EMA
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SAFER SUSTAINABLE COMMUNITIES

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SPECIAL EDITION

includes articles from the
International Journal of
Mass Emergencies and Disasters

Housing construction in earthquake-prone places

an a community
lly psychologically
prepare for
disaster?

How to plan a community's recovery from disaster

Improving community safety in rural and remote indigenous communities

Snapshot

Camp Mountain Train Disaster, Queensland 1947

On the morning of the 5th of May 1947 at approximately 1000 hrs, a crowded picnic excursion train left the tracks on a curve near Camp Mountain in the Samford Ranges. The train was carrying approximately 230 passengers many of whom were children. Tragically 16 people lost their lives and another 38 were injured in what is still described as Queenslands worst train crash. The train chartered by the Commonwealth Department of Trade and Customs Recreation and Social Club, departed Brisbane Central Station at 0859 hrs and was destined for Closeburn on the Dayboro branch. Shortly before 0950 hrs the train slowed down at Ferny Grove Station to receive authority for the line ahead, then proceeded to climb Camp Mountain. On the two-mile decent to Samford Station the C17 Steam Locomotive number 824 left the tracks on a 32-kph curve, (the estimated speed of the train was 65 kph).

The first two carriages (numbers 740 and 739) were destroyed with the leading end of the third carriage (number 742) being damaged. Most of the injured were in these carriages. The first call to Ambulance headquarters was received at 1008 hrs, within 70 minutes there were 18 cars and 26 men on the scene.

ATTORNEY-GENERAL'S DEPARTMENT

Cover Photo: Two sisters comfort each other 23 May 2003 as they stand near their apartment destroyed by the 21 May earthquake, in Thenia, near Algiers.

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

FOREWORD
SARS – A multi-country outbreak or a new viral disease

by Professor Richard Smallwood

SARS (Severe Acute Respiratory Syndrome), an atypical pneumonia of (initially) unknown aetiology, was first identified in late February this year in Vietnam by Dr Carlo Urbani from World Health Organisation's (WHO) Hanoi office. Tragically, he later succumbed to the disease.

It appears that the first cases occurred in China in Guandong Province in November last year. Between November 2002 and early February 2003 over 300 cases had occurred, with five deaths. One third of the patients were health care workers. In late February and early March it became clear that Hanoi and Hong Kong were seeing SARS cases, so that on 12 March WHO issued a global alert about an outbreak of cases of severe atypical pneumonia of unknown cause which seemed to put health workers in particular at grave risk.

After reports from Canada (14 March) and Singapore (15 March) of SARS cases, the global alert was upgraded to include a case definition, based on clinical features, travel history and/or contact with a SARS patient; advice was also given to passengers from SARS affected areas that should they develop SARS-like symptoms they should notify health authorities immediately. By 27 March it was evident that spread was still occurring through international travel, so that new advice was brought forward. First, anyone showing symptoms of SARS who was seeking to fly out of a SARS-affected country should not travel but be referred for medical advice and, second, that non-essential travel to affected countries should be postponed.

It seems probable that SARS is primarily spread through close personal contact, although other modes of spread e.g. via faeces or urine, via blood or via aerosols are not entirely ruled out. Amongst those who become seriously ill (about 10–15 per cent of those affected) there appear to be 'super spreaders' who have infected a large number of others. Infection control in wards housing such a patient has to be absolutely meticulous and sustained; the risk to health care workers makes that crystal clear. Three or four per cent of SARS patients will die of the disease; those at greatest risk of dying appear to be older people or those suffering from some other condition, and heavy smokers.

Australia has been fortunate. Unlike Hong Kong, Toronto, Hanoi and Singapore we were not exposed to SARS in the early days before everyone was alerted to this condition, and before there was any understanding of its transmissibility. We have been able to watch the evolution of this condition globally, and to institute measures to minimise the chance of it arriving undetected and spreading within Australia. These measures have included:

- daily teleconferences of public health officials from all jurisdictions and communicable disease experts;
- providing information to the public and health professionals through direct mailouts, the web, a 1800 number and the media;
- issuing travel advisories consistent with those from WHO through the Department of Foreign Affairs and Trade;
- instituting 'positive pratique' i.e. pilots of incoming flights have to contact quarantine authorities to discuss whether or not there is any ill health amongst passengers before landing in Australia, in order to obtain quarantine clearance;
- giving written information about SARS and what to do if symptoms develop to passengers leaving and arriving in Australia;
- ensuring that pilots on incoming flights remind passengers to report any symptoms to flight attendants;
- making SARS a quarantinable disease, which allows various quarantine measures to be put in place which might be needed to control the spread of the disease in Australia;
- ensuring that blood donors returning from a SARS-affected country do not donate blood for 14 days from the time of leaving that country;
- issuing infection control guidelines for the different environments in which SARS may be encountered or

introduced eg in aeroplanes, at the border, in health care facilities. This includes advice to those returning from SARS-affected countries who are well and who wish to return to work, to university or to school; and

- working with the National Health and medical Research Council to tackle the important research questions for Australia.

The number of cases worldwide of SARS has continued to increase steadily in the two months since its identification to a total of over 3,500 at the time of writing. The seriously affected countries – those to which our travel advisories and other guidelines are directed – are those in which there have been local chains of transmission. These countries are Canada, China, Hong Kong, Singapore and Vietnam. Three other countries have apparently had limited local transmission – UK, US and Taiwan. Between 15 and 20 other countries, including Australia, have reported a small number of imported cases to WHO.

While globally the epidemic can not be said to have come under control, there has been an astonishing amount learned about SARS in a very short time. Through an unprecedented level of cooperation amongst the 11 WHO-linked laboratories around the world, the likely cause of SARS has been identified as a new Coronavirus and its genome completely sequenced. There is every likelihood that a sensitive and specific test for SARS will be widely available within weeks and this will mean, amongst other things, precise diagnosis of cases and a much clearer understanding of the epidemiology of the disease e.g. what exactly are the various modes of transmission; when in the course of their illness are infected individuals infectious; what is different about the super-spreaders. Work can now begin on developing a vaccine and further possibilities for treatment can be canvassed.

For the moment, however, we have to rely on our public health expertise and infrastructure and on the clinical skills of those who might be called upon to care for the ones unlucky enough to come down with SARS. While we can't guarantee to keep SARS out of Australia, we have a good chance of keeping its spread here to a minimum. Whether SARS will disappear from human populations as quickly as it came, or whether it settles in to become yet another of our endemic infectious, remains to be seen.

Professor Richard Smallwood
Commonwealth Chief Medical Officer

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Integrated recovery management: A new way of looking at a delicate process

"If Winter comes, can Spring be far behind?"
Percy Bysshe Shelley (1792–1822) English lyric poet

By Mark Sullivan

This paper considers the factors that relate to the recovery of a community affected by emergency. In particular, principles of recovery, the process of recovery, the reactions of people affected by emergencies, and the means by which recovery needs might be addressed are considered. An approach to recovery that is not strictly sequential, but is flexible, community-centric and which is integrated with other elements of the emergency management process is advanced.

On 20 May 2002 the Republic of East Timor was acknowledged by the United Nations as a country in its own right. When interviewed, citizens of the new country expressed relief at no longer having to live in fear of violent militia attacks. They did however express new concerns; concerns more characteristic of the aftermath of a less insidious, yet equally destructive calamity. These concerns included the need for employment, long-term accommodation, and economic viability. The above, in addition to the psychological sequelae, represent some of the more typical needs of a recovering community. Indeed, the recovery of a community, whether from war or cyclone, rates as one of the more complex and lengthy challenges to confront both those affected by the event and those called to assist the affected.

This paper considers the process of recovery. In particular, several key principals of recovery are considered along with the process by which the recovery of a community occurs. In addition to the aforementioned fundamentals of recovery management, several other recovery issues will be considered, including the diverse reactions to emergencies. The question of meeting the needs of a recovering community in terms of what is required and who accepts responsibility for its provision will also be addressed. Importantly, a number of conclusions will be drawn with respect to factors that affect recovery.

Part 1: Definition of recovery

It is important, when discussing recovery management, that a working definition of what actually constitutes recovery be explored. Recovery has been defined a number of ways, including:

> *"the coordinated process of supporting disaster-affected communities in reconstruction of the physical infrastructure and restoration of emotional, social, economic and physical well-being."* (EMA, 1996)

The State of Victoria State Emergency Response Unit (VSERU) (2000) offers an alternative definition:

> *"an enabling and supportive process which allows individuals, families and communities to attain a proper level of functioning through the provision of information, specialist services and resources."*

These two definitions highlight a number of important aspects of what constitutes recovery. However, principal amongst these is the notion of recovery as a supportive process; that is, a process in which the affected community plays a central role. This notion is fundamental to the recovery process and will be reinforced ad nauseam throughout this paper.

Part 2: Principles of recovery

Recovery has been described by a number of sources, including Carter (1991), VSERU (2000), and Kates & Pijawka (1977) as a protracted, dynamic and complex process. The myriad interrelationships and fundamental considerations required of the recovery manager necessitate a carefully crafted approach to the recovery process. Such concerns, as described by VSERU (2000), include physical rehabilitation, personal rehabilitation, community development, economic concerns and environmental considerations. Consequently, the adherence to a set of recovery management guiding

principles can greatly increase the chance of a smooth recovery.

Since 1979, recovery management in Australia has been set against a background of eight guiding principles, endorsed by the Standing Committee of Community Services and Income Security Administrators. These guiding principles are outlined and discussed below. The principles themselves are taken from Emergency Management Australia's *Disaster Recovery Manual* (1996, para. 1.03) (Hence the continued reference to 'disaster' rather than 'emergency').

Principle 1: Recovery defined

"Recovery from disaster is an enabling and supportive process which allows individuals, families and communities to attain a proper level of functioning through the provision of information, specialist services and resources."

This principle is, for all intents and purposes, one of the more widely endorsed definitions of recovery. Nevertheless, it does stand to highlight some important aspects of recovery management.

First, and arguably foremost, is that recovery is a supportive process. Implicit in this element is the ever-present emergency management fundamental of a community-centric or even community-driven process. The rationale being that the community itself is best placed to identify the community's needs. Hence, rather than playing the role of juggernaut, the recovery manager must instead support the community in its recovery.

The second key element of Principle 1 is the proposed end-state; that is, that those affected are allowed to attain a proper level of functioning, the operative word in this case being 'proper'. Lunn (2001) rephrases this a little more accurately through the use of the word 'appropriate'. In practice, this suggests that the community be assisted to a level of functioning where they are able to sustain themselves in the absence of further external intervention. It does not imply a better level of functioning, nor does it imply a level of functioning similar to that formerly enjoyed. The reasons for this are simple in that a better level of functioning may not be feasible, whereas the former level of functioning may not be desirable. Moreover, there comes a time where external support needs to leave the community to its own devices, and this may be at a time well before the community can claim to be better off than it was previously.

Notwithstanding, current initiatives in the wake of the present Council of Australian Governments (COAG) review of disaster mitigation are redefining the landscape in terms of 'recovery' funding such as the Natural Disaster Relief Arrangements (NDRA). Consequently, there is a growing need to consider assisting the community to a better level of functioning through the implementation of mitigation measures during the recovery process.

Principle 2: Planning and management

"Effective recovery from disaster requires the establishment of planning and management arrangements which are accepted and understood by recovery agencies, combat agencies and the community."

Again, Lunn (2001) couches this principle in more appropriate terms with respect to those that are expected to accept and understand the aforementioned arrangements. Specifically, he writes in terms of 'all interested and affected parties'. Granted, all interested and affected parties will encompass recovery agencies, combat agencies and the community, but it is still prudent, as Lunn (2001) has done, to consider this principle in the context of all potential stakeholders.

Nevertheless, the crux of Principle 2 is the establishment of agreed and understood planning and management arrangements for which there is widespread commitment. This essentially requires the development, in consultation, of arrangements that not only outline how recovery will be prepared for, but how the recovery process will actually be conducted. As alluded to, and similar to planning for response operations, recovery planning and management arrangements need to be developed in partnership with all parties who are either likely to be affected by an emergency or who have a role to play in the recovery of those affected. Each of these stakeholders need to play an active part in the planning process in order that their understanding of and commitment to the agreed arrangements is encouraged. Clearly, the broadest consultation would be impractical and unwieldy. Therefore, the means by which stakeholders are involved must be carefully considered. This, however is outside the scope of this paper, suffice to say that a recovery committee similar to that which would operate during an actual event should form the core of this planning committee.

The development of recovery planning and management arrangements, in addition to being a fundamental aspect of effective recovery management, is also in many cases a legal requirement. For example, under the *Emergency Management Act (Vic)* 1986, Victorian municipalities are required to prepare an Emergency Recovery Plan as part of their Municipal Emergency Management Plan. Similar, though less specific requirements also apply at Regional levels. This requirement is testament to the high importance placed on recovery and recovery planning by many jurisdictions.

Principle 3: Recognition of changing needs and complex nature

"Recovery management arrangements are most effective when they recognise the complex, dynamic and protracted nature of recovery processes and the changing needs of

affected individuals, families and groups within the community over time."

Perhaps more so than at any other stage of an emergency, recovery deals with people in need. Moreover, owing to the infinite complexity of communities and the unprecedented change that is characteristic of a recovering community, these needs and the context within which they develop is dynamic. For these reasons, recovery management arrangements need to be flexible. Indeed, flexibility lies at the heart of Principle 3.

Notwithstanding, flexibility is for nought if not for the means by which the need for flexibility can be identified. In other words, mechanisms must be in place to identify the extent to which recovery processes, as well as the needs of individuals, families and communities, are changing. Therefore, communication is fundamental to the extent to which Principle 3 can be followed. Carter (1991) supports this proposition, albeit principally within the context of response operations. Nevertheless, his ideas are equally applicable to the identification of recovery needs. In fact, the manner by which some needs may be addressed are already outlined for the reader and include such things as means by which information can be obtained, and appropriate actions that the community can take. These equate to addressing one Kates' (1977) principal community needs during recovery – that of 'reducing the uncertainty'. However, other more tangible needs will require voicing and addressing, and it is these that will be continually changing. Accordingly, means by which the community can communicate their changing needs will need to feature prominently in any recovery strategy. Such means should be both active and passive. Specifically, communication with those affected should be active in terms of seeking out the needs of those affected, but also passive in terms of being receptive to changing needs as expressed by individuals, families and communities.

In considering changing needs during recovery, it is prudent not to overlook the likelihood of greed and avarice creeping into the minds of those who are expressing their needs. Many, including Carter (1991) have drawn attention to the possibility of individuals and groups seeking to advance their own interests during recovery to the extent that their wants are expressed as needs. Whilst it is important to do the greatest good with the available recovery resources, and therefore not address these wants, the way in which this distinction can be drawn is problematic. Such a distinction is likely to be highly subjective and will vary on a case by case basis. Distinctions between needs and wants therefore should be made with utmost care, the rationale formally recorded for future reference and accountability.

Principle 4: Community development approach

"The management of disaster recovery is best approached from a community development perspective and is most effective when conducted at the local level with active participation of the affected community and a maximum reliance on local capacities and expertise."

There are three key aspects to this principle. Firstly, that disaster recovery is best approached from a community development perspective; secondly, that disaster recovery is most effective when conducted at the local level with active participation of the community, and finally, that maximum reliance should be placed on local capacities and expertise. Yet, despite this distinction, a common theme prevails – that of a community-centric approach, previously discussed under principle 1.

Again, the importance of this theme cannot be overemphasised. In the context of Principle 4, such an approach acts to empower a disenfranchised community and is therefore central to their future healthful functioning. Clearly, the community development approach is logical. The opportunities manifested in a community that has been fundamentally altered by calamity present significant room for change. This opportunity ought to be capitalised upon in order that the potential for community betterment in areas such as hazard mitigation and enhanced preparedness can be realised.

The importance of involving and empowering the community during this process also cannot be overstated. As has been stated many times thus far, involvement of the community in managing the recovery process is central to the success of key recovery initiatives. Moreover, involvement of the community alters their status from passive pawns in the process, to once again active and contributing directors of their own destiny. This is a very important element in terms of a positive psychological outlook (Raphael, 1986).

Finally, it is important to place as much reliance as is sensibly possible upon local capacities and resources. The value in this approach is essentially twofold. Firstly, the more that recovery relies on local resources, the quicker that the community will be able to move towards self-sustainability, thus move away from recovery and towards relative normalcy. Secondly, but more subtly, a reliance on external resources has the tendency to take business away from those resource providers who are still capable of providing goods and services. Hence, the recovery process is unnecessarily prolonged. The reason for this is clearly articulated by Haas, et. al. (1977) who state that a central element in the speed of a community's recovery is the speed with which the economic sector can re-establish itself. Sinclair (1990) provides a good example of where this approach was adopted in his report on the recovery

subsequent to the Nyngan floods. In this instance, the utilisation of donated goods was carefully managed in such a way as to minimise the detrimental effect on local retail clothing and homeware outlets. In addition, much reliance was placed on locally sourced volunteer assistance.

Principle 5: Involvement of human service agencies

"Recovery management is most effective when human service agencies play a major role in all levels of key decision making which may influence the well being and recovery of the affected community."

On first impressions, this principle may appear to be at odds with the important role of the community in the decision-making process. This conflict is without merit. Rather, the important role of the human service agencies works in concert with the community in determining needs and informing decisions, one not taking precedence over the other. Indeed the very early stages of recovery, during which times many keystone decisions are made, represent a period of significant psychological distress (Raphael, 1986). It is during this time of diminished psychological capacity that health service agencies can play a crucial role in identifying the needs of the community, perhaps in extreme circumstances effectively acting as the community's proxy.

Nevertheless, it is clearly impractical for the community or even a community representative to play a role in decision making at all levels. This is where human service agencies play a particularly useful role, having the capacity and the knowledge to represent the community's interests at all levels. The value in this advocacy function being performed by the human service agencies lies in their intimate knowledge of community needs during times of crisis, this being their core day to day function. This rationale is reminiscent of emergency planning principles, where agencies are allocated roles and responsibilities that reflect as closely as possible those which they engage in on an everyday basis. However, the role and importance of the community must never be ignored.

Principle 6: Recovery begins at impact

"Recovery from disaster is best achieved where the recovery process begins from the moment of disaster impact."

There is a tendency in the part of some to think of comprehensive emergency management in terms of four separate and distinct phases of emergency management, which include prevention/mitigation, preparedness, response and recovery. This approach is fundamentally flawed and is something that Principle 6 seeks to redress.

Recovery actions must and do begin from the moment of impact. Not only are there some critical actions that can take place, which will facilitate a more rapid recovery, but individuals, agencies and organisations that have a major role during response operations also may have a key role in recovery. A very small, but fitting example can be seen in the fire service's response to a house fire. A critical element in any firefighting strategy is 'salvage'. Salvage refers to actions taken to minimise further damage to property during and after firefighting operations, in effect facilitating a more rapid recovery.

However, this principle could be taken further, particularly when considered in parallel with Principle 2. Specifically, recovery should be a consideration during prevention/mitigation, preparedness *and* response activities. For example, during the recovery of a community, initiatives should be taking place to prevent or mitigate future occurrences. Similarly, while activities are taking place to prevent or mitigate future impact, consideration should be given to how this will bear on recovery needs and processes.

Preparedness activities, on the other hand, place much emphasis on formulating plans, training and exercising. It would be remiss not to devote a significant amount of preparedness effort toward recovery considerations so that in addition to being prepared for the impact of a hazard, all parties are prepared for what must be done once the proverbial dust has settled. The events of September 11 2001 serve to further highlight the link between preparedness and recovery. It was demonstrated that organisations that had prepared by maintaining appropriate business recovery arrangements, such as back-up data storage and information processing repositories, were able to conduct business as usual on September 12 2001 (Meredith, 2002).

Accordingly, while Principle 6 ostensibly relates to response considerations of recovery, much benefit can be cultivated from a more comprehensive consideration of recovery management well before an event actually occurs.

Principle 7: Training and exercising of recovery arrangements

"Recovery planning and management arrangements are most effective when they are supported by training programs and exercises which ensure that recovery agencies and personnel are properly prepared for their role."

Training and exercising forms a central link between these principles, particularly Principle 2, and the efficient and effective management of the recovery process. Carter (1991) reinforces this point on a number of occasions, stating that training and exercising are crucial to maintaining the viability of plans, as well as

being a key element in preparedness. However, Carter (1991) is not unique in his emphasis on the importance of training and exercising. Rather, such sentiment can be found reflected in many contemporary training and emergency management texts, including those published by Emergency Management Australia.

While training and exercising have been mentioned above in the same vein, it is important that they are distinguished in terms of their benefit to recovery management.

Training is crucial to ensuring that all those with a responsibility under the extant recovery management arrangements are familiar with and capable of carrying out their designated roles and responsibilities. Moreover, training provides and opportunity for the participants to build a concept of how the process fits together and what command, control, coordination and communication arrangements are in place and what authority is in place to support these arrangements.

In comparison, exercising brings all the elements together to test the recovery management plans and arrangements. This is the generally agreed role of exercising. However, there exist a number of collateral benefits. These include the determination of the continued appropriateness of extant roles and responsibilities; the highlighting of impracticalities inherent in existing arrangements; deficiencies in training; and an awareness of the real potential resource demands.

Of course, a full-scale exercise of recovery management arrangements would not be feasible, hence underlining the importance of effective training and extremely carefully crafted desktop (or similar) exercises.

Principle 8: Comprehensive, integrated, timely, equitable, fair and flexible arrangements

"Recovery from disaster is most effective where recovery management arrangements provide a comprehensive and integrated framework for managing all potential emergencies and disasters and where assistance measures are provided in a timely, fair, equitable manner and are sufficiently flexible to respond to a diversity of community needs."

This principle describes two quite separate considerations, one pertaining to recovery management arrangements, the second pertaining to assistance measures. Accordingly, each will be described in turn.

Principle 8 recommends in the first instance that arrangements provide a comprehensive and integrated framework for managing all potential emergencies and disasters. This holds a number of implications. Firstly, the use of the word framework suggests that arrangements are a starting point for recovery management; a 'straw man'. Clearly, this would encourage flexibility and enhance the practicality of any such arrangements. Secondly, this framework should be comprehensive and integrated. This implies thoroughness, broad consultation and, most importantly, a well prepared, multi-level, all-agency recovery plan where all stakeholders are appropriately involved and interact in a seamless, coordinated, effective and efficient manner. Finally, the first part of Principle 8 makes reference to 'managing all potential emergencies and disasters'. This is consistent with the widely accepted 'all hazards' approach to emergency management, thus ensuring arrangements aren't concerned with the minutiae of specific emergencies thereby losing any trace of practicality, applicability and flexibility. In other words, truly pragmatic recovery management arrangements would not reflect the specifics of the recovery process. Rather, they would be more general in nature, consistent with the framework concept discussed above.

As mentioned, the second part of Principle 8 relates to assistance measures; that is, those contingencies established or maintained to meet the needs of the affected community. Specifically, Principle 8 recommends that these measures are provided in a timely, fair, equitable manner and are sufficiently flexible to meet a diversity of community needs. In other words, assistance measures need to meet four requirements. Firstly, assistance measures should be made available to the affected community in time for such measures to achieve their desired outcomes.

Secondly, assistance measures should be made available on an equal basis to elements of the affected community, with the following caveat: while availability should be on an equal basis, this should also be fair to all involved. For example, equal may mean two bags of rice for each family. It would not be fair to provide two bags of rice to families that have an existing large storage of rice. An interesting challenge to this concept often arises in the wake of bushfire, where debate centres on the provision of appeal funding and other monetary assistance to uninsured homeowners to the exclusion of insured home owners, leaving the insured questioning the sense of paying years of premiums.

Finally, assistance measures should be flexible enough to meet a wide variety of community needs. This requires careful forethought, thus again bearing heavily on Principle 2. Measures not only need to exhibit diversity, but within themselves need to be flexible. This flexibility also reflects the sentiments of Principle 3.

Overview

Each of these eight principles represents an important recovery management consideration in its own right. However, as highlighted a number of times during their discussion, these principles are also closely interrelated, each one complementing and supporting the other.

While not considered in the above discussion, there are also 11 'Recovery Concepts', which reinforce and provide additional substance to these eight overarching principles. Unfortunately, a discussion of these concepts is outside the scope of this paper. However, the reader is referred to Emergency Management Australia's Disaster Recovery manual (1996, paras 1.04–1.15) for a detailed discussion of these concepts.

Part 3: The recovery process

Emergency managers, hence recovery managers, work particularly well when there is a clearly described process from which ideas can be generated. It is important to note that the mere outline of a recovery process, no matter how inspired, cannot take the place of proper planning. Rather, as alluded to above, the description of a recovery process acts as a tool of evaluation and comparison of planned and actual recovery efforts, as well as a springboard for further work.

The recovery process in the broader context of emergency management

Recovery is an integral part of the comprehensive emergency management process. Thus, to truly consider the recovery management process properly, it must be considered in light of this broader context.

In consideration of any process, it can be tempting to fall into the trap of 'sequencing' the myriad steps and sub-processes. This is particularly unwise in the field of emergency management, where the emergency manager must take care to be mindful of the entire process at all stages. For example, recovery must be considered during preparedness activities, whereas it is also prudent to consider prevention or mitigation measures during recovery. An attempt has been made in Figure 1, to represent this concept graphically.

As shown, comprehensive emergency management requires interaction between each of Prevention, Preparedness, Response and Recovery at any point in the process. The large circular arrow represents the general tendency, however, of the process to approximate a sequence. Notwithstanding, the most important point is represented by the blurred transition between each element in the process – that these elements are not 'stages', where one begins and the other ends, but rather elements in a continuum.

Spotlight on the recovery process

An underlying concept

Just as the process described above should not be assumed to represent a number of discreet stages, so too does this principle apply to the recovery process. This approach is strongly supported by the Victorian SERU (2000). In their recovery Planning Guidelines, a key concept is the consideration of the recovery process as

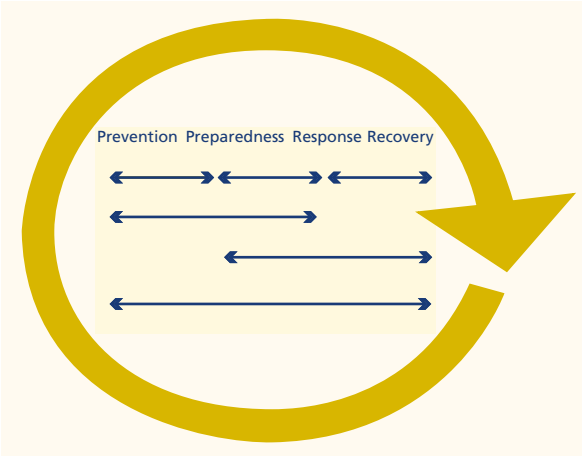

Figure 1. The Integrated Emergency Management Process

a set of activities as opposed to a chronological sequence of events. This is the first principle upon which the recovery process should be based.

A recovery process framework

It is one thing to view the process as a set of activities and still another to define exactly what these activities are. Yet, despite the veritable dearth of literature describing the myriad tasks comprising the recovery process, there is little in the way of broadly endorsed recovery process frameworks. Notwithstanding, there are a number of theories in existence upon which to base an accurate description of the recovery process. Prominent among these the four-level process outlined by Kates & Pijawka (1977).

Described as a sequential model, Kates & Pijawka's (1977) recovery process outlines four principle periods encompassed by the recovery process. These include:

1. The Emergency Period;
2. The Restoration Period;
3. The Replacement Reconstruction Period; and
4. The Commemorative, Betterment and Developmental Reconstruction Period.

These periods are defined by Kates & Pijawka (1977) in reasonably unambiguous terms. The Emergency, or perhaps more appropriately Post-Impact Period is characterised by activities required by those affected to handle the drastic changes that have been wrought upon them. In comparison, the Restoration Period is a 'patching' period characterised by a progressive return to relatively normal socio-economic functioning. The Replacement Reconstruction Period is represented by a full return to pre-emergency functioning, whereas the Commemorative, Betterment and Developmental Reconstruction Period is characterised by projects to memorialise, improve on or further develop the affected community. Kates & Pijawka (1977) also observe that each of these periods have historically taken about ten time as long as that which occurred prior. An outline of

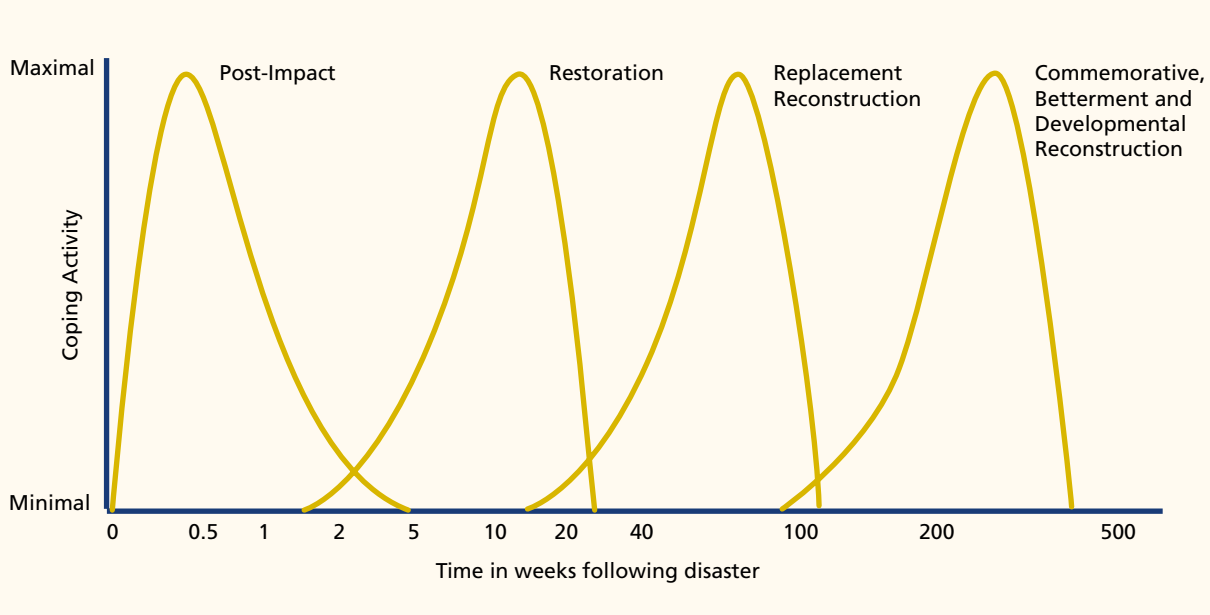

Figure 2. The Recovery Process. Source: Kates (1977)

the how these periods represent a process, adapted from Kates (1977) is outlined in Figure 2.

The rate of recovery, according to Kates & Pijawka (1977), do note that could be greatly enhanced by encouraging as much simultaneous activity as possible, thus reducing the peak and troughs, as demonstrated by figure 3.

Integration with the emergency management process

While Kates & Pijawka's (1977) and Kates' (1977) theories and observations hold a great deal of merit, the means by which they can be integrated with the broader emergency management process are more suited to a sequential model, which is not supported by this paper. Accordingly, this paper proposes an augmentation to the process advocated by Kates & Pijawka (1977) that is more suited to the emergency management process described earlier. While it is noted that the emergency management process generally conforms to an approximate sequence of events, the interaction between all elements of the process cannot be ignored. Examples of this interaction are not hard to bring to mind with a little applied thought. Figure 4, 'Charlotte's Doughnut' (Charlotte being a cryptic reference to web between each element of the process) represents the concepts described above; that is the tendency for the process to approximate a 'sequential continuum', whilst maintaining constant interaction between all elements.

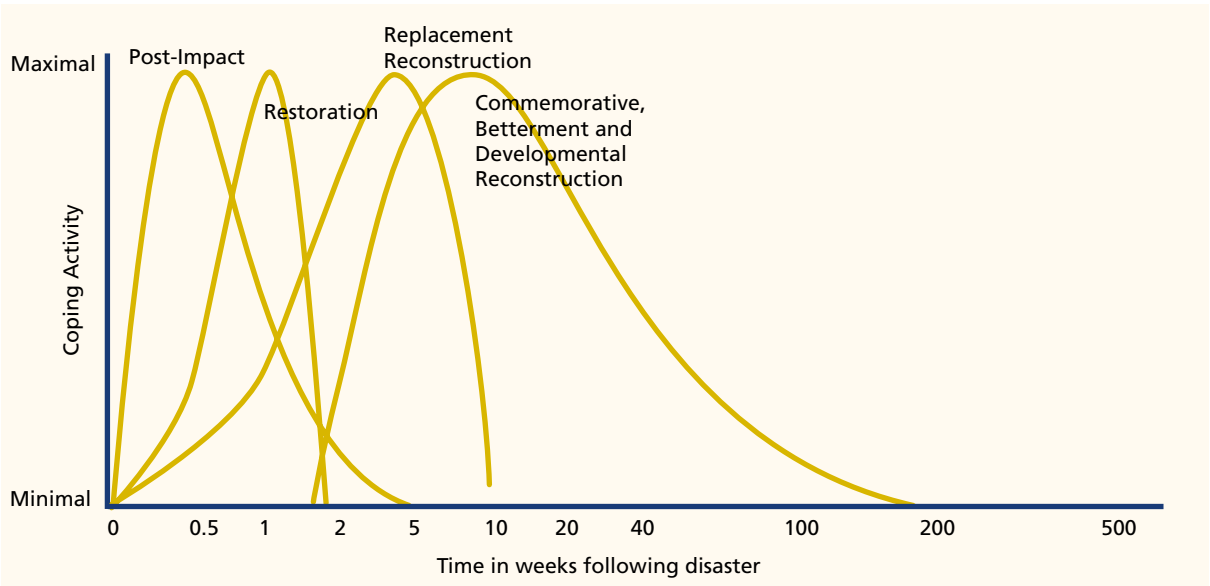

Figure 3. An enhanced Recovery Process Adapted from Kates & Pijawka (1977)

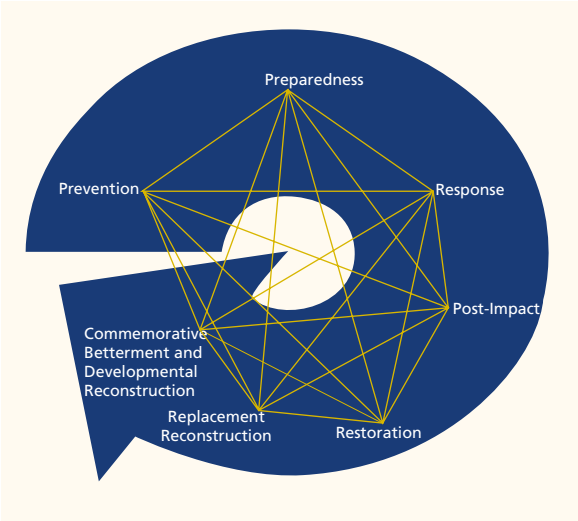

Figure 4. Charlotte's Doughnut

Charlotte's Doughnut reinforces the fact that, while recovery may not in fact be taking place, all elements of the emergency management process continue to contribute to the pace and effectiveness of recovery for when it does finally begin.

The questions now remain as to, firstly, what it is that is contributed to the recovery process from each element of the broader emergency management process, and secondly, what it is that is comprised by each of the element in the recovery process.

Recovery process specifics

There are essentially seven elements of relevance, either directly or indirectly, to the recovery process. Three of these, the 'extra-recovery' elements are the partner elements of recovery within the emergency management process. These elements are either dependent on the recovery process or vice versa.

The remaining elements, the intra-recovery elements, are those that directly comprise the recovery process and are based on the recovery process advanced by Kates and Pijawka (1977).

Not surprisingly, a narrative description of the interactions and actions that relate to each of these elements would be quite tortuous and potentially confusing. Therefore, in the interest of clarity and pragmatism, a description of these elements is presented in the tables in the following pages.

As may be observed in Table 1, extra-recovery elements are principally concerned with building on previous recovery, planning for future recovery and bringing recovery arrangements on-line. Table 2, now brings recovery management into the limelight, focusing on the activities and considerations that comprise recovery proper.

Recovery process key points

Tables 1 and 2 show that recovery is a complex, protracted and dynamic process, which occurs at many levels of the community. It is important to remain continuously mindful that recovery is a community-centric process, and one that is not strictly sequential, but with each of its elements often operating in concert. Moreover, it is important to remain cognisant that recovery is an integral element of the Comprehensive approach to emergency management and therefore must consider and be considered by its partner elements. Thus, the process of recovery cannot be considered without reference to these elements, for what affects one also affects others.

Part 4: Diverse reactions to emergencies

When the infinite combination of hazards and individuals are taken into account, the potential reactions to emergencies are expectably diverse. Further compounding these diverse reactions are the equally diverse reactions prevalent at other levels of society, including family, peer-group and community.

Clearly, a complete exposition of all reactions by all individuals and groups would be a monumental task and is thus outside the scope of this paper. However, the more prevalent reactions to emergencies will be outlined, from which it may be possible for the reader to gain an appreciation of the likely reactions that may be observed in a community following an emergency.

Nevertheless, an understanding of reactions to emergencies is arguably the most central of mental health considerations to the recovery process. The reason being that it is these diverse reactions of individuals and groups to emergencies highlights the needs of those impacted, thereby facilitating a more informed and realistic approach to both the management of the recovery process as well as recovery planning.

Reactions to emergencies: Community, family and individual

Community

Raphael (1986) paints an extremely accurate, yet poignant picture of a community's response to emergencies. She outlines the community response in parallel with the individual response, that is, confusion and change followed by adaptation, management of the situation, reorganisation, and recovery. What effectively happens is that the emergency serves to fundamentally alter the myriad interactions within the community, or as Gordon (1990) suggests, destroy all bonds that come into its contact. However, what is discussed here is merely an aspect of the psychosocial ramifications of the emergency. There is also a physical aspect in the sense that the community can be physically broken up, such

Table 1: Extra-recovery elements.

ELEMENT	PRINCIPLE FOCUS OF ELEMENT	RELATIONSHIP TO RECOVERY	RECOVERY-RELATED ACTIONS *INDIVIDUAL*	*COMMUNITY*
Prevention and Mitigation	Prevent or mitigate against the impact of a hazard	Recovery actions incorporate prevention or mitigation measures; Implications for recovery are considered during prevention and mitigation activities	Incorporate prevention or mitigation strategies during recovery; Take out insurance (home, belongings and income)	Incorporate prevention or mitigation strategies during recovery; Take out insurance
Preparedness	Ensure the community is prepared for the impact of a hazard	Recovery plans are developed; Recovery considerations are incorporated into emergency plans	Take actions to ensure post-impact sustainability; Identify contingencies for accommodation, schooling, work, etc.; Ensure awareness of potential effects, needs and available resources post-impact	Develop plans; Conduct of vulnerability studies; Incorporate recovery considerations into emergency plans; Training in recovery management and arrangements; Exercising of recovery arrangements; Take actions to ensure post-impact community sustainability; Identify contingencies for accommodation, schooling, work, etc.
Response	Respond to the impact of a hazard upon a community	Implications for recovery are considered during response activities; Actions are taken to initiate or enhance recovery processes	Secure valuables, especially documents; Tie into community information networks; Maintain contact with family and friends	Activate recovery plan and keep stakeholders informed, including the community; Identify potential recovery resource needs from the earliest; Identify resources

as was the case in the Hobart Bridge Disaster, which in itself can have psychosocial implications (Raphael, 1986).

Nevertheless, according to Raphael (1986), leaders quickly emerge from the confusion and coordinate what is essentially a process driven by post-impact altruism. This stage is sustained to a point at which former power structures reassert themselves and altruism gives way to former patterns of conflict and bureaucracy, sometimes even manifesting in turf wars between aid and recovery agencies. Further, SERU (2000) state that an unquestionable consequence of emergencies is a degree of community division. The degree to which this division affects the community will depend on a number of factors, including the level of social capital, isolation and resilience.

As one looks closer at what happens to communities in emergencies the real impact of emergencies on communities emerges. For example, uncertainty and complexity are cited by SERU (2000) as significant aspects of the earliest phases of recovery. This accords with Raphael's (1986) description of the '2nd Disaster',

Table 2: Intra-recovery elements.

