sydney Water's public documents. To its credit IPaRT's Information Paper now discloses these facts. In the interests of transparency and full disclosure, there should be an obligation for this kind of data to be published on an annual basis.

## Operational audits

IPaRT Paper, A2.3 Operational Licence Audits (Page 16)

Use of the Licence Regulator's general covering statement for one independent audit (1996) to the Minister is misleading. The citation should be compared to the detailed comments made by each of the two inde-

pendent auditors about Sydney Water's Operating Licence compliance with their stormwater responsibilities. These reports paint quite a different picture to that referred to in IPaRT's Information Paper. May I draw to your attention that specific commentary.

## 1995 Operational Audit

'*Sydney Water also operates some stormwater drainage systems within its area of operations, constituting 354 km of stormwater drainage channels. The Operating Licence and Environment Plan both include requirements with respect to these stormwater systems (p.54) ... During 1995 there were no EPA licences for stormwater transport or discharge. Sydney Water therefore interprets its requirements with respect to stormwater systems as being to meet the specific targets listed under Objective 16.9 in the Environment Plan. These targets are to participate in the EPA Stormwater Task Force, the State Stormwater Coordinating Committee, which has now superseded the Task Force and appropriate Catchment Management Committees (p.55) ... Sydney Water has participated in the EPA Stormwater Task Force since 1993. The Task Force reported in November 1994 and recommended that a State Stormwater Coordinating Committee be established. Sydney Water has continued its representation on this committee.*

*Sydney Water is also represented on sixteen catchment management committees and actively contributes information on the performance, operation and maintenance of a number of prototype pollution control devices on stormwater channels. Sydney Water communicates relevant studies on stormwater monitoring to government agencies involved in stormwater monitoring ... it is not the role of this audit to determine whether Sydney Water has complied with the requirements of its pollution control licences (that rests with the primary regulator, the Environment Protection Authority) ... however the auditors must assess compliance with the Operating Licence requirements...Comments by the EPA on Sydney Water's performance have assisted the auditors in developing their view in this section (p.57) ... Sydney Water has fully complied with its requirements with respect to stormwater drainage systems as set out in the Environment Plan (p.60).*' (1995 Audit Report)

As can be seen, the 1995 audit report simply reiterates Sydney Water's emphasis on the pollution problem in stormwater discharges and it overlooks entirely those problems of increased water volumes, discharge efficiency, stormwater infrastruc-

ture asset maintenance and flood mitigation works.

## 1996 Operational Audit

'Sydney Water operates and maintains 510 km of stormwater drainage channels and is preparing stormwater management plans for 48 catchments. Long term solutions to stormwater quality and flooding issues are being addressed through involvement with the State Storm Water Coordinating Committee and Catchment Management Committees. In short, the impacts of under capacity in the drainage systems and the consequent risk of flooding have not been considered in management plans, and the current flooding risk to customer properties has not been addressed.

*Sydney Water has achieved only **partial compliance** with the requirements for stormwater management because requirements to minimise the consequences of flooding are not fully addressed. It is recommended that in the short term, in cooperation with local councils, Sydney Water should ensure that current areas of high risk are identified and customers in these areas are made aware of mitigation measures they can apply to minimise the consequences of flooding*'. (1996 Audit Report p.3.22)

This statement by the 1996 auditor speaks for itself. Quite specifically, Sydney Water has adopted a minimalist responsibility for flood damage from inadequate stormwater systems that are their responsibility. It could be inferred from the auditor's criticism that income from Drainage Levies might for many years have been squirrelled away as general revenue and used for other purposes.

There is an onus upon Sydney Water to identify how all of those moneys collected since 1992–93, have been disbursed. Expenditure on various committee 'gabfests' can hardly be seen as 'works'.

## Environment plans

Sydney Water's 1996 Annual Environment Report focuses on protecting rivers and oceans (3 sections), and conserving water supply and other resources (2 sections). It makes no mention of protecting people (a resource as one of the three factors of production) from stormwater flooding. Equal weighting for social, health and safety is an obligation clearly specified in the Water Board (Corporatisation) Act 1994, Section 21. The Environment Report discusses the improvement of stormwater management, but focuses on pollution issues in the inner urban areas, and only admits involvement in flood minimisation works at Rouse Hill (see page 43).

Although the Operating Licence is issued under the authority of executive government, I understand that approximately half the scope of the Licence Regulator's annual compliance audit is defined in Sydney Water's Environment Plan and the Demand Management Strategy. These ancillary documents were published by Sydney Water after the Operating Licence was granted. The Operating Licence requires annual audits to be undertaken of the Corporation's progress in the implementation of its environmental objectives against the targets published in the Environment Plan. However, the Operating Licence does not require an evaluation of the targets themselves. Significantly, the first Environment Plan (undated) included nearly ninety targets, approximately half of which restated statutory or Operating Licence requirements. There was but one tenuous linkage to 'flooding', viz *'participate in the EPA Stormwater Task Force and Catchment Management Committees'.*

The second Environment Plan (published in 1996 by Sydney Water) is a heavily truncated version of the 1995 Plan that includes only nine targets, seven of which are restatements of statutory or Operating Licence requirements. There is but one flood related mention, viz. *'manage stormwater systems ... to minimise ... the consequences of flooding'.* More importantly, it should be noted that neither edition was submitted for Government approval, nor exhibited for public comment, and the current version can be changed by Sydney Water at any time. It is understood that Sydney Water has produced a 1997 Environment Plan—the third in 3 years!

Sydney Water's continually evolving Environment Plan should fully reflect all statutory objectives, including measurable targets for stormwater (flood) management. The management and financial detail for this responsibility must be fully transparent and auditable.

As the primary financial regulator, it is understood IPaRT in effect 'certifies' that Sydney Water has carried out the work commensurate with the justifications they would have put at previous IPaRT hearings, and to the level of fees and charges subsequently determined by IPaRT on those occasions.

## Cross subsidisation

The Hon. Ernie Page MP, Minister for Local Government, when shadow Minister for the Sydney Water Board in 1990, supported the concept that all benefiting householders should be charged for drainage and flood mitigation work rather than being subsidised by the community at large (Local

Government Bulletin, December 1990, p.24). Today, the elimination of cross-subsidies is central to National Competition Policy reform protocols and in accordance with recommendations contained in IPaRT's general determination on water and service charges for monopoly utilities (SPR/94/01).

It would be duplicitous if Sydney Water were to now argue that additional income is necessary to fund its stormwater responsibilities in greenfield sites such as Rouse Hill, or where retrofitting is necessary in the older parts of the metropolitan area by a broad cross-subsidisation. The same principle should apply to stormwater drainage levies as has been determined by IPaRT for sewerage backlog contributions (Determination SRD/97/01), that is, those benefitting should be the ones to pay.

Conversely, if stormwater drainage is ever to be viewed as a community service program, then all of the income derived from drainage levies should be spent on that asset, or otherwise the levy should be reduced.

## IPaRT Paper, Table A4 (p. 12)

It would be useful to include another table (or another row) to show the number of employees of Australian Water Technologies Pty Ltd (AWT) over this same period. A comparison could then be made between that commercial arm and Sydney Water as to the extent of customer supported cross-subsidisation. That is, although employee numbers in Sydney Water have fallen, the number of employees in AWT (or other obscure commercial arms) may have proportionally increased. I believe this suspicion is made more relevant by the Auditor-General's recent criticism of Sydney Water's support payment to AWT of $9.1m in the last financial year.

Moreover, AWT has stated (Annual Report 1997): *'The Company entered into a commercial agreement with its parent which formalised the business rules that apply to trading between the two entities. In accordance with the terms of that commercial agreement, the parent reimbursed the Company $9,092,993 representing net costs incurred by the Integrated Asset Services business of the Company for the financial year. The purpose of this payment was to ensure the retention of specialist skills within the Company which the parent may need to call upon from time to time to fulfil its role and objectives'* (p.32). It has also admitted providing *'high level of electrical and mechanical maintenance services'* to Sydney Water (p.8). Even more outrageous is the cross-subsidisation admitted by Sydney Water in AWT's Annual

Report that *'… we wish to confirm that Sydney Water Corporation Limited will provide whatever financial support or assistance, if any, to ensure that AWTPL is able to satisfy its existing debts, anticipated loan repayments and the obligations under any existing or future guarantees'* (p.3).

There appears every reason to believe that AWT is used by Sydney Water as a 'shelf' on which to park an essential workforce and to hide the real operating overheads of Sydney Water Corporation. AWT's Report provides evidence for this construction to be drawn. This subsidised entity appears to be a purposeful device to effectively prevent public disclosure by Sydney Water, and to maximise the 'commercial-in-confidence' defence to avoid public scrutiny.

By way of inference this gives further reason to suspect that Sydney Water is breaching its Operating Licence conditions relating to the requirement not to hinder market competition (clause 1.5). Can there be a guarantee that any of the $9.1 million support payment made by Sydney Water is not used in some way to allow AWT to 'compete' unfairly in the marketplace? Also, will any of the 'support payment' for 1996–97 be repaid to Sydney Water from AWT future profits? If not, then every customer is cross-subsidising annually an obscure, creative, fenced-off enterprise over which they have no control.

It would seem wrong that Sydney Water could argue for an increased price path income from customers in the Drainage Areas and then flagrantly use part of that income to cross-subsidise AWT. Customers of Sydney Water would expect that IPaRT will address the global implications of Drainage Levies and general disbursements on their behalf, as their only economic advocate. (See *Daily Telegraph* 22 January 1998, and the *Auditor-General's Report to Parliament 1997,* Volume Three, pp.577–591).

The suspicion that moneys are obtained and appropriated in ways that are not made transparent is given further substance by IPaRT's Table B1 (p.36) which shows that only one third of the income derived from drainage levies is spent on the stormwater drainage asset. When viewed across the five reporting years in Table B2, and by simple arithmetic calculation, it seems that 376,677 of Sydney Water's customers (those paying drainage levies) have cross-subsidised other un-named Sydney Water activities to the value of $70m, or $14m per year for the last 5 years! I am concerned about this. There is every reason for customers to suspect that Sydney Water is abusing its monopoly position.

## IPaRT Paper, A3.3 referring to Sydney Water's Water Plan 21 (pages 19–20)

The summary detailed here makes no mention of upgrading stormwater drainage assets to deliver efficient and effective stormwater drainage, or to the mitigation of the effects of flooding. This is a serious omission. It is further evidence of the low priority promoted by Sydney Water to this responsibility.

## Summary

Fortunately, excess stormwater in metropolitan Sydney is not a routine seasonal problem that generates much community awareness or outrage. However, outrage will occur when the community begins to believe their stormwater charges are being misappropriated. Overall, it seems many of the messages being propagated by Sydney Water are misleading, and IPaRT needs to be cautious not to endorse that.

I, and the rest of Sydney Water's customers I suspect, would be buoyed by your independent and robust review of stormwater charges and expenditure issues, including those matters referred to above.

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Des Lambley is a part-time student at the University of New South Wales. He is finalising his PhD research on the topic of 'Public policy and the development of floodplains: political expediency, marginalised ethics and commercial imperatives'.

# New publications

### Rain of iron and ice: the very real threat of comet and asteroid bombardment

Lewis, John S.
Addison-Wesley, Sydney, 1997
Introduction—Stones that fall from the sky —Target: Earth—stealth weapons from space—Brighter than a thousand suns— The space age: the cratered planets— Near-Earth objects—The bashful face of Mars —Ends of geological ages—Earth's twin —You found what on Mercury?—Comet and asteroid families—Craters in the ocean don't last—Effects on human populations—The fiery rain: simulations by computer—What can we do about it? (240 pages).

### The crisis manager: facing risk and responsibility

Lerbinger, Otto
Mahwah, N.J.: Lawrence Erlbaum, 1997
Communicating in an era of crises—An era of crises —Contingency planning—Communicating during and after a crises—Managing seven types of crises—Natural crises—Technological crises—Confrontation crises—Crises of malevolence—Crises of skewed management values—Crises of deception—Crises of management misconduct—Improving management performance—Risk management and communication—Ethics: a moral code for executives—Issues management and stakeholder relationships—Conclusions—The crises manager (384 pages).

### Critical incident stress management CISM: a new era and standard of care in crisis intervention.

Everly, George and Mitchell, Jeffrey T.
Ellicott City, Md.: Chevron Pub., 1997
Provides educators, trainers, and lecturers a survey of key definitions and concepts pertinent to the field of critical incident stress management (slide set).

### The river dragon has come!: the Three Gorges Dam and the fate of China's Yangtze River and its people

Quing D., Thibodeau J. and Williams P.
M.E. Sharpe, Armonk, NY, 1997
The three gorges project: a symbol of uncontrolled development in the late twentieth century—A profile of dams in China—The world's most catastrophic dam failures: the August 1975 collapse of the Banqiao and Shimantan Dam—Discussing population resettlement with Li Boning—General plan for population resettlement—Is development resettlement possible?—The environmental impacts of resettlement in the three gorges project—What are the three gorges resettlers thinking? —A survey of resettlement in Badong County, Hubei Province—Resettlement in the Xin'an River power station project—The danger to historical relics and cultural antiquities in and around the three gorges area: interviews with the director of the National History Museum of China, Yu Weichao—A lamentation for the Yellow River: the three gate gorge dam—Water pollution in the three gorges reservoir—Military perspectives on the three gorges project (240 pages).

### Research on social work and disasters

Streeter, Calvin and Murty, Susan (eds.)
Haworth Press, New York, 1996
Introduction—Disaster research in social work—A primer for social work research on disaster—Predictors of rural community survival after natural disaster: implications for social work practice—Research as social action in the aftermath of Hurricane Andrew—Community responses to chronic technological disaster: the case of the Pigeon River—Social vulnerability to toxic risk—Inter-agency collaboration and hazards education in American communities (160 pages).