ELEMENT	PRINCIPLE FOCUS OF ELEMENT	RELATIONSHIP TO THE BROADER EM PROCESS	RECOVERY-RELATED ACTIONS *INDIVIDUAL*	*COMMUNITY*
Post-impact	**Implementation of strategies to cope with damage, dislocation, death and injury**	**Strongly linked with response, but also to other elements;** **Should commence from the moment of impact;** **Effectiveness is associated with effectiveness of preparedness activities**	**Satisfaction of basic needs: physiological, safety & security, limited belonging and love needs;** **Account for family and friends;** **Seek and gather information;** **Attend to psychological needs as best and as early as possible**	**Establishment of recovery committee;** **Establishment of recovery centre;** **Conduct of damage and needs assessment;** **Suspend normal activities where necessary;** **Activate recovery systems in accordance with recovery plan;** **Search and Rescue;** **Establishment of emergency relief measures, including feeding, shelter and clothing;** **Establishment of public information dissemination systems;** **Begin clearing debris;** **Provision of mental health services;**
Restoration	**Progressive return to relatively normal economic and social functioning – patching up**	**Still linked with all elements;** **Effectiveness is associated with effectiveness of preparedness activities;** **Some restoration activities will have a strong bearing on future prevention and mitigation**	**Restoration of social structure;** **Manifestations of grief and loss;** **Possible relocation on a permanent or semi-permanent basis for some;** **Progressive return of evacuees;** **Clean-up of home and personal property;** **Schooling resumed;** **Financial assistance sought;** **Insurance claimed;** **Counselling**	**Cessation of search and rescue;** **Restoration of economic base;** **Restoration of physical infrastructure and utilities, including transportation systems, water, sewerage, etc.;** **Closure of relief operations, including feeding, shelter and clothing;** **Provision of psychological support services;** **Financial assistance sought and provided;** **Appeals established and managed** **Most debris removed**

Table 2 continues on the next page

Table 2: Intra-recovery elements – continued.

ELEMENT	PRINCIPLE FOCUS OF ELEMENT	RELATIONSHIP TO THE BROADER EM PROCESS	RECOVERY-RELATED ACTIONS *INDIVIDUAL*	*COMMUNITY*
Replacement Reconstruction	Progressive return to relatively normal economic and social functioning – patching up	Strongly linked with prevention and mitigation, but also to other elements; Much activity relates to implementation of prevention and mitigation measures as well as review of recovery arrangements; Effectiveness is associated with effectiveness of preparedness activities	Homes rebuilt and personal property replaced; Employment resumed; Social network restored; Reduced demand for psychological assistance; Possible continued heightened demand for health services; Long-term psychological sequelae becomes manifest	Employment recovers to relatively normal levels; Physical infrastructure fully reconstructed; Service industry fully operational; Return to normal economic functioning; Large developmental projects commenced; Litigation commences
Commemorative, Betterment and Developmental Reconstruction	Memorialise the event, encourage community growth and building of social capital, and encourage continued community development	Again, strongly linked with prevention and mitigation, but also to other elements; Much activity also relates to implementation of prevention and mitigation measures as well as review of recovery arrangements; Effectiveness is associated with effectiveness of preparedness activities	Anniversaries of the event and/or loss of family and friends; Planning for the future and focus on the future; Increased birthrate; Some instances of permanent relocation	Building of memorials and monuments; Commemoration days; Public holidays; Efforts to expand and further develop the community; Large-scale community developments; Further implementation of prevention and mitigation measures; Increased efforts to improve community sustainability; Settlement of litigation; Normalised demography; Return to preparatory rather than recovery mindset and political agenda

where confusion reigns supreme as a consequence of damaged communications and information dissemination mechanisms and infrastructure. This uncertainty, complexity and resulting confusion no doubt compounds the already burdensome stressors upon a community.

Another significant stressor bearing down on the recovering community is the loss of autonomy, which according to SERU (2000) can only be mitigated by encouraging a community-driven recovery process. However, as stated by Raphael (1986), the loss of dignity that goes with asking for help is also a significant

stressor. It seems therefore inevitable that no matter which way the recovery of a community is managed, there is going to be some inherent conflict and resulting stress.

Family

Just as family is important in daily life, so too are they important during emergencies, but to a degree unimaginable during times of peace and calm. This importance of family has been highlighted by Raphael (1986), who suggests that the family, operating as a system, goes through some important changes in order to support and protect its members. This accords with the kin input mode as advanced by Haas, et. al. (1977). The kin input mode is a mechanism of coping used by families as a single autonomous unit. This contrasts with the institutionalised and autonomous modes put forward by the same authors, where the institutionalised mode refers to heavy reliance on public support systems, and the autonomous mode placing little or no reliance on public support systems.

Principal reactions of families to emergencies center on protection of its members and provision of support.

In describing the reactions of families to emergencies, Raphael (1986) outlines 5 key observations:

1. Bereavements of family or close friends were likely to be associated with a lower level of recovery;
2. A majority of family ties were strengthened following emergencies;
3. Larger families were more vulnerable to the stress aspects of the experience;
4. Higher income was associated with better family coping;
5. Economic recovery had the highest causal effect on emotional recovery.

In addition, Haas, et. al. (1977) observe that families seem to recover faster than cities reconstruct.

From the above, it may be observed that the family plays a pivotal role in the emotional, hence overall, recovery of a community and therefore should be a prime concern in recovery planning and management.

Individual

It is perhaps the individual reactions to emergencies that are the most diverse. Not only are differences apparent between individuals, but there is also variations between particular demographics; principally the very young and very old. Therefore, against the background of group-based differences outlined above, it is important to consider the diverse reactions of individuals and some of the implications this holds for recovery management.

Generally observable reactions

Raphael (1986) outlines three discreet categories of reaction to the stressors inherent during and after emergencies. These include post-traumatic stress syndrome (also referred to as post-traumatic stress disorder, or PTSD), survivor syndrome, and disaster bereavement syndrome. In addition, other reactions may be observed, including anxiety disorders, depressive disorders and psychic numbing.

An alternate, though not conflicting perspective is presented by Malt (1994), who highlights four broad categories of psychological reaction to traumatic events. These include mood disorders, anxiety disorders (including posttraumatic stress disorder), somatoform autonomic dysfunction and organic mental disorders as a consequence of injury. This range of disorders is reflected in a wide range of traumatic events, including disasters such as earthquake (Sharan, et al., 1996) and volcanic eruptions (Shore, 1986); urban terrorism (Trappler, 1996) and interpersonal violence (Pynoos, et al., 1993). The root of these disorders and their symptoms is beyond the scope of this paper, although Malt (1994) offers a sound and comprehensive analysis, particularly in the case of non-organic psychological sequelae. Nevertheless, it is conceivable, albeit somewhat simplistic to posit that at the root of many of these problems is a set of destroyed constructs, or in the words of Janoff-Bulman (1992) a collection of 'Shattered Assumptions'.

Psychological response to traumatic events has been described as a normal reaction to an abnormal event (Tunnecliffe, 1999). Moreover, this notion of abnormality is further expanded by Janoff-Bulman (1992) when he describes traumatic events as those that are out of the ordinary and threatening to one's existence. In stating that such events are a threat to one's existence, it follows that such events would present a significant risk of personal injury. U.F. Malt (1994) offers a reasonably comprehensive list of traumatic events that could foreseeably lead to such a risk, including the injuries that would likely arise. It is questionable, however, whether or not it is appropriate to pigeonhole injuries in this way. Nevertheless, he impresses upon the reader that a significant consequence of such injury is psychological trauma. No doubt, any such reference to injury would conceivably apply equally to emotional injury as well as physical injury. Moreover, as posited by Raphael (1986), there appears to be a direct association between the severity of the stressor and the resulting reaction or pathology.

In addition, Raphael (1986) has suggested that there are a number of individual factors that bear on individuals' vulnerability to psychological stressors in emergencies. Figure 5 provides and overview. Put simply, the presence or level of certain compounding or mitigating factors bears heavily on an individual's psychological prognosis. One of these, age, will be discussed in greater detail later. Notwithstanding, an appreciation of some of these vulnerability factors is potentially of great benefit when

attempts are being made to identify elements of the community at heightened risk of psychological trauma.

Figure 5 goes some way toward demonstrating the complexity of the human condition with respect to reactions to emergencies. Clearly, the many combinations of vulnerability factors equate to a great diversity in the potential reactions and severity of reactions to emergencies.

Other elements of Figure 5 that are of interest are those of age, religion and cultural factors. While cultural issues and religion are fairly straightforward in that they may correlate with either high or low vulnerability, depending on the individual and the religion, age is slightly more complex and requires further discussion.

Children

Many emergency management texts draw attention to some of the myths associated with the reaction of children to emergencies. However, while their reactions are different to that of adults, children are not immune from the psychological impact of emergencies. Indeed, Raphael (1986) states that children respond directly and appropriately to emergencies. In other words, they are not afforded the protection of the proverbial rose-tinted glasses of youth. Rather, they are affected in a very real and tangible way.

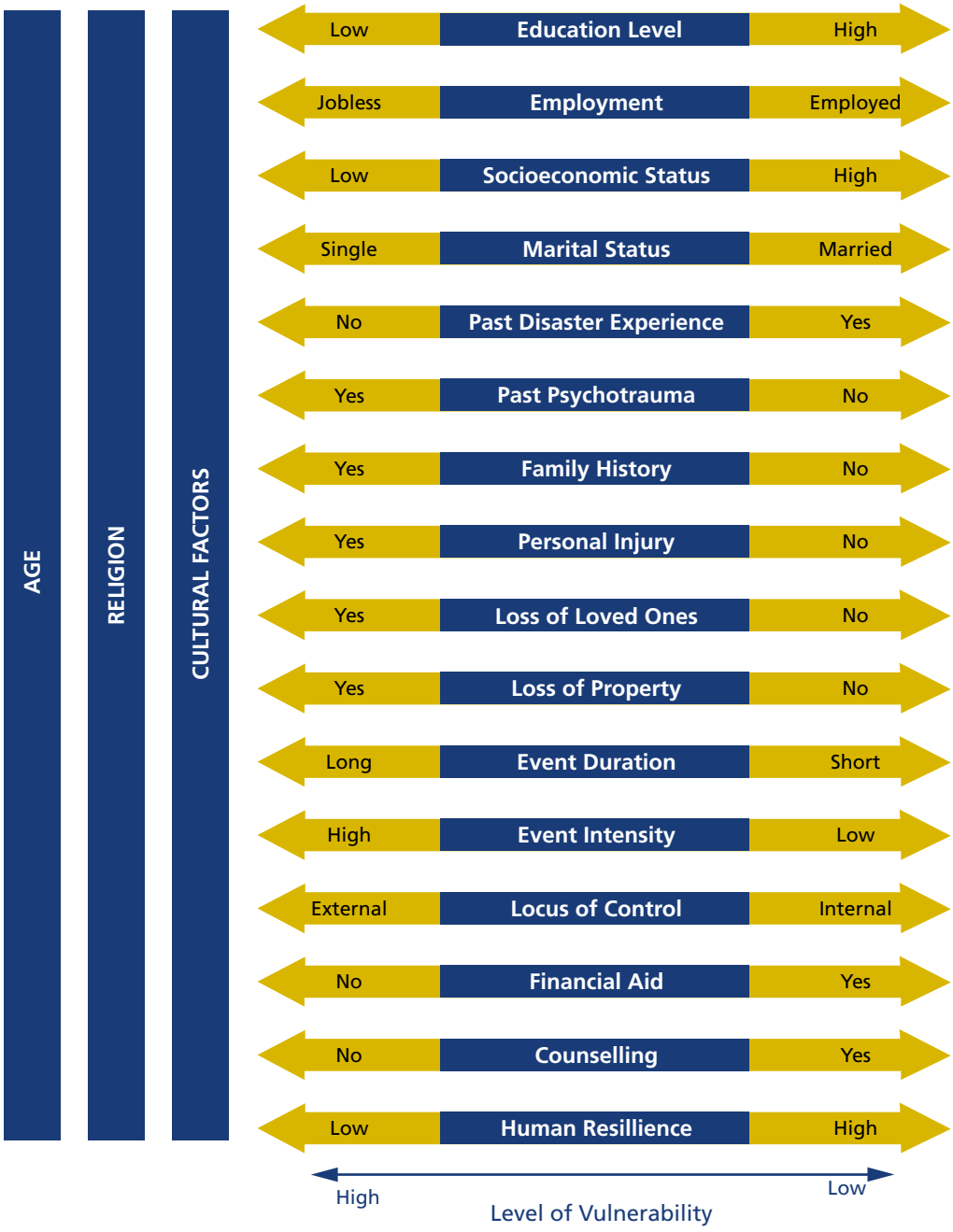

Figure 5. Vulnerability Indicators Based on Raphael (1986)

Some of the more typical reactions include fear, a need to re-establish family links, separation anxiety, sleep disturbances, emergency-related play, and behavioural problems (EMA, 1996). In addition, Raphael (1996) points out some additional reactions typical of children.

Children tend to be less inclined to use denial as a defence mechanism. Further, while children can and do experience symptoms indicative of PTSD, Terr (1983) did not observe evidence of numbing, amnesia or flashbacks in children, but noted a distinctly limited future perspective in child survivors of emergencies. This is supported by Raphael (1986) who observed a sense of 'loss of childhood' in such individuals.

Finally, as shown in Figure 6, while children acknowledge death and grieve as a consequence, the finality of death is difficult for the very young to grasp.

In most texts dealing with the childhood experience of emergencies, a recurrent theme is the need for reassurance and maintenance where possible of family bonds. Children should also be given as many opportunities as practicable to master the experience. This is a critical function of play, school and home life.

Elderly

There has been and will continue to be concerted debate as to the reactions of elderly to emergencies. Regardless, some general themes have emerged upon which the needs of the elderly can be based. Principal among these is that, while the elderly do tend to experience greater mortality rates than those of younger demographics, elderly survivors tend to be more resilient. This is supported by Haas, et. al. (1977) in their discussion of the autonomous recovery mode; a mode representative of the means by which elderly potentially cope with emergencies. There is also the proposition of Raphael (1986) which implies that the elderly are reluctant to see themselves as burdens upon younger generations. Notwithstanding, owing to their oftentimes less favourable financial situation, the elderly tend to recover slower economically, thus emotionally and therefore warrant serious consideration in terms of recovery arrangements.

Key points of diverse reactions to emergencies

In light of the wide range of variables relevant to the manifested reactions of individuals and groups to emergencies, the reactions to emergencies are, not surprisingly, diverse. While reactions within demographics and within categories of groups can be roughly surmised, the reactions of individuals are a little more difficult to predict. Nevertheless, it is without doubt that planning for the psychological aspects of recovery is in all cases warranted. Moreover, the careful and considered deployment of mental health services should feature as an element of any recovery operation. With respect to each of these propositions, it is important that appropriate mental health professionals be consulted from the outset and form part of the recovery management process.

Part 5: Recovery resources

As with any aspect of emergency management, resources feature as an ever-present challenge to planners and managers. These needs will be outlined firstly in terms of what is required and how the required resources are provided. A final consideration, that of who accepts responsibility for provision of resources, is an equally important challenge and will be addressed in the subsequent section.

Some important considerations, highlighted by Carter (1991), should be taken into account when considering the resource requirements of recovery. Firstly, the time pressures of response tend not to apply to recovery, although time is still a factor. Secondly, recovery tends to take place in more stable conditions, except in particularly politically unstable or hazard-prone areas.

Recovery resource requirements

A thorough identification of resource requirements for recovery is particularly problematic, given that recovery needs vary from event to event and no two events are the same. Nevertheless there are indeed some general requirements that need to be provided in order to facilitate recovery. In order to identify some of these needs it has been necessary to examine extant recovery plans, recovery texts and a number of recovery case studies, including that of the Nyngan and East Gippsland floods of 1989 and 1998, respectively, and those described by Haas, et. al. (1977). Of these, extant plans provided the least assistance hence are not referred to in the bibliography, with case studies providing the clearest insight.

The results of these investigations have been distilled into a list of recovery needs, presented in Table 3. Each of these needs are expanded upon to enhance clarity. It should be noted that the categorisation of these needs is not based on any documented methodology and is thus open to debate. Further, some needs apply equally to a number of categories, such as expert advice.

There exists the question of what it is that triggers the need to be fulfilled. In a truly community-focused recovery process, the trigger will be the voicing of the need by the person or group of people in need. However, in an ideal situation, the human service agencies will be a key element in recovery management and may therefore also be in a position to identify needs for which the community is yet unaware. Furthermore, those burdened with particular recovery tasks, such as infrastructure restoration, will also be aware of particular needs for which the broader community is again unaware. This highlights the

Table 3: Recovery needs.

	GENERAL DESCRIPTION	DETAILS OF NEED	MEANS OF PROVISION
OVERALL RECOVERY MANAGEMENT NEEDS	Recovery management structure	Task force or committee structure to coordinate the recovery process. This structure must engage the community.	Pre-planned and activated on impact.
	Government	Government services and political operations are required to provide top-cover and recovery support.	Efforts to reinstate government functioning should begin as soon as possible after impact
	Staff	A variety of staff are required for numerous functions, including clerical support, field staff and management staff. These will be required across organisations and functions.	Potential sources should be earmarked during planning. However, efforts should concentrate on utilisation of local workforce.
	Expert advice	Expert advice will be required across a number of organisations and functions, including medical, engineering, public health, disease, planning, communications, public information and policy.	Organisations and agencies should have identified potential sources of expertise. This information should also have been catalogued in planning.
	Volunteer labour forces	There will likely be a large demand for volunteer labour during recovery operations, especially clean-up.	Most volunteers will offer their services without prompting. Efforts need to be directed at managing this resource effectively as well as targeting local labour.
	Communications	Effective communications are essential to the smooth control and coordination of recovery efforts. Where communications infrastructure has been damaged, efforts need to be directed at immediate restoration.	Carriers and carriage service providers have arrangements in place to bring communications on line. There is also an industry guideline on the coordination of additional ad hoc communications.
	Finances	The entire recovery process rests on access to sufficient recovery funds.	There are a number of sources of funding. However, existing 'local' sources of funding should be investigated in the first instance.
	Public information systems	The need to reduce public uncertainty has already been highlighted. Public information is central to achieving this objective thus facilitating a smoother recovery.	Mechanisms of public information should have been pre-planned and be capable of activation at the earliest.
	Insurance needs	Almost immediately, the need to process insurance claims will arise. The effective management of this need is central to facilitating the economic recovery of the community.	The Insurance Emergency Service and the Insurance Council of Australia exist to, amongst other things, facilitate the proper management of insurance concerns subsequent to emergencies.
	Legal aid	Just as insurance issues will arise in the very early stages of recovery, so too will legal issues. Legal advice will need to be tendered to both individuals, groups and organisations.	Legal Aid would be able to provide a limited service, but every effort should be made to encourage the identification in planning of sources of legal advice.
	Administration consumables	A large number of administration will be generated during the recovery process, which will need to be supported by forms, records and good information management – all requiring large quantities of consumables.	Existing stock should be such that operations are supported in the early stages. Suppliers should also be identified in planning.

Table 3: Recovery needs – continued.

	GENERAL DESCRIPTION	DETAILS OF NEED	MEANS OF PROVISION
HEALTH NEEDS	Sanitation	Subsequent to an emergency, it is likely that sanitation services will have been compromised and will therefore require restoration urgently.	Primary and redundant sanitation maintenance and provision should have been outlined in planning.
	Medical Facilities	Medical services and facilities are likely to be subjected to high demand, though they may have themselves been impacted.	Primary and redundant medical facilities should have been identified in planning. Available medical expertise should also have been identified.
	Hazardous waste management	The need to identify, contain and dispose of hazardous waste is of great importance to ward off risk of a secondary emergency.	Conventional hazard management agencies are likely to be overwhelmed, so secondary sources should have been identified.
	Waste management	There is likely to be a great deal of waste subsequent to an emergency. In addition, further waste will continue to be generated.	The waste management system and a back-up should have plans in place to ensure a rapid return to service.
	Mortuary	There is potential for large numbers of dead. Long-term mortuary facilities may be required to receive the potential large number of bodies.	Identification of appropriate mortuary facilities should be outlined in planning.
	Infectious disease control	In the wake of an emergency, there is a large potential for health problems due to ineffective disease control. This aspect must be managed as early as possible.	Arrangements for relevant expertise in this area should be in place as well as identification of alternatives.
	Vermin and vector control	See Infectious disease control	See Infectious disease control
	Animal disposal facilities	In some emergencies there are large numbers of dead animals which need to be disposed of appropriately in order to protect humans and the agriculture industry from disease.	There are national industry guidelines in place for disposal of animals. This activity may be undertaken by the animal owners or contract/volunteer labour.
	Dry food storage	While conventional food storage is being restored, there is a need to maintain adequate dry food storage.	The provision of such storage should be planned, but may be the responsibility of food owners or providers.
	Refrigeration	See Dry Food Storage	See Dry Food Storage
UTILITY NEEDS	Electricity Water Telephone Gas	Utilities are critical infrastructure elements and require a very high priority of restoration in order to give the community means by which they can recover other elements.	The utilities themselves maintain recovery plans and will restore their services as a matter of priority.
PHYSICAL INFRASTRUCTURE NEEDS	Plant and Equipment	Central to the requirement to restore the built infrastructure is availability of the tools to do the job.	Plans should identify potential sources of such equipment. Also, given that the current trend is to outsource these services, the contractor may maintain some sort of business recovery plan or may not even be affected.
	Maintenance facilities	Maintenance facilities will be required to maintain the plant and equipment used in recovery.	While sources of plant and equipment are being confirmed, the same providers should be queried on maintenance facilities.
	Generators	The demand for electricity in the early stages of recovery will be high, despite the potential that none is available. Generators should therefore be obtained to support critical infrastructure such as medical facilities.	See Plant and Equipment

Table 3 continues on the next page

Table 3: Recovery needs – continued.

	GENERAL DESCRIPTION	DETAILS OF NEED	MEANS OF PROVISION
BASIC COMMUNITY NEEDS	Food	People need to eat.	These resources represent some of the most basic human needs during the recovery process and therefore should form and important element of planning and earmarking.
	Cooking facilities	People need to prepare cooked food.	
	Accommodation	People need shelter.	
	Clothing	People need to be clothed.	
	Bedding	People need to be able to sleep.	
	Counselling	People need psychological support.	
	Transport	The large number of resources, including the human resource will require transportation, especially where existing methods are destroyed or inoperable.	With damaged transportation infrastructure, it is important that alternate means are identified in planning.
	Fuel	Fuel will be required for generators, heaters, plant, equipment and transport.	If fuel suppliers cannot re-supply depleted fuel reserves before transportation infrastructure is restored, innovative and pre-planned arrangements will need to be implemented.
	Childcare	Adults may need to go to work or to assist in the recovery process. Children will require care. This may also have some positive psychological effects in terms of socialisation.	Children will ideally be care for by parents. Where this is not the case, pre-planned and ad hoc childcare arrangements should be established.
	School facilities	It is important for the mental health of children for them to return to normal routine and socialisation as early as possible. Parents may also be required to be absent from home and unable to care for the children.	Alternate schooling arrangements should have been identified in the planning stages or be capable of being readily identified and implemented quickly.
	Animal welfare	The large numbers of domestic animals affected by the emergency will need to be cared for.	A number of sources of advice are available on care of domestic animals during recovery. This information should be readily available and have been prepared/identified in advance where possible
	Heating/Cooling	In locations where extremes of climate prevail, heating or cooling will be required.	Resource lists outlined in recovery plans should identify how these needs can be satisfied, including sources of heating/cooling supplies.
	Storage	Large storage facilities will be required for the substantial quantities of donated and recovered goods.	During the damage assessment, potential storage facilities should be noted. In addition, unaffected nearby resources should be identified.
	Recreation and cultural activities	It is important for the mental health of the community for them to return to normal routine and socialisation as early as possible.	Efforts should be made as soon as practicable to engage the community in recreational and cultural activities.
PUBLIC SAFETY NEEDS	Law and Order Firefighting Ambulance	Despite the heavy demands likely upon public safety agencies, there will be a need to maintain at least a skeleton force to attend to the daily, 'routine' demands of the recovering community, as people will still have heart attacks, break the law and light fires.	These agencies would more than likely be quite well positioned to recover a reasonable level of functioning from very early on in the emergency.

requirement for higher-level coordination by a representative recovery committee or task force.

From Table 3 it becomes apparent that comprehensive and effective planning is an integral element in the unfettered addressing of recovery needs. Planning acts to identify potential needs, potential resource shortfalls and surpluses and means of dealing with these shortfalls and surpluses. Comprehensive preparedness is thus an integral element in the ultimate effectiveness of recovery efforts.

Responsibility for resource provision

Clearly, there are a great number of needs that must be met in order to facilitate recovery. However, there remains the important issue of who is responsible for the provision of these resources. Table 4 provides some suggestions as to who might take such responsibility. However, while not emphasised in Table 4, the use of local resources in the first instance should be a recurring theme whenever considering the provision of resources. The importance of this notion lies in the proposition that the speed of recovery will be greatly enhanced where community self-help is encouraged from the outset. In this respect the community will be guided and supported by all levels of government, with relevant input from key organisations and agencies. Table 4 elaborates.

From Table 4 it becomes clear that the number of stakeholders in recovery is potentially very large, further highlighting the importance of training and exercising in addition to planning. This will encourage each stakeholder to be aware of their role and that of others in the recovery process, and more importantly, that these roles and responsibilities all work together in a controlled and coordinated fashion and are agreed by all involved. Again, the importance of community involvement in these processes cannot be overemphasised.

Part 6: Conclusions on factors that affect recovery

This paper has presented a substantial amount of theory and information on the factors that affect recovery. However, it is important that some practical conclusions are distilled from this material. Such conclusions may then serve as a guide to subsequent evaluations of recovery capabilities of communities, as well as a framework around which actual recoveries may be assessed. Therefore, the true pragmatism of this paper lies not so much in the preceding pages, but in the sections that follow – the conclusions on the factors presented in these preceding pages that affect recovery.

Principles of recovery

In all, eight principles of recovery were outlined. Throughout this paper, many of these principles have been continually alluded to, and while not explicitly expressed, these principles have formed the basis of much of this paper's discussion. Adherence to these guiding principles will undoubtedly facilitate the effective and efficient conduct of a smooth recovery process.

Principle 1: Recovery defined

Based on this principle, recovery has at its core the community. The community must be involved at all points in the recovery process, supported rather than directed by external stakeholders.

Secondly, the desired end-state, in terms of recovery management, is to allow the community to attain a level of functioning that is sustainable and where lessons are incorporated into the broader emergency management process.

Principle 2: Planning and management

Recovery should be planned and prepared for in wide consultation with all stakeholders, including the community. This planning is fundamental to the effectiveness of recovery and was a recurrent theme in the previous outline of recovery needs in Part 5.

A recovery committee is an appropriate means by which consultative planning can take place. Such recovery committees are a legislative requirement within many Australian States and Territories.

Principle 3: Recognition of changing needs and complex nature

Recovery arrangements must be flexible. Moreover, there must be mechanisms in place whereby the need for flexibility can be established, hence means through which the community can communicate their needs are an important element of recovery. Importantly, communication and information media should be both active and passive.

Many wants will be expressed as needs. The manner by which this problem is addressed must be carefully thought out, with auditable and transparent decision criteria.

Principle 4: Community development approach

Again, the community-centric approach to recovery is emphasised, with emphasis on the utilisation of local resources and expertise. This is again a recurrent theme throughout this paper and an underlying theme in Part 5.

The involvement of the affected community and its resources where possible has a positive effect on the psychological functioning of the community through

Table 4: Responsibility for resources.

	GENERAL DESCRIPTION	PRIMARY AGENCY (ALL LEVELS OF GOVERNMENT)	POTENTIAL RESPONSIBLE PARTIES
OVERALL RECOVERY MANAGEMENT NEEDS	Recovery management structure	Department of Prime Minister and Cabinet;	Recovery manager; Most senior public official
	Government	Attorney General's Department;	Departmental responsibility
	Staff	Department of Emergency Services; Mayor's office.	Government; Council; Temp agencies; Volunteers (community)
	Expert advic		Government; Academia; Industry; Community
	Volunteer labour forces		Community; Neighbouring communities
	Communications		Telecommunications providers; Government
	Finances		Appeals; Donations; Government
	Public information systems		Media; Emergency Service Organisations; Community; Government
	Insurance needs		Insurance Council of Australia; Insurance Emergency Service; Individual Insurers
	Legal aid		Legal Aid; Private firms
	Administration consumables		Donations; Commercial sources; Government; Existing stocks
HEALTH NEEDS	Sanitation	Department of Health and Aging; State Health; Urban Services; Council Engineers; Hospital	Waste management authority; Engineers; Commercial sources
	Medical Facilities		Local and nearby hospitals; Private practice; Government (Defence)
	Hazardous waste management		Fire brigade; Work cover; Dangerous goods unit; Hospitals; Universities
	Waste management		Urban services; Community; Contractors
	Mortuary		Local and nearby facilities; Contractors (eg. Kenyons)
	Infectious disease control		Health; Hospitals; Community; Government (Defence)
	Vermin and vector control		Department of agriculture; Contractors; Community

Table 4: Responsibility for resources – continued.

	GENERAL DESCRIPTION	PRIMARY AGENCY (ALL LEVELS OF GOVERNMENT)	POTENTIAL RESPONSIBLE PARTIES
BASIC COMMUNITY NEEDS	Animal disposal facilities		Department of agriculture; Animal Health Australia; Industry; Contractors; Community
	Dry food storage		Supermarkets; Airports; Transport hubs; Community
	Refrigeration		
UTILITY NEEDS	Electricity	Utility companies	Electricity Authority; Contractors (generators)
	Water		Water Authority; Contractors; Government (Defence)
	Telephone		Carriers and Carriage Service Providers;
	Gas		Gas Authority; Contractors
PHYSICAL INFRASTRUCTURE NEEDS	Plant and Equipment	Department of urban services; Engineering department	Engineering department; Contractors; Community
	Maintenance facilities		Engineering department; Contractors; Community
	Generators		Engineering department; Contractors; Community
BASIC COMMUNITY NEEDS	Food	Department of Health and Aging; Centrelink; Department of Community Services	Donations; Non government organisations, eg. Red Cross; Contractors; Neighbouring communities
	Cooking facilities		Contractors; Commercial supplies; Non government organisations, eg. Red Cross; Government (Defence)
	Accommodation		Neighbouring communities; Non government organisations, eg. Adracare; Government; Existing facilities; Commercial sources
	Clothing		Donations; Non government organisations, eg. St Vincent de Paul; Commercial sources;
	Bedding		Donations; Non government organisations, eg. St Vincent de Paul; Commercial sources;
	Counselling		Hospitals; Mental health service; Private practice; Emergency service organisations; Volunteers

Table 4 continues on the next page

Table 4: Responsibility for resources – continued.

	GENERAL DESCRIPTION	PRIMARY AGENCY (ALL LEVELS OF GOVERNMENT)	POTENTIAL RESPONSIBLE PARTIES
BASIC COMMUNITY NEEDS	Transport		Contractors; Local industry; Government (Defence); Community
	Fuel		Fuel Companies; see also transport
	Child care		Existing facilities: Schools; Volunteers; Community; Contractors
	School facilities		Existing local and neighbouring facilities
	Animal welfare		RSPCA; Veterinary practices; Community; WIRES; Volunteers
	Heating/Cooling		Commercial sources; Contractors Existing facilities
	Storage		Supermarkets; Airports; Transport hubs; Warehouses; Community
	Recreation and cultural activities		Donated services; Commercial ventures; Community
PUBLIC SAFETY NEEDS	Law and Order	Attorney General's Department; Department of Emergency Services; Health; Police service	Police; Security contractors
	Firefighting		Fire brigade; Volunteers
	Ambulance		Health/Ambulance; Volunteers, eg. St John's Ambulance

mastery. It also has a positive effect on the economic recovery, providing local business and industry with a reason to recover as quickly as possible.

Recovery also presents an opportunity for betterment through community development activity, which should be a feature of all recovery processes.

Principle 5: Involvement of human service agencies

Human service agencies posses an in-depth knowledge of community needs and therefore are key stakeholders in the recovery process, able to accurately represent the needs of the affected community, especially in the early stages of recovery. The human service agencies can also play the role of community advocate in forums where it is neither possible nor appropriate for the community to be involved, but where community interests should be represented.

Principle 6: Recovery begins at impact

This is yet another principle that features prominently throughout this paper. There is a wealth of evidence to support the fact that recovery is more effective and often less protracted when conducted from the moment of impact.

However, this principle was expanded upon to also advance the notion of recovery arrangements that are completely integrated with other elements of the comprehensive emergency management process. This concept was expanded upon in Part 3.

Principle 7: Training and exercising of recovery arrangements

As also discussed in Part 6, training and exercising is central to the effectiveness and endorsement of recovery arrangements, where training inculcates the required knowledge and exercising tests and refines the arrangements. Training and exercising are the glue that binds preparedness activities to actual recovery operations.

Principle 8: Comprehensive, integrated, timely, equitable, fair and flexible arrangements

Recovery arrangements should represent guidelines to be adapted depending on the situation, thus encouraging flexibility and practicality. Recovery arrangements should also be thorough, developed in broad consultation and, most importantly, well prepared, multi-level, and all-agency. Truly pragmatic recovery management arrangements would not reflect the specifics of the recovery process. Rather, they would be more general in nature.

Recovery assistance measures need to meet several requirements:

1. Assistance measures should be made available to the affected community in time for such measures to achieve their desired outcomes;
2. Assistance measures should be made available on an equal and fair basis to elements of the affected community;
3. Assistance measures should be flexible enough to meet a wide variety of community needs. Measures not only need to exhibit diversity, but within themselves need to be flexible.

The recovery process

The recovery process is an integral element of the broader emergency management process and cannot operate in isolation from other elements of the emergency management process. Much has been said about the link between recovery and response, however, equally vital links apply to prevention and preparedness.

Recovery is not strictly a sequential process, although it does tend to approximate one at times. Rather, recovery comprises a number of activities that can be categorised and can also occur in concert. Indeed the simultaneous conduct of appropriate recovery activities can greatly enhance the pace at which recovery occurs.

A four-stage process was considered comprising the following elements:

1. Emergency or Post-impact;
2. Restoration;
3. Replacement Reconstruction; and
4. Commemorative, Betterment and Developmental Reconstruction.

These four elements are accurate but have a tendency to be strictly sequential and marginally difficult to integrate with the comprehensive emergency management process. Accordingly, a model recovery process was advanced, affectionately titled 'Charlottes Doughnut'. Charlotte's Doughnut is an attempt to reconcile the four-stage process with both the principle of a continuum approach and the elements of comprehensive emergency management.

Therefore it is suggested that an ideal recovery process would approximate Charlotte's Doughnut, displaying the elements of a continuum that approximates a sequence and which is integrated with the broader elements of emergency management.

The specifics of the proposed recovery process include extra-recovery elements, which operate outside the context of the actual recovery and intra-recovery elements that are integral to the actual recovery. However all are interlinked and have at their core the community.

Diverse reactions to emergencies

The reactions to emergencies are diverse and range across individuals, families and communities. An understanding of these reactions is central to planning the likely psychological and support needs of the affected people during recovery. The diversity of these reactions is yet another justification of the need for flexibility described in the recovery principles.

Community reactions

The principal impacts on communities include the destruction of bonds and forming of new ones, uncertainty, stress and conflict. Thus, recovery arrangements must be structured in such a way as to re-build social capital, remove uncertainty, and reduce stress and conflict. This is one of the justifications for the community-centric approach, where the community is empowered and bonds are re-formed. Uncertainty, hence stress and conflict, are also reduced.

Family reactions

The family is a key element to the recovery of a community, playing a pivotal role in the emotional, hence overall, recovery of a community. Family therefore should be a prime concern in recovery planning and management. While many family bonds are strengthened in the wake of emergencies, specific attention should be given to families who have experienced bereavement, low income families and larger families, as these are less likely to recover quickly.

Individual reactions

General

Individual reactions to emergencies are quite varied and include anxiety disorders (including posttraumatic stress

disorder), mood disorders such as survivor syndrome and disaster bereavement syndrome, somatoform autonomic dysfunction, and organic mental disorders as a consequence of injury. There are at least 19 factors that contribute to an individual's psychological outlook following an emergency (See Figure 5) and these should be kept in mind when considering the reactions of individuals to emergencies.

Children

Children are not immune from the psychological impact of emergencies and are affected in a very real and tangible way. Some of the more typical reactions include fear, a need to re-establish family links, separation anxiety, sleep disturbances, emergency-related play, and behavioural problems. Children tend to be less inclined to use denial as a defence mechanism and do experience, albeit slightly different, symptoms indicative of PTSD. Further, while children acknowledge death and grieve as a consequence, the finality of death is difficult for the very young to grasp.

Accordingly, contrary to the myth that children are not effected by the psychological sequelae of emergencies, recovery arrangements should give serious consideration to the mental health needs of children affected by emergencies.

Elderly

Elderly survivors tend to be more psychologically resilient to the psychological effects of emergencies. Moreover, the elderly are reluctant to see themselves as burdens upon younger generations and therefore tend to avoid seeking help. Notwithstanding, owing to their oftentimes less favourable financial situation, the elderly tend to recover slower economically, thus emotionally and therefore warrant serious consideration in terms of recovery arrangements. Also, with respect to the their reluctance to seek out assistance, the elderly may need to be proactively provided support.

Recovery resources

The conclusions that may be drawn from the discussion in Part 5 on recovery resources are fairly straightforward. The recovery demands arising during recovery are significant. Furthermore, the range of individuals, companies, agencies, organisations and departments is equally extensive.

All this points to nine key elements in facilitating a successful recovery from the perspective of addressing recovery needs:

1. Planning, planning and planning;
2. Training, training and training; and
3. Exercising, exercising and exercising.

This may sound a little trite, but in effect goes right to the heart of adequately meeting the recovery needs of the community. Moreover, as has been constantly reinforced, these 'nine' elements need to take place in wide consultation with stakeholders, the most important of which is the community.

Overall conclusions

The eight principles that have served as the foundation of this paper have repeatedly appeared as key elements in the effective recovery of a community effected by community. However, if emphasis were to be placed on three general recovery philosophies, based on the previous pages these would be:

1. The importance of placing the community at the centre of recovery management;
2. The importance of consultative and comprehensive planning, including the training in and exercising of such plans;
3. The importance of flexibility.

With this in mind, one can be confident that, when operating in line with agreed recovery principles according to a pragmatic recovery process, mindful of the diverse reactions to emergencies, and with adequate and agreed means of satisfying recovery needs, that the recovery of a community impacted by a hazard has the best opportunity to serve as an exemplar of successful recovery.

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Community recovery and its sustainability: Lessons from Gujarat earthquake of India

Shaw et. al. case study the rehabilitation of the village of Patank in Gujarat State in Western India after the Gujaret Earthquake

By Rajib Shaw, Manu Gupta and Anshu Sarma

The 2001 Gujarat Earthquake in India highlighted the need for involvement, leadership and ownership of communities in the recovery process. A multi-stakeholder, and multi-organization rehabilitation program was implemented in Patanka, one of the hardest hit villages in Gujarat.

The lessons learned during the program are summarized in this paper. Firstly, interacting and building trust with the community, proper planning processes and budget and time flexibility were important initial considerations. Secondly, implementation was undertaken jointly with the community, along with capacity and confidence-building processes. Sustainability was a major focus during implementation, so that the rehabilitation project became part of the development initiative. Finally, the most important aspect was the exit policy of the project team, leaving an institutional mechanism in the community that enabled it to serve its own needs.

Introduction

An unparalleled earthquake (magnitude 7.7, USGS) devastated the Gujarat State in Western India on 26 January 2001 bringing with it unprecedented and widespread loss of lives and property. More than 13,000 people lost their lives and thousands were injured (GSDMA, 2002) in the quake affecting an area stretching more than 400 km, including urban, semi-urban and rural areas. Several villages close to the epicentre were completely destroyed. Over 300,000 buildings collapsed and more than twice that number were severely damaged. The earthquake was a tragic blow to the region already suffering from drought conditions and the aftermath of a cyclone three years earlier. The devastation affected the area socially, economically and physically (Shaw et al., 2001).

Figure 1: Involvement of different stakeholders

The State received an overwhelming response from a myriad of organisations offering support for relief and reconstruction of the quake-hit areas. Several disaster management institutions and organisations launched a combined effort in the post-earthquake response, providing material and in-kind support. One such consortium included government, non-government, academic and international organizations from India, Japan and Nepal (see figure 1). Sustainable Environment and Ecological Development Society (SEEDS), NGOs Kobe, United Nations Centre for Regional Development (UNCRD), and Earthquake Disaster Mitigation Research Centre (EDM) were the major agencies involved in the reconstruction project along with the Gujarat State Disaster Management Authority (GSDMA). These agencies were supported by other organisations with technical and financial inputs.

The purpose of the consortium was to use collective group strengths and past experiences to assist the people of Gujarat. The Patan district, located to the east of Kuchchh district in Gujarat State and one of the hardest

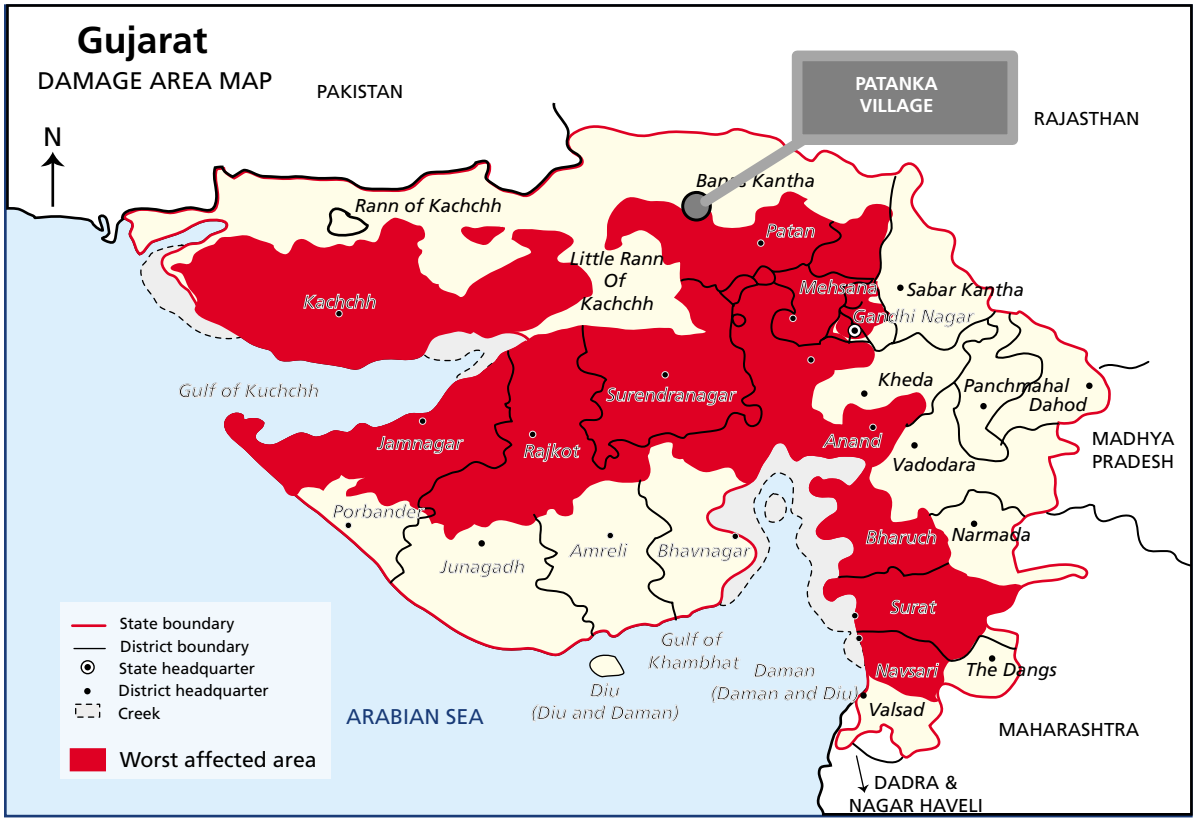

Figure 2: Location of study area in Gujarat, Western India

hit districts, was chosen as an area for intervention (Figure 2). The village of Patanka, located approximately 270 km north-west of Ahmedabad and 70 km west of the epicentre of the earthquake, was chosen by the consortium to test a 'model' mitigation approach. Previously, Shaw et al. (2003) detailed the village, its ethnic group makeup and the role of the local government. Figure 3 shows the types of damage to rural houses in Patanka.

The consortium formed a Project Team on an initiative called the 'Patan Navjivan Yojana' (Patanka New Life Project)(PNY). The project had two major goals:

1. to rehabilitate the lives of the residents of Patanka providing safer houses, better infrastructure and greater livelihood security; and
2. to provide a shake table demonstration for building local capacities in building earthquake-safer construction.

In this paper, the lessons learned from the rehabilitation of the 'model' village are described.

Need for the model approach in community rehabilitation

The need for a 'model' approach to community rehabilitation is felt now more than ever before. The following factors contribute to this need:

1. Disasters in recent decades are causing more deaths than in the past century. Indeed, some areas are repeatedly affected by disasters, yet the relief and rehabilitation carried out following one disaster does little to protect against subsequent disasters.
2. Some areas vulnerable to recurrent disasters do not learn from past incidents and consequently experience a disaster-poverty cycle (Bhatt, 1998). Limited education and awareness among the stakeholders and a lack of confidence in disaster-

Figure 3: Damage to rural housing in Patanka

resistant practices (i.e. construction) are regarded as two major reasons for the repetition of mistakes and tragedy (Shaw et al, 2003).

3. The reconstruction efforts being largely ad-hoc, mean there is no strategic framework and coordination. Inadequate planning, coupled with lack of preparedness and mitigation infrastructure, poor information dissemination and inappropriate measures for accountability have aggravated the problem.
4. Population increases are felt in most parts of the world directly contributing to a rising trend of life loss.

Appropriate rehabilitation and mitigation practices can potentially reduce the loss of life in disaster situations (Maskrey, 1989). Over many years, attempts have been made to develop sustainable disaster management 'models' that can effectively reduce risk. Experience shows most 'models' exist as long as there is external support to the local community (Twigg, 2000). Most initiatives fail soon after external assistance is withdrawn. Ultimately, this withdrawal results in the vulnerability of the community increasing to its previous level. Furthermore, it is widely accepted that an increased coordination and capacity building among aid agencies, long-term planning and a greater understanding of the recovery and rehabilitation issues can potentially improve post-disaster actions at the community level. Accordingly, the Project Team strongly advocated the need to urgently develop a 'model' approach following the Gujarat earthquake.

Figure 4: Chronology of events in PNY project

PNY was conceived as a model program right from its inception. It sought to empower the affected community to become sufficiently resilient against any future disasters. It attempted to link immediate response in the form of relief to mainstream development. An important aspect of the initiative was to establish a framework of mutual cooperation among different stakeholders in the post-disaster scenario. Most importantly, it aimed at successively reducing the role of external agencies in local rehabilitation action until the local community could assume all functions. Figure 4 shows the chronology of events of the PNY project.

The work was completed by a Project Team, consisting of representatives of each of the agencies previously mentioned and four in-the-field engineers and five trained masons located on site during the project implementation.

The process of rehabilitation

The process of rehabilitation was based on concerns relating to the community's needs in the aftermath of the disaster, the need to increase capacity and the need for the community to be autonomous and resilient to any future disasters. Experience showed that in disaster situations, especially earthquakes, affected individuals and their neighbours are the best disaster managers. Rehabilitation should therefore also be a mitigation exercise (Kobe Action Plan, 2003).

An ideal process in the post-disaster scenario needed to link immediate recovery to development. Broadly the process followed the three stages (see figure 5). In the first stage, an overall plan defined the principles and the aim of the rehabilitation exercise. The second stage was carried out jointly with the community with a two-way flow between the Project Team and the individual household. The third stage was the exit stage for the Project Team after it ensured sustainability of its interventions while the community prepared itself to integrate itself to mainstream development.

Rehabilitation stage I: Principles and planning

The first task was setting up the basic principles for planning the rehabilitation intervention. The intervention had to be participatory increasing community involvement gradually. The program had to be flexible with enough buffers for time and resources created in the overall project schedule. The intervention had to follow the minimum standards on the quality of benefits for the community. Rehabilitation was not just a short term, gap-filling exercise. In most cases, the community faced the threat of recurrent disasters and therefore the rehabilitation was aimed at reducing their vulnerability. This implied building the community's assets, achieving sustainability of residents' livelihoods, building houses that could protect residents against

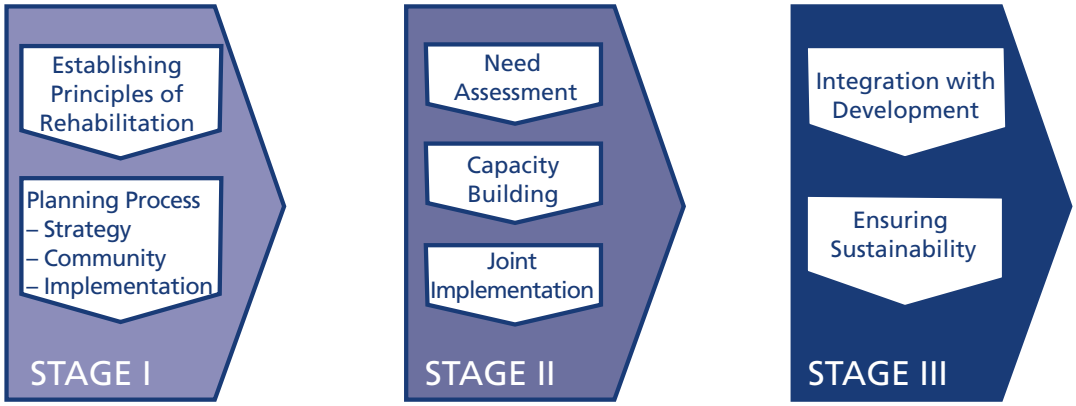

Figure 5: Different stages of recovery process

future earthquakes and building an infrastructure that could potentially improve the quality of life in the community to a level better than it was before the disaster.

The rehabilitation process also needed to be empowering. The Project Team agreed that they would not, and should not, remain with the community forever. Owing to this commitment, the community, the first responder, was sufficiently equipped to cater for its immediate needs. A well-planned rehabilitation exercise had to significantly increase the capacity of the community for a more effective response. Social, economic and psychological aspects therefore were an integral part of the rehabilitation program.
The rehabilitation philosophy was that proper rehabilitation was not only about building earthquake resistant houses, but also the restoration of livelihoods, and the restoration of normal life with sustainable economic activities. 'Livelihood' could not be ensured only by safer housing and suitable income, but would need to include issues such as welfare, health care, medical service, educational facilities, labor condition, disaster prevention and others maintained in good balance.

Rehabilitation needed to also incorporate local cultural aspects and foster a 'safer construction' culture in the community. The rehabilitation program tried to establish a strong bond within the community and with different related stakeholders. The success of the rehabilitation exercise was judged by the degree to which the community replicated actions without intervention from the aid agency. Inputs on capacity-building were therefore important. Additionally, the Project Team needed to ensure that conditions would continue to exist for easy replication.

Incorporating the principles stated above, an overall plan evolved. The plan eventuating from the process had three parts: *The Strategy Plan, The Community Action Plan* and *The Implementation Plan*. In the first part, the Project Team drew on its past experiences and research to draw a broad framework of rehabilitation – The Mission, Goals and Objectives. This formed the basis of the strategic plan. In the second part, the Project Team actively consulted the community as well as the local government to ensure that implementing strategies were culturally and environmentally acceptable to the people to whom they were addressed and were within the framework and guidelines laid down by the local government. The Project Team consulted with the community by organizing local workshops with the community, and involving different stakeholders (Figure 6). In the third part, the Project Team devised specific action plans for the implementation of various components of the project, these were primarily based on local needs and existing capacities. Development and enhancement of the Community Action Plan and the Implementation Plan were completed in Rehabilitation Stage II.

The role of the Project Team was to facilitate the reconstruction process. The composition of the team was therefore very important. Getting appropriate staff members with suitable motivation and skills was difficult, however suitable training and encouragement helped. Establishing good relationships with the community was the foremost responsibility of the Project Team, skills and knowledge followed. The

Figure 6: Community Workshop

Project Team had to commit to helping the community so that they could help themselves. Maintaining professional and ethical standards while performing amidst the community earned the respect and trust of the community. The ability of the Project Team to translate their knowledge into community acceptable practice was crucial to success. Furthermore the team had to ensure transparency in their accounting systems and working methods. This helped in establishing credibility for the team within the community.

Rehabilitation stage II: Implementation

This Implementation Stage of the project consisted of three steps: 1) Need Assessment, 2) Capacity Building, and 3) Implementation. In Step 1, attention was focused on the following features: 1) Recognising the community's needs, 2) Prioritising needs as per available resources, and 3) Translating needs into appropriate action jointly with the community. Role of Government in this stage of the exercise provided a recognised legal basis for working in the community. The involvement of the government also reinforced its relationship with the community. The basic needs of the community were always the same – food, clothing & shelter. Ethnic and regional differences created further complexities in needs. However, field experiences revealed that cultural acceptance of external aid was as important as the aid itself. Local needs were determined by interacting with the community – the best way of doing so was through dialogue, demonstration and training. Carrying out relief operations immediately after the earthquake provided a window to peep into the community's lifestyle, habits and customs. This insight was supported by interactions with the community, especially women. Use of graphic material and practical demonstrations dissolved possible language barriers and increased the scope for community feedback.

Local requirements needed to be matched with available options. Failing to find the best requirement/option fit may have caused several problems, as evidenced in the rehabilitation process after the Kobe earthquake of 1995 (Leckie, 1996). Climatic conditions, cost effectiveness and cultural adaptability were other considerations. Options were identified through extensive research and analysis. Community interaction provided many ideas. The options developed by the Project Team had to be re-examined against community preferences.

Figure 7: Family builds its own house

The framework of action in the field supported by community preferences defined a Community Action Plan that had two components: Framework and Process of implementation. The Plan outlined the mechanism by which the actions would be implemented at community level. The plan also defined the action modes and the roles played by different stakeholders. Government guidelines and policies needed to be recognized and interpreted in the local plan.

Ideally, in a democratic system the government and the community are directly accountable to each other. The role of the Project Team on the PKY project was to strengthen the link between the government and community. Winning the trust of the community was critical for a joint ownership of the process. Unlike programs-driven development initiatives, a rehabilitation exercise had to be executed in the shortest possible time. Getting full community support in such a short time was difficult. The Project Team needed to make positive moves to win community trust. A 'resolution' by the community leaders was sought. Strong leaders were identified to assist in organising a common voice for the project. Leadership problems were previously observed in the Kobe earthquake (Kobe Action Plan 2003), where weak leadership caused factions within the community and hampered the rehabilitation process.

Step 2 aimed to translate the plan into action. At the first stage, the team needed to provide training to build capacity in the community. This training programme was a confidence-building exercise through which the local communities gained assurance in the technology and process. Individual householders and families drove the project, and the construction activity was adjusted to individuals' budget and priorities (Figure 7). Inadequate attention to capacity-building may have jeopardised any rehabilitation exercise. The Project Team included a wide range of capacity building activities that ranged over counseling people who had just experienced the trauma of a disaster, to empowering individuals to handle their needs in case of any future disasters.

To introduce earthquake-safer building technology, local masons were trained to replicate various building practices. Householders were so positively influenced they demanded safer houses without compromising on quality of construction.

For activities to be sustainable, strengthening existing democratic structures, compared to creating new structures, reaped positive benefits. Training in leadership was also important. A social calendar

Table 1: Check-list for sustainable community recovery.

STAGE I	STAGE II		STAGE III
ESTABLISH PRINCIPLES	**NEED ASSESSMENT**	**CAPACITY BUILDING**	**LOCAL INSTITUTIONAL STRENGTHENING**
Rehabilitation linked to Development	Dialogue	Training of Masons, Labor	Integration with government development schemes.
Rehabilitation to be participatory	Training & Demonstration	Building Community confidence on disaster resistant practices	Creating assets for security
To Follow minimum established standards	Community Feedback	Strengthening Institutional Structures at Community Level	Ensuring means for continuous capacity building process.
Rehabilitation aimed at reducing vulnerability	Damage Assessments	Social Mobilization	Providing new opportunities for growth
Promote empowerment	Identifying Suitable Options	Social Calendar	
To be Flexible	Preparation of Local Plans	Joint Action	
Cooperation between stakeholders	Community Preferences	Prepare Sector specific Action Plans	
Improve Quality of Life	Mechanism for joint action with the community	One to one dialogue	
Strategic Planning	Identifying areas of Capacity Building	Flexible Approach	
Mission	Meeting with Community involving government	Guidance & Supervision of Ongoing construction	
Aims & Objectives	Adapting Government Guidelines	Role Clarification & Transparency	
Establish Team	Identifying Confidence Building Measures	Establishing Infrastructure for local storage of raw materials	
	Making the first move to forge trust with the Community	Establishing systems for monitoring and evaluation of construction work.	

of activities ensured good relationships with the community.

Step 3 focused on joint implementation. Rebuilding homes and lives after a disaster extended beyond mere physical activity on part of the households. As residents rebuilt their lives, they would look for an opportunity to get closer to the long-cherished dream, while burying the past. The Project Team strived to strengthen those dreams, and not to replace it with their own. The rehabilitation exercise showed best results when the community and the Project Team carried out joint actions. At the joint implementation stage, along with capacity-building, action plans for each area of intervention needed to be drawn out. There were the housing reconstruction action plan, the house retrofitting action plan, the livelihood action plan, and the social action plan. To prepare and actualize the action plans, one-to-one dialogue with individual households helped. To achieve some action plans the Project Team needed to make itself available and amenable to all individual needs and priorities.

A previously-set ceiling on the expenditure per household with flexibility in design and construction worked the best both for the community and the Project Team. When work-sharing was involved, role clarification and transparency were necessary. Roles and transparency mechanisms were clarified in the Action Plans.

Rehabilitation stage III: Ensuring sustainability

The effort initiated by the Project Team needed to be sustainable long after the interventions finished. In effect, intervention was designed to ensure that the community was able to take care of its development needs and was resilient against future disasters. For the intervention to be sustainable, capacity-building and strengthening/building local institutional mechanisms were absolutely necessary. Additionally, local institutions needed adequate capacity and a fixed source of income to exist and complete its programs. Thus, rehabilitation

actions were sustainable if the individual in the community was empowered and owned the project.

'Model' of rehabilitation

As stated earlier, one of the main objectives of this exercise was to evolve a 'model' for rehabilitation and mitigation that could be universally applicable. Extra time and resources were allocated to enable the Project Team to experiment with new strategies and activities. The program that was the focus of this case study was limited to just one community comprising of 256 households. The Project Team is convinced that what could be carried out in the community of Patanka, could also be replicated in many more communities. Scale was not an important consideration as the issue was the quality of the intervention. What could be completed in one community had the power to influence grassroots endeavours and policy frameworks universally. The lessons learned from the current initiative can therefore be summarized as in Table 1.

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Housing construction in earthquake-prone places: Perspectives, priorities and projections for development

James Lewis argues the requirement for improved building development in earthquake-prone countries

By James Lewis

It can no longer be assumed for all earthquake areas, as it was thirty years ago, that all architects and engineers are both accessible and competent for earthquake-resistant housing. There is a long-overdue requirement for urban multi-storey and self-build small buildings to improve the standard of their construction. After almost every urban earthquake, the call goes out for building construction to be improved. But what are the requirements for improving building construction, and how can they be achieved; and are there other housing strategies to be considered for the achievement of earthquake disaster reduction as an integral part of sustainable development ?
Continued attention to rural small buildings is not disputed, but there is now also a need for redress of an imbalance in the strategy, to reflect the need that clearly exists for more attention to all kinds of urban housing – but it is not only shortcomings in the application of building construction technology that is responsible for these circumstances; so are planning, management, administration and integrity.
All forms of building construction involve a process of legitimate physical covering over of each stage of construction. As each stage is completed, it becomes concealed by a subsequent stage – from foundations under the ground through to the last coat of paint. For there to be as much certainty as possible, from stage to stage, in the achievement of construction quality, periodic, even constant, independent inspection of buildings under construction is necessary.
Legislation does exist in the form of building regulations, codes, standards and guidelines in most countries, but legislation is insufficient without regular, strategic, informed and reliable inspection to ensure its enforcement.
Earthquake-responsible development can achieve more by adopting earthquake awareness through all sectors; micro-zoning of earthquake risk can be used to modify population occupancy and to modify construction standards. Peru is an example of the practice and Turkey is an example of the need.

Introduction

It is exactly thirty years since the publication of A F Daldy's groundbreaking 'Small building's in earthquake areas' by the UK Building Research Establishment (Daldy: 1972). In the preface, Daldy wrote: "This handbook is not written for the professionally qualified architect or engineer, but for builders and others who actually construct small buildings in earthquake areas. In this context a 'small building' means a building of not more than two storeys, with a total floor area not more than about 120 sqm. This is the type of building in which the large majority of people live, and which is generally built without structural calculations by professional engineers".

Since then, for the past thirty years, to counter emphasis there had been on urban, professionally designed housing, there has been appropriate attention given to low-cost, self-build, rural, domestic building construction, in efforts to facilitate resistance to the forces of natural hazards. During the same period of time, however, processes of urbanisation have continued to create the demand from many, and opportunities for some, for rapid construction of multi-storey buildings for domestic housing. These buildings for domestic accommodation, on the one hand, and urban self-build on the other, were excluded by Daldy's definition of 'small building' and by his assumption that single dwellings with an area of 120 sqm are where 'the large majority of people live'.

Structural inadequacy is exposed by failure of so many buildings. Compare for instance the building in the rear to the building in the foreground

Furthermore, it can no longer be assumed, even if it could be in 1972, that architects and engineers are available and that if they are, they have the necessary skills, and that these services can be afforded, and that there is a perception of need of them by developers, for the design of speculative multi-storey housing. Urban self-build is, by its nature, largely outside of normal professional interest. There is a long-overdue requirement for the inclusion of multi-storey housing and urban self-build to be made a part of renewed attention to housing construction in earthquake-prone places.

> *"The type of construction used in most poor people's urban housing makes them particularly vulnerable. The reinforced, concrete-framed, multi-storey block with masonry or precast panels or cladding is potentially hazardous in disaster-prone areas. Although this type of construction can be made relatively safe in all but the most severe disasters, few architects designing such blocks in the South are familiar with the engineering principles of building safer multi-storey buildings, the construction skills of the building contractors may not be adequate, and the introduction of safety features such as shear walls and cross-bracing can add significantly to the cost"* (Ruskulis, 2002) – and even if known of, are likely to be omitted by unscrupulous developers.

Multi-storey and low-rise urban self-build housing for the poor is a constant and increasing activity, and overcrowding is a normal characteristic; it follows that greater attention to the structural security of these kinds of housing would be a major component of housing security and disaster reduction, and one which would significantly contribute towards contexts of long-term sustainable development.

Structural inadequacy is exposed by failure of so many of these kinds of building in almost every earthquake, and there is ample evidence that urban, high-rise housing construction cannot, as has been assumed, be left to itself as not in need of scrutiny and improvement. If media attention to building construction failure in earthquakes were a reliable guide, it could be inferred that urban construction in earthquake-prone areas is now more in need of improvement than that of its rural counterparts, due to high incidence of occurrence, inevitably overcrowded occupancies, and consequently high numbers of casualties that urban building collapses cause.

Urbanisation no longer means only the growth of established cities, but also the growth of previously small villages to towns, small towns to large ones, and large ones to conurbations, as a consequence of migration from impoverished rural livelihoods. Nor can the process of enlargement and construction be envisaged as regular, ordered and planned, but as taking place in contexts of 'a combination of human error, indifference, corruption and greed' (Wisner: 2001).

Consequently, after almost every urban earthquake, the call goes out for building construction to be improved. But what are the requirements for improving building construction, and how can they be achieved; and are there other strategies for housing in built environments to be considered towards the achievement of earthquake disaster reduction in the even longer-term?

Thirty years is a period of time sufficient for large numbers of buildings to have been designed, constructed, occupied, and tested by the natural hazards of their locations. That some buildings have survived such rigourous testing can be assumed, and their number would be difficult to ascertain. That there have been, in that time, so many catastrophic failures of buildings built within the same period, especially buildings for housing, is made repeatedly apparent by the many earthquakes to which they and their occupants have been collectively subjected.

Urban low-rise

Urban construction for housing is not all multi-storey, and not all developer-built. Urban low-rise housing, inclusive of self-built 'shanty-towns', 'bidonvilles', and 'squatter settlements', is a significant feature of urban development in most cities of developing countries, from Rio de Janeiro to Bombay. Special programmes are in place, and need to be replicated, so that this crucial and heavily populated aspect of urban housing does not continue to be ignored as part of the urban housing fabric – whilst it is excluded from programmes for its rural counterpart. Housing of this kind, usually the product of impressive local initiatives, needs to become recognised as a part of municipal responsibility so that it may benefit from appropriate applications of secure building construction siting, guidance, legislation and control.

> *"… formal building codes in disaster-prone areas rarely consider housing and building in informal and low-income settlements. In some Southern cities 60 to 70 percent of the population live in such settlements. Building codes will have little impact in these settlements. This situation is unlikely to change unless community-based organisations representing informal and low income settlements are fully integrated into city-wide planning processes on disaster management"* (Ruskulis, 2002).

Rural construction

Since 1972 there has been emphasis on rural domestic construction. This emphasis is evidenced not only by its quantity, but also its variety of applications to very specific and often remote locations: for example: Norton (1985) for Guinea; Afshar et al (1978) for Iran; and Boyle (1988) for the Australian bush. Similarly, emphasis on some specific building types; eg: Vickery (1982) for school buildings, reflects a recognition of the importance of school buildings in disaster-prone places (Bothara: 2002), and the degree of specialisation achieved within wide ranging rural construction, a formerly significant but neglected area.

Other examples of rural emphasis relate to specific applications such as Department of Economic and Social Affairs (1977) for repair of buildings damaged by earthquakes, and Nimpuno (1993) for NGO training in structural upgrading; others are of mixed applications, such as; Aysan et al (1995); Clayton & Davis (1994), an annotated bibliography, and Dudley & Haaland (1993) on communicating technical information to local builders and householders.

Urban low-rise housing is a significant feature of urban development in most cities of developing countries

There are many buildings older than thirty years that should not fail to the extent they do

An equally large number relate to issues of concern in the USA, and for applications as part of the US overseas aid programme; for example the Office of US Foreign Disaster Assistance (1981). The former stem from the (not so rural) technical aftermath of the 1902 San Fransisco earthquake; eg: Clay Products Institute (1929); followed by earthquake resistant design in Osman (1976) and Green (1978).

However, the majority of these many examples from building construction literature, of efforts for the achievement of earthquake-resistant building construction, are related to the construction of low-cost, self-build small and rural domestic buildings; for example, and in addition to Daldy (1972): Department of Economic and Social Affairs (1975); BRE (1988); Landewijk & Shordt (1989); and Hodgson et al (1999), and for the most part, Coburn et al (1995), inclusive also of guidance in reinforced concrete construction for low-rise multi-storey buildings; and the exemplary Basin News (2002).

Probably only one or two references have anything of structural engineering content applicable to high-rise urban construction; for example Coburn & Spence (1992) and Key (1995). That professional literature, as distinct from that for informed general readership, includes of this specialist area of structural engineering can be assumed, but that its application is not assured is evidenced by repetitions of structural failure. It can no longer be assumed that urban high-rise construction can be regarded as an area of activity exempt from concern, as being subject to professional inputs or that it is automatically subject to regulated design guidance.

Although much of the damage caused by earthquakes is to buildings older than thirty years, there are many built within that time that should not have failed to the extent they did. This applies to both less-developed and developed countries; shortcomings of construction were exposed in the earthquakes at Kobe (1995) and at Seattle (2001). Repeated examples of serious earthquake damage to comparatively recent construction, can only be an illustration of a pervasive failure to apply information that has been available for many years.

The continued need for attention to rural small buildings is not disputed, but there is now also a need for redress of an imbalance in the strategy, to reflect the need that clearly exists for more attention to urban, multi-storey and self-build housing – but it is not only shortcomings in the application of building construction technology that is responsible for these circumstances; so are planning, management, administration and integrity.

The nature of building construction

Building construction proceeds in stages; starting in the ground, for foundations and drainage; proceeding to the erection of superstructure of wall, columns, floors and staircases, etc; to roofing; to the fitting of secondary components, such as window and door frames; to water supply, plumbing, and electric wiring; and to surface finishes for walls, ceilings and floors; and to painting. Some stages may overlap, or are arranged into sub-stages, as different parts of buildings are completed to separate programmes. Each stage is achieved by different trades; the arrival or departure of each one usually signifying start or completion of each stage, or sub-stage.

All forms of building construction involve a process of legitimate physical covering over of each stage of construction, especially the early stages of foundations and superstructure. As each stage is completed, it becomes concealed by a subsequent stage – from foundations under the ground through to the last coat of paint. Mistakes, omissions, deviations, and misunderstandings of requirements, have therefore to be identified and rectified within and as part of each stage. To go back to a previous stage requires costly and time consuming investigation and rectification.

Building construction of any kind takes place under pressures of time; caused by weather or by need to complete by a given date, or both, often with a high penalty or loss of financial incentive for the builder for not doing so. Opportunities to save time, and to save on the cost of materials by reductions in quality or amount, mean that temptations of expediency, shortcuts and omissions, are boundless.

For there to be as much certainty as possible, from stage to stage, in the achievement of construction quality, periodic, even constant, independent inspection of buildings under construction would be necessary. Model regulations for application in legislation have existed for many years (eg: Building Research Station, 1966) and building regulations, codes, standards and guidelines have been published in many countries: (e.g. Organisation of Eastern Caribbean States: 1991) but legislation is insufficient without regular, strategic, informed and reliable inspection to ensure its enforcement.

Project design and management, and construction inspection

Design of structural resistance to earthquake forces, depends upon an assessed or predetermined 'design level' conditioned, in part, by cost and factors of practicality. Design levels may indeed be overcome by an earthquake (or wind or flood) of greater magnitude than that designed for. Decisions concerning the level of resistance are inherent in design standards, even though the design level need not publicly be known. Absolute 'proof' against earthquake, or any other hazard, is not usually feasible.

Other aspects of building design, such as form, juxtaposition and relationship, can influence structural resistance, and means of escape in case of earthquake can all be applied so as to additionally influence occupants' chances of survival.

Inspection of building construction in progress is achieved from either of two different sources, or from both. Arrangements for project management, before construction starts, can be made inclusive, with the request or agreement of the building owner, of measures for the achievement of a required quality of construction. It can arrange for:

- separation of design, specification and tendering/bidding from the undertaking of construction itself, so that structural design is independent of the construction process (over recent years, this traditional arrangement has been repeatedly contested for reasons of cost and alleged inefficiency, but in the context of this paper, it has obvious advantages).
- arrange the inclusion of calculations and specifications of materials, in drawings and other documentation, before tendering, so that requirements for construction quality are known and costed at the outset.

Management at this pre-construction stage, can also be made to include arrangements for inspection of construction-in-progress as part of the execution of independent design management. The project management process can continue into its own inspection by the appointment of:

- site inspectorate (engineers, architects, clerks-of-works), and arrangements for:
- testing and recording of materials in use
- regular inspection and recording of construction in progress
- periodic and final payments for work only when deemed to have been completed as specified

Inspection may also be undertaken by local government building inspectors, or similar, in addition to construction inspection provided by the building owner.

Legislation is insufficient without regular, strategic, informed and reliable inspection to ensure its enforcement

Many homes were destroyed by the earthquake that devastated Northern Algeria in May 2003

The purpose of building inspectors is to ensure compliance with the requirements and standards of building legislation that is in place. Design standards can of course exceed the standards required by legislation, or may be the same, but may not be less. In other words, building legislation is likely to be a minimal requirement that it may be possible or desirable to exceed.

Shortcomings, and temptations for corrupt practice

There are many cases where construction legislation is in place, but where there is an inadequate inspectorate, or no inspectorate at all, to ensure its appropriate application: 'For example, the Marmara earthquake in Turkey in 1999 saw widespread destruction of buildings despite measures being in place to ensure that buildings were earthquake resistant. Inadequacies in the control mechanisms of local municipalities for checking the work of local building contractors meant that many buildings were not built to standard' (Ozerdem: 1999).

The need for building inspectors is the greater in circumstances of a rapidly increasing demand for housing, and a consequent financial imperative to dispense with detailed arrangements for construction project management as an obvious saving in time and cost. In these very common circumstances and on sites where minimal construction is the norm, or there is simply a practice of doing what a builder may have done before (or says he has done before), the need for inspection is crucial.

Legislated inspection aims to ensure basic construction quality, and therefore security, on behalf of current and future occupiers, users and passers-by, in accordance with defined national and local parameters and requirements. The advantages to an unscrupulous developer to offer inducements to inspectors to turn the other way, not appear for certain operations on site, or not to inspect too closely – or at all – are as obvious as are the temptations to inspectors to accept them. The risks to occupants and community, where this is the only source of inspection, are enormous; and by the time building failure occurs, due to earthquake or not, the developer, the builder, and inspectors will all have disappeared.

The construction industries in Britain and in the USA, rich and developed countries of the global North, have long histories of construction legislation, often influenced by past catastrophe, and this process is continuous (eg: Natural Hazards Observer: 2002). In spite of this, failures and corruption continue to occur. If this is the case in developed countries, then

there are questions for many other countries about how effective legislation can be, how it can be achieved, how it will be implemented, and how long it will take. Construction, and construction management, in some developing countries, is evolving so as to eventually eradicate such shortcomings. Even where this is the case, it will be a long time before indigenous construction practice can consistently and pervasively achieve a quality of building construction so that all buildings are able to resist even moderate earthquakes.

Large construction companies, medium and small construction groups and self-builders will all need to be monitored, modified and inspected on all of their construction sites for appropriate compliance and quality achievement. This supported by, but in addition to, legislation in place. For this to happen requires a volume, strength and persistence of political and personal commitment by very many trained people for lengths of time much longer than working lives. And it requires people, a system, and levels of payment, to deter and to resist the temptations of corrupt practice. Even when and where all this is achievable, there will be backlogs of buildings built to earlier less exacting standards and requirements.

The savings to some governments of earthquake-prone countries, or their sheer inability, or reluctance, to achieve a trained building construction inspectorate, is self evident; but the social and economic costs to their nations, societies and communities, of not doing so is nevertheless colossal. In the meantime, there will be more earthquakes. Yes, improved building construction is needed, but in addition, so are a broad spectrum of other measures to do with buildings, to be incorporated into the overall processes of national housing development.

Projections for built development in earthquake-prone places

It is not difficult in contexts prone to the effects of natural hazards, to identify and to project the need for measures for disaster-responsible development (Lewis: 1999; Lewis: 2001), but in this, or any other context, earthquake disaster reduction is not a monodisciplinary, nor indeed a monosectoral undertaking. The Safer Cities series of Case Studies, for example, prepared by the Asian Disaster Preparedness Center presents useful strategies for urban disaster mitigation derived from analyses of real-life experiences, successful practices, and lessons learned. Focusing less on post-disaster response and relief, and more upon comprehensive approaches taken prior to disasters so as to reduce human suffering, economic losses and institutional collapse, this approach integrates disaster risk reduction with sustainable economic, social, and environmental development (Apikul: 2002).

Algerians recover what is left of their properties inside their homes destroyed in Isser 65 kilometres east of the capital Algiers

Improved building construction for housing of all kinds should and could well be a component of such programmes; but for improved building construction to be achieved in all housing activities and sectors will also require long-term programmes for legislation, training, integrated demonstration projects, the preparation of information for non-professional use, and its dissemination. The need is so widespread and pervasive that implementation will require such recurrent series of widely repeated projects to render the programme a continuous one.

Earthquake-responsible development

Building construction legislation, however, is concerned with how buildings are constructed, not where they are placed. Geological, topographical and geographical examination to identify zones of earthquake risk, with the purpose of micro-zoning, enables land-use planning to have the opportunity to deter or prevent inappropriate construction in high risk areas, and prepares the way for modification of construction standards appropriate to zones of risk. Micro-zoning need not be a prohibitively complex and time consuming exercise; methods of earthquake zoning based upon surface observations of natural features, have been developed and successfully applied in Peru for many years (Kuroiwa: 1982, 1986 & 2002).

In Turkey in 1999, even if building construction had been adequate, there would still have been earthquake disasters – though with fewer casualties (Lewis: 2001). Some buildings inevitably would have failed and roads, bridges, power lines, telecommunications, water and fuel supplies would have been disrupted. Villages and rural communities would have been isolated, and tsunamis would have inundated coastal fishing and tourist venues. The poor would still have been living in overcrowded sub-standard dwellings, and the poor would still have been highest amongst the casualties, in urban new and older buildings, shanty settlements, and in rural areas.

Development needs to adjust to a broad spectrum for disaster reduction, inclusive of all its sectors – not only those labeled 'disaster management' – to ensure equitable inclusion of small domestic buildings as well as large and commercial ones, and with inducements for equitable dispersion of communities with commensurate accessibility to services, communications and resources for self-reliance and survival.

The population of North-western Turkey increased exponentially since 1945; the population of Istanbul having increased fifteen times in thirty years. The north-western region in which the1999 earthquakes occurred, has the highest population density of all and contains more than twenty percent of Turkey's national population. The province of Kocaeli, offshore of which was the earthquake's epicentre, had a population density of 260 people per square kilometre – amongst the highest in Turkey. A centralised government has attracted migration to the capital, and to other cities now so devastatingly destroyed. In a country severely prone to earthquakes, concentration of population anywhere is to be countered – until such time as zones of earthquake risk and vulnerability can be geologically and geographically identified.

Significantly, the 2002 earthquake in Gujarat *(see article in this journal)* similarly occurred in one of India's most industrially developed and most densely populated states. Rather than waiting for catastrophe to recur in Turkey or India, and in many other countries, as they have recurred in the past and will in the future, and rather than depend only on search and rescue, it would indeed be 'better to invest in normality than in catastrophe' by wider adjustments in development strategy:

- First; all development sectors need to take on board the earthquake potential, not just those for civil defence and rescue, nor even only for housing and building construction. Issues seemingly not relevant to earthquakes often bear the greatest consequences
- Second; high density populations need dispersal over time for more appropriate risk-related geographical balance. With reconstruction programmes now necessary in India and Turkey, there is the opportunity
- Third; not only is rehousing required, but also redistribution of clinics and hospitals, education in all grades, and social services of all kinds. These to be equitably commensurate with present and future, urban and rural, populations. Sustainable economic

A man searches for his belongings in the rubble of his house after a new second quake aftershock measuring 5.8 points on the Richter scale hit Zemmouri, 60 km east of Algiers, 28 May 2003

development requires all these and communication, transportation and marketing facilities as well. As much attention needs to be given to existing rural and agricultural areas, both currently damaged and those undamaged

- Fourth; multiple series of small and diverse projects for reconstruction and development are required, not massive ones. In the face of the image of massive catastrophe, it is myriad seemingly inconspicuous measures that are the most effective for normal self reliance and quality of life, before, between, during, and in the aftermath of disasters. Though we read of national catastrophes, they are made up of myriad community and domestic small ones.