### Economic consequences of earthquakes: preparing for the unexpected

Jones, Barclay G. (ed.)
National Center for Earthquake Engineering Research, State University of New York at Buffalo, Buffalo NY, 1997
New strategies for dealing with the earthquake hazard—What happened in Kobe and what if it happened here?—Some problems in the assessment of earthquake hazard in the Easten United States—Scenario earthquakes for urban areas along the Atlantic seaboard of the United States—A tale of two cities—Mitigating risks to lifeline systems through natural hazard reduction and design—Seismic performance of ports: lessons from Kobe—Prioritising New York City bridges according to earthquake hazard criteria—Built value and earthquake risk—Adopting a seismic code to protect the buildings of New York City—The natural disaster boom theory: or window breaking our way to prosperity—Impacts of recent disasters on businesses: the 1993 midwest floods and the 1994 Northridge earthquake—Forecasting the economic impact of a midwest earthquake—Impact of catastrophic losses on the insurance industry—Preparing for the unexpected—Recommendations for future action (273 pages).

### Dealing with disaster

Great Britain, Home Office
Brodie Publishing, Liverpool, UK, 1997
Third edition
Introduction and civil protection arrangements—The combined response—Command and control and co-ordination—The care and treatment of disaster victims—Information and the media—The voluntary sector—Central government and lead departments—The combined approach to planning, training and exercising (57 pages).

### The Texas City Disaster 1947

Stephens, Hugh W
University of Texas Press, Austin, 1997
First edition
On April 16, 1947, a small fire broke out among bags of ammonium nitrate fertiliser in the hold of the ship *Grandcamp* as it lay docked at Texas City, Texas. Despite immediate attempts to extinguish the fire, it rapidly intensified until the *Grandcamp* exploded in a blast that caused massive loss of life and property. In the ensuing chaos, no one gave much thought to the ship in the next slip, the *High Flyer*. It also exploded sixteen hours later.

This is the story of the Texas City explosions, America's worst industrial disaster in terms of casualties. In this book, Hugh W. Stephens draws on official reports, newspaper and magazine articles, personal letters, and interviews with several dozen survivors to provide the first full account of the disaster at Texas City (141 pages).

# The need for private dam safety assurance policy — a demonstrative case study

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Most private dams were constructed more than 20 years ago. As such, their designs could only be based on rainfall frequencies and intensities and standards of risk available at the time. However, many aspects have changed over time such as population distributions, infrastructure patterns, meteorological information, engineering methods and design standards, together with the condition of the dams, raising serious doubts about dam adequacy.

Significant advances made in the fields of meteorology and flood hydrology have updated both maximum possible rainfalls and design flood levels those on which most existing dams were based. As a result of these revisions, many dams have inappropriate spillway capacities. This is an issue receiving much concern and attention worldwide.

Consequently, the recognition of risks associated with the dams have increased greatly. A need has therefore developed for owners to appropriately manage their dams in line with current standards in order to reduce the risks involved, reflect community standards and provide increased dam safety assurance to downstream communities. In addition, as it is the role of Government to protect the community, an associated need has also developed for Government to provide appropriate policies which assure the community of owner participation and which protect them from unacceptable dam safety management practices. A case study reported in this paper demonstrates these needs.

## Dam safety management in Australia
In Australia, owner obligation exists under common law to take reasonable care of dams according to *current prevailing standards*. Hence, owners should review their dams, and take appropriate action where necessary, in order to avoid liability for possible failure consequences (McKay and Pisaniello, 1995). The status in regards to this in Australia is discussed in the following Sections.

## Safety assurance policy
Throughout Australia, most Government dam-owning agencies have assumed the responsibility of evaluating public dams in terms of risk in accordance with current guidelines, and subsequently have either undertaken or are in the process of implementing appropriate action to reduce the risks to modern acceptable standards. For example, in NSW works on Pindari Dam to upgrade the spillway and increase the storage capacity of the dam were recently completed at an overall cost of $68.8 million over a period of approximately four years (NSW Dept. of Land and Water Conservation, 1995). This came on top of Burrinjuck, the major upgrading works of which were completed in August 1994 at a cost to the State of $73.8 million over approximately six years (NSW Dept. of Water Resources, 1994). The costs of upgrading these two dams alone represent 0.10% and 0.08% of NSW Government revenue over each period respectively (NSW Parliament, *Budget Papers*, 1988–95).

NSW also is taking a responsible approach to the problem of safety of its privately-owned dams (Pisaniello and McKay, 1996). Elsewhere in Australia there is no supervision over the management of these structures. Webster and Wark (1987) report that owners of private dams are wary of any controls which are likely to add significantly to their costs. Consequently, private owners in general are either ignoring, underestimating or simply remain unaware of the risks and hazards associated with their dams and are frequently guilty of not maintaining the structures. Too often, owners look only upon the benefits gained from their dams and not the hazards which the dams could generate. Local Government bodies are unable to rectify the situation as they lack the power to ensure that owners take remedial action. As a consequence, potential hazards to neighbouring residents and properties exist placing people and community infrastructure at unnecessary risk.

For some time, the Australian National Committee on Large Dams (ANCOLD) has been aware of this problem and has continually expressed concern over the matter. ANCOLD believes that there is a need for regulation and supervision and that this is best provided through uniform dam safety legislation. In 1972, ANCOLD prepared guidelines for dam safety legislation, and proposed that each State should implement such legislation together with establishing an independent control authority. In response, virtually all of the State Governments have acknowledged and attempted to act upon these concerns and proposals by drafting and submitting varying forms of dam safety Bills to their respective parliaments. Unfortunately, due to a high level of political ambivalence, attempts to enact these Bills have not been successful in all States.

To date, only three of the six States and two Territories have been successful in establishing sound statutory control over dam management. However, while Queensland and Victoria have incorporated workable dam safety provisions within existing statutes, NSW is the only State to implement a specific dam safety Act under which an independent dam safety enforcement committee is constituted. Therefore, despite ANCOLD recommendations, there is still a need to ensure that communities are protected against dam management practices leading to unreasonable risk. States which fail to establish some form of safety assurance policy on the management of potentially hazardous private dams are, in effect, unconsciously devaluing the lives of people living downstream of these dams compared with the lives of those living downstream of public dams to which attention has or is being given: South Australia is one of these States.

## Reservoir flood capability standards
The Australian National Committee on Large Dams sets the standard for modern acceptable practice in dam safety management in Australia. ANCOLD (1986) pro-

| Incremental Flood Hazard Category | Annual Exceedance Probability |
|---|---|
| **High** | PMF to 1 in 10,000 |
| **Significant** | 1 in 10,000 to 1 in 1000 |
| **Low** | 1 in 1000 to 1 in 100 |

*Table 1: ANCOLD (1986) Recommended Design Flood Exceedance Probability Standards*

vides minimum prescriptive standards on appropriate design floods for dams, known as Recommended Design Flood (RDF) standards. ANCOLD relates RDF to dam hazard potential based on a 3-level hazard rating system (*Table 1*). The criteria used by ANCOLD for the three hazard categories can be summarised as follows:

- *high hazard potential*—failure will endanger many lives in a downstream community and cause extensive damage
- *significant hazard potential*—failure may endanger some lives and cause extensive damage
- *low hazard potential*—failure poses negligible risk to life and will cause limited damage.

The acceptable RDF determined from Table 1 can be compared to the Imminent Failure Flood (IFF) of an existing dam to determine whether its spillway flood capability is adequate. Guidelines for determining the IFF of a dam are provided in ANCOLD (1986). In line with modern acceptable practice, these guidelines must be used in association with both: Australian Rainfall and Runoff (AR&R) (IEAust, 1987), which provides state-of-the-art engineering methods and design criteria for hydrological/hydraulic reservoir flood studies; and modern generalised Probable Maximum Precipitation (PMP) estimates determined by the Bureau of Meteorology as described by Pearce and Kennedy (1993).

Unfortunately, the above engineering processes are highly rigorous and time-consuming in practice and therefore generate high consulting fees. For this reason, owners tend to neglect the need for reviewing their dams and instead develop a sense of complacency, believing that as the dams have not failed up to now, then they will never fail. The result is that dams are deprived of necessary upgrading and downstream communities are placed at risk. The case study reported below, based on the policy-absent State of South Australia, demonstrates the potential seriousness of this problem.

## The South Australian case study
In South Australia, concern over the need for private dam safety assurance policy has been expressed by many, for example:

'The construction of farm dams in the flood-prone catchments around Adelaide is a potential cause of concern. It is not known what safety standards have been adopted for their construction, or whether they pose a significant risk of failure. Under current legislation, there is no means of controlling construction or maintenance of farm dams. The lack of power to ensure safety during and after construction has in the past and will in the future, inevitably lead to failures and the exacerbation of flood flows in the river systems. The Flood Warning Consultative Committee through its representatives on the State Disaster Committee, urges the Government to introduce legislation and controls and the establishment of safety standards for the construction and maintenance of farm dams' (Flood Warning Consultative Committee SA, 1990). The seriousness of these concerns has been determined, described below.

## Case study procedure
As part of a case study investigating private dam safety management practices in South Australia, the modern flood capabilities were determined of a sample of eleven hazardous private reservoirs located in the Mount Lofty Ranges of South Australia (Pisaniello, 1997). A brief outline of this work is given below.

- The eleven dams were selected on the basis that they be 'referable' in size and rated as either 'significant' or 'high' hazard in accordance with ANCOLD (1986) guidelines.
- The sample dams were all embankment-type structures and had typical spillways that were free flowing and weir-type in nature. The maximum wall heights of the dams ranged from 5.5m to 10.7m; their storage capacities ranged from 50 ML to 250 ML; the size of their catchments ranged from 0.256 km² to 5.141 km².
- Hydrological/hydraulic models of the dams and their catchments were constructed using the RORB runoff routing package, based on procedures described in Laurenson and Mein (1990).
- Design rainfall information was derived as follows:
  - from AR&R (IEAust, 1987) for storm events in the observed range (i.e. up to 100 year ARI);
  - from Bulletin 53 (Bureau of Meteorology, 1994) for the Probable Maximum Flood (PMF) event
  - using interpolation procedures described in AR&R (IEAust, 1987) for events between the 100 year ARI and the PMF.
- The RORB catchment model parameters, $k_c$, m and catchment losses, Initial Loss

(IL) and Continuing Loss (CL), were determined for each case in accordance with procedures described in AR&R (IEAust, 1987). As each sample catchment was ungauged, $k_c$ and m were determined from regionalised information provided in AR&R. Catchment losses for events in the observed range were transposed from neighbouring gauged catchments of similar size and with similar physical characteristics, while, for events in the extreme domain, IL/CL=0/1 (mm, mm/hr) was consistently adopted in line with AR&R guidelines.

- An Annual Exceedance Probability (AEP) for the Probable Maximum Event (PME) was determined for each sample dam using the procedures outlined in AR&R (IEAust, 1987). For small catchments up to 100 km², this is mainly dependant on the value of the following ratio:

$$- \log (X_{PM} / X_{100}) / \log (X_{100} / X_{50}) \quad (1)$$

where:

$X$ represents the peak event magnitude, for either rainfalls, flows, or flood volumes

$X_{PM}$ denotes the Probable Maximum event

$X_{100}$ denotes the 100 year ARI event

$X_{50}$ denotes the 50 year ARI event.

AR&R divides Australia into two zones and provides limiting AEP of PME criteria for each based on the value of Equation 1. In line with these criteria, 8 sample catchments attracted an AEP of PME of 1 in 10⁷ while the remainder attracted 1 in 10⁶.

- The RORB model was used to determine peak inflows to the reservoirs for all events necessary up to the PME. This enabled an inflow flood frequency curve to be established for each dam.
- The RORB model was then used to route all inflow hydrographs through the reservoirs for both an upper bound and lower bound 'start' storage level case:
  - Upper bound case—initial storage level assumed 100% full.
  - Lower bound case—initial storage level assumed 33% full.
  - The lower bound case was checked simply to eliminate uncertainty.
- The resulting peak outflows and corresponding peak water levels obtained for all recurrence intervals up to the PMF enabled an outflow flood frequency curve and elevation frequency relationship to be established for each dam for both cases of 'start' storage level.
- The Imminent Failure Flood (IFF) capability, being the flood which when routed through the reservoir results in a peak storage level equal to the lowest

elevation on the non-overflow crest (as recommended by ANCOLD (1986) for embankment dams), was determined in each case from the associated elevation frequency relationships of the dams.

The case study results are presented in the following Section (see Table 2).

## Case study results and analysis

The results of the case study were analysed by comparing them against ANCOLD criteria as illustrated in Table 2.

ANCOLD (1986) guidelines recommend that unless normal operating conditions indicate otherwise, a 100% full 'start' storage level should be assumed when assessing spillway flood capability of embankment dams. The comparison in Table 2 demonstrates that regardless of the 'start' storage level assumed, many hazardous private reservoirs with inadequate spillway capacities do exist in the Mount Lofty Ranges of South Australia. The risk of failure from overtopping is consistently unacceptable for 91% of the total sample and 100% of the High Hazard sample. In particular, the flood capabilities of five of the six High Hazard dams (83%) displayed exceedance probabilities in the order of those required for **Low** Hazard dams under ANCOLD requirements (ie: 1 in 100 to 1 in 1000 AEP). It is important to note that three of these dams (Dam Numbers 1, 2 and 3) **do not** even satisfy the required criteria for Low Hazard dams. These disturbing results demonstrate that owners are not taking action in terms of analysis and upgrading of their structures and that the need for some form of private dam safety assurance policy in South Australia is urgent.