Sustainability

Much has been written about sustainability, as a matter of energy saving, adaptability, ecological compatibility, and of environmental integration. Damage and destruction caused by natural hazards is the arch-indicator of non-sustainable development. Earthquake-resistant building construction is therefore prerequisite for sustainable housing. The original ethos of the concept of sustainability had social, as well as economic and environmental dimensions, expressed through identification of social needs (WCED, 1987), and this emphasis has been furthered by the 2002 Johannesburg Conference. For there to be sustainable development, 'needs' have to be appropriately identified and expressed in the first place. There can surely be no greater need than for secure building construction for housing, resistant against earthquakes so as to reduce recurrent deaths, injuries, damage and suffering, as well as parallel economic losses. Sustainable development initiatives, such as the Sustainable Cities Programme (UN Habitat, 2002) have the imperative to focus on this need on behalf of humanity. It is not before time:

> *"(Kluge) …suspects that we are unable to learn from the misfortunes we bring on ourselves, that we are incorrigible and will continue along the beaten tracks…. He looks at the destruction of his home town with the horrified fixity of Walter Benjamin's 'angel of history', whose 'face is turned towards the past. Where we perceive a chain of events, he sees one single catastrophe which keeps piling wreckage and hurls it in front of his feet.*
>
> *The angel would like to stay, awaken the dead, make whole what has been smashed. But a storm is blowing from Paradise; it has got caught in his wings with such violence that the angel can no longer close them. This storm irresistibly propels him into the future to which his back is turned, while the pile of debris before him grows skyward. The storm is what we call progress' "*
> (Sebald 2003).

Sustainability is the name of the angel that faces the future, for the piles of debris to be reduced.

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Evaluating the effectiveness of psychological preparedness advice in community cyclone preparedness materials

Morrissey & Reser explore whether psychological preparedness information helps individuals to prepare for the onset of cyclones.

By Dr. Shirley A. Morrissey & Dr Joseph P. Reser

This paper addresses the case of tropical cyclone warnings in Northern Australia and briefly outlines the nature, logic, and findings of a psychological preparedness intervention trialed in Cairns, Queensland, during the 1996/1997cyclone season. The aim of the research was to trial, evaluate and refine an innovative natural disaster public education and warning communication intervention focusing on tropical cyclone preparedness and response. This risk communication intervention involved the dissemination of selected psychological information designed to enable individuals to better cope with themselves and others in an increasingly threatening situation. The psycho-educational content material incorporated was derived from 'Stress Inoculation Theory' (Meichenbaum, 1985; 1994; Meichenbaum & Deffenbacher, 1988). The research found that the pre-cyclone season period is a critically important time and venue for prevention and mitigation, and that psychological factors and processes during this threat period are of singular importance to effective coping and adaptive responding. The research also clearly indicated that there are a substantial number of residents in cyclone-prone communities for whom chronic anxiety, avoidant coping styles, and prior traumatic experience constitute both a substantial vulnerability factor and a genuine impediment to psychological and physical preparedness.

The nature and effectiveness of natural disaster warning messages and community education and preparedness initiatives and materials constitute areas of surprising research neglect in an era in which considerable investment is being made in disaster reduction and mitigation. Likewise, pre-impact psychological intervention has been an area of surprising omission in multidisciplinary writings about human response to natural disaster, with Australian bushfire preparedness work being a noteworthy exception (e.g., Rohrmann, 1998, 2000). This is not to say that there does not exist an extensive literature on human response to natural and man-made hazards, but much of this discourse relates to either post impact stress and coping issues or organizational preparedness and response. The literatures which seemingly focus more directly on individual risk perception and human response to threatening events are typically not psychological (e.g., Douglas & Wildavsky, 1982; Freudenburg & Pastor, 1992; Mileti & Sorensen, 1990; Saarinen, 1982; Turner, Nigg & Paz, 1986) and do not tend to address the individual experience of a threatening and potentially cataclysmic event. While this says more about interdisciplinary fragmentation than any reality, it is surprisingly the case that there has been very little research done at the individual response level as distinct from collective community and organizational impact (e.g. Baum, 1987, 1991; Bell, Greene, Fisher, & Baum, 2000; Earle & Cvetkovich, 1990).

While the clear priorities and research agenda of the recent United Nations declared International Decade of Natural Disaster Reduction were 'to reduce natural disasters through prevention, mitigation and preparedness measures' (United Nations resolution, 1994), these objectives are far from being realised, one year from the close of the decade, in terms of any focused research on the human and psychological side of risk communication or preparedness. Of particular neglect are *psychological* preparedness and the nature of human response to natural disaster *warnings* as distinct from actual impact (e.g., Reser, 1996). The vast proportion of natural disaster research is focused on either the physical event itself, or post impact recovery. Yet from a preventive and mitigation perspective, preparedness and human response to risk communication and threat appraisal are a critical concern. It is noteworthy, indeed remarkable, that so little research has focused on the psychological processes

underlying threat appraisal and coping with natural disaster warning messages, and that no research to date has explored the utility of a stress inoculation, emotion management procedure such as that described in this paper.

This paper addresses the case of tropical cyclone warnings in Northern Australia and briefly outlines the nature, logic, and findings of a psychological preparedness intervention trialed in Cairns, Queensland, during the 1996/1997 cyclone season. The intervention constituted a modified stress inoculation procedure based on the work of Meichenbaum (1977, 1985). The occurrence of Cyclone Justin in the 1996/1997 season allowed for a pre and post event evaluation of a spectrum of psychological variables and preparedness measures.

Aim of the research

The aim of the research was to trial, evaluate and refine an innovative natural disaster public education and warning communication intervention focusing on tropical cyclone preparedness and response. This risk communication intervention involved the dissemination of selected psychological information designed to enable individuals to better cope with themselves and others in an increasingly threatening situation. This information was designed to complement conventional public education materials independently distributed and made available through the Cairns City Council, the Bureau of Meteorology, and other regional authorities. The psycho-educational content material incorporated was derived from 'Stress Inoculation Theory' (Meichenbaum, 1985; 1994; Meichenbaum & Deffenbacher, 1988). Stress Inoculation Theory (SIT) is a well-researched emotion management strategy and cognitive behavioural procedure, which enhances individuals' ability to anticipate, identify, and cope with stressful situations and stress-induced emotional responses. The intervention was intended to address the well-documented non-preparedness of Northern Australian coastal communities vulnerable to tropical cyclones. The logic for employing such a procedure was premised on the arguments that anxiety in the face of an impending natural disaster threat 'gets in the way' of adequate preparedness, and that being able to anticipate, recognise and manage such anxiety and other emotional responses to natural disaster threat will enhance successful coping, promote more adequate preparedness, and ensure that preparedness measures are reinforced by experienced stress reduction and competence in an emergency situation (e.g., Reser, 1980, 1996; Reser & Morrissey, 1995; Morrissey & Reser, 2001). The intervention is also viewed as having substantial preventive value in reducing post-traumatic stress.

Coming to terms with the aftermath

Methodology

The study was an evaluation or outcome study, involving a naturally occurring variable/event (a severe cyclone warning) as well as the presence or absence of an earlier psychological intervention. The methodology of the study conformed to what is known as a 'pre-test – post-test control group design' (e.g., Campbell & Stanley, 1963; Singleton & Straits, 1999). See Table 1. Essentially this is a study in which measures are taken both before and after an experimental procedure or a trialed intervention. In this research the methodology also included a second or 'hanging' control group, which was only surveyed following the cyclone warning to independently assess the effect of the pre-season survey itself. The research can also be considered an evaluation study in that a primary objective was to evaluate the effectiveness of a planned intervention (e.g., Lipsey & Cordray, 2000; Posavac & Carey, 1997; Rossi, Freeman & Lipsey, 1999). The study employed an experimental design and survey methodology which involved 440 residents completing two sequential questionnaires, each of which was approximately nine pages in length, depending on research condition and pre or post-event version, with a further 200 residents completing a post-event only version (Reser & Morrissey, 2000).

Participant households were selected using a stratified street and house sampling procedure, and were randomly assigned to each of the three research conditions. The Cairns suburbs included in the study were essentially from Trinity Park north, including the suburbs of Trinity Park, Smithfield, Trinity Beach, Kewarra Beach, Clifton Beach, and Palm Cove. These

Table 1: Research design.

	Pre-Season Survey Only	Psychological Preparedness Intervention	Severe Cyclone Warning Situation	Post-Event Survey
Group 1 Intervention	O_1	X_1	X_2	O_2
Group 2 Control	O_1		X_2	O_2
Group 3 Hanging Control			X_2	O_2

O_1 = pre-season survey, X_1 = psychological guide,
X_2 = Justin warnings and threat situation, O_2 = post-event survey

suburbs were selected for logistical reasons, as well as the fact that they were particularly 'vulnerable' to cyclonic winds and storm surge threat. The sampled area included some areas of relative safety and elevated ground, extending to the hills on the western side of Captain Cook Highway, and representative strata of socio-economic circumstances. A return rate of 72 per cent and attrition rate of only 28 per cent were surprisingly good for a survey-based study, reflecting a drop-off/pick-up procedure and careful nonreturn follow-up, as well as impressive co-operation and interest on the part of residents of these Northern Beach communities.

The 1996/1997 cyclone season in Cairns

The initiating of the preseason community survey was delayed by a late funding decision in December of 1996. The survey was nonetheless undertaken between the 14th and the 21st of December, 1996, in Cairns, North Queensland. While the original research intention was to collect pre-event data in both Cairns and Townsville, thereby maximising the opportunity of encountering a threat situation, ultimate funding and timing did not allow for this more comprehensive undertaking. One half of the 440 households surveyed at this point in time, the treatment and pre-test control groups, received a copy of the psychological preparedness guide. The objective was to re-administer a post-event version of the survey following a severe cyclone warning situation. While a number of cyclone warning situations did include the Cairns region over January of 1997, none were of a magnitude or proximity to justify implementing the post-event survey until the Cyclone Justin warning situation occurred on 7 March, as an extensive system being experienced over most of the Coral Sea. This system intensified to a severe category 3 cyclone off the coast of southeast Papua New Guinea on 17 March. The difficult decision was when to administer the post-event survey in this situation, given the extended duration of the warning period and the erratic nature of Cyclone Justin. (See Figure 1). An important concern was that a too immediate distribution of the

Courtesy of *Bureau of Meterology Queensland.*

Wave action and seaspray along the foreshore near Cairns

survey following a physical impact would be intrusive, insensitive, and counterproductive. A decision was finally made to administer the post-event survey on the 13th of March, following Met Bureau advice that the cyclone was moving out to sea and towards Papua New Guinea. It was also felt that the severity of an imminent and threatening category 3 cyclone impacting on the Cairns region was more than adequate to evaluate the effectiveness of the psychological preparedness guide, and the judgement was made that the integrity of the study would have been compromised if much more time had elapsed while waiting for a final resolution of Cyclone Justin's course. What must, of course, be factored into the results is the fact that Cairns residents were theoretically still in a cyclone threat situation when completing the post-event questionnaires, and, in fact, Cyclone Justin did return to pass right over Cairns, albeit at diminished strength, on the 22nd of March. Respondents therefore completed their post-event questionnaire approximately three months after the pre-season survey, and following six days of a very large cyclone system sitting off the coast of Cairns, with attendant watches and warnings.

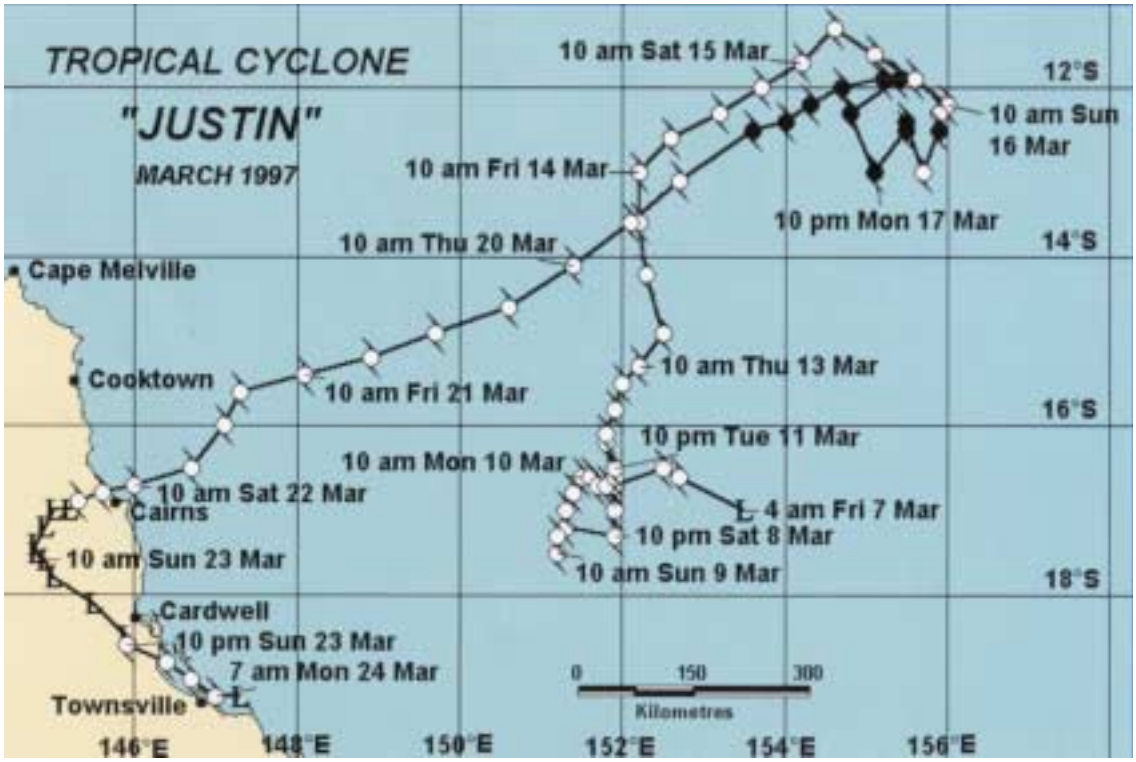


Figure 1: The story of Cyclone Justin

Findings

The meaningfulness of the results of a study such as this depends in part on the comparability of the treatment and control groups prior to an investigated event or intervention. The research groups did differ significantly with respect to gender and education. This was particularly the case for the hanging control group, which was characterised by a higher proportion of female respondents (61 per cent vs 51 per cent and 53 per cent) and residents with secondary education (61 per cent vs 55 per cent and 45 per cent) as contrasted with the intervention and control groups. As subsequent ANOVA tests evidenced no significant differences between the education groups in cyclone preparedness or response, it was considered that the variance in education profile did not materially influence other comparisons in the reported analyses. Gender differences are a concern, however, as gender features as an important variable in subsequent analyses, for example, with respect to reported prior traumatic experience. No significant differences were found between intervention, control and hanging control groups with respect to age, cyclone experience, years lived in Cairns or North Queensland, pre-cyclone season physical preparedness, or with respect to the personality trait of anxiety. Notwithstanding this absence of statistically significant differences, a further noteworthy difference between the intervention and control groups was that whereas 52 per cent of the intervention group had prior direct experience with cyclones, 62 per cent of the control group reported such prior experience. As well the pre-cyclone physical preparedness score of the intervention group was slightly better than that for the control group (14.7 vs 13.2), a matter addressed later by a consideration of relative changes in physical preparedness for each group. The chance but consequential differences in the hanging control group with respect to the relative proportion of male and female respondents were substantial enough to warrant its non-inclusion in group comparisons relating to the effectiveness of the psychological preparedness intervention in the following analyses and discussion.

Intervention and control group comparisons

Several initial and important questions in the pre-season questionnaire related to how concerned residents were at the beginning of the cyclone season. More specifically, residents were asked to indicate how *concerned, confident, frightened, anxious, and helpless* they felt via standard six-point semantic differential rating scales. They were also asked these questions immediately after the Cyclone Justin warning situation. Answers to these initial survey questions allowed the researchers to document what has been an area of guesswork rather than fact, i.e., how people are feeling and thinking coming into the cyclone season (in this instance toward the end of December), and to compare that with their feelings and thoughts immediately after the cyclone warning situation. There does exist some comparative data from Cyclone Joy for the Cairns region, where survey results following Joy indicated that 36 per cent of

Table 2: Mean rated emotional states at the beginning of the cyclone season and after Cyclone Justin.

	Mean Pre-season Rating	Mean Post-event Rating	Mean Change	Standard Error	Cohen's 'd'	t	p
Intervention Group (n=137)							
Anxiety	3.05	2.69	-.36	.14	.44	2.52	.013
Fear	2.54	2.13	-40	.12	.58	3.31	.001
Concern	3.25	3.25	0	.16	.01	.05	ns
Confidence	3.84	4.60	+.75	.13	-.86	-5.8	.000
Helpless	2.43	1.81	-.62	.13	.83	4.8	.000
Control Group (n = 138-140)							
Anxiety	3.05	2.63	-.42	.14	.25	2.88	.005
Fear	2.58	2.16	-.41	.13	.26	3.05	.003
Concern	3.16	3.63	+.47	.16	-.24	-3.01	.003
Confidence	3.79	4.15	+.36	.15	-.23	-2.45	.016
Helpless	2.40	1.81	-.57	.13	.38	4.37	.000

Note: Cohen's 'd' provides an index of effect size independent of sample size or differing units of measure (e.g., Cohen, 1988; Shaughnessy et al., 2000).

respondents had been 'very worried' and 31 per cent 'somewhat worried' about Joy (Smithson, 1991).

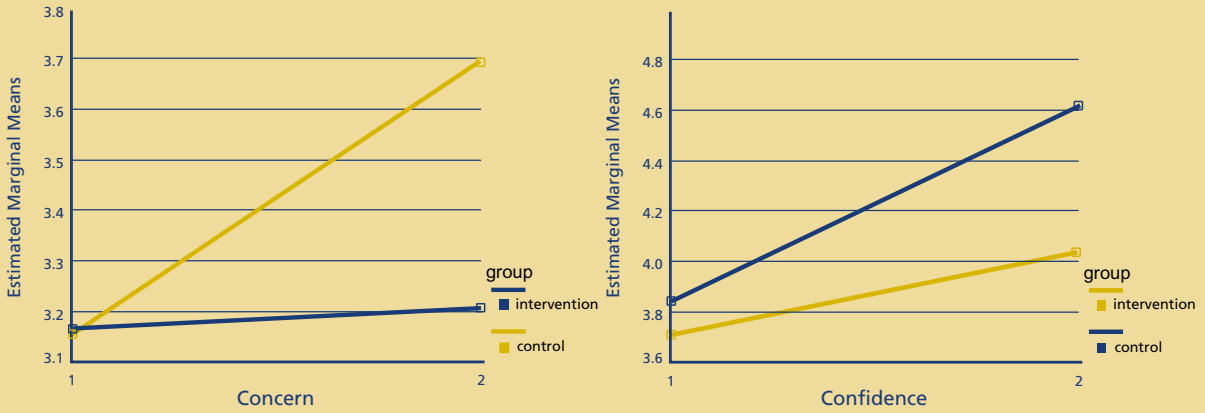
The results of the pre-season and post-Justin survey responses to the above items are presented in Table 2. These findings tell us that the majority of residents in both the intervention and control groups were moderately concerned and anxious at the beginning of the cyclone season, but reported feeling somewhat less frightened and helpless at this point in time, and their rated confidence was at least modest.

It is clear that these feelings were appreciably heightened during the Cyclone Justin warning situation. The data also tells us that there were considerable individual differences here, with some individuals evidencing high levels of anxiety and helplessness both at the beginning of the cyclone season and during Cyclone Justin. Significant differences in changed emotional state were found for concern and confidence during the cyclone warning period, with those individuals using the guide expressing less concern overall and greater confidence.

All of the changes shown in Table 2 were significant, with the exception of intervention group concern level, which remained stable. These changes were largely as expected and in a logical direction, with anxiety and fear dropping with the actual occurrence of an anticipated event that was relatively benign and supposedly over. As well, there is some evidence that the pre-season survey constituted a modest intervention in itself for the control group. What is of particular importance, however, is that the relative magnitude of change between intervention and control groups was significantly and substantially different for reported levels of *concern* and *confidence*, with control respondents reporting a significant increase in concern, and intervention respondents showing steady but not increasing levels of concern as well as an increase in confidence which was more than twice that for the control group. See Figures 2 and 3. This provides strong support for the effectiveness of the psychological preparedness guide.

What was of particular relevance to the research was whether those individuals who received and used the psychological guide were able to manage their feelings better during the Cyclone Justin situation. The stress inoculation training intervention is essentially an emotion management training technique. If we compare the intervention group with the control group on these measures, taken immediately after the more acute warning period of Cyclone Justin, it is clear that the use of the guide was effective in managing levels of concern and in increasing levels of confidence. While the changes in levels of reported anxiety, fear, and helplessness do not differ appreciably between the control and the intervention group, it is important to remember that the objective of the psychological preparedness intervention was to enhance the *anticipation, identification, and management of* emotional responses. It was not intended to reduce the anxiety and apprehension which are normal and adaptive human responses to a threatening emergency situation. As well, the air of emergency at the time of post-event survey was substantially reduced, as there was a palpable sense

Figures 2 and 3: Mean change scores in rated concern and confidence from pre-season survey to post-Justin survey.



of relief in the community with the issuing of Met Bureau bulletins to the effect that the cyclone was heading out to sea.

Another straightforward and pragmatic set of questions had to do with whether respondents were reasonably *prepared* with respect to physical preparations at the beginning of the cyclone season, and whether those respondents who received and used the psychological guide were better prepared than the control group at the time of the post-Justin survey. One of the arguments being explored was that anxiety and fear could be getting in the way of physical preparedness, and that poor physical preparedness also reflected the use of a variety of maladaptive defence mechanisms and distorting beliefs for dealing with anxieties and concerns (e.g., Reser, 1980; Reser & Morrissey, 1995). Physical preparedness items are shown in Table 3.

These physical preparedness measures were similar to measures used by many other researchers in this area, but included more specificity with respect to whether the item needed attention, whether some actual preparedness activity had taken place, or whether the preparedness measure was completed. The items allowed for a reasonably sensitive composite index of physical preparedness which could be calculated for the beginning of the cyclone season and at the time of the post-event survey (score range was 0–24). The mean physical preparedness score for the intervention and the control group were 14.70 and 13.23 at the beginning of the cyclone season, and 18.85 and 15.00, respectively, at the time of the post-Justin survey.

Table 3: Preparedness activity checklist.

Cyclone preparedness activity	Need attention	Begun attending to this	Completed this activity
Cleaned the yard			
Purchased new batteries			
Purchased emergency food supplies			
Checked or purchased first aid kit			
Checked battery function of radio			
Checked for containers of water			
Filled a spare petrol can			
Checked for candles			
Checked gas cylinder			
Carefully read through cyclone preparedness pamphlet			
Checked emergency numbers			
Checked radio frequencies			

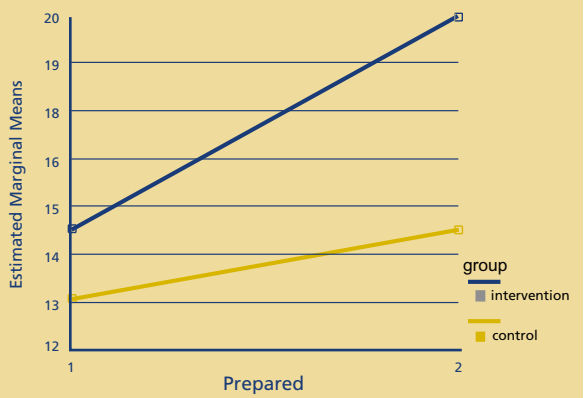
Table 4: Physical preparedness at the beginning of the cyclone season and following Cyclone Justin.

	Pre-season Score	Post Justin Score	Change	Std Error	Cohen's d	t	p
Intervention group (n = 131)	14.70	18.85	4.15	.43	1.95	-8.64	.000
Control group (n = 141)	13.23	15.00	1.77	.53	.70	-3.05	.003

It is clear that respondents were reasonably prepared at the beginning of the cyclone season, and that residents in the intervention group reported a modestly higher level of physical preparedness than those in the control group at the beginning of the cyclone season. This relatively high level of physical preparedness contrasts with media statements during this 1996/1997 season that the Cairns community was, once again, poorly prepared for the cyclone season. It is also clear that levels of preparedness were significantly improved at the time of the post-event survey for both groups. See Figure 4.

These improvements are not surprising in that Cyclone Justin would have motivated many, if not most, residents to get serious about preparedness. Changes between the pre and post-event scores for the intervention group as compared with the control group are, however, of particular interest. The appreciable and significant difference found between intervention group improvement and control group improvement, a score change of 4.15 versus 1.77 ($p < .000$), provides strong support for the effectiveness of the psychological guide. This is a particularly strong finding given the relatively high level of reported physical preparedness at the beginning of the cyclone season, which created, arguably, something of a ceiling effect. Across both groups, the improvement in physical preparedness was significantly less for those respondents reporting prior traumatic cyclone experience.

Figure 4: Mean change in physical preparedness from pre-season to post-Justin.



An interesting comparison was the difference between the physical preparedness scores of the intervention group and the hanging control group at the time of the post-event survey, as this control group had no exposure to our pre-season survey, which arguably could have constituted an influential intervention in itself. The preparedness score for the hanging control group was 16.43, which was significantly lower than the intervention group but actually higher than the pre-test control group, i.e., the hanging control group reported being somewhat better prepared than the pre-test control group (at the time of the post-Justin survey). This could suggest that the heightening of threat salience and provision of preparedness information, in this case through the completion of the pre-season survey, but without psychological advice, might have actually diminished ultimate preparedness.

Of related interest was whether respondents felt *psychologically prepared* for the cyclone season and the specific warning situation of Justin. The discussion earlier examined levels of reported concern, anxiety and confidence, and how these changed for the intervention and control groups between the time of the pre-season survey and the post-Justin survey. In addition, respondents were asked, at the time of the post-Justin survey, how confident they felt about *being able to cope* with another serious cyclone situation and whether they thought it was *possible to exercise any personal control* over the impact of a cyclone on themselves or their families. The findings in Table 5 again suggest strong support for the effectiveness of the psychological guide. Intervention respondents reported feeling significantly more confident about being able to cope with another serious cyclone situation, they reported that they felt it was more possible to exercise personal control over the impact of a cyclone (although this difference did not achieve significance), and they reported experiencing less concern about the threat of another cyclone.

An additional set of survey questions explored psychological preparedness with respect to a number of specific predictions relating to the psychological guide. The rationale for the stress inoculation training intervention that was provided was that it should enable

Table 5: Rated confidence, personal control, and concern with respect to another serious cyclone event this season.

	Intervention Group n = 140	Control Group n = 137	Std error	Cohen's 'd'	t	p
How confident at being able to cope	5.07	4.54	.146	.39	3.63	.000
How possible to exercise personal control	4.83	4.61	.161	.15	1.42	.156
How concerned about another threat	3.05	3.47	.195	-.26	-2.18	.003

Table 6: Reported effectiveness ratings of stress inoculation on specific components of stress inoculation.

	Intervention Group n = 138-141	Control Group n = 135-137	Std error	Cohen's 'd'	t	p
Anticipate feelings	4.08	3.23	.21	.65	4.06	.000
Identify feelings	4.08	3.24	.22	.62	3.76	.000
Manage feelings	5.05	4.81	.16	.21	1.50	.135

participants to better *anticipate* their feelings in a cyclone warning situation, to better *identify* particular feelings, and to better *manage* these feelings. All respondents were asked these questions at the time of the post-event survey, directly following their experience with Cyclone Justin. The results for both the intervention and the control groups are presented in Table 6.

The results are very clear. Respondents who used the guide reported being better able to anticipate how they would feel and that they were better able to identify particular feelings. While the intervention group also reported being able to manage their feelings better, this effect was not as marked. There are several points that should be kept in mind in interpreting this latter finding. Such evaluative and reflective self-report items are reasonably different in nature than simpler descriptive self-report items. This makes it somewhat more difficult to interpret and evaluate these statements. Are individuals, for example, able to judge accurately a modest and diffuse improvement in 'emotion management' abilities?

A further set of questions directly asked intervention respondents about their use of the psychological guide and its relative effectiveness and utility. The results are presented in Table 7.

It is clear that 74 per cent of intervention group respondents felt that the guide was useful, with over one third of respondents finding it 'very useful'.

Intervention participants were also asked whether the guide made them feel more or less anxious during the recent cyclone. This item was measured using a 6-point Likert-type scale where '1' indicated less anxiety and '6' indicates greater anxiety. More than 60% of respondents reported feeling less anxious (scoring 1, 2 or 3 on the scale), 14 per cent scored a '4' on the scale, and only 4 per cent indicated a '5' on the scale, with none of the participants reporting greater anxiety ('6' on the scale).

Clearly the above findings relate to self-report items that must be interpreted with caution, but they do reflect the considered judgement of all of those respondents who trialed the psychological guide during an eventful cyclone season. These questions also provide additional

Table 7: Reported utility of psychological preparedness guide.

	n	%	(%) Missing
Not at all useful	10	7%	18%
Somewhat useful	60	40%	
Very useful	48	34%	
Didn't provide any new strategies	29	20%	19.4%
Provided some new strategies	62	44%	
Provided many new strategies	25	17.5%	

and convergent support for the findings examined earlier. They indicate that intervention respondents used the guide during the cyclone season, that such use made them *feel* less anxious, and that the guide provided them with new and helpful strategies for managing their feelings during the Cyclone Justin warning situation.

The post-Justin survey for the intervention group included two items asking whether the psychological preparedness guide provided them with any new strategies for managing their feelings during the cyclone warning situation, and to describe these new strategies. The mean rating for this first item, going from 'not at all' to 'a great deal' suggests that respondents did learn a number of new coping strategies. The kinds of written responses received included repeated reference to self-talk and calming exercises, as well as normalising one's feelings. These responses are very congruent with the nature of the psychological advice and strategies included in the preparedness guide.

> "We talked a lot more about our feelings"
>
> "I talked to myself and others about what we could do to stay safe"
>
> "Felt good knowing that being anxious is ok"
>
> "The guide made my feelings feel normal. I don't feel so isolated"
>
> "Talked about the feelings that occurred instead of pretending they were not there"
>
> "Think things through – don't panic"

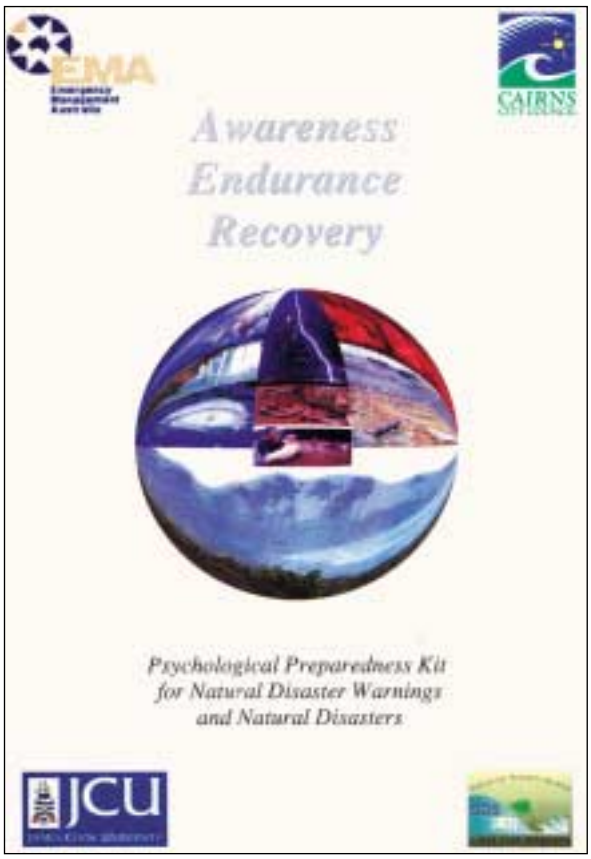
While it is questionable that these were entirely "new strategies', e.g., many respondents may have simply learned how to better anticipate and identify particular feelings, it seems clear that the guide facilitated respondents actually using these procedures and feeling better about doing so.

Did the psychological guide help some people more than others?

An important aspect of this research concerned whether the psychological preparedness guide was differentially effective for different types of individuals. There are multiple theoretical reasons for expecting that the stress inoculation and management components of the psychological preparedness material might be less effective for individuals characterised by moderate to high chronic anxiety and/or prior and traumatic cyclone or other natural disaster experience (e.g., Gibbs, 1989; Gist & Lubin, 1989; Lazarus, 1991; Myers, 1994, NAMHC, 1996; Russell, Goltz & Bourrque, 1995; Watson & Clark, 1984). Briefly, these theoretical arguments relate to the fact that chronically anxious or previously traumatised individuals might well need more assistance than that which a brief self-instruction guide on managing emotions might be able to provide. As well it was possible that the stress induction component of an SIT intervention might have heightened anxiety for those 'normally high anxious' respondents to an extent that self-directed cognitive behavioural management techniques might not have been sufficient. It was also the case that the overall level of preparedness for more highly anxious individuals or those with prior traumatic cyclone experience might be expected to be relatively low, possibly reflecting selective avoidance strategies and an escalating experience of anticipatory stress and panic.

Variables of particular note that were examined in this study included the *demographic* variables of age, education and gender; the '*personality*' variables of trait anxiety, coping style, optimism-pessimism, and self-efficacy; and the *situational* variables of knowledge, prior cyclone experience, threat appraisal, and perceived control. The two variables of particular relevance to the differential efficacy of the intervention, and to the hypothesised vulnerability of particular residents were the personality variable of *trait anxiety* and the person-situation variable of *prior experience*. Previous research has shown that trait anxiety is positively associated with experienced stress in an emergency situation and inversely related to physical preparedness (e.g., De Man & Simpson-Housley, 1987, 1988; Dooley et al., 1992). Research which has examined the role of prior experience in disaster preparedness and response (e.g., Baker, 1989; Faupel & Stiles, 1993; Nielson & Lidstone, 1998; Riad & Norris, 1998; Sattler, Adams & Watts, 1995; Smithson, 1991) has reported very mixed findings, suggesting that experience contributes to better preparedness under some circumstances and conditions, but not in others. The previous findings for Cairns and Townsville residents were that prior experience did not appear to be related to preparedness (Smithson, 1991). This aspect of the current study particularly addressed whether the psychological preparedness guide was less helpful for those residents who normally experienced moderate to high anxiety and for those individuals who had prior but very stressful experience with cyclone situations (Walsh, 1999).

The focus of the data analyses relating to whether the psychological preparedness guide worked better for some residents than others was the intervention group. Some information on this group is helpful. It is noteworthy that 65 individuals in the intervention group (44.5 per cent) reported no prior cyclone experience. Respondents were asked, "Have you personally experienced a severe cyclone warning situation?", and then asked, "Have you personally experienced a cyclone event?", with a description of the event requested. This made it possible to establish which respondents had actually been in more than a warning situation. Seventy-two percent of the intervention group (105 individuals) reported having experienced a severe cyclone warning situation previously. Fifty-five percent reported that they had more direct experience with a 'cyclone event'. Of those 81 intervention group respondents reporting prior



Psychological Preparedness Kit for Natural Disaster Warnings and Natural Disasters following from Cyclone Justin research project

cyclone experience, one half (40) indicated that this experience was highly stressful, i.e., they gave a rating of either '5' or '6' on a six point impact of event scale going from '1' (not at all stressful) to '6' (very stressful). These figures provide an interesting profile of an unbiased sample of northern beach community Cairns residents with respect to anxiety and experience. What is clear is that many residents had no prior experience of an actual 'cyclone event', and of those who did, at least half reported the experience to have been very stressful and possibly traumatic.

None of the *demographic variables* explored were significantly related to physical or psychological preparedness, the principal measures of intervention effectiveness, with the exception of gender, with women reporting that they experienced more stress during the Cyclone Justin warning, while men reported feeling more psychologically prepared. In these individual difference analyses psychological preparedness was measured by a composite 'psychological preparedness' score utilising the summed individual self-ratings of concern, confidence, anxiety, helplessness, and fear (see Walsh, 1999).

An examination of the *personality variables* measured identified 20.6 per cent residents in the intervention group as 'highly anxious'. The personality measure employed was the PANAS scale (Watson & Clark, 1984, Watson, Clark & Tellegen, 1988) and respondents were classified as falling into three anxiety groups depending upon whether their scores fell into the upper quartile, mid quartiles, or lower quartile of the trait negative affect scores (with score range of 10–28). The number of individuals falling into the lower quartile, 'low-anxiety' group was 41(28.1 per cent), the number categorised as 'moderately anxious' was 75 (51.3 per cent), and the number labelled as highly anxious was 30 (20.6 per cent). These respondents classified as being highly anxious with respect to trait anxiety had scores greater than 18.

All personality variables explored, trait anxiety, coping style and prior cyclone experience, were found to significantly influence physical preparedness and psychological preparedness. The results confirm that lower physical preparedness scores were found for highly anxious individuals, for those who often use avoidant coping strategies, and for those with prior and traumatic cyclone experience. The results also confirm that anxiety level and prior experience interact, with high anxious individuals with prior traumatic experience evidencing the lowest physical preparedness levels. These results were very similar for psychological preparedness, with the highest psychological preparedness scores being those for the low anxious, active coping, and no prior experience groups, whereas the lowest psychological preparedness scores were found for the high anxious group, high users of avoidance, and prior traumatic experience groups. Again anxiousness, avoidant coping, and prior traumatic experience were found to significantly interact with each other, with the lowest psychological preparedness scores being evidenced by those highly anxious individuals with prior traumatic experience and an avoidant coping style (see Walsh, 1999 for more details).

Psychological preparedness and vulnerability

There has been a strong consensus among clinical and counselling psychologists and other mental health professionals for many years to the effect that adequate information and preparation for recurrent natural disasters can empower individuals and assist in the prevention of physical and psychological devastation and distress (e.g., Dudley-Grant et al., 2000; Gist & Lubin, 1989; Gist & Stolz, 1982; Lindell & Perry, 1992; Myers, 1994). This consensus is mirrored in the sociological risk communication literature (e.g., Covello, McCallum & Pavlova, 1989; Drabek, 1986; Mileti & Sorensen, 1990; Tierney, 1993). An extensive theoretical and research literature addresses the value of such 'critical incident stress training' for emergency workers, both before and after disaster relief and recovery involvement (e.g., Dyregrov, 1989; Mitchell, 1983; Mitchell & Bray, 1990). Nonetheless there have

Cyclones can be particularly distressing for children

been very few published discussions of what this actually means in practice for those who are not emergency workers, or how psychological preparedness might be operationalised and enhanced in a community preparedness and preventive context. There have also been very few published research findings relating to psychological intervention outcome studies particularly focused on natural disaster public education or warning situations. This may reflect, in part, the overwhelming weight of evidence and professional experience and judgement in other areas with respect to the preventive value of stress inoculation and general emotion management knowledge in emergency situations. It also reflects the difficulty of undertaking intervention-focused outcome studies in the context of unpredictable natural hazards.

A core construct and parameter in natural disaster prevention and mitigation considerations is vulnerability (e.g., Blaikie et al., 1994; Briere, 1995, Buckle, Mars, & Smale, 2000; Cutter, 1993; King & MacGregor, 2000, Salter, 1997). Indeed, this notion has taken on new meaning and life as a key indicator in both risk assessment and the mapping of risk via GIS and other risk representation strategies. Unfortunately these risk management and emergency management discourses make little if any reference to psychological vulnerability or the extensive psychological and health literatures on vulnerability and resilience (e.g., Dohrenwend & Dohrenwend, 1974, 1981; Freedy et al., 1993; Hodgkinson & Stewart, 1991; Katschnigi, 1986; Lazarus & Folkman, 1984; Yager, et al., 1984; McFarlane, 1988, 1989; Monat & Lazarus, 1991; NAMHC, 1996; Spacapan & Thompson, 1991; Zeidner & Endler, 1996). The current research findings and those of many others document the critical importance of *psychological* mediators of vulnerability and ultimate preparedness and successful coping. These include personality factors such as trait anxiety and coping style, and situational variables such as the nature and extent of prior natural disaster experience and perceived risk. Our current research would indicate that anxiousness and prior traumatic experience are particularly important psychological variables which should be factored into any assessment of 'community vulnerability'. These variables in particular appear to reduce the efficacy of a psychological preparedness intervention such as that trialed, notwithstanding its overall positive role in enhancing community physical and psychological preparedness. Such psychological indicators are measurable, and allow for identification beforehand of those individuals and households likely to be poorly prepared in the event of a cyclone warning situation. It is also the case that it is just such psychological factors relating to chronic anxiety and critical incident distress that are specifically addressed by more focused and intensive anxiety and stress management interventions.

The understandable societal and agency preoccupation with community intervention and recovery in the aftermath of natural disaster events has tended to eclipse the far more extensive human impact of severe warnings and near misses, as in the case of cyclone warnings in a cyclone prone region such as northern coastal Australia. The social science research literature on human response to natural and technological environmental threat clearly documents the powerful psychological impacts of perceived threats (e.g., Baum & Fleming. 1993, Lehman & Taylor, 1986; Cvetkovich & Earle, 1992; Turner, Nigg & Heller Paz, 1986; Wandersman & Hallman, 1993). Indeed the burgeoning literature on risk perception, assessment and communication largely reflects this new understanding that perception is reality and that the warning situation itself can in fact be more distressing than impact, and can have dramatic and long lasting psychological and social impacts (e.g., O'Riordan, 1995; Slovic, 1987, 2000). The research focus of the present study was on the effectiveness of a particular psychological intervention in helping residents manage their emotional response which were hindering adaptive physical preparedness. The research findings, however, with respect to the nature, severity and extent of emotional distress, both before and during a severe cyclone warning situation, and the lasting impact of previous traumatic experience, suggest that a pervasive natural disaster impact, currently neither recognised nor addressed, is the impact of severe cyclone *warning situations* on individuals and communities. These impacts are both serious and consequential, not only in terms of psychological well being and mental health, but because these impacts very directly influence future preparedness and vulnerability (e.g., Reser, 1996).

From a public health perspective it is useful to know that the guide was helpful and improved physical and psychological preparedness for most residents. From a vulnerability perspective it is helpful to know that there are many residents whose chronic anxiety level, coping style, and/or prior traumatic experience with cyclones appears to reduce the overall effectiveness of the guide. It is important to reiterate that fully one half of those residents reporting prior direct cyclone experience found this experience to be highly stressful, and that the proportion of residents who would appear to be prone to high anxiety is reasonably high, one out of five. It was also quite evident in this study that most people were actually quite worried about Cyclone Justin, with situation-precipitated anxiety being widespread. These individual difference findings, along with the intervention and control group comparisons, clearly suggest that there are a large number of individuals who, for reasons of temperament and past experience, find a cyclone warning situation to be particularly stressful and one for which they are typically less well-prepared, physically or psychologically, than other residents. These individuals may benefit from being targeted in future preparedness studies, utilising a more complex intervention (e.g., participation in a group anxiety management and cyclone preparedness program, facilitated by a community mental health professional).

Final window on findings

A final window on what this extensive data set suggests is provided by how people felt when it looked like Cyclone Justin was not going to actually impact on the Cairns region and was heading out to sea. We were particularly interested in whether most people would experience such a situation with a mixture of relief and disappointment, and whether it would be experienced as a near miss or a false alarm. Our own view is that media coverage can strongly influence how people feel following a cyclone warning situation, and that it is vital that preparedness behaviours are reinforced and validated by the media following a serious warning situation. It was pleasing to find that 84 per cent of respondents felt that Cyclone Justin was a 'close call' or 'near miss' situation as distinct from a 'false alarm'. This would indicate that they felt good about their preparedness activities, and that this behaviour was validated by their overall experience during and following the cyclone threat. That 16 per cent of respondents would have viewed the Cyclone Justin warning situation as an over-reaction and a false alarm is still quite worrying, but it doesn't coincide with some problematic media coverage suggesting that the cyclone was a 'fizzer'.

Implications and recommendations for natural disaster public education, warning messages and procedures

The research undertaken was in the context of a tropical cyclone warning situation in Far North Queensland. Any generalisations to other disaster warning situations and circumstances must be done with this qualification in mind. Natural disasters are quite different in many respects, and elicit rather different human responses to risk communications concerning an impending or potential threat (e.g., Bell et al., 2000; Cvetkovich & Earle, 1992; Quarantelli, 1998). Indeed, Quarantelli argues that physical parameters are not sufficient to define and differentiate natural disasters and that a more informative and useful taxonomy and yardstick is with respect to the nature and extent of disruptive impact on the community itself. All of this suggests some caution in generalising findings from a community and regional context such as coastal North Queensland where cyclones are an integral part of 'living in the north'. In particular, communities in cyclone prone regions tend to establish a culture of anticipation and concern, if not preparedness, which influences how disaster preparedness communications are perceived and responded to (e.g., Sims & Bauman, 1972; Renn & Rohrman, 2000; Riad & Norris, 1998, 1999). Similarly individuals living in such regions develop their own personal and prior experience-influenced response pattern to impending cyclone threat, with this particular event having very event-specific meanings and implications. We note this, in part, because the findings of this research are being applied to other natural disaster situations in the context of an underlying and widespread 'all-hazard' approach to natural disaster warning messages and materials in Australia.

One of the most important implications of these research findings is a non-obvious one. We have evaluated the utility of psychological content in community education and preparedness materials, but what happens when such information is not there? The current findings strongly suggest that the provision of preparedness information which heightens the salience, nature, likelihood and magnitude of a natural disaster, without providing adequate and concrete information about what to do and how to deal with such a situation, is likely to result in either a diminished adaptive response to the risk communication or an erosion of existing preparedness motivation and resolve. The data for the second or hanging control group with respect to physical and psychological preparedness indicated that those residents who did not complete a pre-season questionnaire were in fact marginally better prepared physically and psychologically than the control group which completed the pre-season questionnaire. This suggests that heightening the salience and need for natural disaster preparedness, without providing psychological advice and strategies, can in fact be neutralising or even counterproductive with respect to individual and community preparedness. While *almost*

Anxiety accompanies preparedness and can interfere

all natural disaster education and warning materials do include advice and strategies with respect to physical preparedness, *almost none* include information and advice with respect to psychological preparedness. It is arguable that managing one's own psychological response to a disaster preparedness message or warning, or the emotional response of others, is at least of equal importance to actual physical preparedness advice, and that the absence of such advice substantially reduces the effectiveness of the physical preparedness advice and recommendations. This appears to be particularly true for those moderate to high anxious individuals for whom the cyclone season is a source of considerable concern and anxiety, and who, in effect, are most vulnerable.

The argument and the psychological processes involved in risk communication appraisal and response and preparedness activities are somewhat more involved than may be immediately apparent. Our research findings over the past 20 years with cyclone warning preparations suggest that many people are unprepared for the elevated anxiety and concern which accompanies the thinking through and carrying out of standard physical preparedness advice. This anxiety is often unrecognised as such, but is nonetheless distressing, and a common response for many residents is to simply think about other things or stop doing whatever preparedness activity they may have commenced (for example, battening down, checking emergency supplies, or writing down radio station frequencies and emergency service numbers (e.g., Reser, 1980). Anxiety and fear do not just accompany the reading through and thinking about preparedness advice or warning bulletins; it is often an integral and powerful accompaniment to preparedness activities themselves, with these feelings and the activity itself conferring a particular reality and salience to the threat. The clear implication of this argument and both past and current research evidence is that the inclusion of psychological advice about how to anticipate, recognise, and cope with one's own emotional response to a cyclone threat will enhance the effectiveness of conventional and existing public education and warning materials. The absence of such advice may well diminish and compromise the effectiveness and utility of such materials.

Further effective research on cyclone preparedness and human response to risk communications requires a longer-term research investment and strategic planning. In many ways the most valuable research being undertaken in North America in natural disaster preparedness is that which has targeted particular cities and catchment areas for longitudinal panel studies (e.g., Riad & Norris, 1998; Riad, Norris & Rubak, 1999; Mileti & Fitzpatrick, 1993). Such research initiatives can build up a database and profile of communities, can establish the reliability and appropriateness of measurement, can have in place a methodology and set of procedures for data collection in the event of a warning period or an actual disaster, and can more clearly monitor and assess the experiences over time of particular individuals, households and communities. The far north coast of North Queensland provides an ideal location for such programmatic research and evaluation studies, given the foundation provided by the Centre of Disaster Studies, the composite risk profile of Cairns produced by the Australian Geological Survey Organisation (e.g., Granger et al., 1999), the lead role which has been taken by the Queensland Bureau of Meteorology, and the strong support and commitment of local authorities, such as the Cairns City Council.

Conclusion

The research provides convincing support for the effectiveness of the modified stress inoculation intervention in an actual cyclone threat circumstance. The research design and methodology provided for a very credible and comprehensive evaluation of the psychological preparedness guide, within the constraints of a single study and an ongoing natural disaster situation, and the research data shed considerable light on the nature of residents' cognitive, emotional and behavioural responses and experience at the beginning of the cyclone season and following a severe cyclone warning period. The investment of time, energy and resources in studying the *pre-disaster situation* and *psychological preparedness* as well as physical preparedness has proven to be of substantial value and benefit.

The research findings and substantial media and conference coverage have disseminated the message that the pre-disaster situation, and in particular the pre-cyclone season period, is a critically important time and venue for prevention and mitigation, and that psychological factors and processes during this threat period are of singular importance to effective coping and adaptive responding. The research has also clearly indicated that there are a substantial number of residents in cyclone-prone communities for whom

chronic anxiety, avoidant coping styles, and prior traumatic experience constitute both a substantial vulnerability factor and a genuine impediment to psychological and physical preparedness. The clearly psychological character of this research, the intervention, and the expertise and training of the researchers has served to highlight the importance of professional psychological input as well as the need for transdisciplinary and intersectorial collaboration in the development of effective natural disaster mitigation polices and programs. The findings of this research, undertaken before, during, and following the onset of Cyclone Justin, have allowed for the development of an innovative series of warning statements and educational messages which are being adopted by Emergency Management Australia, and the preparation and publication of a trainer's manual for the facilitation of training workshops focusing on community psychological preparedness (Morrissey & Reser, 2000).

We have attempted to stress that this research study is in many ways exceptional, due to its design, its focus, its disciplinary base, and to the exceptional good fortune of it having been undertaken in the right place at the right time. The data reported here, and the convergent evidence and argument of many other studies eloquently make the case for including psychological advice in natural disaster public education and warning messages and materials. This is happening, here in Australia, to a modest extent, with respect to all hazard brochures produced by Emergency Management Australia. There is nonetheless a pressing public need for more and better advice on how to cope with and better manage one's own emotional and psychological response to dramatic environmental threat or hazard, and that of others. Such human responses constitute very genuine impacts in themselves, whether the event is a serious threat or a physical event, with these psychological impacts often being very stressful, costly and consequential in terms of individual and community vulnerability and resilience.

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Strengthening the capacity of remote Indigenous communities through emergency management

Hocke & O'Brien show how the Queensland Department of Emergency Services is strengthening community capacity in RICs

By Irene Hocke & Arthur O'Brien

The Queensland Department of Emergency Services is focused on improvements to the health, disaster resilience and well-being of rural and remote communities, particularly Aboriginal and Torres Strait Islander communities. A number of initiatives are being implemented across each of the operational areas of the Department to address the Queensland Government's priorities for Aboriginal and Torres Strait Islander people and communities across the State and to strengthen the capacity of these communities to respond to disasters and emergencies.

Introduction

The Queensland Department of Emergency Services comprises the Queensland Fire and Rescue Service, the Queensland Ambulance Service and the Counter Disaster and Rescue Services.

The Department is an essential community safety agency that either directly delivers or funds a range of critical emergency and disaster management services. These services focus on preventing, in the first instance, or minimising the risk or impact of emergencies and disasters, as well as response to and recovery from emergencies and disasters.

The Department is addressing the challenge of improving services to rural and remote communities within an environment of funding restrictions. A number of innovative and potentially revolutionary initiatives are being, or will be, implemented as part of a collaborative effort between the respective operational arms of the Department, in conjunction with other Government Departments or in partnership with local Community Councils.

Future work of the Department will also include addressing the emergency and disaster response and recovery needs of the outstation or homeland movements, and involving other community representatives and organisations in the delivery of emergency and counter disaster services.

The context

Historically, fire and ambulance services were established by local communities forming, in the first instance, volunteer services.

Over time these volunteer services iterated into part time or full time services with a paid workforce in those communities that could justify such a service. Communities with a high socio-economic profile could afford a better service, while those relatively disadvantaged communities went without or continued with a volunteer service. The ongoing viability of these volunteer services relied heavily on the ongoing goodwill of the local people.

In 1975, the *State Counter Disaster Organisation Act* was proclaimed and established the State Emergency Service (SES) as a State-wide volunteer based emergency service. SES Units have been established in each Queensland Local Government and Community Council area. SES Units comprise volunteers from the local community who are willing to make a commitment to preparing for disasters and thus protecting and supporting their communities.

In 1989, both the fire and ambulance services in Queensland went through a revolutionary change and became State-wide services. Over the last decade both services have been refining resource allocation models to address some of the inequities of the past and put in place models of service delivery based on population, demand and risk profiles.

In 1994, the SES Cadet Scheme was established as part of the Government's youth strategy. The scheme aims to

train and resource groups of young people capable of assisting their communities in times of emergency and to foster career development in permanent and volunteer emergency services.

More recently, the Department has focused on improving equity of access to emergency services for people living in rural, remote and Indigenous communities.

Why focus on Indigenous communities?

Aboriginal and Torres Strait Islanders generally live in remote coastal regions in greater numbers than other Australians. Their communities are extremely isolated, generally lack effective cyclone shelters, housing and infrastructure is a lower standard than elsewhere and they have limited communications and transport facilities.

Communities also have low levels of education and awareness, a lack of access to knowledge and information on health and safety, and suffer the effects of complex social issues such as alcohol abuse, family violence and dispossession. Adding to this there is the growing movement by traditional owners back to homelands or outstations, who now have access to lands under native title legislation, and through the Aboriginal Land Act *1991*. This means that the number of very small communities scattered across very rugged and remote areas is on the increase. These factors combine to make these communities particularly at risk from climate change and natural disasters and therefore reliant on access to emergency services.

The Department of Emergency Services' purpose is to save lives, protect property and help preserve the natural environment. To achieve this purpose the Department needs to ensure that the best value services are provided to communities and individuals throughout Queensland commensurate with the inherent risks and hazards within those communities and within the overall resource constraints imposed by Government.

A recent Aboriginal and Torres Strait Islander Commission (ATSIC) Submission to the Council of Australian Governments' Review of Natural Disaster Relief and Mitigation Arrangements summarised the issues of significance to the delivery of emergency services to remote Indigenous communities. The issues raised by ATSIC are summarised in Box 1.

The extent of the issues raised by ATSIC makes it apparent that the effect of emergencies and disasters go beyond the realm of emergency management and can strike at the foundations of a community in terms of overall health and well-being.

Box 1: Issues raised by ATSIC in their submission to the Council of Australian Governments Review of Natural Disaster Relief and Mitigation Arrangements.

- **The lack of resources, equipment and expertise means that Indigenous communities are generally under prepared for emergency situations.**
- **There is confusion regarding the respective roles of Commonwealth, State and local government bodies in planning for and responding to emergencies.**
- **Indigenous communities can be overlooked because of their small size and remote location. Local governments, which are usually the responsible bodies through which recovery activities from disasters are coordinated, either may not recognise Indigenous communities as being within their sphere of responsibility or may not have sufficient resources to fulfil their obligations to such communities.**
- **There is a reliance on ATSIC and State Indigenous welfare/development agencies to take leading roles in responding to emergencies in Indigenous communities. However, these agencies have neither the resources nor the expertise to carry out such functions.**
- **Environmental health issues already exist in small, isolated communities and these existing problems are exacerbated during and after natural disaster events. Some Indigenous communities rely on their own generators that are prone to sustained failure during disasters. The consequent malfunction of sewerage and water pumps can lead to serious health problems which are less likely to occur in mainstream towns.**
- **Recovery can be severely affected by damage to access roads that can be a critical factor in the ongoing viability of some communities.**
- **There is a lack of appropriate cyclone shelters or community buildings for use as effective refuges during emergency events.**

Previous community awareness programs undertaken within Indigenous communities have had limited success due to the lack of sustainable funding required to properly support an ongoing awareness program and a lack of suitable materials due to language and cultural barriers. An important lesson learnt through programs attempted to date is that one size does not fit all communities, yet the many sizes to fit many communities is an expensive exercise. Given that there are 32 identifiable Community Councils within Queensland, plus a significant number of outstations, many with differing languages and cultural norms, raising community awareness of emergency and counter disaster issues becomes a challenging exercise.

One possible process for progressing this issue is a prioritisation of community risk based on a variety of factors including:

- accessibility to existing emergency and health services (and information);
- exploring existing community information mechanisms; and
- identification of the existing capacity of individual communities.

This information would then allow an assessment to be made of the vulnerability of that particular community to emergencies and natural hazards enabling a prioritisation of information needs across communities without resorting to a *one size fits all* policy.

While the Department has implemented a number of programs to address shortfalls in terms of the emergency and disaster management systems in place within Indigenous communities, there is a need to go further and to explore our role in terms of the overall health and well-being of communities.

One question with which the Department is currently grappling is – 'Is the lack of comprehensive emergency services within communities adding to the extent of the social and economic problems inherent in communities, or is the lack of emergency services within communities due to the social and economic problems?'

Yarrabah Emergency Services Unit – joint RFS and SES

Box 2: Extract from *'Meeting Challenges, Making Choices'* – April 2002.

'Levels of health, education, life expectancy and employment for Indigenous people are significantly lower than for other Queensland communities.

For example, Indigenous people on Cape York have some of the poorest health profiles in Australia:

- **Mortality rates 2–3 times higher than that of Queensland's population over all**
- **Median age at death at least 20 years below that of non-Indigenous people**
- **Suicide rates among aboriginal males in remote communities over six times higher than that of Queensland's population overall**
- **The highest prevalence of sexually transmitted diseases in QAlcohol-related death rates are over 21 times the general Queensland rate, and for homicide and violence (much of it alcohol-related) 18 times higher'.**

In addressing this question the Department is also asking – 'What effect will improved emergency services have on other issues of relevance to that community? If the effect results in a net benefit to that community – how best do we assist communities to develop appropriate emergency management measures within an environment of limited resources?' Finally – 'What role does the Department have in terms of building the overall capacity of communities beyond simply emergency and disaster management?'

Realistically communities cannot develop and become sustainable where community capacity is low. Indicators of the dysfunction that exists within a majority of Indigenous Australian communities have been highlighted in numerous reports and studies including the *Royal Commission into Aboriginal Deaths in Custody* in 1991 and the *Aboriginal And Torres Strait Islander Women's Task Force on Violence* in 1999.

More recently Fitzgerald's *Cape York Justice Study,* 2001, points out the social and economic problems facing Aboriginal people in Cape York communities as reproduced in Box 2.

Fitzgerald, gravely points out that, 'Unless the epidemic of alcohol abuse is dealt with, no other development, including economic and educational reform, can occur.' (Fitzgerald, 2001).

Further to this, the Aboriginal and Torres Strait Islander Women's Task Force on Violence argues for an holistic, just, and co-ordinated whole of government approach, that focuses on helping individuals, families and the Further to this, the Aboriginal and Torres Strait Islander Women's Task Force on Violence argues for a holistic, just, and co-ordinated whole of government approach,

which focuses on helping individuals, families and the community to heal, become stronger and capable of sustainable development. The implications are an urgent need for reform, and new approaches to address issues and problems linked to individuals and community capacity and social and family networks within communities.

In Australia, emphasis is now being placed on the building of community capacity, through the development of social and human capital within communities. Collaboration between governments and non-government agencies and communities to build on the current assets that exist within communities is required.

The Department's role in community capacity building

Cavaye (2000) sees capacity building as 'a flexible series of actions conducted by community people that creates economic benefits and helps communities become more able to manage change.'

The Aspen Institute (2000) described capacity building as the combined influence of a community's commitment, resources and skills that can be deployed to build on the communities strengths and address community problems.

In exploring the Department's role in community capacity building, a decision needs to be formally taken as to whether we are simply strengthening the existing capacity of communities in a purely emergency management context, or does the Department have a role in building the community's capacity in other areas. Other areas would of necessity include providing services that respond to drugs/alcohol abuse, domestic violence and environmental health concerns within communities.

A whole of government approach would suggest that the Department would need to play a broader role in capacity building and sustainable community development, particularly given the complexities of social and economic issues impacting on a large number of Indigenous Australian communities.

Obviously, in assisting communities to build capacity in areas outside traditional business, the Department is heavily reliant on working with State and Commonwealth agencies such as Queensland Health, Queensland Police, the Department of Aboriginal and Torres Strait Islander Policy, the Environmental Protection Agency and the Aboriginal and Torres Strait Islander Commission. The Department is no less reliant on community organisations and the continuing goodwill of individuals within the communities due to these partnerships.

The exploration of the role of the Department will continue, particularly given the Queensland Government's commitment to the *Meeting Challenges, Making Choices* – the Queensland Government's response to the Cape York Justice Study. The Department's proposed innovative solutions, outside of the mainstream, may well prove beneficial to both the Government as a whole, and to target communities, for very little up front investment.

Why build capacity?

The Department is heavily reliant on a volunteer emergency services workforce in those communities, which are unable to justify, in terms of population levels and risks, a part time or full time paid workforce.

Developing a self-sustaining volunteer emergency service within communities across Queensland is challenging and relies heavily on the goodwill and support within communities, particularly from local government and community councils. The Department has historically enjoyed, and indeed encourages, a cultural ethos of community self-help. In addition, there is also a heavy reliance on those individuals within communities who donate both time and money to support the ongoing operations of the various emergency services volunteer organisations.

This reliance on the goodwill of local communities lies at the heart of community capacity. Communities must be prepared to engage with the Department in order for our volunteer service delivery model to function effectively.

Victor Joseph of St Paul Community, Moa Island in the Torres Strait, explained it best when he talked about a triangular relationship between Government, the community (represented by the Community Council and other key community representatives) and the individuals that make up the volunteer services. Importantly, without the support of any side of this triangle the service delivery model falls apart.

The challenge for the Department is therefore to sustain and strengthen partnerships in areas where the model is operating well and to build partnerships in those areas where the model is not yet in place.

The Department, over the past few years has begun to look beyond simply providing training, support and infrastructure to volunteers and is now looking at our role in terms of building the capacity of communities to

First Aid training at Oriners Outstation a homeland of the Kwanyama Aboriginal Community

respond to some of the other issues impacting on their lives and our role in terms of building social capital.

Our approach to enhancing service delivery

In responding to the issues and challenges in delivering essential emergency services to remote Indigenous communities, the Department is implementing a two-pronged approach by focusing on both service delivery and on employment opportunities for Indigenous Australians.

Regarding service delivery, the Department is developing a five-year service delivery plan to improve the delivery of emergency services to rural and remote Aboriginal and Torres Strait Islander communities through enhancing partnerships and collaboration with community representatives, local, State and Commonwealth agencies.

The Plan will also improve the cultural appropriateness of our services, and promote positive outcomes and improved quality of life for Indigenous people, particularly those living in rural and remote communities.

The Plan is being developed through engaging with communities to discuss current issues and for communities to suggest possible solutions. Issues raised through community consultations are being prioritised in consultation with the community and will be addressed through the Plan.

Some 21 out of 32 rural and remote Indigenous Communities have contributed to the development of the Plan.

The results of the consultation process with local communities are encouraging. A number of communities have identified the potential role of the Department in assisting community capacity building for sustained service delivery through partnership arrangements. While communities have acknowledged the Department's focus on emergency management, they believe that this focus may well have spin off outcomes in terms of social and economic benefits.

Communities are also seeking outcomes in the delivery of training, equipment, infrastructure, community education and awareness and are seeking ownership and responsibility for emergency services delivery. Locally based individuals are seeking responsibility for local service delivery to maintain the expertise of local people, build sustainable emergency response and recovery systems and to develop culturally appropriate programs delivered by local people.

One of the key directions of this project is to develop innovative and flexible models of service delivery that meet the emergency and disaster service needs of local communities. In this regard it is intended to support the continuing development of a number of joint rescue units in Aboriginal and Torres Strait Islander communities in the Cape, Gulf and Torres Strait areas.

This will entail the enhancement of joint Rural Fire Service (RFS), State Emergency Services (SES) and in some cases Volunteer Marine Rescue (VMR) emergency services units in remote Aboriginal and Torres Strait Islander communities. A rationalisation of volunteer commitment, and resource efficiencies, will lead to improved safety outcomes for these communities from this type of initiative.

The Department has also initiated a consultation process with key Government stakeholders both in Cairns and in Brisbane. Part of this process is related to exploring the Department's role in areas outside of our traditional business. More importantly, the Department is building relationships with other providers of services to Indigenous communities (both Government and non-Government) to leverage the very best services at the most effective cost.

The Queensland Ambulance Service (QAS) undertook a major consultation process in 1999 with Indigenous communities in the Cape and Torres Strait, Commonwealth and State agencies, the Royal Flying Doctor Service and other relevant organisations to further determine the QAS response in terms of pre-hospital care and injury prevention for isolated remote communities. The results of these consultations form part of the five-year service delivery plan and led to the formation of the QAS Aboriginal and Torres Strait Islander Co-ordination Unit.

This Unit was initiated to develop and implement a comprehensive policy framework to provide a better ambulance service to Aboriginal and Torres Strait Islander people.

This framework includes:

- Guidelines for culturally and clinically appropriate service delivery;
- Educational support packages to officers delivering services to Aboriginal and Torres Strait Islander communities.
- Bridging programs to provide assistance with education and competency requirements to ensure Aboriginal and Torres Strait Islander people have the opportunity to qualify as student ambulance officers.
- Establishment of a mandatory 10 per cent intake of *Aboriginal and Torres Strait Islander specific* student positions within the Student Paramedic Intake for 2000–01 onwards.
- A commitment to provide support to health promotion/equity-based collaborative projects for Aboriginal and Torres Strait Islander individuals and communities to encourage better health outcomes.

As a result of the consultation and subsequent recommendations of the Service Development Plan for Cape York Peninsula, the QAS has established a Field Officer in Coen. This Field Officer will provide training and assistance to the remote communities of Coen, Lockhart River, Aurukun, Pormpuraaw, Kowanyama and major outstations throughout the area.

The QAS is working with Cape York communities and the Cape York Partnerships Office to establish appropriate service delivery models including the establishment of Field Officer positions in other locations throughout the Cape and within the Torres Straits.

The establishment of QAS Field Officers in remote communities builds on the existing collaborative arrangements in place with Queensland Health and will enable joint planning and service delivery in these areas.

The role of QAS Field Officers is:

1. To assist Indigenous communities in Cape York to establish or further develop effective arrangements for pre-hospital emergency care;
2. To work with Indigenous communities to increase the capacity of community members to respond effectively and appropriately to health care emergencies and to injuries or their prevention;
3. To work with Indigenous communities to identify and assist prepare community members for employment within QAS;
4. To assist/respond to pre-hospital care emergencies; and
5. To assist with health promotion and health education programs.

The QAS has conducted consultations throughout the Torres Strait Islands and has recently launched *Enhancing the Capacity of Islander Communities to Prevent and Respond to Health Care Emergencies and Injuries.*

During the 2001–02 financial year an important milestone in the 25-year history of the SES in Queensland was achieved through the completion of the SES Strategic Plan.

Initiatives developed as part of the implementation process of this plan will address a number of the equity and diversity issues facing Aboriginal and Torres Strait Islander SES volunteers and their communities. Priority will be given to developing closer working relationships with communities and reviewing SES guidelines and procedures to not only ensure equity in the workplace but to also address the sensitivities applicable to the needs of Indigenous communities.

The Department is also currently collaborating with Aboriginal and Torres Strait Islander community councils to develop Natural Disaster Risk Management Studies Program (NDRMSP), funded by the Commonwealth, State and Local Governments. The aim of this program is to aid the identification of mitigation strategies that may lead to a reduction in community loss and suffering caused by natural disasters.

Horn Island SES Unit at the State Rescue Competition in Toowoomba

Recent Budget outcomes have enabled the Department to continue its support of Torres Strait Rescue, an organisation that provides a contracted aeromedical and air rescue helicopter service to the Northern Cape York area and Torres Strait.

The Department pays an annual standing charge towards this service and provides training for the volunteer air rescue crew through Queensland Government Helicopter Rescue Service personnel. There are currently five, trained volunteer crew members drawn from Queensland Ambulance Service (2), Queensland Police Service (1) and Torres Strait Islanders from the local community (2).

The future

The Department intends to build upon the strategies commenced in 2001–02 and to increase the focus on enhancing service delivery to rural and remote Indigenous communities.

The QAS has employed a Field Officer at Horn Island, and is in the process of building a field office and employing additional Field Officer at Kowanyama. These Field Officers will assist these communities to establish or further develop arrangements for pre-hospital emergency care, increase the capacity of community members to respond effectively and appropriately to health care emergencies and to injuries or their prevention and to work with Indigenous communities to identify and prepare community members for employment within the ambulance service.

The establishment of QAS Field Officers in remote communities builds on the existing collaborative arrangements in place with Queensland Health and will enable joint planning and service delivery in these areas.

An additional Rural Fire Service and Counter Disaster and Rescue Training Officers will be employed to provide training and support specifically to Cape York and Torres Strait communities and will help build the capacity of existing joint RFS & SES volunteer units as well as working towards establishing new units in partnership with Community Councils.

The Department has also established an Indigenous Project Officer based in Townsville to enhance community safety and prevention capability on Palm Island as part of a pilot project. This pilot will be evaluated for possible expansion into other areas of Queensland.

A number of innovative programs which will assist in building the capacity of Indigenous communities beyond simply an emergency management response has commenced, including a drug awareness program for Indigenous Year 7 children from communities throughout Queensland to be developed and delivered in conjunction with Queensland Health.

The Department also intends to pilot a joint Emergency Services/Environmental Protection Agency rescue unit in Cape York including trialling an emergency services

coordinator at the Land and Sea Management Centre at Lockhart River.

The recent Queensland Government Response to the Cape York Justice Study *Meeting Challenges, Making Choices* recommends, amongst other things, that youth programs such as the State Emergency Services Cadets be expanded. Currently the SES Cadets Program involves 1,000 Cadets in 38 Units across Queensland.

The Program provides leadership skills to young people aged 12 to 16 with Cadets called upon to support the social fabric of their communities.

Potentially the program can be further developed as a youth development program and extended into remote Indigenous communities as a potential crime prevention, suicide prevention, and substance abuse prevention strategy.

In addition, the Department will explore models of community engagement as part of its five-year service delivery plan.

The Department intends to contribute to a new youth development program in Cape York and the Torres Strait in the 2002–03 financial year including the current piloting of a primary school-based program on Moa Island (St Pauls) with the aim of extending it to other centres in Cape York.

The Indigenous Coordination Unit is the Department's most recent initiative was established in Cairns on December 2002 and launched on 23 May, 2003. The ICU will establish a collaborative approach to developing the capacity of staff to work with communities to ensure effective and efficient outcomes. The Unit will effectively co-ordinate resources from a multi-service perspective, and will ensure collaborative consultation and negotiations with relevant Government, Non-Government, and Aboriginal and Torres Strait Islander Communities to meet specific and sustainable community-based outcomes.

Through the Unit, the department will also be able to respond efficiently and contribute to the Government's Cape York Justice Study and Ten Year Partnership Strategies, coordinate the implementation of the Department's *Five Year Plan for Safer and Healthier Murri and Ilan Communities in North Queensland, 2003–2007*, and effectively support a multi-Agency approach for the implementation of and reporting on appropriate planning framework and service delivery outcomes.

Community engagement

Community engagement has come into prominence over the past few years as a means of planning and delivering responsive Government services, that meet the needs and expectations of local communities.

Engaging with communities, not just consultation has become an important facet in the planning, policy development and service delivery components of Government.

The Department of Emergency Services has had in place a number of excellent examples of community engagement practices – the Local Ambulance Committees (LAC) that have been an important component of ambulance service delivery, and the Emergency Services Advisory Council (ESAC) and the Rural Fire Council (RFC).

The LACs, first established in 1991, advise local ambulance services on the needs of their community, the quality of services provided and manage funds on behalf of the community. The QAS has made a genuine commitment to community engagement both in structural and performance terms through the LACs.

The ESAC is a non-policy-making community based body, which reports to the Minister for Emergency Services on the extent to which the delivery of fire, ambulance and other disaster management and emergency services meet community needs.

The RFC provides advice to the Minister for Emergency Services and the QFRS in respect of fires in rural areas and the operation of rural fire brigades and promotes fire safety, fire prevention and the reduction of fire danger within rural areas.

More recently a Community Engagement Unit has been established. The role of this Unit is to work in partnership with communities to develop policies and service delivery models that meet the needs of those communities.

Another aspect of community engagement has been generated through the establishment of the Department's Strategic Plan for Indigenous Australians. This Plan reflects the Government's commitment to the reconciliation process and the principles contained within the Ten Year Planning Framework for Indigenous Affairs and the *Cape York Partnerships: Some Practical Ideas*.

This Plan was developed through input from senior managers of the Department and Indigenous staff representatives from across the Portfolio. The Plan is underpinned by a Departmental Reference Group, personally Chaired by the Director-General, which comprises Indigenous and management representatives of both the Department and its volunteer groups.

The Plan is being advanced through the establishment of Local Support Network groups in a number of cities and provincial towns across Queensland including Yarrabah, Cherbourg/Murgon, Townsville/Burdekin, Mackay/Bowen and Brisbane. Local Support Network

forums allow a support mechanism for staff and provide a link between the Department and local communities. The development of the 5 Year for Safer and Healthier Murri and Ilan Communities North Queensland 2003–2007, supports the need to investigate the establishment of similar support mechanisms for volunteers and employees in remote locations.

Conclusion

The Department of Emergency Services has embraced the principles of community capacity building in delivering on its vision to improve service delivery to rural and remote Indigenous communities across Queensland. While only just commencing this journey, the Department recognises that it has a long way to go, and needs the support of staff, Community Councils and community individuals if it is to succeed.

A number of innovative pilot projects will commence in the 2002–03 financial year and will be evaluated, not just in terms of the emergency management outcomes, but also in terms of broader social and economic outcomes for target communities.

A key rationale for these initiatives is the need to invest time and resources into strengthening the capacity of remote Indigenous communities to protect themselves from natural hazards and other emergencies. However, enhancing the communities' emergency management capacity can also have further benefits in terms of the social and economic development of communities and therefore generate real value for money from the resources invested.

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Special Issue

Issues in Comparative Emergency Management

Benigno E. Aguirre – Guest Editor
Andrew Coghlan and T. Joseph Scanlon – Associate Guest Editors

Editor's introduction

By B. E. Aquirre*

The meetings of the International Research Committee on Disasters (IRCD) in Brisbane and Melbourne, Australia, coinciding with the activities of the Committee during the meetings of the International Sociological Association (ISA), are without doubt the most successful meetings in the history of the Committee. Their success can be traced to the superb organisational work of Andrew Coghlan and Joe Scanlon; the extraordinary hospitality and good will of Emergency Management Australia (EMA) and the EMA Institute; the cooperation of other colleagues at the *Australian Journal of Emergency Management,* RMIT University, and the Department of Human Services; and the general intellectual cordiality and openness of the participants. The participants were from many walks of life, from private practice, national emergency management and international agencies, and from universities and research centres on various continents. Each in her or his own way contributed to the lustre of the proceedings. Indeed, the sense of accomplishment is so widespread that the intent of the IRCD is to continue the workshops in upcoming meetings of the ISA in South Africa and Europe.

This special issue of the International Journal of Mass Emergency Disasters (*IJMED*) reflects the intent of the workshop, a sharing of Australian and other research, and occurs in conjunction with a parallel special issue of the *Australian Journal of Emergency Management*. It is not meant to be all-inclusive of the scholarship presented during the meetings, for the papers underwent peer reviews and some of the initial presentations could not be rewritten by their authors in time for their inclusion in this special issue; others have been accepted for publication elsewhere (for a complete list of ISA presentations, see the IRCD newsletter Unscheduled Events at http://muweb.millersville.edu/~isarcdue/UE_NOV_2001.PDF; a summary of the EMAI workshop is found at http://muweb.millersville.edu/~isarcdue/UE_SEPT_2002.PDF).

There is a varying degree of thematic continuity among the five articles that make up this special issue, captured by three underlying themes. The first two articles, by Gabriel and by Buckle and his associates, explore disaster management issues in Australia and the innovations that are taking place in Australian thinking about disasters, in what constitutes an enviable perspective if compared to other countries' efforts to mitigate disaster losses. A third article, by Handmer, also uses material from Australia to examine with exceeding rigor and discernment the complexities of disaster loss estimation practices. The final two articles, by Norman and Cole and by Scanlon, explore, respectively, emergency management issues in England and Wales and in Canada in the aftermath of the September 11, 2001, terrorist attacks.

In 'The Development of Municipal Emergency Management Planning in Victoria, Australia,' Paul Gabriel points out the unique blend of influences and conceptions that inform the emergency policy process in Victoria. As he points out, the emphasis on local initiative and civilian participation, and prevention and mitigation at the community level, transforms work on hazards, for it allows for a holistic understanding of the functions of government and other actors and an understanding of risk reduction as part of the development of resilient communities. Given the current emphasis in the U.S. on an overall military solution to all threats, there is irony in reading that this Australian model, with its emphasis on an engaged citizenry and local participation, in fact had its inception in the U.S.

Buckle, Marsh, and Smale's reframing of risk, hazards, and disasters expands on these themes by presenting selected findings from their research in four different settings. To my way of thinking, one of the most important implications of this summary of their recent work is the expansion of the concept of vulnerability to include considerations of the resilience of local institutions, or what they call the capacity of communities. This has very important implications. The vulnerability paradigm is often used as a synonym for weakness, marginality, exploitation, and injustice, part of a political economy view of disasters in which vulnerability stands for poverty. Much more nuanced understandings are possible, however, if the resilience of communities, families, and victims is understood as a key dimension of their vulnerability. Doing so forces us

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to recognise their historical specificity, to give them power as actors in their own lives rather than looking at them as inert and in need of saving and rescuing by government bureaucracies, community organisers, and the intelligentsia.

Derived from his work on estimating economic losses associated with floods in Queensland, Australia, John Handmer's assessment of disaster economic loss estimation techniques has wide applicability. He identifies categories of reasons for variations in estimates. His conclusions, that in many instances loss estimations are neither accurate nor comparable and that there are uncertainties inherent in the approach to making them so, run contrary to a contemporary overemphasis on accounting for disaster losses in terms of precise money figures.

Finally, the two remaining articles addressing the post-September 11th environment are widely different in tone. The first, by Sarah Norman and Eve Coles, gives a well-informed albeit alarming perspective on the lack of effectiveness of disaster planning and coordination in England and Wales and the resulting vulnerabilities. It is worth quoting from them on this key point:

> [M]uch of the impetus generated by events of the past two years has slowly disappeared as the recommendations of the review [of emergency planning in the United Kingdom] have been buried in the bureaucracy of the Civil Service administration known in the U.K. as 'Whitehall.'
>
> A distinct lack of research from a British perspective is evident.... As yet another review is relegated to the 'slow waltz' of Whitehall, the question must be asked whether the role and importance of issues such as legislation, structure, communication and coordination will continue to be shrouded in secrecy, hampered by the continued mismatch of policies that successive governments have introduced, and low public interest, all of which is demonstrated by the last fifty years of the British civil defense system.

The surprising contrast to the relatively high effectiveness of disaster programs in Australia is painfully clear.

Joe Scanlon's analysis of the multiple emergency operations centres (EOCs) that operated in Gander, Newfoundland, to handle the problems posed by 38 diverted flights to its airport on September 11th not only traces the origins of these EOCs and how they worked together, but it also offers rare, rich documentation of the key insight that successful disaster response is a mixture of planning *and* improvisation. As Scanlon indicates, the success of the operation was a mixture of local preparedness, the importance of the airport for the local economy, and the community's previous disaster experience with previous airport incidents. But it also resulted from the ability of the people of Gander to work together under an implicit shared collective purpose that encouraged a 'can do' approach to the emergency.