## Providing appropriate private dam safety assurance policy

In order to provide increased dam safety assurance to downstream communities, it is necessary to educate private dam owners so as they are made to realise their responsibilities and liabilities in accordance with the dictates of common law, and also to establish some form of regulatory control over dam management practices to ensure that owners appropriately manage their dams in line with current standards. A detailed review of international practices conducted by Pisaniello (1997), see also Pisaniello and McKay (1996), indicates that this can be best achieved with the establishment of properly organised, systematic dam safety programs based on dam safety legislation. At the very least, considering that downstream communities ultimately bear the risks associated with dams, they should have the 'right to know' the potential dangers they are living under and be provided with the opportunity for salvation

| Dam no. | Minimum hazard rating | IFF if 100% full 1/AEP | IFF if 33% full 1/AEP | ANCOLD guidelines IFF range 1/AEP | Acceptable under ANCOLD guidelines? |
|---|---|---|---|---|---|
| | (High/Sig.) | (years) | (years) | (years) | (Yes/No) |
| 1 | High | **40** | 800 | PMF–10,000 | No |
| 2 | High | **80** | 290 | PMF–10,000 | No |
| 3 | High | **97** | 1600 | PMF–10,000 | No |
| 4 | High | **150** | 1150 | PMF–10,000 | No |
| 5 | High | **320** | 680 | PMF–10,000 | No |
| 6 | High | **2750** | 3300 | PMF–10,000 | No |
| 7 | Sig. | **190** | 2000 | 10,000–1000 | No |
| 8 | Sig. | **130** | 570 | 10,000–1000 | No |
| 9 | Sig. | **280** | 2300 | 10,000–1000 | No |
| 10 | Sig. | **500** | 2700 | 10,000–1000 | No |
| 11 | Sig. | **1400** | 6400 | 10,000–1000 | Yes |

*Table 2: Comparison of flood capability results with ANCOLD Guidelines*

in the event of failure though appropriate Emergency Preparedness Procedures provided for under legislation.

Overseas experience together with the experience of NSW, demonstrates that dam safety programs are workable and not too costly. Elements of best practice can and do exist successfully to control the safety management of private dams and in turn provide increased dam safety assurance to the public and promote the ideals of reducing loss of life as well as environmental and economic losses. Pisaniello (1997) provides detailed guidelines and criteria for determining 'appropriate' safety assurance policy for any jurisdiction.

## Conclusion

There is a clear need in States where hazardous private dams exist to ensure that owners review and maintain their dams in line with current acceptable practice and take appropriate remedial action where necessary. Adequate assurance can only be provided through the implentation of appropriate policy which requires the backing of law-makers. The results of the case study reported here should encourage such backing.

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Refereed

# The Port Arthur shootings — Royal Hobart Hospital staff response

by Rosie Crumpton-Crook,
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This paper offers an anecdotal account of my observations, (as Staff Counsellor) of the ways in which staff at the Royal Hobart Hospital coped with the immediate and longer term aftermath of the Port Arthur shootings.

In a paper as brief as this, it is impossible to cover all the events that have happened since 28 April 1996, so this is a very personal selection it is what stood out for me. For the sake of confidentiality I have kept my observations general, where I use more specific information I do so with the permission of the staff members concerned.

Hospital staff see trauma and sad situations routinely and to some extent develop ways of dealing with this. The Port Arthur Massacre however, was very different, it went way beyond boundaries of the routine and it appeared to effect staff very deeply and for a long time. There were a number of reasons to make this situation so different:

- The scale of it—35 people dead and 22 injured.
- The international media interest. Within one hour of the first news of the shootings, the BBC in London was telephoning the evening Nurse Managers in the hospital. In less than 24 hours there were two satellite dishes and about fifteen media crews on the front lawn of the hospital.
- Our hospital received all of the injured *and* the alleged perpetrator. Some staff came into contact with both consequently, some were to experience confused and mixed emotions.

There was also a misunderstanding among some of the community who commented on the poor management practice of having the alleged gunman in the same hospital as the injured. There are certain facilities at the Royal Hobart that are not available at other Tasmanian hospitals, all of the injured, the alleged gunman included, had to be admitted to the one hospital. Our hospital mortuary doubles as the City Mortuary, so in addition to the gunman and the injured we also received all 35 dead.

Our hospital is in an unusual situation, if this Disaster had occurred in a large mainland city the load would likely have been shared among a number of hospitals.

- The fact that it was a deliberate act.

Sister Susie Jones, a member of the emergency department staff dreamt up the title of this paper, she said that the whole thing was 'within our training and capabilities, but beyond our comprehension', her statement illustrates so well how staff felt. The hospital's response ran very smoothly, but for staff, the difficulty was witnessing the distress of the injured and their relatives, hearing their horrific accounts of what they had witnessed, and feeling helpless in response. Staff spoke of being overwhelmed by what they were seeing and hearing.

In my role as Staff Counsellor, what became instantly apparent was the very great sensitivity required when dealing with any aspect of the disaster response. This was illustrated by the differing opinions amongst staff about what we should call it. Was it the Port Arthur Massacre, the Port Arthur Shootings, the Port Arthur Disaster, the Port Arthur Tragedy, the Port Arthur Incident, or just Port Arthur?

All of these options have been bandied about endlessly, and I have had my head bitten off more than once for using a term which someone does not feel happy with.

But if we have such difficulty in agreeing on a name for the event, and if any number of people are upset by the use of one or other term, it gives an idea of how careful and how sensitive people need to be during the aftermath of such a monumental event.

What was to become clear during those early days and weeks was that our understanding of the events unfolding was to be stretched to the limit. We were bombarded with flowers, with messages of support, with advice, with offers of practical help. These interactions were overwhelmingly positive and created a tremendous feeling of being supported and cared for, but although this was something good in the midst of horror for some staff their feelings were of being emotionally swamped. They did not want this good stuff to stop or go away, but it too became a challenge to manage.

So how did staff manage? Well there were distinct phases that we moved through:

There was the first day. When people received that initial phone call that gave news of the Disaster, many were unsure if it was real or not. Some felt it just had to be an exercise. The more cynical amongst us said that they knew immediately it was the real thing because it was Sunday and the hospital would never plan an exercise, which involved paying double time!

Even when people realised it was real, everything still felt unreal. The descriptions most used by people were 'unreal, beyond comprehension, overwhelming'.

In the initial stages the worst thing was the waiting. People were fearful of what was to come and fearful of someone familiar being among the injured. There was also a great fear of stuffing up, of not being up to the task.

When the injured started to arrive the hospital's response swung into action seemingly without a glitch.

At the end of their shifts many staff did not want to go home and some had to be forced to do so. Many people remained in a hyped up state for days. A lot of people reported that they didn't sleep for a number of nights.

Monday morning brought the realisation that the alleged gunman was to be admitted. This came as a surprise to staff, most had assumed that he would not survive. All of the staff I spoke to who were to be involved in his treatment just accepted that it was part of their duty to care for him. None were too impressed with the idea, but contrary to some media reports no one refused to work, all in all the staff's reaction was 'well we just have to get on with it'.

There then followed a hectic and fraught seven days until Bryant was transferred to Risdon Prison. It is hard to describe the atmosphere in the hospital during that time. For the first two and a half days the body identification process was going on. a succession of relatives were assisted through the process by hospital staff and police. One Senior Nurse Manager who had a major involvement told me that she was

devastated when she learnt that due to the requirements of forensic evidence she was not allowed to do anything to the bodies. Not being allowed to wash the bodies, to make them look their best went against the whole grain of her nursing philosophy. In an effort to make some small amends she dressed in her smartest clothes every day, she said it was her way of showing respect for the deceased and their relatives. It soon became evident that it wasn't only those people closely involved with the identifications who were upset, other staff told of being distressed at seeing groups of grieving, weeping relatives, of trying to avoid them in corridors and of feeling entirely overwhelmed.

The Tuesday after the Disaster was I feel, the day when people hit their lowest ebb. The enormity of what had happened had sunk in, and the exposure of the hospital to the world media was beginning to grate.

At this stage timed seemed to be suspended. People would comment about something that had happened last week, then realise what they were talking about had happened yesterday.

During that first week the hospital was crawling with Police and Security Staff. Police Officers were at every entrance, and stationed at various points throughout the hospital. Relationships between hospital staff and the police was excellent, but this did not prevent the feeling of unease that there was in the hospital.

Martin Bryant was transferred from the hospital, to Prison, on Sunday 5 May 1996. Walking into the hospital the next morning the atmosphere was completely different, the big security presence had gone and the feeling of relief was tangible.

In the first two weeks the team work was phenomenal. There was that classic post disaster period when everyone loved one another. All the usual bureaucratic restrictions went out the window.

By weeks three and four the hospital system was returning to normal and there was much grieving amongst staff for the return of that post disaster goodwill. Generally, the atmosphere around the place was flat. People did not want to talk about the Port Arthur incident any more, except that you always did end up talking about it.

At this stage, people were inclined to be ratty, fuses were short. Just about all the well wishing flowers had died. Then by week five things were picking up and returning to normal, until a major episode of industrial action was to come along and blow things apart again.

The industrial action was unpleasant with staff of different unions pitted against each other. One union in particular was felt

to have handled the episode very inappropriately so soon after the shootings, this resulted in significant numbers resigning from the union in question. It was a very distressing few days to have to witness, the team-work and support of a few weeks ago seemingly forgotten.

One hundred days after the shootings the media returned, the one hundred days seemed significant to them. It is interesting that most of the interviews never went to air or appeared in print.

The first anniversary was a tough time for many. In the hospital it was marked quietly with a 15 minute Memorial Service and the media were asked not to attend. Many people saw the first anniversary as a major hurdle to overcome and there were a few sighs of relief when 29 April dawned.

A short time after the first anniversary there was a particularly unpleasant murder–suicide in Tasmania when a father murdered his four young daughters while they slept, then committed suicide. This horrific crime appeared to send shockwaves through the hospital and my telephone ran red hot with people reporting that they were re-experiencing the grief they had felt after the shootings, some people said they felt worse.

So, looking back, over the past year or so, what effect has the shootings had on staff, what has helped and not helped?

In the early days people reported having intense physical and emotional reactions, the most common being:
• headaches and sleeplessness
• dry mouthed, being permanently thirsty
• nightmares
• feeling fuzzy headed — having poor concentration
• lack of appetite, or eating comfort food
• weepy, heightened emotions
• increased alcohol consumption.

For most people these subsided after a couple of weeks.

More recently some staff have reported that they now lock themselves in the car when driving—something they have never done before. People report feeling 'edgy' in crowded places, choosing tables in restaurants that face the door.

For some people the first anniversary brought with it intrusive thoughts and flashbacks. A fundraising sticker showing an autumn leaf, a yellow ribbon and the words 'The Port Arthur Appeal' was launched in Tassie. It has raised much needed funds, but I had a number of staff say to me that they hate it. They will be driving along having not thought of the shootings for a while, they see this on the back of a car and all the memories come flooding back.

We have had three workers compensation claims directly related to the shootings with two pending, the latter being triggered by the first anniversary. I suspect that this is not a true reflection of the effect on staff. We will probably never know the true figures.

Some other factors that have worked against healing and have exacerbated stress symptoms includes:
• the intrusion of the media and the endless re-running of the details of 28 April
• a small minority of the people who contacted the hospital to offer help or advice or gifts behaved in a way so inappropriate we were sometimes left speechless, and their actions left staff who dealt with the them frustrated and weary
• the bomb scares, the abusive phone-calls received while Bryant was a patient added to anxiety levels
• there have been ongoing problems at the Port Arthur Historic Site and on the Tasman Peninsula generally and this inevitably has an effect on staff.

I have already mentioned the episode of industrial action. Add to this a major building program going on in the hospital with its disruption and noise. A redundancy program, the restructuring of the Health Department, changes in the hospital's structure, a new Chief Executive Officer and you see that all in all it has been a tiring and at times tiresome couple of years.

What helped with the healing process for some staff was the fact that they had worked on the Sunday night. The teamwork on the first night was amazing and the memory was to sustain us through the next few days when things did not always run so smoothly. Those who did not work the Sunday night did not have the good memories to help them. This came to be something of an issue so that we ran separate debriefings for those who had worked on the Sunday night and those who had not.

Supportive telephone calls, facsimiles, letters, flowers came from all over Australia and beyond. Other hospitals sent hampers and even staff, who volunteered to work on their days off so as to allow our staff an extra break. The circulation of flyers containing basic information about stress reactions generated an amazingly positive response from staff. People commented on how reassured they have been to read that their symptoms were considered to be normal behaviour.

For some people Critical Incident Stress Debriefing was to help. In all, 32 formal CISDs were run in the first two weeks. Over 300 staff attended.

Some staff did not feel comfortable with the group debriefing approach and chose instead to access one-to-one counselling or the anonymous and independent Port Arthur Counselling Telephone Hotline.

Countless informal debriefings were also held, some taking the form of social gatherings. On the Wednesday after the shootings the C.E.O. shouted drinks for all staff at the pub across the road. The Burns Unit staff who were caring for Martin Bryant did not attend. They said they would have felt too awkward doing so, they were not sure how their colleagues would react to them.

Of particular help to the recovery process was the more ritualistic events. The minute's silence that was observed on the front lawn of the hospital and which stretched to quite a few minutes.

The Memorial Service was also held on the front lawn a week after the tragedy. Some of the symbolism was very comforting to staff. Different coloured balloons were released symbolising the different coloured ID badges worn by the different disciplines who had worked so well together, all professional boundaries forgotten.

A significant boost was given to the healing process when Martin Bryant pleaded guilty. The relief throughout the hospital was audible and palpable! We no longer had to call him the ALLEGED gunman. At long last we received information about Bryant's personality - something we were previously deprived of. Dr Ian Sale a Forensic Psychiatrist who had interviewed Bryant made a statement which was to significantly assist some people in coming to terms with what had happened, 'Think of Bryant as a freak', he said, 'think of him as a natural disaster'! Thinking of him in these terms made it easier to believe that a similar event would not happen again.

So what are the lessons to have come out of the Port Arthur shootings? For me they would have to be:

- A recognition of the enormity of the emotional impact that such an incident can have on staff. I am not sure how we could ever adequately prepare people for such an event, but we must look more closely at pre-incident education.

- I believe there is a need to de-mystify the counselling and debriefing process. We need to place a lot more emphasis on the basics of care and compassion for colleagues, peer support, listening and empathy. We need the structured response programs but they are not single magic solutions, we also need to remember that we as individuals have a responsibility for ourselves and for each other.

- We must ensure that we do not develop tunnel vision with regards to CISD. It became evident that some people saw this as being a quick fix-it solution to their stress reactions. We need to work harder at promoting a holistic Critical Incident Stress Management package.

- Lastly I learnt just what phenomenal work my colleagues are capable of. I feel honoured to have been a part of the hospital workforce at that time.

At the time of the Port Arthur shootings, Rosie Crumpton-Crook was Staff Counsellor at the Royal Hobart Hospital. She left the hospital in February 1998.

# New publications

## Illusions of safety: culture and earthquake hazard response in California and Japan

Palm,,Risa and Carroll, John
Westview Press, Boulder, Colo., 1998

Earthquake hazards in Japan and the United States—Social and behavioural science and the study of human response to earthquake hazards—Description of the empirical study—General description of respondents—Attitudinal characteristics—Culture and risk perception—Adoption of mitigation measures—Beliefs about government aid and public policy measures—Implications of this research for public policy (119 pages).

## Mitigating the impact of impending earthquakes: earthquake prognostic strategy transferred into practice

Vogel, Andreas and Brandes, Klaus (eds.)
A. A. Balkema, Rotterdam, 1997

Earthquake prognostics: from fundamental research to practical measures of protection—A few comments on earthquake disaster prevention—Studies about crustal structure and crustal dynamics using converted waves—Teleseismic body-wave spectra for earthquakes in the Hellenic arc—Self-organisation and evolution of seismicity—Sesimic electrical signals recorded by VAN-system in Greece and their contribution to earthquake prediction—The earthquake sequence in Volos, Central Greece, April 1985 and its temporal and spatial variations and focal mechanisms—Modelling earth current precursirs in earthquake prediction—Estimation on the duration of strong ground motion—Description methods for earthquake-induced slope and ground hazards—Seismic hazard assessment in Albania at national level—A Bayesian seismic hazard model for Greece and surrounding areas—Influence on local site conditions on surface strong ground motions parameters in near and far field conditions—Analysis of strong motion records from two tectonically active areas in Greece—Statistical analysis of the damages by Manjil earthquake—Two methods for soil-structure interaction with seismic excitation—Protection of historical centres against earthquakes in Italy—Earthquake vulnerability, loss and risk assessment in Turkey—A critical review of current seismic codes—Consequences of a strong seismic activity in Costa Rica—Earthquake-resistant design of large building structures—Cyclic loading behaviour of bolted end-plate connections of structural steelwork—Experimental development for earthquake resistance of low-cost housing systems in Colombia—Town and country planning in earthquake regions with regard to seismic microzoning—Aspects and chances in geoscientifical cooperation between Germany and Japan (407 pages).

## Tasmanian lifelines project: Hobart lifelines project report

Tasmania State Emergency Service,
State Emergency Service, Hobart, 1997

This report is divided into two parts.

*Part 1* is a summary of the outputs from the project.

*Part 2* contains an outline of the project's methodology, the strengths and weaknesses of the project's methodology and recommendations for future lifeline projects. This part is aimed at those wishing to understand why the project was initiated, how it was initiated, the processes used and how future projects can be enhanced as a result of the lessons learnt from this project (30 pages).

## Floods: people at risk, strategies for prevention

Miller, John B.
United Nations Publications, New York, 1997

Introduction—Causes of floods—Flood plain management—Structural counter measures—Non-structural flood defence—Dam safety—Emergency response —Conclusions (93 pages).

# A social work perspective on the response to the Port Arthur crisis

## Introduction

Since 28th April, 1996, we have been asked many questions about the part social workers played in the response to the massacre at Port Arthur: where did you start, what did you do, how did it feel, how useful and relevant was your social work training? Today, with reflective accounts of our particular experiences, we attempt to answer those questions.

## 'This couldn't be true! things like that don't happen here!'

For those of us old enough, hearing about the Port Arthur shootings evoked memories of the news that John F. Kennedy had been assassinated. Many people still recall where they were and what they were doing when they heard of his death and they remember their feelings — disbelief, confusion, shattered sense of security, and intense sadness.

These are the memories and the feelings that returned on Sunday afternoon, 28 April, 1996, as the news filtered through that someone had run amok at Port Arthur and 15 or so were dead.[1] This couldn't be true, we said. Things like that don't happen here! Soon, interruptions to the radio football coverage confirmed that it was true, that something quite awful had happened here, in our state.

A news item announced that an Emergency Crisis Centre was being set up at Rokeby Police Academy. This was a responsibility of Department of Community and Health Services and I anticipated that they would need additional resources from the community. I telephoned, identified AASW and gave an assurance that the Branch could provide qualified workers as required.

## 'Man on tightrope'

Soon after came the call from Rokeby. Busloads of people who had been at Port Arthur at the time of the shootings were being brought to the Crisis Centre. More workers were needed to attend to them. The selection of the clip-art picture, 'man on tight rope' at this point of the presentation represented the trepidation and anxiety of that evening. How does one prepare for such circumstances? These are some of the things that seemed important that night:

- Practical items: box of tissues, full tank of petrol, contact names and addresses,

by Janet Whelan, Hobart, Tasmania

Presented at the Australian Association of Social Workers, National Conference, Canberra, 21–24 September 1997

notebook and pencil
- Belief in the strengths and traditions of the social work profession
- Knowledge of the fine record of Tasmanian social workers in dealing with the aftermath of other local disasters[2]
- Confidence in the value and relevance of training in Critical Incident Stress Management[3]
- Identification of key social work knowledge and skills

## 'Counselling services have been set up'

From that Sunday night through the following month, 1 became part of a comprehensive support service organised by the state Department of Community and Health Services, working with departmental staff on telephone counselling rosters and at counselling sites established on the Tasman Peninsula. The range of tasks we attended to was vast.

On the Sunday night at Rokeby, we assisted those who had witnessed shootings, had felt vulnerable and under immediate personal threat. Their need to talk and be listened to was great. Others had seen and heard little but had been detained on the site for many hours. Vehicles and luggage had been impounded and people were concerned about retrieving property and reorganising travel arrangements. It was late in the evening and they were all tired. Most important, however, was their need for information about what had happened and whether the gunman had been apprehended. That night, we listened, we provided information, as far as we were able, we confirmed practical arrangements, made hot drinks, and got people back in buses to be taken to hotels.

On telephone rosters, we took details from people offering accommodation for relatives and friends of the deceased and injured and we listened to people who were distressed or sleepless. All were trying to make some sense of what had happened. Others were concerned about neighbours or friends connected in some way with the

events at Port Arthur. We talked with parents anxious about how to answer questions from their children. We provided information about common responses to trauma and details of where personal support might be obtained.

At the counselling sites on the Peninsula, we responded to similar calls, directly or by telephone. Sometimes we sat through the night with those who could not sleep. At weekends at Port Arthur, we listened to visitors who had made a determined effort to come down to the site, in support of those who were affected by the tragedy or because the place had special personal or family connections. Others had resolved that one person's actions should not end their enjoyment of a loved place. Some wanted to talk about gun law reform, their support for it or their feeling that it would be unfair to responsible citizens.

## 'The quality of the service depended on the quality of the listening'

Media reports about serious incidents invariably conclude with a comment that 'counsellors will be attending'. In quiet moments and in forums held since the shootings, we have questioned the nature and effectiveness of counselling in such circumstances. Does it ease pain or risk causing more harm then good? What should be the training of counsellors and to whom should they be accountable? Where does counselling fit with debriefing?

Disquiet has been expressed about the possible intrusiveness of some services. We have questioned what seems to be the establishment of a grief and disaster industry with 'experts' ready to fly to every new location. We have wondered about the dominance of psychology and psychiatry in post-disaster work and asked ourselves if there is a response that is distinctly 'social work'. The opportunity to work alongside

members of other professional groups provided opportunities to observe core social work skills in action. They included the following:

- *Sound assessment skills—the ability to see and start 'where the client is'.* Described by Bell (1995) as the 'systems and person-in-environment perspective', social work looks at the client and his present circumstances in relation to the impact of other experiences in his life and the availability of other support systems. Interventions are tailored to meet immediate needs whilst harnessing resources and strengths for longer-term care.
- *The ability to listen and to be comfortable with silence.* 'The quality of the service depended on the quality of the listening', said manager Peter Fielding when reviewing interventions after the first few days. For many people the opportunity to be listened to objectively, patiently, and compassionately and to feel 'heard' in the midst of emotional chaos was supportive and sustaining. (The importance of listening is also mentioned by Newburn (1993, p.132) who considers that renewed emphasis needs to be put on 'listening skills' in professional education.)
- *Knowledge of the processes of grief and loss.* Social workers have extensive experience in assisting clients to deal with loss and grief in many life situations. This knowledge can be applied to appreciate the emotional trauma of those caught up in sudden, violent incidents.
- *Knowledge of community resources and the ability to make appropriate referrals.* Many of the people to whom we responded came from other parts of the country. For local people, it was not intended that crisis counsellors would provide continuing services. Identifying appropriate support agencies, networking to make contacts and arranging referrals for clients who needed further help were key tasks.
- *The ability to educate through the provision of appropriate information.* Many clients needed reassurance that the feelings they were experiencing did not mean that they were going mad or overreacting. Some needed information to help them answer their children's questions. In this process, we were greatly assisted by the flow of information, brochures, and booklets that came from other parts of Australia to distribute to people in the community.
- *Experience in providing services within the community.* Social workers are experienced in home visits and outreach

work and are able to adapt to working away from desks and offices. This work took us to unfamiliar places and to work stations that had been set up us part of the crisis response. We were comfortable to work by the side of the road or under trees at Port Arthur, in the State Emergency Service depot at Nubeena, in the dining hall at the Police Academy, or in temporary telephone booths. We were also willing to do practical tasks, such as serving drinks, finding medication for headaches, making phone calls, or checking information when these were assessed as the immediate concerns.

While other professional groups may claim to have expertise in these areas, they are skills central to social work practice and grounded in long experience in responding to crises. It is important that they are owned and that continuing training for disaster work is provided for all social workers in order to reinforce and promote the contribution the profession is able to make.

## Caring for the carers

How did we look after ourselves and what effects did we feel from this trauma? Our professional training may heighten our awareness and provide some preparedness for the impact of tragic events but it does not give protection (Cwikel 1993). Whilst we are helping others to cope, we are dealing with our own sense of vulnerability, sadness, and confusion. These feelings may be put on hold or we may fight to keep them at bay whilst our energies are absorbed in service delivery. Eventually, they need to be confronted. These are some of the events and gestures which assisted workers in Tasmania:

- Attendance at memorial services, including the one at St David's Cathedral where the lighting of 35 candles in memory of the victims reinforced the enormity and reality of the massacre
- The positive experience of building links with colleagues through working together and debriefing informally during and after shifts
- The creativity of a social worker who organised local fitness clubs to set up a rest, revive and relaxation centre where workers could go for massage
- The gesture of a resident who arranged pedicures for social workers she knew as her practical contribution to the community response
- The receipt of cards, letters and faxes from social workers around the country
- The sending of written resource material which workers interstate had found useful in their practice

## 'And now it's time to be debriefed'

For many workers, this was the first experience of being debriefed or debriefing others. An aura of mystique seems to have grown up around debriefing, with a view that it must be conducted by specially trained mental health workers, normally psychologists and psychiatrists. My own study of the subject and my experiences of being both a participant and a leader in the process assure me that debriefing lies well within the capabilities of social work. The effectiveness or otherwise of debriefing is the subject of much debate (Robinson, 1995). To add to the discussion, I record these observations:

- *Debriefing needs to be demystified.* The debriefing role is a facilitating one and there is nothing in the process that is beyond the capacity of an experienced social worker; however, *preparation, emotional energy, focus and confidence with group processes are necessary*
- A model for debriefing provides an important *framework* to give structure and direction for leaders and participants. Strict adherence, however, may introduce a rigidity into the process that is not necessarily helpful for the participants. Within any framework, there must be scope for adaptation in order to provide for the special circumstances of each group.
- *Sound interpersonal skills,* demonstrating empathy, listening, reflecting, summarising, information giving, are the tools by which the process is implemented, all within the capabilities of social work.
- The *language* used and any material distributed as handouts must be carefully chosen. The educative part of the process is designed to inform workers about *possible* reactions. It should help them to identify and mobilise their own resources and coping strategies and to feel comfortable about these. The process should not result in increased anxiety or an expectation that disturbed behaviour is inevitable.
- The *allocation of time* to participate in debriefing and the acknowledgment by management of the extraordinary work undertaken by their staff are likely to be as significant and helpful for the staff as the debriefing process itself.