I am very pleased to offer the readers of this special issue a set of articles by a distinguished group of contributors. They will find in the collection a wide set of topics, a diverse set of national experiences, and a growing maturity of the field of disaster studies that augurs well for its future.

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The development of municipal emergency management planning in Victoria, Australia

By Paul Gabriel

In Australia, local government plays an essential role in emergency management, although not a provider of emergency services. The role of supporting emergency services and the community both during and after emergencies has been a traditional role. Added to this is an increasing responsibility as the focal point for the conduct of local mitigation using risk analysis, prioritisation, and treatment under the methodology of emergency risk management. This role is part of a shift in the emphasis of emergency management in Australia away from the strong focus on emergencies and the emergency services, towards an emphasis on the sustainability of the community and its life in the context of the risk of loss posed by natural and other hazards. Models of municipal emergency risk management planning are presented to assist municipalities to connect or even integrate their emergency management planning processes with other similar community safety activities such as crime and injury prevention.

Australia's Federal system of Government

The Australian states were formerly separate British colonies which came together in 1901 to form the states of the Commonwealth of Australia, together with two territories (Northern Territory and Australian Capital Territory) both of which are now self-governing. Under the Australian constitution, the commonwealth has jurisdiction over national issues such as defence, trade, immigration, and major aspects of taxation. Many of the more community-interface government services such as education, health (including public hospital and ambulance services), and public transport remain with the states. Importantly, state responsibilities also include police and fire services; the latter are generally set up as more or less autonomous statutory authorities so as to give them a degree of operational and financial independence from the government of the day.

Local Government responsibilities

In Australia there are some 770 municipalities, with populations ranging from a few thousand to over three-quarters of a million. Large areas of Australia with low population density do not have municipal government, so municipal services are provided there by state or territory agencies.

Local governments are created by state governments, whose legislation governs their formation, roles, and powers. Their traditional responsibilities of roads, rates, and rubbish have expanded considerably in recent years to encompass promotion of healthy, prosperous communities, and they carry significant roles in emergency management through responsibilities for land use zoning (within state statutory frameworks and policies) and application and enforcement of building control standards. More specific roles are discussed below.

Unlike many other countries, Australian municipalities are not responsible for provision of police services, but in rural areas many have a close involvement with fire services through support to volunteer brigades. There is, however, a trend towards greater state responsibility for rural fire service resourcing and management, as the needs of state fire services for a homogeneous force deployable over a wide area exceed the capacity of municipalities.

Emergency management responsibilities of states and the Commonwealth

Under Australia's constitutional arrangements, emergency management is a state responsibility, as are all nonmilitary aspects of safety for the community. States provide emergency response services (fire, police, ambulance, and state emergency services) using a combination of paid and volunteer staff. In addition, the states control or provide the major legislative and financial tools for prevention/mitigation and professional and financial services for recovery. All of these state-based organisations use some type of regional structure for provision of services and operational management.

Most states and territories also have emergency management legislation which creates the framework for relationships between the key organisations and provides for declaration of specific legal states, such as states of emergency/disaster, for times when there is need to use extraordinary or coercive powers in dealing with a disaster or major emergency.

The commonwealth provides explicit support to the states and territories through the provision of

- physical resource support, mainly from the defence forces, when state resources are inadequate or unavailable;
- financial support for regional planning support personnel, general enhancement of emergency management capabilities through, for example, research or specialised equipment acquisition, mitigation through grants programs, and also response and recovery expenditure when states' costs exceed thresholds linked to the size of their general revenues; and
- a range of supports to the improvement of emergency management nationally, through Emergency Management Australia (EMA), part of the Attorney General's Department; these include facilitation of national policy and practice, research, and, through its training arm the Emergency Management Australia Institute (EMAI), specialised development and training services.

Principles underpinning the current emergency nanagement system

During the 1970s and 1980s, Australian states developed formalised emergency management structures largely in response to both a series of major emergencies such as the substantial devastation of Darwin by Cyclone Tracey in 1974, major floods in Brisbane in 1974, and the 'Ash Wednesday' bushfires in Victoria and South Australia in 1983. Further impetus was provided by the emergence of a new commonwealth focus in the formation of EMA (then Natural Disasters Organisation) by the reformist Whitlam Labor government in the early 1970s.

Significantly, the Comprehensive and Integrated model of emergency management articulated by the National Governors' Association (1979) from the U.S. was incorporated into states' legislation and management structures and, by virtue of national training programs, became deeply embedded in the thinking of emergency management practitioners and the many others who undertook basic familiarisation courses, where it resides to this day.

The most prominent element is the Prevention, Preparedness, Response, and Recovery (PPRR) model (Emergency Management Australia 1993). The Australia-wide uptake of this model has been very beneficial on the whole because of its emphasis on a broad range of emergency management activities carried out by a variety of organisations, not only emergency services.

There are various limitations or, to be fairer, misuses of the PPRR model, as noted by Crondstedt (2002) including the tendency to see its components as separate, as always equal in importance, as sequential phases of a cycle, or as focused on activity and physical action. Another limitation is, again, not an inherent fault, but rather the assumption that the various PPRR components are managed and discharged in similar ways, and by roughly the same groups of people and organisations.

Until recently, the emergency management networks and structures at state and local levels have been centred around emergency services and their personnel, who have not necessarily been in the best position to significantly influence and promote prevention/mitigation on a comprehensive basis. Prevention may be facilitated through organisations with appropriate powers, responsibilities, and resources, in conjunction with the exposed communities generally. As noted by Hays (1999), the creation of a 'natural disaster reduction culture' is a considerable challenge for any jurisdiction.

Reconceptualising emergency management

The PPRR model may now be close to its 'use-by date' because it is emergency-centric, in that emergency events are the focal point and purpose for the activity embraced by it. (Prevention of *emergencies*, preparedness for *emergencies*, response to *emergencies*, and recovery from *emergencies*.) Emergency management objectives can no longer be limited in scope to coping better with emergencies and disasters, but must instead be seen in the broader context of the ongoing everyday life of the community. Emergency management is a key contributor to community 'triple bottom line' outcomes by its specific contributions to safety and sustainability.

The range of perceptual and conceptual shifts in Australian emergency management over recent years includes such directions as:

- away from an emergency-*centric* view of emergency management and towards a community-centric view;
- away from an emergency-service centric view of emergency management and towards one which embraces the whole of government;
- towards an increased emphasis on sustainability as a key purpose of emergency management;
- seeing emergencies as manifestations of vulnerability not simply as a function of the presence of hazards (Salter 1995);
- recognising the need to create many focal points for interdisciplinary and intersectoral partnerships

(International Strategy for Disaster Reduction 1999); and

- emphasising the benefits of effort and resources invested in prevention/mitigation/risk reduction compared with response and recovery.

Victoria's Emergency Services Commissioner, Bruce Esplin, has observed that 'Communities own their own risks, and a community-centred rather than agency-centred approach is essential in the management of [emergency-related] risks and the development of local, integrated plans and programs. What works in one community may not work in another' (Esplin 2000). A major paradigm shift is underway in which we are witnessing a shift in the role and image of the emergency services away from the role of quasi-military 'authorities' (Dynes 1994) taking charge of the community during times of crisis, into supporters and facilitators working with community in dealing with its risks as well as its emergencies (Esplin 2000).

Risk management and PPRR

It is in the context of this broader imperative that risk management offers a new way to think about and build planning frameworks for emergency management. Following the publication in 1995 and revision in 1999 of the Australian Standard on Risk Management (Standards Australia 1999), Australia's emergency management community has been quick to adopt and adapt the standards generic risk management approach to its own field, recognising its potential to provide a better way to manage prevention in particular. In the emergency management environment, risk management has been adapted to become emergency risk management (Emergency Management Australia 2000).

The risk management based framework facilitates

- a focus on risks (the interactions between hazards and communities in particular contexts) and not just on hazards;
- the development of a variety of innovative approaches to safety programs through the reduction of risk by modification either of *likelihood* of emergencies and/or of their *potential consequences*, by, for example, enhancing the resilience of exposed populations; and
- the engagement of a wider group of people and professions than just emergency services to promote safety and sustainability.

Despite the ready uptake of risk management, there has been some lack of clarity in thinking among some Australian emergency management practitioners as to how emergency risk management relates to the PPRR formulation. For example, in the *Emergency Risk Management Applications Guide* (Emergency Management Australia 2000) in which a risk management process for emergency-related community risks is set out in detail, one of the final stages in a detailed analytical process model is '[g]enerate risk treatment options' (Emergency Management Australia 2000, p. 20). Under this section, PPRR is included as a potential way of 'thinking about' risk treatment. This reveals a misunderstanding of risk, of risk management, and of the differences between treatment of risk (a constructed idea) and dealing with an emergency (a real phenomenon). Worse, it suggests that the risk management process is an additional set of activities on top of what was already being undertaken using the PPRR process.

A more satisfactory marriage of the two approaches is based on the recognition that *treatment* or *reduction* of risk (through reduction of likelihood and/or potential consequences) is the same thing as what has been called prevention/mitigation – it aims to achieve the same goals. In the emergency context, risk reduction will rarely result in the *elimination* of a particular risk, of course, unless drastic steps are taken, such as moving a community and its assets completely out of a floodplain.

The risk that remains subsequent to risk reduction activities is known as residual risk (Standards Australia 1999, p. 3). The exposed community lives with residual risk on an ongoing basis. Generally, there remains a risk of potential future loss or damage from emergencies which it is too expensive, difficult, or disruptive to life to eliminate or avoid. Therefore, there is need for the exposed community, in conjunction with its emergency agencies, to prepare for both response and recovery.

Recent publications by EMA such as Reducing the Community Impact of Landslides (Emergency Management Australia 2001) have adopted this way of articulating the relationship between risk reduction and operational preparedness, using the linking concept of residual risk.

In a public administration activity such as emergency management, there are those who would argue that a shortcoming to an approach is not a problem, as long as there is a some actual and hopefully beneficial activity taking place. However, the major benefit of the emergency risk management approach is to pursue all the means other than response and recovery of reducing the likelihood and/or potential consequences of

Figure 1. Emergency Risk Management Linked to Operational Planning.

emergencies. This is well expressed by Crondstedt, who states that 'Un constrained [sic] thinking about possible treatments is a critical feature of deriving innovative, new and possibly better ways of treating risks. Participants in the risk management process, in particular while sourcing and selecting treatments, must therefore be able to look beyond a framework that emerged from an era well prior to the current risk management framework' (Crondstedt 2002, p. 13). The introduction of emergency risk management would yield little true benefit if the 'old treatments' of response and recovery were considered to be available options, as they could tend to be relied upon excessively.

Municipal roles in emergency management

The role of local government as a key focal point for the various networks of people, organisations, needs, resources, and issues that impact on community sustainability and safety has become increasingly important. However, this role is not always taken up willingly or competently, and, in doing so, local governments may encounter structural obstacles created by others, such as the state, for which some solutions need to be facilitated.

The emergency management roles of local government in Australia include the following:

- Identification and treatment of emergency-related risks using such resources as they have available to them, in conjunction with other government agencies and nongovernmental organisations and the private sector. This includes establishing and maintaining nonstructural risk treatment options such as community education and awareness, and warning systems.
- Support for the emergency services in response operations. Control of emergency operations is usually vested by legislation or agreement in a member of a statutory body (fire service, State Emergency Service, police) according to the type of emergency. Municipal support can take the form of resources such as the provision of heavy machinery which the response agency needs but does not own, responsibility for feeding response agency personnel, managing road closures, provision of local information to response agencies, provision of evacuation or relief centres, and general immediate support to its community.
- In recovery from emergencies, the provision not only of resources to assist residents with clean up, but also personnel to manage the recovery process and assist affected householders and communities, using community development processes, with their recovery journey into a viable future. In this they are often supported by personnel from relevant state human service departments – who may also source financial assistance from state and commonwealth assistance programs.
- Generally mediating between their communities and state agencies in emergency management matters.

To underpin these roles, Victoria's emergency management legislation requires each local government to:

- develop and maintain a municipal emergency management plan,
- make specific appointments of municipal emergency officers whose role is to ensure provision of municipal resources in emergencies, and
- appoint a planning committee which must follow planning guidelines issues by the Minister for Police and Emergency Services (*Emergency Management Act 1986*).

An additional impetus to municipal planning is a commonwealth requirement that postdisaster financial assistance to a municipality may be reduced if it has not been engaging in risk reduction activities arising out of its risk analyses. In Victoria at least, emergency management planning support and facilitation is provided free of cost to municipalities. This is carried out by paid personnel of the State Emergency Service (SES), a predominantly volunteer organisation whose other main roles include volunteer response to floods, storms, and road crashes. The benefit of this paid support is that there is a quality level below which municipalities' plans rarely fall.

Repositioning municipal emergency management

Many municipalities identify emergency management as substantially the responsibility of the 'outdoor' or physical services side of their activities, often managed part-time by engineers who also may be responsible for contract and/or works management. This is consistent with the traditional view of municipal emergency management as support to response agencies. As a broader view of emergency and risk management gains strength, the municipal locus of responsibilities needs to shift towards the community services or people-focused side of municipal activities. This would support municipal emergency management planning, to both maintain the emphasis of coping better with actual emergencies and incorporating the further dimension of managing the risks to community safety and sustainability by engaging the community in relevant social processes.

The question now becomes how to efficiently and effectively organise and plan for all the various activities which contribute to the safety and sustainability of communities. As pointed out by Britton (2001, p. 45), emergency management is now placed 'in the overall context of a community's economic and social [and, one might add, environmental] activities.'

Other influences

In addition to emergency risk management, other factors are influential in the rethinking of how municipalities engage with emergency management and how they might evolve their approach into the future.

Community safety

A range of social programs in Victoria associate under the umbrella term community safety. The Government of Victoria supports a range of community safety programs and objectives such as crime prevention, prevention of injury in the home, workplace, and in public and recreational spaces, as well as the prevention of emergencies and the minimisation of their effects. The government has sought, over the past few years, to encourage local governments to be actively involved in programs to promote and improve community safety.

The government's sponsorship of Community Safety Month (formerly Community Safety Week) is designed to encourage communities and households to be more conscious of the need for safe behaviours in a variety of life activities and situations. It is a focal period for many local safety displays and events, incorporating emergency services among others.

Mandated planning committees

As pointed out above, emergency management at the municipal level carries a legislative mandate, requiring each municipality to have a planning committee, a plan, and appointments of emergency-relevant officers. In contrast, municipal participation in crime prevention has been promoted through government grant funding programs as well as the encouragement of municipalities to appoint specific personnel to promote this activity.

These personnel tend to be drawn from the community development side of the municipal organisation. In addition, outer metropolitan and rural municipalities in Victoria are required under fire legislation to maintain municipal fire prevention committees. The role of these committees is to devise treatment strategies related to the fire risk in their municipal district and to recommend implementation to the municipality and other bodies.

All these safety-related activities promote a risk management approach which commences with an assessment and evaluation of the risks which are facing the communities of that municipality. There is a clear possibility that a conscientious municipality might undertake all the processes in isolation from each other and duplicate not only the findings regarding risk, but also the effort involved in undertaking the assessments and in devising and planning treatments.

The challenge

The challenge for municipalities in Victoria is that each of these state-initiated programs, whether statutory or funded, calls for a specific committee in every local government to promote and administer it. Each one also promotes a holistic approach to problem identification and solving without full acknowledgment that municipalities may already be engaged in very similar programs and projects under slightly different banners. And each has to report independently.

This is made more complex by the fact that many of the programs which promote safety can overlap, can be similar, and could draw upon the others' programs and their proponents to contribute to their own objectives. For example, it would be feasible for those people who

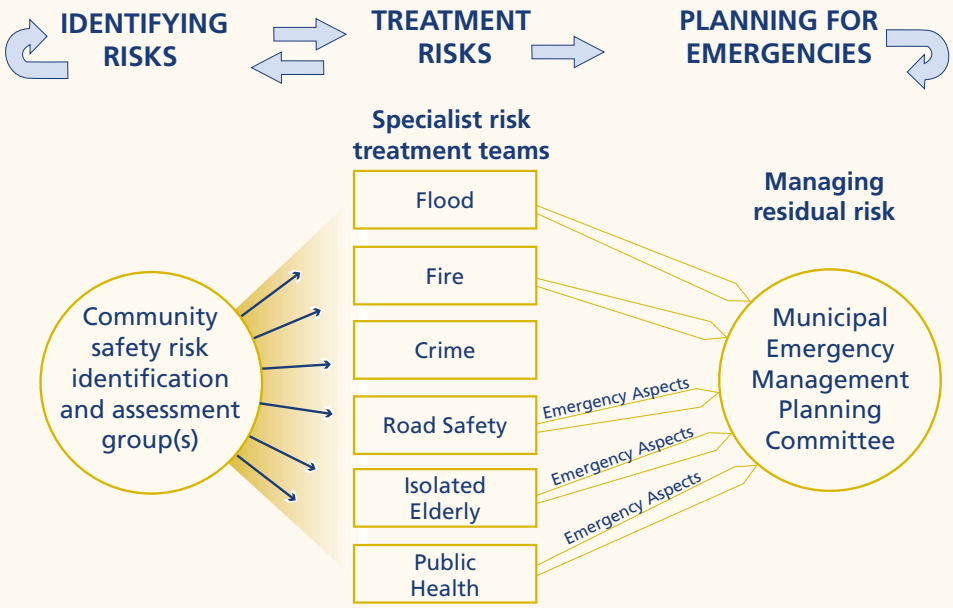

Figure 2. Integrated Community Safety and Emergency Operations Planning Model.

routinely visit elderly people in their homes to add a small component to their visit to explore and promote fire safety issues.

Model for integrating community safety planning

What is needed is an integrated, holistic process for local government community safety planning and practice which is not only efficient and effective, but also

- responsive to the legislation and/or funding conditions required by state government;
- manageable and managed by local government personnel, so it is 'owned' and not simply run out of a sense of duty; and
- capable of contributing to key objectives as an element of municipal core business.

This represents a strong argument for integrating at the municipal level the planning and execution of programs which promote community resilience and well-being.

The model represented in Figure 2 is being promoted to Victorian local governments (Office of Emergency Services Commissioner 2001) as a way in which they can operate a community safety process which assists in meeting the criteria set out above. Implementing this model requires municipalities to interpret, for their own resources, structures, and communities, the state government's expectations for managing the various aspects of community safety. It therefore promotes the principle of diversity—local structures devising local solutions for local problems (Wheatley 1997).

The model draws on the simplified representation of risk management identified in Figure 1, above, in which the key elements (in respect of organising the planning process) are:

- Identify, analyse, and prioritise risks
- Treat risks
- Acknowledge existence of residual risks
- Plan and prepare for emergency operational activities

The first activity, that of identifying, analysing, and prioritising risks, should be a holistic activity, covering as broad a range of community safety risks as the municipality wishes. This is a major activity, and should not take place too frequently – once per three- to five-year period may be appropriate. It needs a reasonable amount of knowledge and expertise to obtain and interpret data from a number of sources, including government or research institutions that gather statistics on health, emergencies or crime, and to segment it on a municipal basis. In addition, information from all departments of the municipal organisation can provide valuable insights into the community including possibly people at higher than normal risk, the local area and its hazards, and existing hazard-relevant planning and building controls.

A common presentation basis using a Geographic Information System (GIS) would facilitate interpretation and understanding, and assist in identifying areas of heightened risk. It must be acknowledged in this context that identifying, for mapping purposes, the characteristics of communities which indicate resilience and/or vulnerability is currently at an early stage of development.

This first stage is not isolated in terms of people or information from the other stages. Risk is evaluated with reference to treatment strategies already in place. On the diagram in Figure 2, the first stage is represented as having an interactive relationship with the second stage, that of treating risks. The first stage results in a determination by the municipality in association with its partners of the high priority risks affecting the relevant area and its communities which are to be addressed by risk reduction activities.

The next stage is the allocation of risk reduction tasks to those in the best position to address them. In the diagram, this is managed through specialist risk teams differentiated by hazard type (e.g., fire, flood, or road accident). However, the separation of risk treatment teams implied by the diagram is not desirable. Rather, there should be a degree of common membership and/or an overarching structure within which each team interacts, to ensure that there is exploration of the possibilities for common action. The common action would be specifically directed to enhancement of community capacity as a means of reducing risk.

The activity on the right side of the model is planning and preparedness for emergencies, given the existence of residual risk and the expectation that emergencies will occur. This is the traditional role of municipal emergency management planning committees in Victoria; their membership made up of municipalities and emergency service representatives makes them well-suited for this purpose.

This model clearly places new demands on the administration of the municipality to manage the various elements, stages, and bodies involved. However, it is important to note that not all possible risks need to be treated in all places and all times—the process of risk prioritisation is important. In addition, there are efficiency gains to be made throughout the whole process which could provide a payoff for the extra administrative effort involved.

The emphasis is on local process. The skills are those of networking, consultation, and problem-solving, where people are provoked and empowered to identify and address their local safety issues with the support of

emergency services and other organisations with necessary knowledge and expertise.

It is acknowledged that this model is yet to be explored in-depth by municipalities on a practical basis. It has been put forward on the basis that municipal emergency management planning ought not be an isolated autonomous activity and would benefit greatly by being incorporated into a larger stream of activities.

Conclusion

As with any evolutionary process, the directions outlined in this paper may not all lead to an improved future safety for communities and more efficient and effective multiagency planning processes. Change always requires a letting go of the familiar previous practice. For busy people whose commitment to municipal emergency management is generally part-time, the effort to grapple with something they have to partially invent themselves can be difficult to justify. Nonetheless, there are those who are prepared to take up the challenge of discovery, and whose experience will be instrumental in the development and refinement of the way forward.

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Reframing risk, hazards, disasters, and daily life: A report of research into local[1] appreciation of risks and threats

*By Philip Buckle[2], Graham Marsh and Sydney Smale**

This paper introduces a series of research projects in which we have been engaged examining a number of issues related to contemporary disaster management since 1999 (Marsh, Smale, and Buckle 1999; Buckle, Marsh, and Smale 2001a, 2001b, 2002). These research projects, supported by our own agencies and Emergency Management Australia, have at their core an examination of the concepts of community, localness, risk, hazard, vulnerability, and resilience and everyday life.[3] The results of completed research projects are available either from the authors, from the Department of Human Services (DHS) or from Emergency Management Australia (EMA). All documents are available on request by email to P.D.Buckle@rmcs.cranfield.ac.uk.

However, acknowledging the centrality of these concepts, there are two caveats. First, while there is agreement on how these terms are defined, there is often not a good understanding of the internal structure, mechanisms, and dynamics of these concepts. For example, there is agreement that community is a core disaster management (DM) concept, but whether in practice this refers to issues such as community as locality, community as interest group, or community as demographic group (gender or age, for example) is often not clear. Second, the linkages and interactions between these core concepts are not well understood, either. How do communities (however defined) define and deal with risk?; how does risk translate to vulnerability (or vice versa)?; and, how are resilience and vulnerability linked or dependent (if they are)?

In the first research project (Marsh et al. 1999), for the Department of Human Services, we worked to identify which groups in the community were especially vulnerable.[4] In our second research project, conducted for EMA, we talked with local people across Victoria about the perception and understanding of disaster, hazard, risk, and vulnerability among agencies and communities.

In our third project, also for EMA, we asked the question of local agencies and municipalities, why they frequently did not use the documents, guidelines, and resources used to encourage, support, and direct risk, vulnerability and resilience assessments. In our current project, also for EMA, we are trying to identify and describe any linkages that may exist at municipal and local levels between community capacity building and DM capability. This last project is being managed using a comparative method using case studies in Australia and the United Kingdom.

Background

Disaster management in Australia and in other locations within the developed and developing worlds is in the process of moving from a hazard management paradigm (where the focus of policy and program attention is on

* The authors have collaborated on a number of research activities, teaching programs, consultancies, and operational matters over the past five years. These activities have been, and continue to be, across Australia, the United Kingdom, and the United States.

1. In this context, local refers to individuals or small groups that are not professional disaster managers and that are active at the municipal level or lower levels of social organization.
2. At the start of this research program Philip Buckle was the Manager, State Emergency Recovery Unit in the Department of Human Services, Victoria, Australia; he is now Academic Leader, Cranfield Disaster Management Centre in the United Kingdom.
3. Each of these core concepts has its definition, or in some cases many definitions, and we do not propose to review them here. We generally accept the definitions given in the glossary prepared by Emergency Management Australia as working definitions. All we need to observe at this point is that these concepts are central to current thinking in disaster management (DM).
4. Prior to clear and resolved definition of terms, the everyday use of language (which often has agreed-upon definitions which have very fuzzy boundaries) seems to force us into this perceived and sometimes actual circularity of expression.

management of the perceived hazard agent), though a risk management paradigm (where efforts are directed more comprehensively to both hazards and impacts and to the development of strategies that may be directed at a range of mitigation, response, and recovery options) through to (so we would argue) a consequence management paradigm where effort and attention is directed at putting greater emphasis on understanding, prioritising, and dealing with the full range of consequences. These are not fully logically consistent or exclusive categories, but public administration is as much about achieving results as it is about intellectual coherence.

As part of this movement through a series of management paradigms there has been an increasing understanding and acceptance of the concepts of risk, vulnerability, and resilience, but especially there has been an increasing acknowledgement of community right to be engaged in the DM process and of the contribution that the community can make to DM policy and practice. This critical development has been driven in part by the political process of community activation, in part by an increasing emphasis on rights and participation as key elements in DM thinking and practice, and partly by the direct experience that community engagement is an indispensable tool in effective management and policy development. Nonetheless, there is still not a good understanding on the part of disaster managers of the significance and meaning that these concepts and of the realities they have for local people.

Origin of the studies

In June 1998 there were major floods in East Gippsland, a remote and sparsely populated rural area in eastern Victoria. These floods confronted the local community and the recovery management team with particular problems. An economic, environmental, and social context which include severe drought in the years up to and including 1998, recent Ovine Johnnes disease, a downturn in agricultural commodity markets as well as a diverse population – aging farmers in the hinterland, retirees along the coast, urban populations in the east of the municipality – combined to make this a unique situation. Understanding the context, vulnerabilities, and capacities of the affected population took some time even after it was recognised that we were not dealing with a homogeneous population.

Three months later an industrial accident at Victoria's only domestic and industrial gas processing plant, run by Esso in Gippsland, left 1.8 million households out of a total number of about 2.1 million without gas. Again the significance of this loss was not immediately perceived. The focus of attention was on managing the fire at the damaged processing plant, but over a few days it became obvious that maintaining critical facilities such as hospitals reliant on gas for heating, laundry, sterilising, and other critical functions was of equal need. Further, it rapidly became apparent that, apart from industrial needs for plants and commercial activities dependent on gas for industrial processes, cooking, and the like, there was a very vulnerable population that itself was diverse. Two hundred people on gas-powered life support systems, people receiving palliative care, the incontinent and new born babies requiring washing facilities, the frail elderly needing heating, and people with skin disorders requiring regular and frequent bathing were among the groups of people dependent on gas.

These events prompted an increasing awareness of the diversity of groups at risk and of the range of vulnerabilities. With this improving knowledge, work began early in 1999 to prepare for any possible Y2K disruption. Although no significant events occurred in the transition to the new millennium, the work in preparedness, risk assessment, community consultation, and vulnerability analysis was profitable in that it incisively informed the planning process for other disaster potentialities.

This work paid dividends in better informing preparedness and risk reduction activities, not just for 'traditional' natural disasters such as windstorms and wildfires, but also for widespread, socially disruptive, and potentially disastrous events such as electricity supply disruption. In Victoria, electricity generation in now privatised, and it appears that private companies may have little economic incentive to provide the safety net margin of productive capacity that existed when ownership of utilities was in public hands. As a result, at times of peak demand (during hot days in summer when air conditioners exact a heavy toll on the available electricity supply), 'brown-outs' and in some conditions actual power outages may occur. This has necessitated the development of sophisticated schedules for the reduction in use of electricity and, in parallel, the development of exemption criteria for groups most at risk in circumstances where power is not available.

Method

The studies we are discussing form a deliberate succession: first an analysis of vulnerability and risk appreciation, second an analysis of why risk and vulnerability assessment tools are or are not used, and third how community capability to manage disasters can be improved. However, given the absence of a robust and rigorous body of knowledge and theory about these concepts and issues, our work has been in part exploratory, in part speculative, to identify key issues and to stimulate debate on these critical subjects. The methods we have used have reflected the priority we have given to exploration and (initial) description as precursors to analysis and theory building, and we

recognise their limitations while also acknowledging that they have been appropriate for the current state of knowledge.

Each study has been started with an exhaustive review of the literature. Many people have contributed to an improved understanding of the issues, but no one, in our view, has developed models that link risk, vulnerability, resilience and day-to-day life in a coherent and puissant framework, nor have any analytical frameworks or models emerged that have managed to deal with the complex interactions of daily life, risk management, and disaster management in ways which allow for the linkage and integration of these issues between individual, group, community and system levels. Of course, at local levels where the focus will be on discrete groups such as family units, clans, and tribes or geographically defined communities, this may not matter. But for policy development at regional, state, and national levels, a coherent framework is an imperative.

Following the literature review we employed a variety of methods, each with their strengths and weaknesses but each able to help in the triangulation process. Employing a grounded theory approach of recursive examination, development, and refinement of knowledge and query and framed within an interpretivist method, we began first with a modified Delphi technique calling upon experts in the field of disaster management to provide their views. Some experts were interviewed individually, others as part of a group. We employed a structured approach to interviews and then, as the interview progressed, moved into a semistructured approach. Interviews and group meetings were repeated with some key informants. These experts were drawn from public administration, encompassing areas of policy formulation, program development, disaster management, and planning, as well as from comparable areas in municipal government and also from the academic world in Australia, the United Kingdom, the United States, and Canada.

Participant observation was another technique that we employed, although infrequently given that our research interest focused on local people and municipal officers rather than agency officers with whom we interacted on a daily basis but to whom we were known. We conducted a series of focus groups in ten municipalities across Victoria. These municipalities included rural, urban/rural fringe, and metropolitan municipalities with these subdivided into those that had recent experience of disasters and those that had no recent experience. We also used a case study method and looked at a number of municipalities that had recent experience of significant disasters.

Research findings from project 1: Assessment of community impacts

This project set out to identify and describe the groups of people most at risk from major utility disruption, but took into account also vulnerability to natural disasters. We acknowledged that certain groups of people, such as the elderly, disabled, and very young, might be particularly at risk. These groups, as we acknowledged, are traditionally thought of as being vulnerable. We identified a range of other groups who might also be at particular risk. These included the homeless, those without existing resources, travellers and tourists, as well as people who have been affected by the events (emergent vulnerabilities).

It is not entirely trite to say that we are all vulnerable in particular ways in specific circumstances, although it may be a blunt instrument for policy development. However, it is the case that we are all vulnerable to a range of events, and we are all vulnerable in a range of ways, including loss of life, injury, loss of home, and loss of livelihood, and trauma.

We indicated in this report, which by its brief was exploratory and descriptive, that vulnerability is contingent not only upon the inherent characteristics of the subject but also on the local circumstances. In this sense vulnerability (and with it the related concepts of risk and resilience) is relative, not simply in the sense that each person or social entity is vulnerable in different ways but that vulnerability varies across time, space, and activity.

Research findings from project 2: Assessment of personal and community

Resilience and vulnerability

The results from our first study, local appreciation of risks and disasters, surprised us but were not inconsistent with much sociological research into choice, risk perception, and the 'overheads' of everyday life. It was clear from our discussions and interviews with local people that their appreciation of risks and hazards was clearly disparate with the assessment of DM professionals. The risks associated with hazards such as fire and flood were demonstrably of less significance than threats associated with the practicalities of navigating a course through daily life. No one underestimated the potential of hazards such as wildfire to disrupt life and health. But given their low probability, particularly relative to the likelihood of the risks of maintaining a mortgage, managing children's education, and sustaining a healthy, vibrant community and environment, they scored low compared with more mundane (as assessed by DM professionals) risks.

It was particularly important that local people took a much more strategic approach to risk assessment than

did DM professionals. Local people looked to the horizon to see demographic changes, changes to the environment, changes to farming and business practices, and the loss of young people to large urban centres as the critical issues in risk and safety management. Local people saw the underlying structure to their risk environment, whereas DM professionals saw topical issues and risks and failed to see the social and economic determinants of safety and sustainable living. Of course, agencies and their staff are invariably constrained by their mandate to focus on particular issues and risks, and this leaves them unable to focus on others.

Sense of place, history and context

On reflection it may be no surprise that local people had a sense of place as a geographic area, but also as a social space defined by a set of values and shared aspirations. This is linked to a sense of history, most strongly in rural areas where population changes are least, and if not of a sense of communal destiny, of a feeling for a direction in community development. This is paralleled by a sense of contemporary activity such as recent and continuing economic trends, demographic trends (particularly immigration and emigration from the area), and activities that harm or sustain the natural environment.

Sense of daily life

Within the broader context of purposeful and often driven direction, people had a pragmatic appreciation of the exigencies, labours, and rewards of daily life. The necessity of meeting mortgage payments, managing children's education, sustaining a social life, and other equally necessary but often mundane activities set the contemporary context in which attention to risks from natural and nonnatural hazards was merely another activity to be managed in sustaining family and community life.

Local hopes and fears

Daily life and its maintenance provide a foreground to life, but they are intertwined and coloured by hopes, aspirations, and fears about the future and about the realisation of personal, family, and community goals. These hopes and fears are the counterbalance to the practicalities of day-to-day existence, and as such they provide the goals for which people aim. Missing the target was not seen to be significantly affected by hazards and disasters. Broader social and economic processes were felt to have more influence on desired futures. These issues therefore formed and set the boundary to the context in which local people understand hazards and disasters.

Local understanding of hazards and risks

Local people had an understanding of hazards to which they and their communities are exposed that was sophisticated and comprehensive. They understood better than agencies the range of hazards to which they are exposed and also the potential outcomes (risks) to which they were exposed when confronted by the hazard agents. In particular, they had a more comprehensive understating of environmental hazards and risks to farming and economic processes than did agencies. Local people understood that environmental, social, and economic processes work over decades and generations and that, while particular outcomes may not be predicted, it is possible to foresee that profound structural changes may occur to the community when exposed to the tides of long-term processes.

Local changes: thresholds and rates of change

It became clear in our meetings and discussions with local people that change was often discontinuous and unpredictable. For example, local sporting clubs can survive (more or less) down to a critical point which is usually the minimum number of players to field a team. Once membership falls below this critical number, the club disappears. In a sense, therefore, the club exists and functions, or it odes not exist. There is no middle ground, no gray area, and no ambiguity. Local capacity is affected by this step-like approach to change.

Local changes: predictability of outcomes

Linked to the notion of thresholds is the issue of predictability. Numerous changes have consequences that are not easily foreseeable. For instance, a scheme to buy back land from flood-affected farmers assisted farmers with cash and finances for their future, but it removed people from the local community as they moved off to the coast or large cities for retirement. This weakened the local community and further reduced its coping capacity. This is particularly the case with population reduction, which reduces the pool of people available to provide volunteer services. The rural fire services, rural emergency services, and support services depend almost entirely on local volunteers. Any measure which encourages people to move away (and often this encouragement is given with altruistic intent) weakens the local community.

Significance of losses

The losses to which people and communities are exposed range from the loss of physical infrastructure, through material assets such as houses, through intangible losses such as mementoes and memorabilia as well as health and safety, through to intangible or even indefinable losses such as loss of community, loss of trust, loss of hope, and loss of peace of mind. These intangible, irreversible, and uninsurable losses are held by most local people to be more important than the loss of physical, material items that may be replaced. Replacement, of course, comes at a financial cost, but it is achievable.

Significance of disasters

Disasters as periodic but unpredictable events were acknowledged by local people to be potentially serious, but the implicit risk assessment they carried out suggested that the risk (as a function of probability and severity of consequence) was generally less than that of more probable but, for any particular occurrence, less important event.

Divergence of agency and local priorities

The conclusions suggested from the results indicated above showed that agencies, mandated by legislation, government policy, political expediency, and agency tradition, had a different view of hazards and risks to local people and to local communities. This is not intended to either denigrate or devalue the agency assessment, but rather to point out that this divergence exists and must be accounted for in policy development and planning if disaster management is to be effective.

Issues for disaster management

The issues that were identified by this project that are most relevant for more effective disaster management, and in particular for disaster management that is responsive to community needs and priorities, are:

Remoteness and Communications. The absence of easy access to services and to elected representatives and the absence or access only to intermittent services that are dependable was a recurrent theme.

Youth and Community Futures. The future of local communities, faced with the fact of the emigration of young people to large metropolitan centres, was frequently expressed concern for rural areas. This emigration in the long term threatened community viability and in the short-term reduced the capacity to deal with hazards and risks by reducing the number of available volunteers for fire and other emergency services.

Change to Society and Environment. Other social changes, such as the perceived (but often incorrect) assumption of immigration of new types of people, an aging population, net emigration, and other changes, as well as changes to the environment through changed agricultural practice, tree plantations using new species, and other developments reduced the capacity to rely on existing and traditional methods of risk reduction.

Change to the Local Economic Base. Rural economic decline in both absolute terms (though perhaps occasioned by social developments such as an aging population) and in relative terms when compared to the increasing dominance of large urban centres reduced the capacity of rural communities to manage hazards and risks in ways that they thought appropriate and in ways that allowed them to deal with new and emerging threats.

Thresholds. Our research also suggested that social capacity may not decline linearly but may decline in a step-like manner, and that this loss of capacity may not be easy to foresee. For example, sports clubs and church congregations are likely to have levels (well above zero members) below which they are not viable, but the demarcation line between viability and irreversible and rapid or immediate collapse is very thin and may not be apparent before the event.

Local Capacity. Ability to manage hazards and risks is critically dependent on local capacity in areas of resources (including personnel), skills, and knowledge. Local people were inventive in tailoring existing capacities and in developing new strategies and methods, but the eventual success of long-term effectiveness was ultimately dependent on local capacity; this was often reported to be in accelerating decline.

Long-Term Development. Social, economic, and environmental development was recognised by local communities (and is increasingly being acknowledged by disaster management agencies) as central to the building of capacity but also to the reduction of risk through incorporating mitigation into development, betterment into infrastructure projects to reduce their vulnerability to identified impact thresholds, and to incorporating sustainability into the fabric of community life.

Research findings from project 3: Assessing the implementation of community resilience and vulnerability analysis

This project focused on an assessment of whether various materials (such as videos, pamphlets, and guidelines) and training programs on disaster management planning (and weighted towards recovery planning) and vulnerability and resilience assessment had had any effect, whether this effect was positive or negative, and in any case (positive, no effect, or negative) why this was. The focus of this study was on municipal officers but also included regional officers from government agencies and nongovernmental organisations.

Our study concluded that the various products individually had had little influence on planning activities. Cumulatively, they had contributed over time to a general awareness of the need for risk and vulnerability assessment. The manifest issues are set out below.

Confusing definitions: vulnerability and disaster

It was clear that municipal and regional officers were not clear about the defined meanings of key terms as these were used by central agency staff or by the research community. This confusion over meanings and

significance attenuated the message that such concepts are central to understanding disaster causation and remedy.

Time and resource constraints

Although it appears mundane (and perhaps even trivial), this factor in the low uptake of risk and vulnerability assessment (and the low responsiveness to supporting material) was pivotal. Most officers are too busy and many commented that over recent years they have become significantly busier. This has lead them to focus on management by crisis (dealing with issues as they approach a deadline or point of failure) or to focus on meeting legislative requirements first. Both these positions are dictated by necessity, often by legal requirements, and both seem quite rational, purposive, and efficacious in the face of insufficient resources and time to do all tasks. Given that disasters are infrequent and improbable events, it is comprehensible that priority resources are directed at frequent and foreseeable threats even if they are individually of less import. Of course, the cumulative impact of many day-to-day events if poorly managed may exceed the impact of rare but large-scale disasters. This issue in particular tied in with the finding from our previous research that day-to-day life usually takes precedence over spectacular but infrequent events.