Bell (1995) believes strongly that social workers constitute the profession of choice to bring traumatic stress intervention to those in the workplace. With our 'unique perspective' we can identify where teams are needed, which debriefing design is appropriate and we can develop and lead debriefings. I am sure she is right; however,

it is imperative that social work is confident to claim its place in this area of practice. It can do this by attention to continuing rigorous training, demonstration of professional practice, recording its experiences and promoting evaluation and research wherever possible.

## 'I feel guilty that I'm not there to help'

It might be expected that most social workers, faced with tragedy would wish to contribute directly to response work. There will be some, however, for whom reactions to these events are so intense and so personal that they are not able to contribute effectively to service provision.

These responses need to be validated and decisions not to participate in crisis work should be respected. Other workers have referred to the competition that can arise between workers and organisations (Newburn 1993, 131), and of the guilt felt by workers who cannot be involved, perhaps because of distance from the scene or family commitments.

In Tasmania, the identification and rostering of workers appeared haphazard and there are reports of those who felt anxious or concerned about their professional competence when they were not called.

It is also important to be clear that there is not a hierarchy of tasks. The overall response needs to be viewed as a 'big picture' with value placed on cumulative rather than individual tasks. Credit also needs to be given to those workers who remain on duty in their agencies, ensuring minimum disruption to usual service delivery.

## 'In just twelve weeks the daffodils will bloom'

At the public memorial service at Port Arthur on 19 May, 1996, the choice of readings and music encouraged belief that recovery was possible. The Premier's looking forward to the blooming of the daffodils, symbols of the brightness and new life of spring, and the remarkable shining of the sun as the service concluded were reminders that there would surely be brighter times ahead.

There is no doubt that the experience of working in the aftermath of the Port Arthur massacre will stay with us forever. We will look back sadly at some aspects - the fact that it happened at all, our difficulty in understanding why, the despair and disruption it brought to so many people. We will also remember warmly the positive experiences we had despite the sadness of it all, the camaraderie that developed with colleagues, demonstrations of hope and

goodwill, the comments from clients that indicated our contact had brought some relief.

I hope that we will continue to explore the issues around responses to disasters, consolidate our knowledge and develop and practice our intervention skills. It is not possible any longer to think that these things do not happen to us, only to other people. Tragic events in my work place and in our local community since the Port Arthur massacre are sombre reminders that tragedy can strike without warning in any place and at any time.

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Robinson C. and Mitchell J. 1995, 'Getting some balance back into the debriefing debate', *The Bulletin of the Australian Psychological Society*, October.

Scott M. 1997, *Port Arthur: A Story of Strength and Courage*, Random House Australia.

## Resource material and leaflets

Australian Army, 1st Psychology Unit, *CISD and PTSD* (see section on 'Supporting Caregivers').

Australian Army, 1st Psychology Unit, *Stress management guide*.

Australian Red Cross, *Coping with a major personal crisis*, booklet.

DCHS Tasmania, *Coping with a tragic event*.

Gordon R. and Wraith R., *When children learn about trauma*.

Gordon R. and Wraith R., *The family and personal crisis*.

# Stronger bonds between the Tasmania State Emergency Service and Charles Sturt University

The Tasmania State Emergency Service and Charles Sturt University have collaborated in the last three years by offering through Distance Education the Bachelor of Social Science (emergency management). The course is very successful and is going from strength to strength. There has also been significant interest in both a post graduate qualification such as a Masters degree and providing the course for overseas students. These initiatives require a full-time course coordinator to be established in the new School of Public Health on the Bathurst campus of the Charles Sturt University. The Director of the Tasmania State Emergency Service and the Tasmania Police Commissioner, Mr Richard Macreadie, agreed that Mr John Lunn, the Manager of Training and Development, could be seconded to Charles Sturt University for a minium of two years to coordinate the course full time and establish the other initiatives for the benefit of Emergency Management throughout Australia and overseas.

The contact details for John Lunn are now:
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# The Tasmania Fire Service School Fire Education Program

by Greg Butters
Co-ordinator Community Education
Tasmanian Fire Service

Fire is part of everyday life. For everything from the backyard barbecue to the power that drives our automobiles, fire is an essential tool. Yet fire is also a danger. Every year hundreds of people are touched by the destructive power of fire. Too often, the destruction is triggered or amplified by ignorance. When people fail to understand fire hazards, when they panic during an emergency, they not only risk their own life; often their irrational behaviour can place other lives in danger.

The School Fire Education-Tasmania Program was designed to address this problem. It was initiated in the belief that it is not enough to just promote general awareness of fire and it's hazards. We need to increase specific knowledge levels to change response behaviours. To do that we need to educate our children to protect themselves from fire and burns. Periodically, coronial reports highlight this fact, and further studies of statistics indicate that it is either the aged or the very young groups of our society that are the most likely fire victims.

This information made it apparent to the Tasmania Fire Service that a structured fire education program should be formulated and implemented. This was reinforced by community groups and the Education Department, which indicated that whilst it would cooperate fully, the resources and training to deliver a fire safety component was neither available nor budgeted for.

It was recognised that for decades firefighters have been involved with school visits and teaching fire safety to children throughout Tasmania, but there was no formal structure to their teaching methods. Firefighters each had their own interpretation of what was relevant and what children should know, all with good intent and purpose. Although this approach was certainly better than no approach at all, it was not structured in a way that would ensure all school children received the same important fire safety messages.

Children are a precious resource that need to be protected from the trauma and dangers that fire can present, and certainly the importance of teaching children fire safety is not contested. Whilst the Tasmania Fire Service School Fire Ed Program does not deliver anything new to primary school children it is certainly more structured than the 'old ways', providing easy to follow lesson plans with the relative resources required to deliver the message effectively. This ensures that every primary school child receives the same information. The program encourages parents to take an active role in their child's fire safety education with tasks sent home to be completed and returned to the instructor for comment and marking.

The Tasmania Fire Service has four full time School Fire Education Instructors, who are trained professional firefighters, to

> **'Fires can be a very frightening experience for children. When most children are frightened they tend to hide from the danger. The Instructor encourages children not to hide if they are trapped in a fire but to yell out to raise attention to where they are trapped.'**

deliver the program. One instructor is located at Devonport (North West Region), one at Launceston (Northern Region) and two Instructors are located in Hobart (Southern Region). Each Instructor is responsible for making contact biennially with the schools in their respective areas.

The program is directly aimed at children in Prep Grade through to Grade 6. However, children attending kindergarten do receive a limited amount of exposure to the program. Instructors visit kindergarten children and demonstrate to them what a firefighter looks like in his turnout gear and breathing apparatus. The objective is to teach them not to be scared of this 'Darth Vader' like creature coming through the smoke to rescue them.

## Prep Grade
Prep Grade children receive two lessons lasting for approximately 30-40 minutes duration. Lesson One involves the instructors introducing themselves to the class telling them where they work, how long they have been a firefighter etc. The children are assured that they may never have a fire, but just in case, they are there to show them what to do should they ever be involved in one.

Prep children are encouraged to dress up in purpose-made turnout gear with the Instructor. At this stage the protective clothing a firefighter wears to fires is explained. This is turned into a game with the children racing to beat the instructors to finish putting their turnout gear on.

Fires can be a very frightening experience for children. When most children are frightened they tend to hide from the danger. The Instructor encourages children not to hide if they are trapped in a fire but to yell out to raise attention to where they are trapped. Children are given the opportunity to see what a firefighter looks like when wearing breathing apparatus and are encouraged to touch and feel the mask and listen to the noises the firefighter makes when they breathe with the mask on.

Children are taught the effects of smoke on humans and shown that smoke rises and good air can be found down close to the floor. At this stage the Instructor teaches children to crawl low in smoke, turning this section into a game by getting the children to crawl under some chairs or a stick.

The second lesson involves participation in Stop, Drop and Roll activities and encourages children to keep at least one big step away from heaters. The instructor shows children how to Stop, Drop and Roll and explains why they must never run if their clothes catch fire, why rolling on the fire extinguishes it. A catchy song called Stop Drop and Roll is introduced at this stage to encourage the children to participate and practice the actions.

Information on burns is taught to children and dispels the 'butter, ice and ointment' fallacies. The message is that if they receive minor skin burns then running the effected area under cold water for around 10 minutes is the correct action to take.

At the completion of each lesson the children are given homework, which in turn encourages their parents to participate in the valuable lessons taught to the child.

## Grades 1-4

Grades 1-4 receive five lessons. The information is similar to that taught to Prep but additional information is introduced and more in-depth explanations given to the older children. A simplified version of the structure of the Fire Service is explained. Children are also shown the different functions a modern Fire Service performs, such as rescue, building inspections, fire investigation and our public education roles.

Again breathing apparatus and protective clothing are shown and worn by the instructor, who encourages the children to ask questions and touch the protective equipment to allay any fears they may have.

The action to take when phoning information about an emergency through is explained. Children are taught the number they have to ring (000), to convey what type of fire it is, the address of the emergency, if there is anyone hurt or trapped and to give their name and phone number.

As with all buildings, it is important to have some form of emergency procedure should an emergency occur; the family home being no different. Home Fire Escape Plans are explained and they are shown how to develop their own Plan taking into account a safe meeting place such as the letter box. They are taught to ring the Fire Service from a neighbour's house and never go back into a burning building. Home Fire Escape Plan handouts are given to the children to take home and, with the help of the family, they are encouraged to draw up their own family's escape plan.

The instructor explains the importance of smoke alarms and ask the class who has at least one smoke alarm installed in their home. This also assists us to measure our public education campaigns in relation to the number of homes with smoke alarms.

The action in the event of a fire is explained, children are encouraged to sleep with their door closed, to roll out of bed rather than sit up, the correct way to crawl to their door and to touch it with the back of their hand to ascertain if it is safe to open. Children are asked how many exits there are in their bedrooms; and it is explained that every room should have alternative exit such as a windows or a door.

Most family homes contain items that are hazardous, not only to children but their parents as well. Children are asked to identify the potential fire hazards in their own homes. Double adaptors, power boards, electric blankets and hazards in the kitchen, as well as flammable liquids, are discussed with the children.

An activity sheet is used to teach children to recognise how normal everyday items can become dangerous when used incorrectly or complacently.

Possibly the most important lifesaving devices people install in their home is a smoke alarm. The School Fire Ed instructors reiterate the importance of smoke alarms and explain what approved types are, and their correct maintenance. A practical example of how they work is demonstrated.

## Grades 5 and 6

The lessons for Grades 5 and 6 are enhanced to those previously taught, however, because of their age, more information can be given. Additional information is also taught to these grades.

The false perception people have of fire due to films such as *Backdraft* and similar films must be explained. Firefighters in

> 'In Tasmania, every primary school age student receives this comprehensive fire and safety education program. Each year around 40,000 students receive a fire safety certificate and every student undertaking the program also completes a home fire escape plan.'

these films enter buildings with little or no protection and it is a common misconception that people can in fact breathe smoke. It is explained to children that it is necessary for the 'stars' in these films to be seen, therefore not allowing them to wear breathing apparatus, helmets and in some instances no protective clothing. Additionally, children are made aware of how much smoke fires generate and that in these films there isn't a lot of smoke produced.

A video is shown to the children and at the end they are asked to identify all the faults. Most children are able to identify that the firefighters were not wearing breathing apparatus, they enter burning buildings with their turnout coats open, there is no smoke and that they enter burning buildings with uncharged hose lines.

At this age children can be taught a little bit about the theory of combustion. The fire triangle is used to show children how fires burn and how they can be extinguished. This lesson ties in with previous Stop Drop and Roll lessons.

The Grade 5s and 6s are introduced to the dangers bushfires can pose. The three major causes are explained. Bushfires are started deliberately, through human carelessness and from nature. A video of the NSW bushfires of 1994 is shown to demonstrate the ferocity of bushfires.

To reduce the risk of the family home burning down should a bushfire threaten, pre-planning is vital. Part of this pre-planning is good housekeeping. Children are encouraged to help their parents clear vegetation from around their homes, remove leaves and sticks from guttering and to make sure their home has an alternative water supply.

As families prepare for the fire season they are encouraged to stay with their homes during a bushfire situation and to close all doors and windows until the fire front has passed.

As mentioned the lessons taught to these grades are very similar to previous lessons. As the child gets older and more responsible the information given to primary school children is increased. The program topics provides basic safety procedures and survival skills that we believe are necessary to enable students to prevent fire or assist them survive a fire situation.

Feedback from staff, students and parents indicates that the long-term benefits are of great value to the individuals and the community. Documented evidence supports this program. The skill, knowledge and actions of children who have been exposed to the program has prevented injury, and reduced the impact of fire in several incidents.

The School Education Program is now an integral component of the Community Education Unit of the Community Fire Safety Division.

Course material and parent–teacher evaluations are reviewed constantly to ensure that the program continues to achieve its objectives. We are conscious of the need to maintain, upgrade and continually develop the program to meet the needs of our changing society.

In Tasmania, every primary school age student receives this comprehensive fire and safety education program. Each year around 40,000 students receive a fire safety certificate and every student undertaking the program also completes a home fire escape plan.

Children have a unique association with 'Firemen' that no other emergency service can emulate, which certainly contributes to child response in relation to our fire safety education programs. The Tasmania Fire Service School Fire Education Program will continue to work toward reinforcing the bond between children, parents, school teachers and firefighters to protect life, property and the environment.

# James Cook Cyclone Structural Testing Station

The Cyclone Structural Testing Station has provided international leadership in the design of cyclone resistant construction details, methods and systems. The Station's strategic location in Townsville has enabled it to serve not only Australia and North Queensland but also most other cyclone prone regions throughout the world. The Station's mission is delivery of quality research programs, testing and technical advice, leading to effective building practices that minimise loss and suffering as a result of severe wind events.