Existing data sources

Counterbalancing the general inability or reluctance to undertake risk and vulnerability assessment (though there was a common agreement that in themselves these were worthy activities) was the capacity of municipal and agency managers to draw upon existing knowledge bases, data sources, and practices and to rapidly meld these into vulnerability assessments in real time. When an event occurred or seemed imminent, staff had access to information that could with some precision identify groups at risk and local capacities. This capacity drew heavily on the competence and professionalism managers and their staff, but seemed a capacity that was shared by all the municipalities and agencies with which we met. This real time assessment is not ideal, especially as the ability to make the assessment may be affected by the impact itself, but it went some way in practical terms to ameliorating the absence of forward planning.

Dealing with uncertainty and improbability

Managers and their agencies are often not comfortable dealing with uncertainty. This applies in many different ways to disasters, which may be characterised as events with a high inherent uncertainty. The lack of definite boundaries (what is or is not an emergency or disaster), the lack of predictability of occurrence, the uncertainty about location, size, and extent, and the contingent uncertainty about appropriate meliorative activity acted as inhibitors to agency staff. Planning for the definite even if the planning process is complex is more desirable and more easily accepted cognitively and emotionally than planning for the improbable.Issues for Disaster Management

Managing Uncertainty. Officers with responsibility for disaster planning and management need to be given training and special support in dealing with uncertainty as a central element of social life. At the same time they need to be supported by senior management in making decisions to allocate resources to planning for high consequence, low probability events. Senior managers can give critical support in indicating whether disaster management planning and associated activities such as risk and vulnerability assessment is to be given a priority. Senior officer mandates would resolve a source of doubt and uncertainty for many middle managers.

Workloads, Direction, and Resources. At the same time as providing strategic direction, additional resources, or reduced workloads, are needed if risk and vulnerability are to be properly assessed. Competing demands for resources inadequate to meet all those demands often results in all tasks being completed suboptimally.

Existing Knowledge. Existing knowledge and data sources can be tapped rapidly to provide indicative risk and vulnerability assessments. These sources need to be identified and catalogued as metadata; this would save considerable time and effort in preparing more detailed assessments.

Integrating Expertise. Parallel with using existing knowledge is the benefit from integrating existing expertise, which typically is held in different parts of organisations. Our research indicated that social services, planning, environmental services, engineering and physical infrastructure, and public health services could all contribute to a comprehensive risk and vulnerability assessment of an agencies clients. But this was rarely achieved in practice; at best it occurred as an afterthought. However, all our respondents indicated that there were synergies to this type of interaction as well as better coverage of the risk landscape. This is a planning strategy that is dependent on senior officer mandate.

Research project 4: Development of community capacity

Assessment methodology as applying to disaster management capability

This project is underway at the moment, and we have not reached any definitive conclusions; indeed, no tentative conclusions. Our hypothesis is that community capability building projects that embrace social, health, environmental, economic, and infrastructure issues can contribute to enhanced disaster management capacity. This is presaged in part on the notion intrinsic to capability that it is sustainable, and this concept is now entering the language of disaster management. But we

suspect that particular activities can do more than promote sustainability in so far as they can directly and in specific and discernible ways contribute to particular disaster management skills, knowledge, and resources.

It our supposition also that this increased disaster management capacity will not come in the form of, or be derived from, additional resources. These are not likely to be forthcoming in the short-term except perhaps as targeted, time-limited government subsidies. However, improved knowledge of local skills, shared knowledge, and improved linkages and networks may contribute significantly to local capacity. This capacity may not be improved significantly in the area of operations, which is crucially dependent on physical resources, but may be much strengthened in areas of local contribution to policy advice and development, risk perception and risk analysis, and vulnerability and resilience assessment.

We expect to conclude this project in mid-2003. A further comparative study between Australia, the United Kingdom, and the United States or Canada is then proposed to provide triangulation and the evaluation of our conclusions from societies that share many similarities in their value systems, social organisation and behaviour, and disaster management arrangements.

Conclusion

Many of the conclusions we drew from our research are already known in the developing world, especially in relation to values, beliefs, and behaviour at local level and how these are relevant to disaster management. In this sense our conclusions simply confirm much other research. It appears to us that disaster management agencies need to address some critical matters if they are to progress with a better understanding of local and community responses to risks and disasters and if they are to improve disaster management effectiveness.

These issues include, but are not confined to:

1. The current demand for local and community engagement in the disaster management process has its basis in civic rights, the duties and responsibilities of citizens, as well as the practical issue that disaster management is only fully effective when the community is an active participant. However, given the responsibilities and commitments of day-to-day life and such competing priorities as managing families and employment, it may well be the case that engagement in disaster management will rarely be given a high priority by local people. They may argue (in our view, with at least partial justification) that it is the role of government to protect its citizens. In any case, local capacity to commit a large amount of time and effort to unlikely events is not high. Governments need to be clear about what they can expect from citizens in dealing with unlikely events that, in competition with day-to-day matters, have a low priority. This is apart from the argument that the drive to engage the community may be a covert means of shifting responsibility and costs from government onto local people.
2. Incorporating local assessments of risks into the planning process, not only so that local issues can be addressed but also so that a proper priority can be established for the planning and management of events which are traditionally considered to be 'disasters' such as fires and floods.
3. Understanding local values so that sustainable communities can be built that encompass these values in ways, which allow for the realistic management of the spectrum of risks faced by, and perceived to be faced by, local communities.
4. Moving from a response-based approach (which still inclines to a focus on the hazard agent as the object to be controlled) and a command and control model of management to an approach which recognises that managing consequences, and developing response options and mechanisms on the basis of a comprehensive risk assessment, will lead to improvements in the engagement of local people in the management of the risks that they face.

Finally, we would like to acknowledge all those people who worked with us in this research, as collaborators, partners, advisors, and contributors and as interviewees. Often an individual filled many of the roles. We learned early on that people in disaster-affected communities are often inundated with well-intentioned researchers. Well-intentioned they may be, but this does not make the nth or nth + 10 research team any easier to deal with. But all the people we interviewed were gracious and provided us with many new insights.

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The chimera of precision: Inherent uncertainties in disaster loss assessment

*By John Handmer**

Loss assessments are undertaken to support decisions about disaster mitigation. There is considerable pressure to use economic principles and to make such assessments a condition of funding for all mitigation. A fundamental underlying assumption is that loss assessments are accurate and comparable – and that this accuracy makes comparisons more valid. Unfortunately, it appears that this is not the case. A key question concerns whether loss assessments can be made accurate and comparable through improved knowledge and training – as implied by many critics of the approach – or whether the problems are inherent in the idea of loss assessment. Drawing primarily on Australian flood loss assessment work, these issues are examined. Results suggest that the uncertainties may be larger than generally acknowledged, that at least some are irreducible, and that comparisons may not be assisted by improved accuracy. The implication is that loss assessment methods should aim to make comparisons valid and reliable rather than chase unachievable precision.

The development and implementation of disaster mitigation strategies have long relied on political support with occasionally some financial analysis. However, treasury and finance departments everywhere have always sought economic justification for any significant expenditure. Now, in many jurisdictions, these government entities have increased influence and are demanding that expenditure be based on case-by-case sound economic justification. Sound economic analysis is desired so that there is confidence that expenditure is worthwhile, and importantly that the expenditure is worthwhile compared with other mitigation proposals.

There are strong assumptions here about the accuracy and comparability of loss assessments. Cochrane (1991) among others has argued that economic loss assessment in disaster management has been of highly variable and often very low quality. The development and application of cost-benefit analysis has been matched by outpourings of criticism – generally directed at the economic and other methodological assumptions underpinning the approach including its sensitivity to assumptions about the future, in particular the way the future is discounted, and the inherent bias of many assessments against what is difficult to measure – with the result that the approach supports measurement of property rather than human capital losses, and favours structural mitigation in flood risk management.

A key question concerns whether loss assessments based on economic principles can be made accurate and comparable through improved knowledge and training – as implied by many critics of the approach – or whether the problems are inherent in the idea of loss assessment. This is not the only issue. Loss assessment does not take place on the basis of sound datasets and modelling as documented by, among others, Blong (2002), Cutter (2001), and Granger (2002).

A major project undertaken recently for the Australian state of Queensland (Handmer, Read, and Percovich 2002) highlighted a range of issues – some methodological and some of a more public-policy nature – which help answer the above question. This paper builds on this and other work, and takes it further by suggesting a way of managing the problem of inherent uncertainties.

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Reasons for lack of accuracy

Loss estimates typically vary greatly between similar events, and estimates for the same event may vary greatly. This is the case whether the event being examined is hypothetical or has actually occurred. When assessing losses resulting from actual events, minor differences in hazard characteristics may result in major differences in loss. For example, flood depth may be just below or just above a critical level – such as floor level or levee top.

Reasons for variations in estimates appear to fall into four general categories:

1. the inherent complexity of loss assessments;
2. the level of knowledge. This includes lack of data for a specific event as well as vested interests (e.g., major enterprises, land developers, environmental interests) emphasising certain types of data over others. In addition, it is often uncertain what data are being used, and appropriate metadata are often unavailable (Cutter [2001] makes these comments for earthquake loss assessment);
3. differences in the philosophy and approach brought to the loss assessment – for example, is the need for a rapid assessment for political purposes, a thorough economic analysis to persuade treasury officials, something to guide recovery planning, or deciding on mitigation between competing areas or between competing proposals in the same area? Each approach and accompanying mindset will have its own gaps and limitations; and
4. variations in the funds, expertise, and time available for assessments.

Appreciation of all four basic reasons is needed to understand why loss estimates vary and why their accuracy and comparability is an issue. It is reasonably clear that lack of knowledge and variations in the available resources and expertise will affect the scope and quality of assessments. It should also be clear that assessments conducted for different purposes will often quite appropriately reach different results. Different results are reached in this context because, among other things, different levels of accuracy are required for different purposes and because different assumptions are made about losses by groups with different objectives.

This paper, however, deals with the first point: the inherent, or apparently inherent complexities and inaccuracies in loss assessments. It does this because many of the sources of and reasons for lack of precision are not widely acknowledged. The paper first examines some implications of using an economic approach, including issues surrounding assessment of mitigation alternatives. The identification and measurement of losses is then discussed with the emphasis on the difficulties involved with indirect and intangible losses – the assumption that stage-damage curves are reliable is questioned; dealing with the underlying problems of uncertainty in flood frequency determinations and predictions about the future – both essential for cost-benefit analysis – is covered next; approaches to assessment follow, with comments on their dependence on accurate information and their robustness in the face of uncertainty; finally, the peculiarly Australian question of converting 'potential' into 'actual' loss estimates is examined. Flood loss assessment is used throughout to illustrate the issues.

What is an economic approach?

Poor quality assessments do not occur because the basic principles and procedures are unknown. In fact, the field of economic cost-benefit analysis was originally codified for assessing whether flood mitigation proposals were worthwhile in the U.S. *Flood Control Act* of 1936. The basic approach has been extended since and applied to most areas of government activity. As far as hazard mitigation is concerned, economic assessment has been extended the furthest in the U.K. and U.S. For decades, central government funds have been made available for flood works in the U.K. only if the proposals satisfy cost-benefit criteria following government guidelines. Assessments there have generally followed the detailed approach set out in handbooks prepared by Middlesex University's Flood Hazard Research Centre (Penning-Rowsell and Chatterton 1977; Parker, Green, and Thompson 1987; Penning-Rowsell et al. 1992). The National Academy of Sciences has published guidelines in the U.S., and FEMA is developing a comprehensive approach to *Natural Hazard Loss Estimation Methodology* or HAZUS (see www.fema.gov/hazus/fl_main.htm). The U.S. General Accounting Office sets out its criteria for an economic loss assessment in its review of losses from the attacks on the World Trade Centre (U.S. GAO 2002). In Australia, the approach has been widely, if erratically, used and was codified by Thompson and Handmer (1996). Recently, the Australian Bureau of Transport Economics has restated the principles of economic loss assessment and applied them in a national assessment, the *Economic Costs of Natural Disasters in Australia* (Bureau of Transport Economics 2001). These documents pay only limited attention to the gaps and limitations in loss assessments.

Economic versus financial losses

The principles of economics are different from those governing financial accounting in private-sector enterprises. However, few loss assessments satisfy the demands of either economics (Cochrane 1991) or financial accounting.

The objective of an economic analysis is to assess the impact of an event on the economy of the area selected for analysis (see Table 1). Such areas are usually large political jurisdictions, such as countries or states, with responsibility for economic management. Selection of other areas, such as a region or town, involves a large

degree of judgment and acceptance that much of the economic activity flowing into and out of the area will not be captured. We are interested in the net economic cost of a disaster to the area. To calculate this net cost, all costs and benefits resulting from that event need to be identified and where possible quantified. Any social or environmental costs (known as intangibles, see below) must be identified and included in the economic analysis.

A financial analysis, on the other hand, is usually undertaken to assess the return or loss on an investment from the perspective of a commercial enterprise (Table 1). Commercial enterprises are interested in the impact of a disaster on their own profits rather than the impact on the economy. Some impacts not counted as a financial loss by a business affected by a disaster can be counted as losses to society. Such losses would generally include all intangible losses, much of the disruption caused by disaster, and losses to the residential and governmental sectors. Similarly, there are financial losses that are not economic losses. For example, one company may be forced to close following a disaster and thereby lose its sales market, but others may then reap the lost business, resulting in no net loss to the economy in question, apart from any extra costs incurred in transferring production. Similarly, tourists may cancel their trips to an area impacted by disaster, but holiday elsewhere in the same country or region – with no net loss to the economy. Such impacts depend on the structure and boundary of the economy under consideration.

Insurance assessments can produce estimates higher than those prepared using economic principles. This is because household insurance policies commonly provide 'new for old' replacement coverage for insured losses, whereas an economic analysis only counts the market or depreciated value of goods lost or damaged. This comment applies to household insurance policies; it does not apply to insurance for vehicles, commerce, etc. Depreciated value can be thought of as the actual market value. For example, most new cars or computers lose value dramatically with time, so that a five-year-old car might be worth half its new value.

Use of economic approaches for assessing mitigation proposals

Mitigation measures are implemented to reduce disaster losses, and so the benefits of any disaster mitigation measure are assessed in terms of the losses expected to be avoided by introducing that measure. Economic assessment is one of a number of decision support tools for mitigation proposals. But in practice it is often used as the sole criterion for flood mitigation, especially in England and Wales, and for some projects funded by the U.S. federal government. Decision makers often ignore the limitations of an economic approach and proceed as if the results of an analysis were near perfect. Table 2 sets out some of the more common experiences with using an economic approach for assessing mitigation.

Table 1: Key elements of an economic approach to loss assessment, contrasted with the usual or financial approach.

Economic assessment is about:

- **All members of a defined society or economy, not individual firms;**
- **Economic efficiency for this defined economy, not components within it;**
- **Depreciated rather than replacement values;**
- **Counting all impacts on the economy, both positive and negative;**
- **Changes to economic activity as a result of the disaster in the defined economy.**
- **Avoiding double counting, by counting losses once* and by not counting losses made up later or by other businesses in the same economy.**

Economic assessment is NOT about:

- **Distributional affects;**
- **Commercial profit and loss.**

The type of loss and the type of mitigation measure determine how complex it is going to be to include it in an economic assessment. Mitigation measures that try to prevent the disaster, such as levees or dams that positively exclude floods from an otherwise flood-prone area or strict land use controls that exclude people from hazardous areas, are relatively easy to assess as they will prevent almost all of the losses which would otherwise have been expected. There are some caveats to this general picture. Of course, they will not prevent losses above their design level, but these can usually be calculated. If the measure is a structure such as a flood levee, normally some allowance should be made for the chance that it might fail. We could add that even this calculation would normally assume perfect maintenance, whereas this is far from the case, and maintenance costs and difficulties are almost always underestimated. Political neglect, other priorities, new knowledge and rising standards making the original design obsolete are just some of the reasons why maintenance difficulties are underestimated. Where measures are likely to increase exposure to the hazard, although at a reduced

* A key element here is the 'stocks and flows' issue whereby damage to a physical asset (stock) should not be counted as well as loss of profits generated by that asset (flows), on the basis that one is a reflection of the other. Rose and Lim (2002) review the issue. This is not dealt with here except to note that, in a world dominated by human capital, the issue may not be so clear cut.

Table 2: Some experience with economic assessment for disaster losses.

- **Decision makers ignore the limitations of economic assessment.**
- **Items for which market values are hard to establish, or which are contentious, are ignored.**
- **Poorer areas do badly – they are worth less, and protecting them gives less return for the investment – as economics generally ignores distributional effects.**
- **Assumptions about the future of land use, climate, and individual behavior are always rough estimates.**
- **Through the application of discount rates, the future is generally discounted at the same rate for everything: Is this appropriate?**
- **The time dimension and event sequencing are usually ignored.**

risk – such as levees encouraging new development in the newly protected areas – this should also be taken into account as possibly leading to higher loss than before if the levee is ever breached or over-topped. Mitigation measures may also create new hazards or transfer the problem elsewhere rather than eliminating it.

However, most disaster mitigation measures can only alter the outcome of the event by changing the pattern or amount of loss, rather than preventing (or nearly preventing) losses altogether. Assessment of measures that modify the disaster outcome, such as smaller scale building modifications including floodproofing or retrofitting for earthquake and cyclone protection, may appear simple to assess, but compliance with these requirements has to be estimated, and it may be very low.

A similar problem of estimating compliance arises with mitigation measures which rely on public or commercial response such as warning systems, flood management schemes, and other strategies open to interpretation and negotiation, including most land use regulations. These mitigation measures are easily specified on paper, but there is great uncertainty over how they work out in practice – and the economic outcome will depend on the reality of how well they work in the event of a disaster. The issue here is the gap between written regulations and the realities of implementation (e.g., between the assumptions about near-perfect warning message dissemination and the reality of patchy dissemination and slow response).

Estimating the economic benefits of disaster mitigation is wholly dependent on predictions of the future. Yet, as with predicting the level of compliance with regulations, predicting the future through forecasting land uses, commodity prices, and environmental conditions is itself hazardous and prone to uncertainty. Assuming that it will be the same as the present is a typical and perhaps necessary approach, but one which is usually incorrect.

Implications of using an economic approach

Economic loss assessment counts the losses to the local economy as well as the benefits. Even if we could assess losses perfectly – and we cannot – we would still be faced with the problem of identifying and then estimating the benefits (or offsetting payments) resulting from the disaster for the area of assessment. This is particularly important within a regional context, because postdisaster insurance and aid funds that flow into the area may partly offset the tangible losses suffered – something that is unusual at the national level. Joe Scanlon (1988) is one of the few hazard researchers to document the benefits offsetting some disaster losses. Note that dollar benefits are normally offset against dollar losses only. Intangible losses are not included in this part of the analysis. Normally, attention could be given only to the major flows of funds into the region that are clearly a result of the event under assessment. This can generally be assessed fairly easily after an actual event, but poses difficulties when hypothetical events are being assessed. Table 3 shows the impact of including benefits for a region of North Queensland, Australia. In this case study the losses were estimated at $245.1 million (Australian dollars [ED.: $138 million U.S]), but benefits to the region in the form of insurance payments and government aid (both from outside the region) amounted to $141.9 million ($80 million U.S.), for a resultant net loss of $123.2 million ($69 million U.S.) – half the original estimate. This net loss is borne by the region defined for the analysis. However, the loss to the nation would be the full amount of $245.1 million as benefits to the region are simply transfers within the national economy. (Even this statement needs qualification, as business gains outside the region would need to be deducted from the loss estimate for a national perspective.) The U.S. General Accounting Office highlights the importance of offsetting payments in its report on the World Trade Center attacks. The New York City Partnership estimates the losses to the city at 83 billion U.S. dollars, offset by insurance, federal government aid, and increased economic activity worth about 67 billion dollars, to give a net loss to the city of some 16 billion (quoted in U.S. GAO 2002).

Defining and measuring loss

The economic framework for disaster loss assessment possess a number of measurement challenges including determination of the spatial and temporal boundaries of the analysis. Within this framework, the assessment of flood losses is based on a number of conventional or agreed approaches, each of which carries assumptions

Table 3: Total economic cost of the January 1998 floods to north Queensland: Implications of including benefits.
(Figures are in Australian dollars [AUD].
NDRA refers to the Australian Natural Disaster Relief Arrangements.)

Loss type	Losses to region ($m)	Benefits to region			Total economic loss ($m)
		NDRA ($m)	Insurance ($m)	Total ($m)	
Totals AUD ($U.S.)	245.1 (138.1)	52.56 (29.6)	69.35 (39.1)	121.91 (68.7)	123.19 (69.4)

and its own set of uncertainties and measurement problems. This section examines: how losses are normally classified; stage-damage curves which have been a key tool for flood loss assessment; the geophysical information underlying cost-benefit analysis; and issues of exposure and vulnerability.

Types of loss

Losses are conventionally classified as either direct or indirect. These are the major categories of loss, which can be further subdivided into tangibles and nonmarket impacts – or intangibles – according to whether or not the loss can be easily valued in dollars. Table 4 contains examples. In practice, the two types of tangible losses are distinguished from intangible losses, giving three overall loss categories: direct, indirect, and intangible. These three categories represent increasing levels of uncertainty and measurement difficulty. Uncertainty will also increase with the scale of the event. This is because indirect and intangible losses are likely to be larger, as a percentage of the total loss, as the size of the impact increases – with the result that losses from large-scale events will likely be underestimated (research cited in U.S. NAS 1999, p. 15). The U.S. GAO follows this classification of direct/indirect losses but does not have a separate category for intangibles. For an examination of other approaches to defining direct and indirect losses, see Rose and Lim (2002).

- **Direct losses** result from contact with floodwater, wind, etc. They are generally the most visible, often represent the largest loss component, and are the easiest to assess. Nevertheless, a wide range of loss estimates is still possible because of different assumptions about the condition of the assets before the disaster and, as with all types of loss, because of different approaches to measurement and variations in the resources and skill used in the assessment.
- **Indirect losses** arise as a consequence of the impact of the hazard. They reflect disruption to economic and other activity within the area of analysis, which flow from the effects of flooding, wind, or fire, etc. – hence the term 'indirect.' Indirect losses are more complex to evaluate, particularly because of the need to avoid double counting losses which have already been assessed as direct losses or which are already counted elsewhere in the analysis. Indirect losses to commerce may be made up by other enterprises within the area of analysis or by the same enterprise over a reasonable time period. Not surprisingly, the application of economic principles such as the need to determine the spatial and temporal dimensions of the analysis has the most impact in dealing with indirect loss assessment – generally reducing the estimates.
- **Intangible losses** is a catchall term that identifies direct and indirect impacts for which there is no commonly agreed method of evaluation and not normally a market. They include lives, health, memorabilia, ecological damages, destruction of community life, cultural artefacts, and loss of leisure. Research shows that people often value the intangible losses from a flooded home – principally loss of memorabilia, stress, and resultant ill health – as at least as great as their tangible dollar losses (Heinz 2000). Yet, most studies relegate intangibles to little better than footnote status. The National Academy of Sciences Framework for loss estimation (U.S. NAS 1999, p. 15) states that intangible losses "may sometimes be greater than the losses of direct physical destruction." But on the same page it advises that loss assessors should "Focus on direct losses, as they are easier to objectively measure" (ibid.). Lives lost are an exception to this general picture. The Australian Bureau of Transport Economics uses a value of $1.3 million Australian ($732,000 U.S.) per life (BTE 2001). Assessments of losses from the World Trade Center attacks used a foregone earnings approach to value lives at about $5 million U.S. each (U.S. GAO 2002). One problem with the U.S. approach is that the lives of high income earners have greater value than those on lower incomes. In summary, there is usually great uncertainty over the identification of intangibles and their valuation, with the result that losses are typically seriously undervalued.

Identifying losses is challenging, especially for those of an indirect and intangible nature. Although there appears to be reasonable consensus over the appropriate approach to measurement for most direct losses, this apparent agreement disguises much variation in practice, in particular over how the damaged item is valued. Stage-damage curves, the basic method of assessing direct flood losses to dwellings, are reviewed below. There is now doubt about their real value.

Are stage-damage curves worth the effort?

Stage- (or depth-) damage curves represent the relationship between expected loss and varying depths of flood water. These are typically used for assessing loss to housing and other structures where the stage or depth refers to depth of water inside a building and the damage refers to the damage expected from that depth of water. They have been the fundamental element of flood loss assessment.

The basic expectation from flooding is that deeper water will result in greater loss. At floor level, floor coverings will be damaged, and there may be losses to furniture and other items normally kept at floor level. At two or three metres of water inside a single storey building, all contents will be lost, and the structure itself may be endangered. Modern building techniques and furnishings, as well as contemporary furnishings and contents, may be making the stage-damage concept less relevant. Curves may disguise enormous variation in individual cases and uncertainty about their true value (Blong 2002).

There are two methods for developing stage-damage curves:

- Firstly, they can be compiled from loss measured following flooding; Stage-damage curves can be based on actual loss data collected after a flood using a single event or an amalgam of events. The U.S. curves employed by the Corps of Engineers are drawn up this way (USACE 1996), as are most Australian stage-damage curves.
- Secondly, the curves can be constructed synthetically. Synthetic stage-damage curves are produced from detailed inventories of typical property contents for different types of property; the height above floor level each item is normally kept, classified by the potential loss if flooded. This is the method used by the U.K.'s Flood Hazard Research Centre, where the items are also depreciated so that the loss reflects the economic loss rather than the replacement cost of the flooded items (Penning-Rowsell and Chatterton 1977). In practice, each item is assumed to be halfway through its economic life. Structural damage is derived from estimates of the cost of repairing the damage caused by flooding to building fabric for each building type.

Both methods are based on an averaging approach (explained below in 'Implications for Approaches to Loss Assessment') and assumptions regarding the validity of the transfer of loss estimates from one situation to another. Stage-damage curve values are very sensitive to flood water depth, yet this is frequently known only approximately. The curves only assess direct losses to small structures and their contents. No matter how much effort is put into them, large elements of direct loss must be assessed in other ways. In most cases, overall assessment results will depend on how indirect and intangible losses are handled.

Exposure and vulnerability

In the definitions employed in this paper and drawn from Emergency Management Australia (EMA 2000), exposure refers to people, assets, and activities threatened or potentially threatened by flooding, and vulnerability refers to the susceptibility to harm by flooding of what is exposed and its ability to recover. Assessment of exposure is reasonably straightforward within the rather severe limits of flood hydrology and hydraulics, as set out below, and the quality and reliability of the needed datasets (see, for example, Granger, 2002). As well, the number of people and activities actually exposed may be dependent on many circumstantial factors. However, assessment of vulnerability is much more complex. There is no general agreement on what constitutes vulnerability or on how it should be measured. Although there are many publications suggesting various approaches, most of these either use surrogates or employ indicators for which the evidence is often contested. Physical scientists

Table 4: Types of loss and measurement. (Uncertainty in both identification and valuation increases from the top left to the lower right of the table.)

Can the lost item be bought and sold for dollars?	**Direct Loss** **Loss from direct contact with flood water.**	**Indirect Loss** **No contact – loss as a consequence of flood water.**
Yes – **Tangible**	**For example, buildings and contents, cars, livestock, crops, infrastructure.**	**For example, disruption to transport, etc. Loss of value added in commerce and business interruption where not made up elsewhere.** **Legal costs associated with lawsuits**
No – **Intangible**	**For example, lives and injuries. Loss of memorabilia. Damage to cultural or heritage sites. Ecological damage.**	**For example, stress and anxiety. Disruption to living. Loss of community. Loss of nonuse values for cultural and environmental sites and collections.**

may assess vulnerability in terms of building safety, for example; other disciplines will employ livelihood security, wealth, gender, and so on. For our purposes here, it is sufficient to highlight that the concept and measurement are contested and that vulnerability is often specific to the situation and circumstance. At the present state of knowledge, measurement is expensive and of limited use for economic assessment due to its lack of stability through time. In addition, there is an important policy issue. Those of high vulnerability are likely to be less wealthy with fewer assets. A standard economic assessment would judge such people worthy of little flood mitigation investment relative to richer groups. This may not be a satisfactory social or political outcome.

The geophysical dimension

Knowledge about flood water extent and other characteristics is usually important for loss assessment of a single flood event. The survey and synthetic methods in particular depend on having accurate flood information. Where cost-benefit analysis is to be undertaken, additional information is needed. Knowledge of the flood frequency and magnitude relationship for the area being assessed is essential for estimating average annual damages (AAD) and for projecting losses into the future as required for cost-benefit analysis. Underlying the frequency-magnitude concept are many assumptions, including a stationary or stable climate. In addition, there is often uncertainty about the precise extent and attributes of the hazard, such as a storm or flood: where did it go, how strong was the water flow, how long did it last, what contaminants were in the water, and so on? Where flood water remains high for weeks, or where the contaminant may remain indefinitely, indirect and intangible losses may be much larger than direct losses even in the absence of deaths. However, existing standard methods do not assess this properly or even properly acknowledge the potential impacts.

To assess the magnitude of relatively rare events like the one percent flood takes a long, stable record. This is an important underlying assumption of both flood record analysis and flood damage assessment. But there is good evidence that the flood-producing aspects of climate are variable over periods of decades (for eastern Australia, see Smith and Greenaway 1983; for New Zealand, see McKerchar and Pearson 2001). In addition, in some areas short-term variability – also referred to as reliability – may be enormous. Arid areas exhibit this characteristic dramatically, where long periods of no flow may be followed by extensive flooding. McMahon, Finlayson, and Haines (1992) show that streamflow and therefore flooding in Australia and southern Africa varies greatly over the short-term – in addition to the longer-term variability mentioned above. On top of this, it is now generally recognised that climate change may have significant impacts on flood frequency and magnitude (Handmer, Penning-Rowsell, and Tapsell 1999).

The effects of land-use change on runoff adds further uncertainty to frequency/magnitude calculations. For all their apparent precision and the attention paid to the flood record, calculations of rare floods are abstract and sit within very wide confidence bands. It is also quite possible that climate change will affect the shape of the frequency/magnitude distribution. There appear to be two possibilities here. One possibility is that the rarer or more extreme events, such as the 1:100 flood or even rarer events, will be affected disproportionately. At other locations, the whole magnitude/frequency relationship may shift, so that floods of all severities will change. Such shifts will have a profound effect on the calculated annual average damage as smaller and medium-sized events are more important since they occur much more often and thereby normally contribute a greater proportion of the average damage. This shift has been documented from historical flood data; for example, Smith and Greenaway (1983) have shown that in southeastern Australia the flood frequency/magnitude regime has shifted, with a dramatic increase in flood damages.

Implications for approaches to assessment

How does all this uncertainty – in the economic approach, the underlying geophysical and demographic data, and the identification and measurement of damage – affect the various approaches to loss assessment? The variety of assessment methods used worldwide today can be categorised into three general types which range from very detailed postdisaster surveys attempting to calculate precise losses through to rapid estimates. They are known here as the averaging, synthetic, and survey approaches (Table 5). In practice, some combination of approaches would normally be used; for example, surveys are the most appropriate method for assessing losses to large businesses most infrastructure, and intangibles. The implications for each approach are considered below.

1. *The averaging approach* sets out an average loss per impacted dwelling, with average values for business premises based on the area of the structure. It does this by drawing on preexisting data. This average loss is applied to every flooded structure in the area being assessed. In the Australian state of Victoria, percentage figures for indirects and indexes for intangible losses are also used (Read, Sturgess, and Associates 2000). The averaging approach has the advantage of great simplicity and relatively low resource requirements compared with other approaches. It makes no pretence at precision in individual cases and does not rely on accurate flood depth information – although for cost-benefit analysis frequency/magnitude information is needed. The averaging approach also suggests considerable

evenhandedness, with one outcome being that the loss potential of poorer areas will be valued much the same as wealthy areas. However, the approach may under- or overvalue indirect and intangible losses. It also treats very serious and dangerous flood hazards the same as shallow flooding that results in little damage and poses little threat to safety. With refinement, the approach may be able to overcome these problems.

2. The *synthetic* approach involves a detailed assessment based on preexisting databases covering a range of building types and contents. Losses are based on assumptions regarding the age and condition of the items and the effect of the hazard, and are often developed theoretically or synthetically – as opposed to being based on experience. The synthetic approach is probably the most flexible and currently most widely used of the three approaches. It can make use of a variety of existing computer packages with their own stage-damage curves for calculating direct losses for the residences and small shops. However, the extensive use and availability of calculation packages disguises considerable debate over the accuracy of the stage-damage curves and resulting figures. The accuracy of the synthetic method depends, therefore, on the reliability of the available datasets including the detailed characteristics of the flood or floods in question. One argument is that the inaccuracies in this approach make no difference when it is applied to large areas – this argument can be made for the averaging approach, too, but that approach involves much less effort.
3. A *survey or historical* approach involves using surveys after the event being assessed to establish actual losses. The approach depends on surveys to ascertain the extent of the loss. Often this will involve taking a sample of households or enterprises and generalising the results to the affected population. Where a substantial number of properties are involved, a more sophisticated analysis is usually attempted, and stage-damage curves may be constructed for different activities and structure types. The curves produced in this way are based on a *sample* of affected properties and are used to estimate losses for all affected properties. The accuracy of the results depends, among other things, on rigorous sampling and careful survey design.

No matter how much effort goes into the rigor of this approach, historical loss assessment provides results that define the losses experienced at one point in time, given the community's preparedness, length of warning, and other unique attributes of the flood. This fact – and the wide variations in survey and sampling quality and in the elapsed time between the flood event and survey – greatly reduce the utility of the approach for comparative purposes.

'Actual' versus 'potential' losses?

Loss data collected after an event will be – or at least will appear to be – the losses actually experienced. In Australia such loss estimates are known as *'actual'* losses. They (purport to) take account of the unique features of the event, the warning system, people's experience with the hazard, and their preparedness. Questionnaire surveys typically provide this type of estimate. The synthetic approaches for flood loss estimation developed in the U.K., the U.S., and Australia, as well as the averaging approach, cannot reflect the unique attributes of each event and of the people involved. Instead, they provide what are known in Australia as *'potential'* losses. Generally, these are the

Table 5: Summary review of basic eements of the three approaches to loss assessment.

Loss Assessment Approach	Direct Loss			Indirect Loss	Intangible Loss
	Houses/Small Business	Commerce, Farming (>1000m³)	Infrastructure		
I Averaging	Average loss per flooded structure	Average loss per m² for types of enterprise & surveys	Average $ Per km of road and surveys*	Examine $ flow and use surveys % of direct	Identify types and magnitude. Surveys
II Synthetic	Standard stage-damage curves for types of property.	Stage-damage curves applied to m³ for different types of business	Stage-damage and average loss per km depending on type of infrastructure	Examine cash flow and use surveys.	Identify types and magnitude. Surveys
III Survey (based on sampling)	Surveys – new stage-damage curves.	Surveys.	Surveys.	Surveys.	Surveys.

* Much public infrastructure does not generate income directly, so future revenue cannot be used to assess loss nor is its social benefit necessarily related directly to the infrastructure cost.

maximum losses likely to occur in a given event. Potential losses are averages in the sense that they do not take account of the unique features of the event or of the affected population. It is worth observing that most U.S. and Australian stage-damage curves have been constructed from an amalgam of postflood event loss assessments and therefore reflect a mix of actual losses, including insurance losses – although they do not reflect the unique features of any one event. The U.K. curves have been synthesised as described earlier and represent pure potential loss.

Many of those assessing flood losses in Australia have adjusted potential losses so that they are closer to 'actual' losses, typically taking into account local experience, preparedness, and warning time. In Australia more or less standard ratios are often used for conversion of potential to actual losses (e.g., see Read, Sturgess, and Associates 2000; Handmer et al. 2002). Application of these ratios makes a major difference to the resulting damage estimate, reducing it by 60 percent for a flood experienced community with at least twelve hours of warning time. However, the ratios are based on a few data points from predominantly rural locations and were developed many years ago as indicative or preliminary (Smith 1981).

In addition to serious questions about the validity of the ratios, there are a number of practical and policy problems with this approach:

- the use of 'actual' losses may be discriminatory against those who take action to reduce their losses, as it will reduce the amount deemed worth spending on mitigation in their communities;
- 'actual' losses may discriminate systematically against poorer sections of the community, because their actual tangible losses may be very low – although intangibles may be very high – with the result that it will not be worth investing in mitigation;
- the 'actual' loss estimates are unstable as people move or as circumstances change – yet in cost-benefit analyses estimates are projected decades into the future; and
- it is not easy to estimate the ratio between actual and potential losses for different flood prone communities.

In any case, we may be fooling ourselves that we can measure 'actual' losses with precision. The implication is that, at the present state of knowledge, estimates of 'actual' losses may not be valid. Instead, it may be more appropriate to think of potential losses under different circumstances.

Conclusion – accept averages

There are significant uncertainties at every step in the loss assessment process, whether the intent is to produce economically sound estimates or not. Some of these uncertainties may be essentially irreducible, and, even if this eventually proves not to be the case as our knowledge expands, key steps require judgments – some of an overtly political nature. These uncertainties are not merely features of loss assessment, they are also inherent in the limits to our knowledge of climate and extreme events, and of people and economies. The apparent accuracy of assessments conducted immediately after a disaster may make them unsuitable for comparative purposes, as the precise impact of each disaster is contingent on an almost infinite range of situational factors which will vary over time and space.

The implications for loss assessment procedures everywhere are, in summary:

- exact loss estimates do not exist, and it is important to appreciate that disaster losses can only be estimated;
- the assessment process involves judgment, and efforts should go into refining this judgment process rather than simply attempting to achieve 'exact' loss values;
- training will increase expertise, which is essential for the application of an approach based on the principles of economics, but will not eliminate uncertainty;
- as intangible and indirect losses are difficult to identify and assess, are often the major part of the total loss, and are frequently ignored because of measurement difficulties, special effort should be devoted to these loss categories; and
- the approaches used should be examined for systematic or inherent biases.

These limitations support the development and adoption of an averaging approach. The emphasis here is on achieving a transparent and consistent approach that enables comparisons between areas and alternative strategies for risk management, rather than to pursue increasing accuracy which may be an illusion anyway. The approach should not be overly sensitive to minor changes in the dimensions of the hazard under consideration – as this will usually be an area of considerable uncertainty. The approach should nevertheless aim for a reasonable and achievable degree of accuracy and replicability. Consistency and replicability enables confidence with comparisons between areas, as well as between mitigation options – the normal reason for the assessment.

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Order out of chaos? A critical review of the role of central, regional, and local Government in emergency planning in London

"Ministers have admitted that the chaos over the fuel crisis, flooding, foot-and-mouth and then the panic over September 11 have shown the United Kingdom's ability to respond to national emergencies is haphazard."
(Hall and Palmer, Sunday Express, 17 March 2002)

By Sarah Norman and Eve Coles

The events in New York and Washington on September 11, 2001, (9/11) apparently represented a fundamental shift in opinion towards emergency management, presenting a unique opportunity to promote change in England and Wales through heightened awareness of the need for emergency planning. The awareness afforded by 9/11 and the proposed changes in legislation recommended by the most recent review of emergency planning in the United Kingdom (U.K.) presented a unique opportunity for government to put its 'emergency planning house' in order. The review, initiated after the flooding and fuel crises of 2000 and given further impetus by the foot-and-mouth crisis, stated that: "The need for effective partnership working across organisational boundaries is a major requirement for emergency planning in the future" (Cabinet Office 2001, p. 8). As the last of a number of reviews over the past eleven years, this review seemed to offer the opportunity of a bright future for emergency planning by providing comprehensive legislation, the restructuring of emergency planning, and the hope of increasing public awareness of the role of emergency managers. Unfortunately, it is our contention that much of the impetus generated by events of the past two years has slowly disappeared as the recommendations of the review have been buried in the bureaucracy of the civil service administration known in the U.K. as 'Whitehall.'

A distinct lack of research from a British perspective is evident, and yet the organisation of emergency planning in the U.K. is a crucial issue. As yet another review is relegated to the 'slow waltz' of Whitehall, the question must be asked whether the role and importance of issues such as legislation, structure, communication, and coordination will continue to be shrouded in secrecy, hampered by the continued mismatch of policies that successive governments have introduced and low public interest, all of which is demonstrated by the last fifty years of the British civil defence system.