## History

In the mid 1970s, Professor Hugh Trollope AO, then Professor of Civil Engineering at James Cook University, and Mr Theo Wilkinson, then Managing Director of Monier Colourtile, recognised the need for the establishment of a small research unit to investigate the effects of wind on low rise buildings. It was obvious after cyclone Tracy devastated Darwin that there was not an adequate source of practical information on the likely performance of houses subject to severe wind forces, nor on ways of preventing future wind damage. They decided to overcome this by establishing a unit at James Cook University to research these problems. The university had just built a wind tunnel and had established an international reputation for its work in wind engineering.

James Cook Cyclone Structural Testing Station commenced operations on 1 November 1977. It was established to fill a need in the building industry for a specialised research unit to concentrate on wind effects on low rise buildings, and to provide industry with an independent centre for the testing of building products and the development of testing techniques. Its charter is not restricted to cyclone winds.

The Station now operates as a unit within the School of Engineering at James Cook University, Townsville. Although it was established under the Constitution of the James Cook University it has managed to achieve its own identity through its research and testing programs and through the guidance of its very active Management Committee. It is dependent upon the School for accommodation and the use of structural engineering test facilities, but otherwise it is self funding.

by Greg Reardon, Technical Director

## Research and development

The Station is probably best known for its house testing research program. So far it has tested to destruction seven new houses and one old one. The new ones were a traditional tropical high set house, three brick veneer houses, two of light gauge steel construction and a timber framed one with plywood cladding sent from the Pacific island kingdom of Tonga. Some were tested for cyclonic wind forces while others were tested for Sydney, Melbourne or Brisbane wind climate. These and other results from the test series have been published nationally and internationally and made available to authorities for inclusion in building regulations and Australian standards.

As another research project, the Station has investigated the performance of high strength thin metal roofing subject to load cycling, as occurs during a tropical cyclone. Many of the Station's publications in recent years have addressed this complex problem. In collaboration with others it is developing a new test procedure to simulate this cyclic loading effect.

The Station has maintained a high practical content in its research program. Some of the more practical topics researched in the 20 year period include the performance of batten/rafter joints, the corrosion of roofing screws, diaphragm action of ceilings, bracing strength of roofing, ribbon plate timber framed construction and roof truss hold down against high uplift forces. The results of these have been published in the Technical Report series and are used by industry.

The Station has also conducted damage investigations after tropical cyclones hurricanes. These have been conducted at various locations in Queensland, Northern Territory and Western Australia, as well as Tonga, Vietnam and USA. The most significant of these would have been its investigations into damage to houses in Miami after Hurricane Andrew in 1992.

Over the past two decades, there has been a much greater awareness of the need to understand the risk of occurrence of extreme events and to predict the likely consequences of that occurrence to a particular community. The Station has

collaborated with the Bureau of Meteorology and Queensland Emergency Services in making an extensive assessment of the likely damage to Queensland coastal communities from severe cyclone winds. The Station has also consulted in risk assessment studies.

The Station has been very active in the formulation of building and structural engineering codes, building regulations and advisory publications. It has been represented on Australian Standards committees for housing, house components, housing performance and loading.

The Station has issued nearly 500 confidential reports to industry on the performance of products subjected to simulated wind loads. The most common requests are for pressure testing of roof and wall cladding and for racking of bracing walls, mostly in cyclic loading for cyclone prone regions. Some of the more unusual ones have been withdrawal strength of ground anchors, on-site lateral loading of balustrades, testing battenless roofing, checking prestress in guy cables and lateral loading of fences. Risk assessments and terrain categorisations have also been conducted.

## Testing for industry

The Station provides a service to the building industry as an authority for testing the effects of wind forces on buildings and building components. Where standard test methods are not available the Station has developed its own techniques to accurately simulate the effects of wind pressures on structural elements. It has established itself as the leading independent testing authority in Australia for wind effects on buildings and components.

### a. Structural

Structural testing is usually required when either the form of loading or the structural element does not comply with the relatively simple rules that govern engineering design. Cyclic loading of roofing is an example where the effects of both the loading and the structural resistance are not covered by simple engineering design. Normal structural engineering design theories do not cover the effects of repeated loading, nor do they adequately allow for a structural element that changes the shape of its cross section as transverse load is applied.

The Station has developed techniques for accurately simulating the effects of wind on buildings and components. Some of the structural tests it conducts are:

- static or cyclic racking and uplift on full scale buildings
- cyclone wind risk assessment of communities
- determination of terrain categories
- static or cyclic loading of roof sheeting, roof tiles, wall cladding, and joints
- static or cyclic racking of bracing walls and ceiling diaphragms
- static or cyclic uplift on walls
- static or cyclic flexure of walls
- water permeability of walls
- withdrawal strength of fasteners
- pressure loading of glass
- debris impact on screens
- lateral loading of walls and fences.

## b. Wind tunnel

In structural engineering, wind tunnel tests are usually needed for slender structures or components where their interaction with wind results in additional loading. A wind tunnel can also be used to determine ventilation of buildings and plume dispersion effects. The following services can be provided by the Station:

- determination of structural and overturning loads
- determination of cladding pressures
- studies of pedestrian wind comfort
- determination of dynamic forces
- studies of building ventilation
- studies of environmental air quality.

## The future

What will the Station be doing in 10 years time? Which way should it be directing its research programs?

Assuming that its excellent relationship with the building industry and James Cook University continues, the following areas of research are logical extensions of the Station's aim to conduct quality research to minimise loss as a result of severe storms.

Whilst the house testing research program has made an extensive contribution to the knowledge base of how houses perform in high winds, emphasis is likely to change to computer based analysis. The advent of bigger and more powerful computers and analysis programs has opened the way for more comprehensive analyses of complex structures such as houses. These were not available when the house testing research program was initiated. Items identified in the program, such as the sharing of load by adjacent members, the significant contribution to lateral strength and stiffness by the internal lining materials and some external claddings acting as diaphragms and the extraordinary contri-

bution of the plaster cornice will be accounted for by complex super elements within a finite element analysis. This may lead to the identification of other force paths or contributing systems too subtle to be identified in the testing program. It is a formidable task to mathematically describe the action of all of the small elements that constitute even a simple house, and to determine their interaction and integration to become a structure capable of withstanding severe wind forces.

The Station is a leader in research into the strength and performance of roof and wall cladding materials. In 1998 it plans to commission an air box test facility that will herald a new era in its research and testing of cladding. With the free air facility, pressure can be applied to all of the re-entrant angles and flutes of a ribbed cladding profile. For cases where building paper or sarking is not used directly under the roofing the free air system gives a better distribution of pressures on profiled cladding than an air bag test system.

An extension to the free air system is to be able to apply abrupt pressure changes to the cladding, as can occur during a wind storm. The ideal situation would be to have the capacity to apply pressure fluctuations in accordance with a pressure trace measured on a building during a real wind storm, or from wind tunnel tests. The only device currently available with this capability is the very expensive BRERWULF system developed by Building Research Establishment, UK.

Since its commissioning in 1977, the boundary layer wind tunnel at James Cook University has been used in the areas of wind loads on buildings, pedestrian comfort, building ventilation and atmospheric air quality. Data from wind tunnel research on domestic low-rise buildings have been used to develop standards to improve construction methods. The growth of computer modelling in wind engineering will require increasing amounts of experimental data for calibration and validation. Such data obtained from full scale and wind tunnel studies will also be used in updating and standardising codes globally. Wind tunnel studies will continue to be an efficient research tool with continually improving electronic technology.

The Station is developing closer relations with Asia and Pacific Rim countries. It has already established close relationships with Fiji and assisted in the design of 'hurricane houses' for Tonga in 1984 by testing one of the prototypes. The two United Nations consultancies, India in 1993 and Vietnam in 1996, demonstrated that those countries need assistance to reduce hardship for

people as a result of damage to houses and buildings during tropical cyclones or typhoons. There are various levels at which assistance can be given. Education programs are needed, extending all the way from professionals such as architects and engineers through to supervisors and builders in villages. Interchange of research personnel between institutions in Asian countries and those in Australia has been proposed. Collaborative research programs can also help the developing countries. It is planned to continue and expand these activities.

A greater emphasis is being placed on the assessment of vulnerability of communities to natural hazards. Local government authorities, emergency services and the insurance industry all have an interest in being able to predict the likely performance of buildings in a township threatened by a severe hazard. These assessments are very dependent upon the experience and expertise of those conducting them. In the field of wind engineering, the Station has built up extensive experience from its research and damage investigations. The development of risk assessment programs is seen as an area where the Station can contribute to the reduction in the effects of a severe wind storm on a community.

The development of retrofitting techniques to improve the strength of older buildings is not new. Many houses in Darwin were fitted with external strengthening devices after cyclone Tracy. But there has been little evidence of those techniques being put to use since. The Station could develop a suite of different methods of improving the structural strength of older houses. Different solutions would be required for different forms of house construction.

Whilst verifying the validity of the Greenhouse Effect is the role of meteorologists and scientists, the Station must be aware of the likely consequences in respect of tropical cyclones and thunderstorms. If the oceans do warm up, and the region of influence of tropical cyclones is increased, will their frequency increase also? Will the intensity increase as well or is there a limit on the amount of energy available to sustain cyclone activity? The Station will need to stay up to date with all the likely scenarios so that it can advise industry and government on possible consequences.

In summary, future research programs will include numerical analyses of houses, extensive wind tunnel studies, development of new testing techniques and cyclic loading regimes and practical investigations into the performance of structural elements.

# Community Fireguard: creating partnerships with the community to minimise the impact of bushfire

Community Fireguard recognises that on days of extreme wildfire danger suppression capabilities are limited and Country Fire Authority (CFA) cannot guarantee protection to each property.

On such occasions the key to community safety is the preparedness and response of the residents threatened. By promoting the development of wildfire survival strategies by communities at greatest risk, Community Fireguard promises to significantly reduce the vulnerability of these residents. Enabling residents to accept responsibility for their own safety, means that CFA is not only reducing wildfire threat, but also transferring risk to those best able to manage it—the residents.

The principles of empowerment on which Community Fireguard is based are described, and the efficacy of the program in reducing losses in recent wildfires is discussed.

The findings reinforce that reliance solely on suppression to ensure the safety of communities threatened by wildfire is an ineffective strategy. The greatest potential for increasing safety is for fire agencies to enhance community self reliance, through long term public education supported by fire protection works that assist residents defend themselves.

## Wildfires in Victoria

Protection of life and property are the fundamental goals of firefighting and

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counter-disaster operations. Yet, the protection of life and property in high intensity wildfire is problematic, and in Victoria significant losses continue to occur several times a decade (see Figure 1).

Australian wildfires are usually described by their intensity, that is the amount of heat energy produced by each metre of active fire front. Suppression effectiveness has been shown to be linked to fire intensity, with direct attack becoming ineffective in forest at less than 4,000 kW m$^{-1}$ (Luke and McArthur, 1978) and in grassland at approximately 10,000 kW m$^{-1}$ (Packham, pers. comm.).

Occasionally there come about combinations of weather, fuel, topography and an ignition source which produce wildfires of an intensity many times greater than can be suppressed. Fire intensity during the 1997 Dandenongs fires exceeded 30,000 kW m$^{-1}$ (CFA & NRE, 1997), whilst on Ash Wednesday fire intensity peaked at more than 100,000 kW m$^{-1}$ (Packham, 1992).

When such fires occur in the urban-forest interface they have the potential to grow to a large size and involve thousands of properties. In this event, fire fighting agencies are stretched to the limit, and it is impossible to provide individual protection to each property. On Ash Wednesday, for example, the CFA was able to commit approximately 450 tankers to the six major interface fires, whilst over 1900 homes were destroyed and thousands more directly threatened. Approximately 85% of economic damage attributable to wildfire in Victoria results from just 0.1% of all fires over a hectare in size (Loane and Gould, 1986). That is from those rare fires whose size and intensity overwhelm suppression capabilities.

Clearly most residents are going to have to face these disaster fires alone. It is going to be their preparation, and their decisions on the day which will determine whether they and their homes survive.

## Strategies for protecting life and property in extreme wildfire

The good news is that wildfires are survivable, and research into how houses burn down and why people die, has demonstrated that there is much the community can do to improve their safety and minimise their losses.

The most common cause of house loss is fires started by burning embers landing on or near the building (Lazarus and Elley, 1984; Wilson, 1984; Wilson and Ferguson, 1984; Ramsay *et al.*, 1987; Ramsay *et al.*, 1995). A house will generally survive the passage of the fire front if fire intensity in the immediate vicinity is reduced by managing the fine fuels. However, many houses burn down in the hours afterwards if there is no one present to extinguish ember caused fires.

The pattern of deaths in wildfires in south-eastern Australia clearly indicates that the greatest danger is being caught in the open or in a vehicle as the fire front passes (Packham, 1995; Krusel and Petris, 1992). Thus evacuation immediately before the fire arrives is an extremely hazardous activity. Whilst early evacuation is the option with lowest risk, the inability to

| Year | Fire(s) | Fatalities | House losses |
|------|---------|------------|--------------|
| **1962** | Dandenongs | 14 | 454 |
| **1965** | Longwood | 12 | 53 |
| **1969** | Lara | 23 | 230 |
| **1977** | Western Districts | 5 | 123 |
| **1983** | Ash Wednesday | 47 | 2090 |
| **1985** | Maryborough | 6 | 102 |
| **1990** | Strathbogies | 1 | 17 |
| **1995** | Berringa-Enfield | – | 9 |
| **1997** | Dandenongs | 3 | 40 |
| **1998** | Spring Hill | – | 11 |

*Figure 1: Wildfires in Victoria 1962–1998 with significant losses.*

provide the threatened community with warnings, the logistics and time required for emergency services to conduct a community wide evacuation, and the tendency of self-evacuees to wait until the fire is obviously and immediately threatening them, means that evacuation is unlikely to happen early enough to be considered preferable to resident's staying with their homes.

Popular perception, however, seems to be that evacuation is the 'safe' option (Boura *et al.*, 1995; Murray, 1986). Media coverage tends to concentrate on the dramatic stories of householders' who have left their properties only when they perceived the fire as being very close, and portrays this to the community as the only possible, and hence correct, response (Silberbauer, 1997). In fact able-bodied people who are well prepared and take shelter in their homes not only have a good chance of surviving a wildfire, but are likely to be able to extinguish any small fires after the fire front has passed, thereby saving their homes. Also, unless people choose to leave well in advance of the arrival of a wildfire, sheltering in a house will generally be safer than evacuation. A decision to use the declaration of a Total Fire Ban Day as a warning to leave the fire threat area at 10.00 a.m. prior to any fire starting, requires just as much commitment to wildfire safety as deciding to stay and defend the property.

## Residents need to develop survival strategies that suit them

In Victoria the right of each resident to decide for themselves whether they will stay and defend their property is enshrined in legislation (*Country Fire Authority Act, 1958; Emergency Management Act, 1986*). Every resident who is faced with a wildfire will have to make a decision as to how they are going to respond to that wildfire. A role of CFA public education programs is to motivate residents to make that decision well before the fire season, and then help them develop a family survival strategy which reflects their needs and capabilities.

Yet clearly many residents of high risk areas are not developing the strategies which would enable them and their assets to survive the next major wildfire.

Traditionally, CFA has used television, radio and brochures to inform the general community of the most appropriate bushfire survival strategies. The shortcomings of this media approach have long been recognised and major fire reports since Ash Wednesday have questioned the effectiveness of public education strategies in changing people's behaviour (Boura *et al.*, 1995; House of Representatives Standing

Committee on Environment and Conservation, 1984; Miller *et al.*, 1983; Wilmoth, 1992). The literature on risk perception and adult education suggest that passive publicity is not the most effective way to achieve significant changes in attitude, perception and behaviour (Rangan, *et al.*, 1996; Silberbauer, 1990; Simms and Baumann, 1983).

The traditional Information-Action model i.e. information leads to awareness and awareness leads to action, assumes that the links between receiving information and taking action are strong and direct. It assumes that the community is an homogeneous group with the same needs and values (Beckingsale, 1994). The communication is also short-term and one-way with fire services unable to correct any misunderstandings.

If asked why residents are not undertaking fire prevention work, many fire service personnel would probably reply that the community are apathetic, or that there are too many 'greenies', they might even criticise those who live on heavily vegetated blocks as being 'stupid'.

Our experience is that most members of a fire-prone community want to improve their safety, and where residents are not doing what we think they should there are usually good reasons for it. Three of these could be that:
- residents do not believe that they are personally at risk
- the advice or direction residents are being given conflicts with their values in life e.g. people with a strong conservation ethic being told that they must clear their properties
- the fire safety message is not reaching residents in an effective manner (Rhodes and Boura, 1996), and they do not understand the message or do not have the ability to apply it.

Community Fireguard attempts to overcome these obstacles. It explains to people why they are at risk—the realities of fire behaviour in their area, the limitations of the fire service in halting the fire or protecting every home, and the difficulties of evacuation. It demonstrates that there is much they can do to reduce their vulnerability without destroying their lifestyle, and helps them develop and implement survival plans that fit their values and priorities.

## How Community Fireguard works

Community Fireguard is based firmly on theories of adult education, participation and empowerment. It involves small groups of people living in high-fire risk areas, taking responsibility for their own fire

safety and working together to devise survival strategies that suit their particular situation. It is very much a 'bottom up' process of CFA assisting people to develop their own strategies rather than a 'top down' approach of telling them what to do.

The vast majority of Community Fireguard groups are self-initiated. Often one or two residents concerned about their level of safety or about a local issue such as Council or public land, poor access or water supplies, will initiate formation of a group. Others are a direct result of public meetings held by the local Brigade, CFA's Bushfire Blitz street corner meeting program, or publicity in local media. Others still are existing groups such as Land Care or Conservation groups who adopt Community Fireguard as part of their activities.

High profile wildfires in Sydney in 1994 and the Dandenong Ranges in 1997 prompted surges in group formation. Program growth in its five years of operation is shown in *Figure 2*, from humble beginnings with 2 part-time staff to nearly 400 active groups serviced by nine area-based paid facilitators, a dozen or more volunteers and staff working within their brigade areas, and a part-time program support officer.
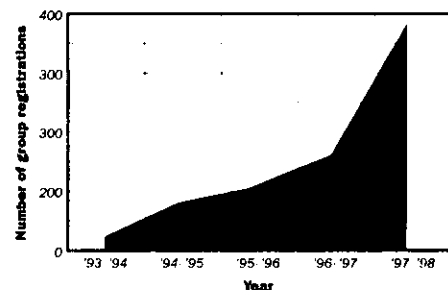


Figure 2: Growth in the number of Community Fireguard groups 1993-1998.

Once formed, Community Fireguard groups tend to go through an intense period of information collection followed by the formulation and enactment of survival strategies. A trained facilitator helps the group learn, and then acts as a sounding board as plans are developed.

The groups meet in members' homes in a friendly and informal atmosphere. A small group in a neighbour's lounge provides a more effective learning environment than a larger gathering in a cold uncomfortable public hall. The optimum learning environment is one where people feel comfortable to ask questions, safe to explore different ideas, and where their participation is valued (Beckingsale, 1994).

Group dynamics are important in this learning environment, and are also critical in sharing knowledge and developing strategies. The processes used in Commun-

ity Fireguard to facilitate group discussion recognise the indigenous knowledge within the group. The facilitator and Brigade representative are not the 'font of all knowledge'.

Belonging to a group has numerous benefits. A group can provide motivation and enthusiasm, it can provide several, or better, solutions to a problem. It can be a powerful lobby for presenting a local view to the authorities as a community group approach is more likely to be responded to, than an individual approach. Neighbourhood groups also provide community development and the social benefits derived make it more likely that residents will choose to be involved for a period of time, thus increasing the likelihood of creating a culture of safety in that locality.

The only bushfire safety strategies that people will understand, trust and actually implement during a major fire are those they develop themselves. Consequently Community Fireguard recognises the importance of empowering people to develop their own bushfire safety strategies.

Empowerment requires people to realise that they are responsible for their own safety, and accept that they themselves can do what is necessary to successfully manage the threat of fire. They need to overcome the learned helplessness promoted by inaccurate and sensationalised media reporting of wildfires. They also need to have the knowledge and skills to develop their own strategies, and they need the technical and resource support to enable them to implement those strategies. The Community Fireguard process does not end with the provision of information but rather recognises the need to work with the community over time to achieve long term behaviour change (see *Figure 3*).



*Figure 3: The community education cycle (after McWaters, pers. com.).*

## What can Community Fireguard groups do ?

Community Fireguard recognises the complex nature of the bushfire threat, and

that for a community to reduce their vulnerability to fire they must take a holistic approach.

To develop an effective survival strategy a family needs to:
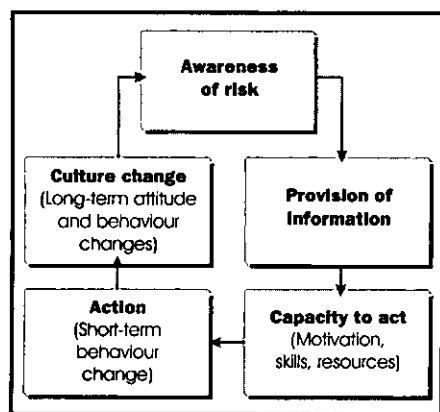- know what they can expect from the fire and emergency services during a major fire, understand the law regarding evacuation and road blocks, and appreciate the unreliability of reticulated water, power, and telephones
- be prepared for what a major fire looks, sounds, and feels like
- understand how houses are ignited, what can be done to improve their safety by reducing fire intensity and reducing avenues for embers attack, and the importance of active defence by residents in reducing house loss
- make the decision to stay or evacuate considering the safety level of their home, how much warning they would get, how far they would have to travel to safety and what sort of roads they would have to use
- consider the capabilities of the family members who will be home. Does there need to be a different plan for week days when only mum and two young children are home, as opposed to the weekend when the whole family is there ? What will the rest of the street be doing ?

Working as a Community Fireguard group increases the options available to residents:
- complementary fuel management and the organisation of working bees to help those less able to manage their property
- the development of telephone trees to facilitate the spread of emergency information through the group
- selection of 'safer homes' in which people can shelter whilst the fire front passes
- identification of more vulnerable members of the community who need additional assistance e.g. the old, infirm, or even someone without a car at home or a shift worker asleep during the afternoon
- a knowledge of what neighbours will do during the fire, and the opportunity to support each other morally and physically during the fire.

Once plans have been finalised many groups become less active as there is little reason for them to continue to meet, however the community networks developed during the education and planning stages remain and this mutual support can prove vital during wildfire. It has been encouraging that groups which formed during one summer have chosen to meet again prior to the next fire season. Groups are also kept in touch via a quarterly

newsletter, which contains many articles provided by program participants themselves.

## An interface with the community throughout the emergency management process

Community Fireguard is not just an education program. Rather it provides a framework for emergency services to interact with high risk communities throughout the emergency management process— prevention, preparation, response and recovery. In this way Community Fireguard is fundamentally different from other 'education' programs, which are limited to provision of prevention or preparedness messages.

Community Fireguard groups are in a unique position to interact with emergency managers during a wildfire. Not only does the education phase give them the knowledge necessary to appreciate the issues of emergency management, but their history of working with local CFA brigades and staff, and personnel from local government and public authorities to solve fire safety issues has built up confidence and trust.

This relationship is an important prerequisite to an effective warning system— something that has proved extremely difficult to provide for wildfire (Boura *et al.*, 1995; CFA and NRE, 1997; Miller *et al.*, 1984; Petris, 1995; Senate Standing Committee on Industry, Science, Technology, Transport, Communications and Infrastructure, 1994).

For an emergency information, or warning, system to be effective several requirements must be met:
- the community must understand the system, know how to access it, and believe the information it provides
- appropriate information must be collected and analysed by the fire agency within a very short time frame e.g. 10 minutes
- timely and accurate information must be actively disseminated to the threatened community through a variety of channels
- the threatened community needs to possess the knowledge necessary to react appropriately to the information they receive.

Thus an effective warning system needs to be developed with the community, and requires an ongoing public education component as well as a strong commitment from the Incident Management Team and wider emergency management network.

In time emergency managers will come to see programs such as Community Fireguard as an integral part of managing

a wildfire emergency, rather than as a 'touchy feely' education program. *Figure 4* is a compilation of the interaction between Community Fireguard groups and CFA during recent wildfires.

## Evaluation research

In 1996 the Department of Psychology at Melbourne University commenced a longitudinal study on the effectiveness of the Community Fireguard program. Preliminary results from this study show that:

- there is a high level of knowledge regarding basic wildfire safety actions both within Community Fireguard groups and in the wider community
- in terms of the absolute levels of awareness, reading of information materials, knowledge and actions, Community Fireguard members rate higher than non-members
- in particular, in terms of taking action Community Fireguard members rate well.

- while Community Fireguard members rate similarly compared to non-members with respect to preparing house and property, Community Fireguard members rate significantly higher for more sophisticated strategies; in terms of planning (including family, clothing, animals), discussion of plans with family, joint planning with neighbours, taking care of the vulnerable in their community, setting up warning systems within the community, and deciding on evacuation (Rohrmann, 1998).

The study showed that Community Fireguard is very well received by the community. Evaluation of group activities, information provided, and of staff involved in delivering the program was overwhelmingly favourable. Community members rated as very positive the increase in their understanding of bushfire issues, their increased ability to support and help each other, and the organisation of Community Fireguard meetings. CFA staff involved in

the program were rated very highly by the community with respect to facilitators' technical knowledge, ability to guide groups, ability to activate and inspire group members, approachability and availability, and ability to address specific community needs (Rohrmann, 1998).

While this research project was unable to measure the full impact of Community Fireguard, Rohrmann argues that evidence from this research project clearly indicates that the community-based Community Fireguard approach is beneficial on the whole to the bushfire preparedness and improves both individual and group risk mitigation (Rohrmann 1998).

The results indicate that Community Fireguard is successful in its aim to not just raise awareness but to achieve behaviour change. Members are not only informed, but actually put in place individual and community strategies that enhance their bushfire preparedness.



**Pre-fire season**

The education component of Community Fireguard includes the experience of a major fire, basic fire behaviour, how houses are ignited, and why people die.

This information is then used by families to develop a survival plan. Working as a neighbourhood group enables family plans to comprise a community plan, with all the benefits of peer support in resources, complementary fuel management, and help on the day of the fire.

Prior to the fire season well established Community Fireguard groups meet to touch base with each other and with CFA, bring any new residents into the group, and inform each other of any changes to their plans or resources.

Physical preparations might include testing the group's 'phone tree or trying on their wildfire clothes. Many groups undertake cooperative fuel management, and conduct working bees in the street or for those unable to do the work themselves.

**Pre-fire**

The forecast of hot and windy conditions for the next day, or the declaration of a Total Fire Ban Day, is used as a prompt to put survival plans into action. Those who have chosen to evacuate may go shopping or visit friends in the city; those who have chosen to defend their properties might arrange to work from home that day.

**Pre-impact**

Once a fire has started, warning information needs to be provided to the community as rapidly as possible to allow residents to enact survival strategies.

Community Fireguard groups can have an advantage over other residents. They have better access to emergency information through possession of radio receivers capable of picking up CFA transmissions. In some cases the Area Community Fireguard Facilitator has a role in phoning the "mover & shakers" of groups with timely and accurate information. This is then rapidly disseminated through the groups" phone trees. This can be valuable warning or reassurance depending upon the fire's proximity to that group.

**Impact**

With an understanding of the dangers of ember attack to their homes and radiant heat to themselves, appropriately dressed and equipped group members patrol for spot fires. Peer group support, both moral and physical, makes its easier for them. Residents fulfill the asset defence role freeing up CFA resources for fire attack.

Updates of the fire location and status are passed through the group. This information is supplemented by advice and moral support from CFA personnel becoming more familiar with the concepts of Community Fireguard.

**Post-impact**

Following the fire there is a need to for those involved to debrief, a form Critical Incident Stress counselling for residents. The CFA Facilitator can explain exactly what happened — how and where the fire started, how severe it was in comparison with others, what the emergency services did, what losses there were.

For those who lost their home, probably evacuees, Community Fireguard can be the process to link residents with recovery agencies. After the January 1997 fires a seminar on rebuilding wildfire safer homes was organised.
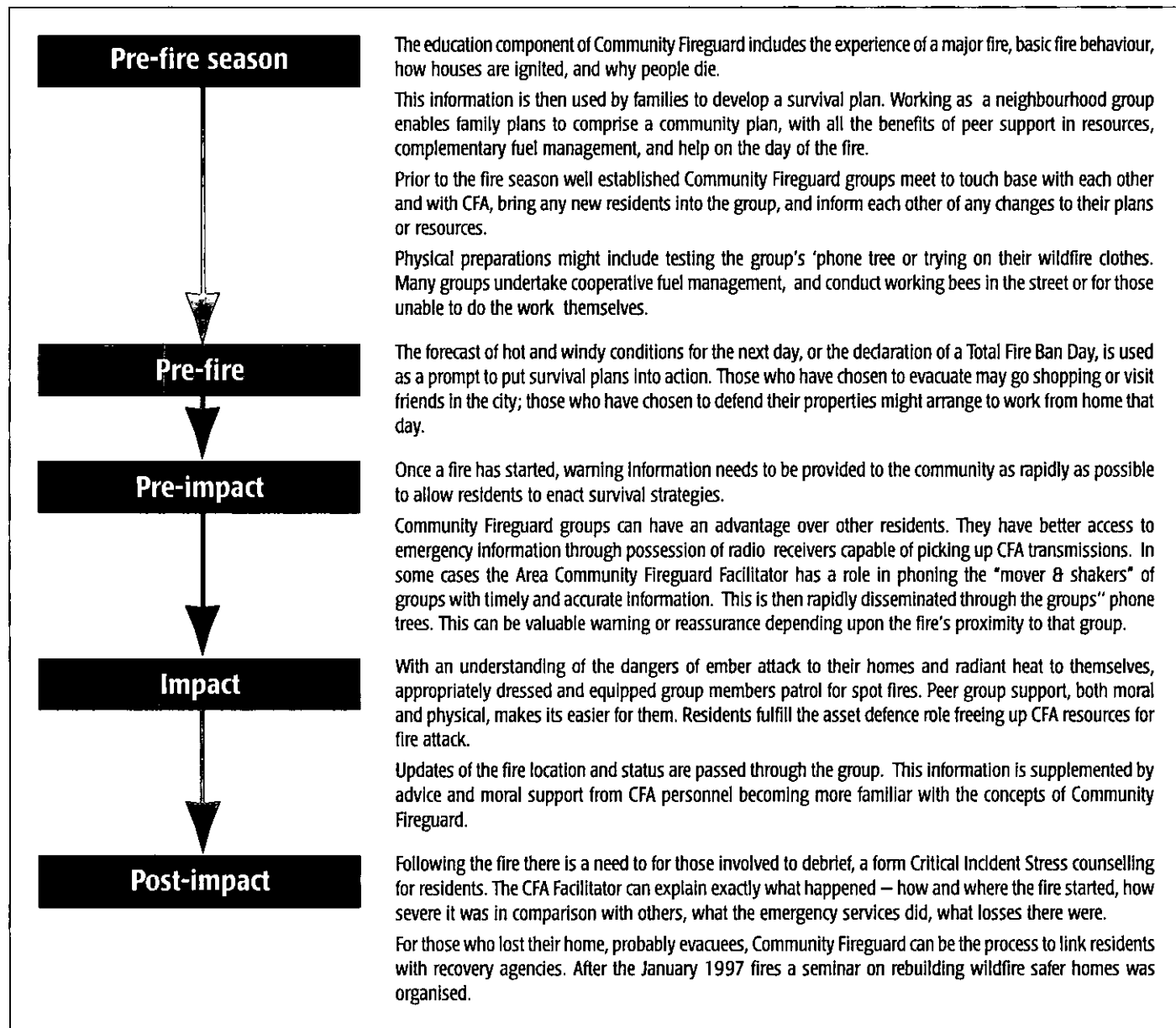
*Figure 4: Community Fireguard — a partnership between the community and CFA before, during and after major bushfire.*

## Wildfire experience

The real test of a wildfire safety program is wildfire. In the five years that the Community Fireguard program has been in operation a number of groups have been put to the test.

In November 1994 the Moggs Creek group were directly affected by the fire which burnt through their neighbourhood, and it is acknowledged that the fire protection work they had done helped minimise the damage to their properties compared to that suffered by people who had not been involved in the program (Boura, 1995). In February 1995 the Berringa-Enfield fire threatened the South Dereel Community Fireguard group and, although the fire did not actually reach them, their preparation and planning ensured that they received early warning of the fire and in turn notified neighbours who had not attended any Community Fireguard meetings. A private scanner provided regular updates on the fire's progress. Suitably clothed and armed with independent water supplies and home defence equipment all members of the group stayed with their homes ready to protect them if the fire reached their neighbourhood (Boura et al, 1995).

Community Fireguard groups also put their plans into action in response to the Dandenong Ranges and Arthurs Seat fires of January 21 1997 and the Kalorama fires of March 1998, although in all cases the fires were contained before they impacted directly on the Community Fireguard streets. Those whose plan was to evacuate left early in a calm manner. Those who stayed were appropriately dressed and equipped and their properties well prepared. Feedback from residents who formed Community Fireguard groups as a response to the 1997 Dandenongs fires shows a marked change in the confidence and ease with which they coped with the 1998 fire. As Dawna Richardson of the Upalong Road Mt. Dandenong Community Fireguard Group wrote the day after the 1998 fire, 'we were much better informed ... we no longer have a victim mentality ... having a plan empowered us'.

During the 1998 Kalorama fires the Yarra Area Facilitators rang the contact people of the 35 Community Fireguard groups in the northern part of the Dandenong Ranges thus activating their phone trees and passing timely and accurate information to an estimated 700 families. A similar role was played by the Midlands Area Facilitator during the Spring Hill fire of March 1998 which destroyed 10 homes. Whilst this information service cannot be guaranteed it points to the potential of community based warning systems.

The high level of preparedness is mirrored by the high level of commitment participants have to the program. In the Yarra Area members of Community Fireguard groups meet several times a year to help the Area facilitators steer the program. Group members did most of the organising of two Fire Safety Expos which attracted a total of more than 3,500 residents. In the Midlands Area, the Wheatsheaf Community Fireguard group publishes its own regular newsletter. Both initiatives were recognised with Community Awards during Victoria's Fire Awareness Week 1997.

## Conclusion

Further reduction in wildfire losses requires the development of a culture of safety within high risk communities. Residents in Community Fireguard streets have come to see sensible levels of fire prevention and preparedness as an important responsibility for people living in their neighbourhood.

The investment by the CFA of time and money in high-risk communities through Community Fireguard can already be seen to have reduced both the immediate cost of wildfire in terms of life and property, and also the unmeasured cost of social dislocation and psychological distress that occurs when vulnerable communities are exposed to major wildfire.

As fire services become more outcome focused and redefine their role as promoting community safety rather than as fighting fires, there will be greater emphasis given to mitigation including community education. Programs such as Community Fireguard which also provide a framework within which to work with the community during the response phase become doubly attractive.

Wildfire will be an ongoing expense, whether it be fire losses, suppression costs or mitigation costs. Fire services are well advised to invest before the fire in creating meaningful partnerships with the community to minimise the impact of wildfire.

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Jon Boura joined the CFA staff in 1993 and worked for two years as Community Fireguard facilitator in the Westernport and Yarra Areas, and then three years as Municipal Programs Coordinator in the Risk Management Department, a role that included management of the Community Fireguard program across the State. He now works on a range of research, policy and training issues in the Wildfire Management Section of the Risk Management Department.

Jon has been a volunteer firefighter for 17 years, the last ten as a second lieutenant of the Upper Beaconsfield Fire Brigade.

# Disaster events calendar

## 17-19 February 1999

**5th Annual California GIS (Geographic Information Systems) Conference**
*Oakland, California*
Sponsor:
California chapters of the Urban and Regional Information Systems Association (URISA).

Topics include emergency management and risk mitigation, urban and regional planning, facilities management, utilities inventory and management, and environmental preservation. Abstracts for presentations are being solicited.

Contact:
Stephanie King
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Tel: (650) 725-0360
Fax: (650) 725-9755
e-mail: sking@ce.stanford.edu
Web site: http://www.calgis.org

## 11-13 May 1999

**PROMIT 98 International Expo: 'Solutions for Natural and Man-Made Disasters' and National Mitigation Summit**
*Chicago, Illinois*
Contact:
National Building Protection Council
6300 Park of Commerce Boulevard
P.O. Box 3051
Boca Raton, FL 33487-82291
Tel: (561) 988-0932
Fax: (561) 241-1247

e-mail: nbpc@nbpc.org;
Web site: http://www.promit.com

## 7-19 May 1999

**3rd International Conference on Seismology and Earthquake Engineering**
*Tehran, I.R. Iran*
Organized by International Institute of Earthquake Engineering and Seismology (IIEES)

Call for papers. Prospective authors wishing to participate in the conference are invited to submit their abstracts to the conference coordinator by June 15, 1998.

Contact:
International Institute of Earthquake Engineering and Seismology,
PO Box 19395/3913
Tehran, I.R. Iran
Tel: (98 21) 229 5085
Fax: (98 21) 229 9479
E-mail: SEE3@DENA.IIEES.AC.IR

## 17-20 May 1999

**National Fire Protection Association (NFPA) 1999 Annual Meeting**
*Baltimore, Maryland*
Contact:
Casey C. Grant
Assistant Vice-President
Codes and Standards Administration
NFPA
One Batterymarch Park
P.O. Box 9101
Quincy, MA 02269-9101
Tel: (617) 770-3000
Fax: (617) 770-0700
Web site: http://www.nfpa.org

## 24-28 May 1999

**23rd Annual Conference of the Association of State Floodplain Managers (ASFPM)**
*Portland, Oregon*
Contact:
ASFPM
4233 West Beltline Highway
Madison, WI 53711
Tel; (608) 274-0123
Fax: (608) 274- 0696
E-mail: asfpm@execpc.com

## 30 August-5 September 1999

**'Rescue Down Under' 1999 International Road Accident Rescue Competition, Symposium, and Expo**
*Melbourne, Australia*
Sponsors:
Victoria State Emergency Service and the Australian National Road Accident Rescue Association.
For more information:
http://www.ses.vic.gov.au/rdu/
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# Australian Journal of Emergency Management
# Instructions for authors

## Contributions

Contributions relating to Australian and international emergency activities, articles identifying and discussing issues, policies, planning or procedural concerns, research reports and any other information relevant to the emergency and disaster management community are welcome. The aim of this publication is the exchange of information and views across the Australian emergency management community.

## Article review

This journal incorporates a review process. Three levels of review are now conducted—refereeing (optional), editorial board review and editing.

## Submission dates

Material submitted for publication should be on disk and reach the Editor by the following dates: Summer – October 15th; Autumn – January 15th; Winter – April 15th; Spring – July 15th. The editorial committee reserves the right to determine the suitability of all material submitted and where necessary to edit submissions.

## Submission requirements

Each paper should start with the complete title of the paper in **bold**, two lines after that, the name of the *author(s)*, followed by the *author(s) affiliation* in *italics*.

A short abstract follows of approximately 100-200 words. The abstract should be in italics and indented.

Each section should be clearly identified with appropriate headings e.g. **introduction, technical headings, conclusions and references**. *Subheadings* may also be used throughout, and preferably in *italics*.

It would be appreciated if authors would use the Harvard system of referencing in their papers e.g. (Jones 1995, p 4) rather than footnotes.Thus, references cited in the text will be listed at the end of the paper. The reference list should be structured as follows: author, initials, year, title of the book (italics) or article, publisher and place of publication, or journal title (italics) volume and issue number, and pages of article, e.g.

For a book source:

Jones L. R. 1995, *The Firefighters Concern*, Blackwell, London.

For a journal source:

Jones L. R. 1997,'Hazard Management in the Fire Service', *The Australian Journal of Fire Engineering*, Vol. 12 No. 3, pp. 13–15.

The paper should be single spaced with all tables, figures, charts, boxes, and equations incorporated into the text. The paper should be provided in A4 format.

The length of the paper is usually between 5 to 10 pages. Longer articles will be accepted but usually they should be no more than 20 pages in length.

Diagrams, tables should be included within the electronic copy. Where they are unable to be provided in this format they can be bromide copy or a high quality photocopy. Photographs should be provided in print and negative form and where possible in digital format.

A short CV should be provided of the author(s) at the end of the article. This should not exceed 1 or 2 short paragraphs.

The papers are to be provided in electronic format (Microsoft Word 6 preferably, although other common formats may be acceptable) and one hard copy to:

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