This paper will focus on the recent development of emergency planning in the U.K., the current situation following the latest review, and how the structures that exist between the Greater London Boroughs and Central Government have reacted in responding to an event of equal magnitude to 9/11.

It must also be noted at this stage that disasters are complex events, and the definitional debate that surrounds them is equally complex (see, for example, Quarantelli 1998). In the U.K., such events are more commonly referred to by emergency services and response organisations as a 'major incident' (Home Office 1997, p. 1). Similarly, the term 'emergency management' (Lindell and Perry 1992, p. 2) is not one in regular use in the U.K. More commonly the term 'Emergency Planning' is used for this varied and responsibility-laden job, which in our opinion does not always reflect the responsibilities and scope of this 'profession.'

Another point of clarification needed here is the perceived difference (in the U.K.) between civil defence and peacetime emergency planning. Civil defence is the protection of the civil population in the event of a hostile attack by a foreign power. Peacetime emergency planning is seen as planning for the response to a major accident or emergency that may occur as a result of explosion, train crash, building collapse, or the like. In the U.K., planning for civil defence at the local level is compulsory and has been governed by an act of Parliament since 1948. Yet despite the plethora of disasters since the 1980s, peacetime emergency planning is not yet compulsory, although a new act of Parliament is currently being drawn up.

Emergency planning in the U.K. is carried out at the local government level; there is no government agency that undertakes such activities. Thus, in order to understand how it works it is necessary to understand firstly the structure of local government in England and Wales and secondly the development of the legislation controlling emergency planning.

The structure of local Government in England and Wales

The U.K. is comprised of England, Wales, Scotland, and Northern Ireland. For the purposes of this paper and because Scotland and Northern Ireland have their own devolved assemblies with legislative powers, only arrangements related to England and Wales will be discussed. To further narrow the focus and to help demonstrate the complexity of emergency planning arrangements in England and Wales, London will be highlighted. Also, it is vital to understand here that, unlike the United States, Canada, and Australia that have a federal system of government the U.K. has a unitary system. This means that central government determines all policies and decisions. These are then implemented in acts of Parliament or regulations in turn determining (in emergency planning, for instance) what a local government can and cannot do. Furthermore, the setup of U.K. local government is extremely confusing. This is the result of a complete reorganisation in 1973 and further partial reorganisations in 1986 and the 1990s which have left a very complex situation. In the major urban areas—London, West Midlands, Greater Manchester, Merseyside, South Yorkshire, West Yorkshire, and Tyne and Wear—there is a single tier of councils responsible for all the services. These are called London Borough Councils in London and Metropolitan District Councils in the other areas. Moreover, in order to avoid total chaos in these areas and to fall in line with already existing regional services, functions such as fire, police, and public transport are exercised through joint boards to which all the local authorities in an area appointed members.

In the 1990s the Conservative government's view was that the two-tier model of service provision provided by the more rural county councils and district councils was inefficient and confusing and that county councils were too remote from those they served. Therefore, it was suggested that county councils should be abolished and their functions transferred to district councils, with some of the smaller districts being merged.

In Scotland and Wales this is exactly what was done. In England there was a process of local consultation which led to the single-tier model being supported, and implemented, in some places and rejected in rather more. Where single-tier councils have been implemented, they are called Unitary Authorities.

At the conclusion of this reorganisation the total count of Principal Authorities in England and Wales is: County Councils 34, District Councils 238, London Boroughs 32, Corporation of London 1, Isles of Scilly Council 1, Metropolitan Districts 36, English Unitary Authorities 46, and Welsh Unitary Authorities 22.

Legislative framework

Secondly, understanding the legislation is important because it will help clarify the situation that exists not only in London but also throughout the U.K. At present there are a number of different acts of Parliament and regulations that govern the way local authorities plan for civil defence and emergencies/disaster. Again it is worth emphasising here that the only compulsion on local authorities to plan is for civil defence; hence the basis for the legislation is a civil defence Act.

The legislative framework that underpins emergency planning in England and Wales is a patchwork of acts that began with the Civil Defence Act (1948) and has developed through a series of ad hoc measures introduced over the last fifty years. However, the 1920 Emergency Powers Act (a piece of legislation designed to give governments the power to declare a 'state of emergency' in the event of industrial unrest) has taken on a new significance since 9/11 (Turney 2002), particularly when considered in conjunction with the increased threat from terrorism and chemical, biological, nuclear, and radiation attack (CBRN).

Although now seen by government as an outdated act (Civil Contingencies Secretariat [CCS] Progress Paper 2002), the 1948 Civil Defence Act was an enabling device that allowed the Home Secretary to introduce regulations affecting the functions of local authorities and their ability to deal with defence of the civil population "against any form of hostile attack by a foreign power" (Tucker 1999). The act also provided for a grant from central government to fund the civil

defence activities only of local authorities. The act still provides the statutory basis for emergency planning in the U.K. and the grant, which will be approximately £18 million [ED.: $29 million U.S.] for 2003/2004, is still the only funding that local authorities receive from central government for carrying out these activities.

Various statues and regulations have followed the 1948 act including, the Local Government Act (1972) that allowed local authorities to spend money to ". . . avert, alleviate or eradicate" the effects caused by disasters (Turney 1990), the Civil Protection in Peacetime Act (1986) (a direct result of the disasters of the 1980s) that further allowed local authorities to 'use civil defence resources' (i.e., the civil defence grant) to respond to a 'peacetime emergency,' a recognition of the risks faced by the U.K. that are unconnected with any form of hostile threat (Tucker 1999, p. 10), the Civil Defence (Grant) Regulations (1987) that raised "the level of the grant for salaries and associated expenses of employing local authority emergency planning teams for civil defence purposes from 75 per cent to 100 per cent" (ibid), the Civil Defence (General Local Authority Functions) Regulations (1993), and finally the European-led legislation, the Control of Industrial Major Accident Hazards (CIMAH) regulations (1984) that required a company undertaking hazardous industrial activities to produce an on-site plan for dealing with a major accident and for local authorities to produce an off-site plan for protection the civil population in the vent of a major accident. The CIMAH regulations were replaced by the Control of Major Accident Hazards (COMAH) regulations in 1999 (ibid., p. 11).

Most of the above legislation (except for the COMAH regulations) is expected to be superseded by the new Civil Contingencies Bill that is currently being prepared by central government. This bill, a result of the latest review, will for the first time place a statutory duty on local authorities to plan for peacetime emergencies. Ironically, the Labour Party itself stated in its policy review in 1989 that it would like "to ensure adequate development of a new statutory emergency planning system," a proposal strongly supported by the Fennell Inquiry into the Kings Cross Underground Fire (Coles and Smith 1997), the Civil Emergencies Adviser in his first report, and Parker and Handmer (1992a) in their assessment of the U.K. situation in 1992. It is, however, disappointing to note here that, even under a Labour government (that has been in power since 1997), this piece of new legislation will have virtually no new money attached to it and will not be given parliamentary time until at least 2003/2004 (Weatherill 2002).

Development of emergency planning Since the 1980s/1990s

That there is a need for good civil protection and peacetime emergency planning at a local level has been recognised by researchers for a number of years (see Dynes and Quarantelli 1975; Dynes 1994; Drabek 1986; Newkirk 1998; Parker and Handmer 1992a; Quarantelli 1976, 1985, 1988, 1991, 1995). However, it was not until the proliferation of major incidents and crises in the 1980s and early 1990s that disaster recovery and emergency planning in the U.K. was firmly catapulted onto the political and public agenda. Indeed, Parker and Handmer (1992a) suggest that the decade of the 1980s will be remembered as the decade of disaster for the United Kingdom. Disaster events like the ones noted[1] are triggering mechanisms; they have the effect of pushing issues such as local authority emergency planning onto the political and public agenda almost instantaneously. These situations occurred in the U.K. at the end of the 1980s when, as Rocket (1994) noted, the government finally appeared to accept "the need for peacetime disaster preparedness" and resulted in the role of emergency planning being subjected to two government reviews in close succession.

The first review in 1989 concluded that the prime responsibility for handling disasters should remain at a local level and that more needed to be done to encourage and develop coordination of the various services at that level. It also resulted in the appointment of a civil emergencies adviser and in the Civil Defence College changing its name to Emergency Planning College to reflect a new, wider peacetime planning remit (Civil Protection 1989). The review, however, did little to allay the concerns of those involved with emergency planning (Sibson 1991; Parker and Handmer 1992a). Parker and Handmer (1992a) also noted that "the British approach is characterised by a lack of policies, especially explicit national policies providing unambiguous signals."

The second review in 1991 was carried out after the Civil Emergencies Adviser issued his first report and at a time when there was much debate within the emergency planning community regarding, among other things, the issue of a statutory duty. The Home Secretary (Kenneth Baker) did not, however, implement the recommendations of his adviser to impose a statutory duty on local authorities. Instead, he adopted what he called 'a broad based approach' in an effort "to achieve improvements in local authority planning for emergencies in peace and war through a package of measures" (Baker 1991). These measures included the introduction of an integrated emergency planning policy, a more flexible use of the civil defence grant, guidelines

1. For example, the Bradford City Fire, Hungerford, the great storm of 1987, the Kings Cross Underground Fire, Piper Alpha, the Herald of Free Enterprise, Lockerbie, Hillsborough, Kegworth, The Marchioness, Dunblane, and others.

for dealing with disasters, a review of emergency planning in metropolitan areas, and a more efficient use of emergency centres and communications.

Following the second review a circular issued to local authorities by the Home Office in September 1993 stated that "[t]he main role of local authorities should be to develop an integrated approach to emergency management as described in the government's statement of July 1991" and that "councils would be expected to make contributions to emergency planning from their own resources" (Civil Protection 1993), a worrying development for low-profile activities such as emergency planning in the current climate of restraint when departments in cash-strapped local authorities were and still are having to bid for scarce resources (Coles and Smith 1997).

The change of government in 1997 from Conservative to Labour and the subsequent Comprehensive Spending Review resulted in a further review of local authority civil protection, the third in less than ten years. This review was gotten underway by the issue in November 1997 of a Home Office consultative document on *The Future Role and Funding of Local Civil Protection in England and Wales*. The document, which was sent to all local authorities in England and Wales, asked for views regarding the following of issues: the need for a statutory duty for peacetime emergency planning, the coordination arrangements for emergency planning in terms of boundaries, restructuring of financial arrangements, and national performance standards. It is unfortunate that this review resulted in little visible change.

Both Parker and Handmer (1992b) and Rocket (1994) have discussed the need for a comprehensive reorganisation of local government civil protection. Parker and Handmer (1992b, p. 267) went as far as suggesting an eight point policy[2] for the improvement of hazard management and emergency planning in the U.K. In the intervening years since the publication of these suggested improvements, the political environment and the "auditing mindset of successive governments" (Hood and Jackson 1992) has conspired to ensure that no progress on any of these issues has been made. Furthermore, each consultation process has taken no account of the call for a separate department to deal with civil protection, or of developing a research agenda, or for regular audits and inspections of local authority emergency preparedness, or indeed for adequate training and education for emergency planners. Any new arrangements for emergency planning currently being considered should provide structures, funds and legislation that will cope with the range of events that increased dependence on technology, and climate change can bring. Indeed, Coles (1998) noted that the safety and protection of the general public that is afforded by good (or even, as Kreps [1992] points out, reasonable) emergency planning is a moral obligation of government.

The current review of emergency planning in England and Wales

As noted above, the current review of emergency planning was initiated in 2001 by the Deputy Prime Minister John Prescott following the fuel crisis and extensive flooding in the millennium year 2000 and the subsequent foot-and-mouth crisis of 2002. The terrorist acts of 9/11, while not having a direct influence on the review, have served to emphasise the ad hoc nature of arrangements in the U.K. and add impetus to the consultation.

The consultation period following the review was begun with the publication, on the eve of 9/11, of *The Future of Emergency Planning in England and Wales:* Discussion Document in August 2001. The document itself was like 'a breath of fresh air' as it contained the first indication that government had finally accepted that the 1948 Civil Defence Act was an outdated piece of legislation, unable to cope with the modern day demands of civil protection. It also outlined proposed changes in policy, guidance, and monitoring and the way emergency planning is funded by central government, a clarification of national and regional roles and responsibilities, the introduction of prevention and mitigation strategies for local authorities in the form of hazard identification and risk assessment, and controversially suggested that local authorities and not the police take the lead role in the coordination of local emergencies. The consultation period that ended in October 2001 was given added impetus by the events of 9/11 and the renewed debate these events generated among the U.K. public.

However, the wheels of Whitehall turn exceedingly slowly, and the results of the consultation were not published until the spring of 2002 (see Cabinet Office 2002a), by which time public interest was already beginning to decline. Respondents to the consultation were generally in favour of the recommendations made in the document CCS 2002, and it was assumed that action to implement the proposed changes would be almost immediate. Again, this was not the case; the consultation document on the proposed new Civil Contingencies Bill has only recently been published (Cabinet Office 2002b), and the bill itself will not be given parliamentary time until 2003/2004.

2. The eight points are: a statutory duty to plan for peacetime emergencies; a separate government department to deal with civil protection; policies for dealing with cross-boundary emergencies; adequate financial and human resources; effective arrangements for the free flow of information; regular audit and inspections; development of a research agenda; and adequate arrangements for the education and training of emergency planning personnel.

Emergency planning arrangements in England and Wales

Emergency planning in the U.K. includes structures at local, regional, and national levels involved in the response to disasters. The organisational framework for the present system that is operated in London is provided in Figure 1.

In July 2001, during the consultation period of the most recent review, responsibility for emergency planning moved from the Home Office to the Cabinet Office under the auspices of the 'Civil Contingencies Secretariat' (CCS) with the declared aim to "... to improve the U.K.'s resilience to disruptive challenges at every level" (Home Office 2001, p. 1). Local authorities can seek advice from central government through either CCS or a nominated Lead Government Department (LGD) if more appropriate to the type of incident (e.g., a radiation emergency).

Although 'Government Offices of the Regions' (GORs) exist at regional level, their role and responsibilities during a disaster appear vague at best. This is clearly evident when assessing the recent examples involving their activation such as in the 'fuel crisis' in 2000 and the foot-and-mouth outbreak in 2001. In general, the regional level within England and Wales has an undefined emergency planning role, currently in the process of being clarified as part of the review.

The Department of Health is almost a separate entity in terms of organisational structure; with representation at the central government level, as well as a regional level that supports Strategic Health Authorities (StHAs), and NHS Trusts at local level. An Emergency Planning Coordination Unit (EPCU) within the Department of Health has the responsibility for developing policy and maintaining national guidance in terms of emergency preparedness and provides national coordination for health if required in response to a major incident (NHS Executive 1998, p. 12). The Directorate of Health and Social Care provides the 'regional' coordination arm (facilitated by the Health Emergency Planning Advisors) that is tasked with ensuring that plans are compatible with other responders and comply with national guidance (ibid.).

The Home Office (1997, p. 4) publication *Dealing with Disaster* suggests the "…core of the initial response will normally be provided by the emergency services and as necessary by the appropriate local authority or authorities." The police, fire, National Health Service (which includes Strategic Health Authorities, Acute Hospital Trusts, Primary Care Trusts, and Ambulance Trusts), and local authorities are considered to be the main agencies providing or contributing to the local response to disasters.[3] Support for the emergency services and local authorities is provided by a number agencies and organisations such as volunteers, industry and commercial organisations, the Environment Agency, and assistance from the military.

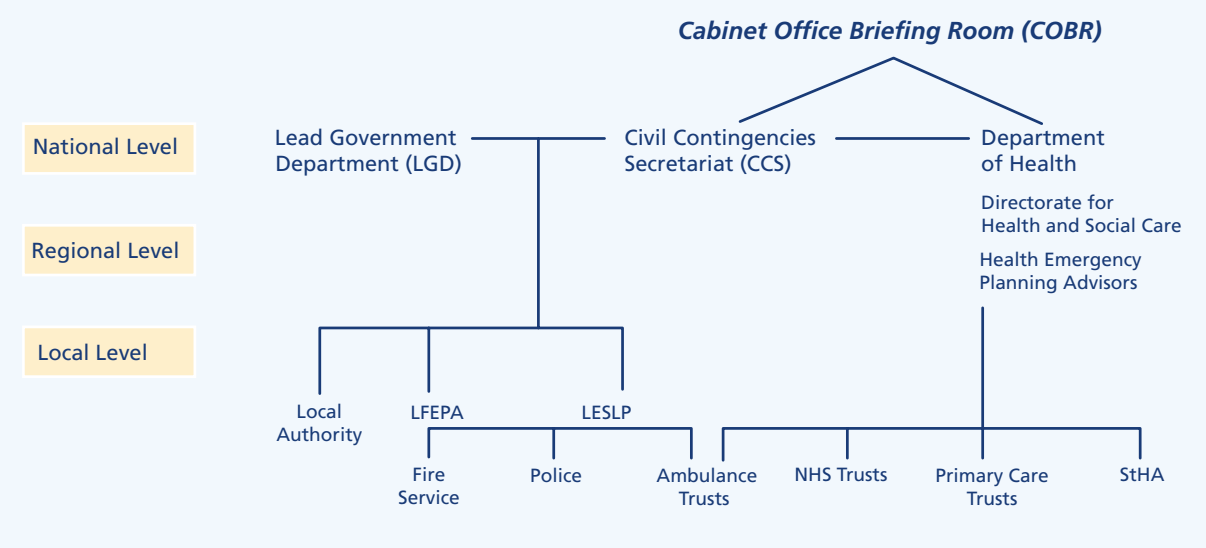

Figure 1. Emergency planning System in London (Source: Norman 2002, p. 8)

3. Disasters are normally managed using three nationally agreed operational levels of response: Operational (Bronze) Level, Tactical (Silver) Level, and Strategic (Gold) Level. These three levels are recognized by organizations normally involved in a response to a disaster and allow a common framework for all responding organizations. A Strategic Coordinating Group can also be formed to focus on the provision of resources, prioritization of requests, and forward planning for the successful resolution of the incident and return to normality (Home Office 1997, p. 16).

Figure 2. Map of the London Boroughs (Source: Norman 2002, p. 15)

Emergency planning arrangements in London

The emergency planning situation in London mirrors the complex nature of emergency planning in the rest of the U.K. London as the capital of the U.K. is one of the most influential financial centres in the world, with a population of 13 million (Mitchell 1999, p. 29). It is divided into thirty-three boroughs (forming the greater London conurbation) that are governed by Local Councils (see Figure 2).

It is important to note here that London, unlike any other major city in the U.K., is in a unique position with regard to arrangements for emergency planning because it is also the seat of government. This creates a hierarchy of power in the capital that is firmly rooted in five hundred plus years of history and rests overwhelmingly in Whitehall. For, although the responsibility for and function of emergency planning resides at the local level with the thirty-three local authorities that make up the Greater London conurbation in reality should a major event of the type and order of 9/11 take place, then the coordination of arrangements for dealing with it would undoubtedly be assumed by central government.

A number of organisations and forums exist in London, some of which were created to promote a pan-London response to disasters. Other organisations may have such a role in the future. The main organisations include: London Emergency Services Liaison Panel (LESLP), the Mayor of London, Greater London Authority, the Government Office for London, and the London Assembly. The LESLP Panel has created the Major Incident Procedure Manual (also LESLP 1999) to describe ". . . the agreed procedures and arrangements for the effective coordination" (LESLP 2000, p. 7). "The Mayor, London Assembly and the Greater London Authority comprise a new and unique form of strategic citywide government for London" (GOL 2002). The mayor is responsible for strategic management to deal with London-wide issues and coordinating action on a pan-London basis; however, the mayor does not currently have a legislated role within emergency planning in a disaster situation. The Association of London Government supports the London Boroughs and Greater London Authority, whereas the Government Office for London supports the Minister for London and a number a government departments.

London Resilience is another pan-London group housed within the CCS; it was established after the attacks on the World Trade Center (WTC). Initially, London Resilience was viewed as a temporary subcommittee tasked with assessing the state of 'resilience' of emergency management within the capital. London Resilience is now a permanent group mainly staffed by secondees from the organisations represented on the committee to ensure London is prepared for a 'catastrophic' incident (Kowalczyk 2002, p. 16).

A 'catastrophic' incident could be seen to include an exceptional incident outside the current realm of experience. A number of London organisations provided seconded staff to London Resilience to undertake an assessment of emergency management; this assessment involved a questionnaire and interviews with individual practitioners, departments, and organisations across London. The results from the assessment were compiled into a reported produced in March 2002. However, due to the security-sensitive nature of the report, it was classified 'confidential' by London Resilience, with only participating practitioners and organisations privy to the report; however, aspects of the report may be disclosed in the future (Kowalczyk 2002).

London Resilience is, however, recommending a number of general changes to the emergency management system in London. These recommendations include a new and more formal command and control center structure with a 'diamond' level of command for catastrophic incidents (Kowalczyk 2002). A new regime for strategic management in London will also be developed which will include a generic emergency plan for London and clear protocols for the roles of organisations involved in the response to a 'catastrophic' incident (ibid.). Furthermore, organisations will receive individual recommendations to improve future performance of their emergency management responsibilities (ibid.). In June 2002, a new group of secondees joined the London Resilience Team to further develop the above initiatives and begin to formulate the practical implications of implementing these changes.

The current system in London between local-level responders and central government appears disjointed. Organisations above the local level appear to formulate their own plans and arrangements with little integration with other organisations, departments, or levels involved in emergency management, as admitted by Brigadier Abbott in the Ministry of Defence Select Committee in January 2002. "What we have found since 11th September is that the plans for one particular department may well be sound but the problem is they are not synchronised with the other departments. It is the ability to synchronise not only central government and the elements of central government but also down in the nation at local level, whether it be authorities, boroughs or the police, which is important" (Ministry of Defence 2002, p. 3). The difficulty comes, not from everyday emergencies, but from an incident that does require a multiagency and multilateral response, as seen during the fuel crisis and flooding during 2000 and the foot-and-mouth crisis in 2001, which resulted in a disjointed and disorganised response. Brigadier Abbott from the CCS admitted in the Ministry of Defence (2002, p. 3) Select Committee that "…we do not learn our lessons" (p. 81).

Research carried out over a number of years since 1998 indicates that every facet of the local-level response in London, from voluntary organisations to the emergency services, are in regular liaison with each other (Norman and Coles 2002). This frequency of liaison, particularly with the voluntary organisations, is a positive one and reflects local-level involvement in volunteer organisations interests and activities. However, the picture is not quite so positive where regional and central government are concerned.

Two organisations exist at now 'regional' level, the Mayor's Office and the Government Office of London (GOL). Central government level is considered to include the Civil Contingencies Secretariat, the Department of Health, and other government departments that may have a role in responding to a disaster.

Research has indicated that less than half of the organisations questioned were in regular contact with regional level of government (ibid). This may, however, reflect that as a new entity the Mayor's Office has an unclear role in terms of emergency planning, as participants did question whether it was considered a 'regional' organisation. Also, there is presently no legislated emergency planning role for the Mayor's Office. The role of the GOL is also confusing, with no emergency managers at the regional level (the Department of Health is the only central government department with its own regional emergency managers) and what would appear to be complete disconnection (both vertically and horizontally) from any other department or organisation.

With regard to central government, the emerging picture is overwhelmingly one of confusion. Although the responsibility for emergency planning moved from the Home Office to the CCS in July 2001, research carried out by Norman (2002) also identified similar levels of confusion when emergency planning was the responsibility of the Home Office. The results are stark. CCS is the only other level of emergency planning above the local response, and communication once every three months hardly seems adequate (ibid). It is hoped they are merely finding their feet in this transition period and not setting the precedent for the future functioning of their department.

When mapping the coordination arrangements for Greater London, some difficulties were encountered. These were not with the complexity of the arrangements, but rather, to echo the Sunday Express (Hall and Palmer 2002) report, with their haphazard nature and the confusion found at all levels that surrounds them. The relationship between the organisations involved in emergency planning and the lines of communication is shown in Figure 2. The diagram represents the lines of communication and

liaison in London before and after 9/11 and provides a model of the current levels of communication between the London boroughs up to central government. The diagram clearly demonstrates the new lines of communications that have suddenly opened since 9/11. It is our contention that, before effective coordination can take place, lines of communication must be well established and operating in a two-way fashion, both vertically and horizontally. As the model shows, this is clearly not the case.

The evidence gathered in the research is clearly supported by the work of others. For instance Toulmin, Givans, and Steel (1989, p. 120) have formulated a model of 'intergovernmental distance' which suggests that there are constraints in disaster communications between the various levels of government and agencies involved in undertaking their normal duties and emergency tasks simultaneously. A number of models for coordination have been formulated by such authors as Drabek (1985, 1986, 2001), Rosenthal, Charles, and 't Hart (1989), Flin (1996), Sylves and Waugh (1996), Paton, Johnston, and Houghton (1998), and Waugh (2000). What has become evident is a move away from traditional and often highly structured systems of organisation with unity of command, task specialisation, and where communication is often top-down, towards a more 'structurally fluid' organisation that does not rely on hierarchy and formal communications systems. This type of organisation is referred to by Waugh (1990, p. 10) as a 'professional bureaucracy' and by authors such as Drabek (1985, p. 91), Sylves and Waugh (1996, p. 93), and Paton, Johnston, and Houghton (1998, p. 7) have formulated coordination models based on this concept of more 'structurally fluid' organisations.

It is apparent that the emergency planning system operating in London leaves a lot to be desired, and if, as we suspect, it is a reflection of what is happening in the rest of the U.K., then we should indeed be worried. However, it is important to note here that London is the seat of government in the U.K. and considered to be a megacity where responsibility for emergency planning rests at the local level. Should there be a major incident on the scale of 9/11, it is almost certain that, unlike New York City, control will be assumed by central government. Cabinet minutes to this effect were recorded in 1982, when the possibility of a major flood in London was discussed. Such a dichotomy creates a duality of tensions that are firmly rooted in the power base that has existed in London for over five hundred years. Coles (1998) noted immediately after the last U.K. review of emergency planning that the system in the U.K. was haphazard at best. Moreover, Parker and Handmer (1992a) pointed out in 1992 the one thing that characterises the way past governments and industry have handled disaster has been their inability to disseminate and share information following incidents "… in marked contrast to the 'right to know' law of the United States." In four years since 1998, not much has

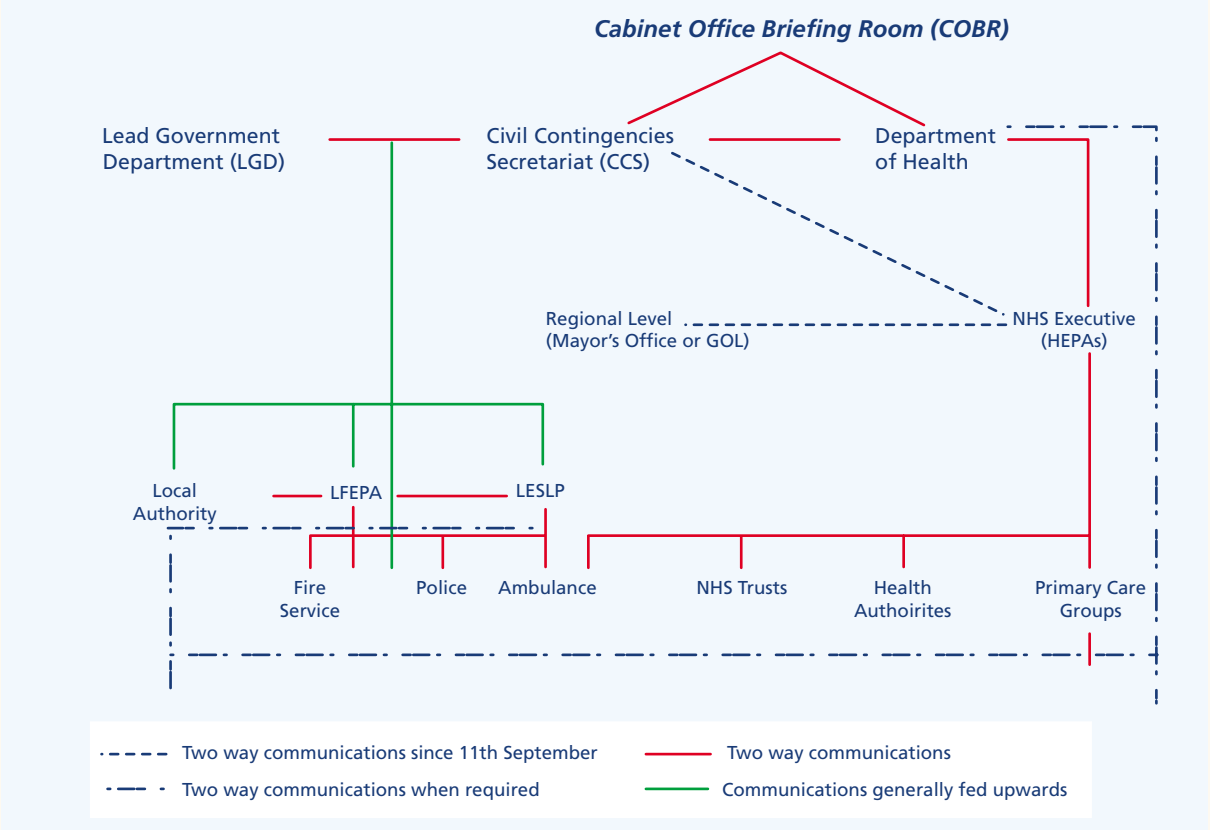

Figure 3. Lines of Communication and Liaison in London before and after 9/11 (Source: Norman and Coles 2002)

changed and following the recent review government procrastination will ensure it will not do so until at least 2003/2004 (Weatherill 2002).

It is clear from the results of the research carried out between 1998 and 2002 that the response at the local level within the London boroughs is working despite a small downturn since 1998. The emergency services, local authorities, and pan-London liaison groups communicate regularly, which has helped to build an effective and coordinated response. The regional level seems to present a confusing picture where ill-defined roles are the norm. Before September 11, no lines of communication, either vertically or horizontally, were evident in an emergency planning role. Although it is probably true to say that the Mayor's Office and GOL would like a role within emergency planning, one must question the political motivation rather than practical expertise this would afford London. Lines of communication have been established since September 2001; however, their role, responsibilities, and authority within emergency planning appear no more transparent.

Conclusion

It is evident from this paper that some of the problems that beset emergency planning in England and Wales in the 1980s and 1990s are still ongoing in 2002. The important issues of legislation, structure, communication, and coordination have still to be addressed by central government, although the most recent review is going some way to doing this, albeit slowly. However, there is to some extent still a veil of secrecy surrounding how emergency planning takes place, a situation that was noted in 1990 by Hodge (1990) and by Beishon (1990). Responsibility for this lack of transparency must be shouldered by Whitehall, which could do much more to raise awareness to the issues of civil protection.

Local authority civil protection in the U.K. is about to experience a major change. This has been evidenced by the current review and the ongoing consultation process regarding a proposed new statutory duty. This paper has critically examined the current status of local authority emergency planning and found that a comprehensive reorganisation is indeed needed if the government is to maintain its principal responsibility of the safety and protection of the public. Since July 2001, the responsibility for emergency planning at central government level rests with the CCS. It has been identified that there is considerable confusion about the role of CCS which, coupled with the lack of vertical communication between borough level and CCS that is evident in Figure 3, demonstrates a serious weakness in the vertical system. As stated earlier, it is hoped they are merely finding their feet in this transition period and not setting a precedent for the future functioning of their department.

Waugh (2000, p. 154) suggests disasters can create policy windows when the ". . . the need to act and to prepare for future events" is heightened and he further suggests that these 'windows' close very quickly as the memory of the event fades. These opportunities for emergency planning are a rare occurrence. It would appear then that the high hopes for the review have already been dashed as the policy window appears to have been closed just over six months after the attacks of September 11, 2001; for, as the Sunday Express (Hall and Palmer 2002) has stated, the "Cabinet Office has told local authorities that it will be at least two years before it can find time for legislation to go through Parliament to set up a proper nationally coordinated system." So, it appears that the future of emergency planning has again been subjected to delaying tactics and empty promises. The lack of political will on this issue may result in a complete system failure at a point in the future when London's recovery from disaster may rely on it; at that point emergency planning will become part of the disaster.

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Helping the other victims[1] of September 11: Gander uses multiple EOCs to deal with 38 diverted flights

By T. Joseph Scanlon

On September 11, 2001, after seeing three hijacked jets turned into missiles and a fourth crash in Pennsylvania, the United States ordered all U.S.-registered aircraft to land at the nearest airport *and* closed its airspace. When the decision was made, hundreds of commercial flights were over the Pacific or Atlantic en route to North America. Some had sufficient fuel to turn back. Most needed a North American airport to take them, and that airport had to be in Canada. The Canadian government, its air traffic control system, and Canadian airports were presented with a *fait accompli*. They had to accept hundreds of aircraft knowing – given what had happened – that one or more of them might be carrying terrorists or be under terrorist control.

Worried about the possibility that some of these jets might attack major Canadian cities, the federal government ordered that they land at smaller communities along Canada's East Coast.

On the East Coast, two factors affected precisely where those jets landed – the jet stream and the weather. The jet stream was far south that day, so most flights made their North American landfall at Newfoundland rather than Labrador. That took them to St. John's, Gander, or Stephenville, Newfoundland, rather than Goose Bay, Labrador. Then a light drizzle and fog hit Newfoundland's West Coast, dropping visibility to a mile at Stephenville. Aircraft heading there had to pull up and land in St. John's or Gander or continue to Halifax, Nova Scotia, or Moncton, New Brunswick. On Canada's West Coast, there was little choice: if the planes were going to land in Canada, for the most part they would have to land in Vancouver.

As a result of all this, two Canadian cities – Halifax and Vancouver – received the most diverted flights on September 11. But when Gander's population – 10,347 – is considered, its intake was proportionally far greater. Gander took in 38 flights and 6,600 passengers, a 63 per cent increase in its population, compared to a two per cent increase in Halifax, less than a third of a one per cent increase for Vancouver. Even including nearby towns – Appleton, Gambo, Glenwood, Lewisporte, and Norris Arm – the Gander area's population is 18,882. That is still a 35 per cent increase.[2]

This article is about how Gander handled that situation. As will be shown, the community activated a number of emergency operations centres (EOCs) – and each ended up managing one aspect of the response. Though the airport was the key, the result was a coordinated system that ran smoothly without any single agency taking charge. This article describes how that system came about, why it worked, and how Gander avoided problems that often occur with multiple EOCs and emergent groups.

Literature

When a commercial flight has a seriously ill or unruly passenger, it notifies its company, and its company calls an airport service company, which makes whatever preparations are necessary. When the plane lands, the problem passenger is unloaded, the fuel tanks – if necessary – topped up, and the plane is on its way. The service company takes care of and pays for local arrangements, then bills the airline. Even when there is a mechanical failure, the process is much the same. The

1. The idea of calling the diverted passengers the 'other victims' was suggested by Henry Quarantelli.
2. Of the 6,600 passengers diverted to Gander, 536 stayed in the Salvation Army and Anglican summer camps, 713 in Lewisporte, 887 in Gambo, 155 in Norris Arm, 542 in Glenwood – a total of 2,833 – and the remaining 3,767 stayed in Gander. In addition to 25 American flights, Sabena, Aer Lingus, Lufthansa, Air Italia, Malev, Air France, British Airways, and Virgin Air all had flights diverted to Gander.

service company arranges a secure area – if the stop is a short one – or transportation and hotels – if the stop is likely to be longer. If necessary, the service company alerts Customs, Immigration, and other agencies. Once again, the service company pays the bills and later bills the airline. No matter what the cause – even severe weather – diversions are not seen as local, regional, or provincial emergencies.

Because diversions are routine, there appears to be no academic literature on the subject.[3] There is some literature on sheltering, but, for the most part, it deals with cases where those being sheltered are from the community itself or from communities nearby – in short, sheltering as a result of evacuations (Scanlon 1994a). Usually, most persons end up with friends, neighbours, or relatives (Dynes and Quarantelli 1980; Smith, Macauley, and associates 1980, p. 344). When 217,000 persons were evacuated from Mississauga, Ontario, after a chemical spill, only about five per cent ended up in shelters (Scanlon with Padgham 1980). That percentage is virtually identical to Xenia, Ohio, after a devastating tornado (Dynes and Quarantelli 1980, p. 344). A University of Toronto study showed that in Mississauga one-quarter of those evacuated stayed within five kilometers [ED.: three miles], 60 per cent within 10 kilometers [six miles], and 95 per cent within 100 kilometers [62 miles] of their homes (Burton, Victor, and Whyte 1981, pp. 9–18). The situation in Gander on September 11 was very different. None of the travellers had friends, neighbours, or relatives but came from hundreds if not thousands of kilometers away.

Two studies about sheltering relate to stranded travellers. The first describes stranded travellers in a rest stop along the Pennsylvania Turnpike in 1958 during a snow emergency. The second looks at travellers stranded when flash floods destroyed 25 bridges along the Trans-Canada Highway in Northern British Columbia (B.C.) in November 1987. But there were only 800 stranded travellers in Pennsylvania, 100 in B.C., both far less than the thousands stranded on September 11 – and in both cases the stranded travellers were in the area by choice, not in a location or even a country they had not intended to visit.

On March 19 and 20, 1958, a severe snowstorm forced approximately 800 travellers to take shelter at a rest stop along the Pennsylvania Turnpike for 24 to 36 hours. The group was heterogeneous except for a rather large group of young, healthy male truck drivers. Even in this brief period, some leaders emerged – and were accepted. Leadership came initially from a physician, but two U.S. Air Force officers and a salesman joined him.

The leaders focused on two things – controlling access to outside communications and making certain everyone knew what sustenance was available and that it was fairly distributed (Disaster Research Group 1958, p. 4; in later references, this study is called the DRG Snowstorm Study). They imposed a few rules. One was a ban of smoking necessitated by the poor ventilation (ibid., p. 12). Two persons were diabetics, and a number had suffered exposure – three physicians, two nurses, and two ambulance drivers, all stranded travellers, handled these (ibid., p. 13). One traveller had died while trying to reach the restaurant in the deep snow. His body was wrapped in blankets and left outside until removed by helicopter. Two Roman Catholic Nuns consoled his spouse.

In 1978, flash floods caused by sudden warm conditions caused severe damage along the Skeena River. Though Terrace was not flooded, water streaming down from the mountains created the breaks along the Trans-Canada Highway and the rail link between Terrace and the interior of Canada. The floods also broke the gas pipeline that provides natural gas to Terrace, the industrial centre of Kitimat, and the coastal town of Prince Rupert. Travellers were stranded all along the highway. One man had a broken neck: he had driven onto a bridge unaware the other end had collapsed. Helicopters rescued him and the other stranded travellers and flew them to Terrace. It would be months before some were able to return and retrieve their cars.

In one sense, the B.C. travellers were comparable to the travellers stranded on September 11. Only a handful had medical problems, but they had lost their transportation. But there was one major difference. No one saw these persons as anything but victims. No one thought that some of them might be terrorists. At first, they were put up in hotels, but later most were moved to a college dormitory. Since most had intended to head south to Lower British Columbia by ferry (there is a ferry at Prince Rupert), they had few resources to pay for alternative transportation (Scanlon with Taylor and Jarzab 1978). There is nothing in the study to suggest any leadership patterns emerged.

Three other items have relevance to September 11 and Gander. Two are studies of EOCs – emergency operations centres – and one relates to how Gander dealt with an earlier emergency. An unpublished paper by E. L. Quarantelli notes that, while EOCs are unquestionably of value, they often run into problems, among them overcrowding and the fact that it is not clear who is managing the EOC itself (Quarantelli 1972). He also found that, if an EOC becomes overcrowded there is a tendency for key players to go off

3. A search was made at the Disaster Research Center in Delaware, the Natural Hazards Research and Applications Information Center Information in Colorado, and at the library of the Emergency Management Australia Institute in Victoria. Only one article turned up. It was written after 9/11, and it was not based on research.

and make decisions outside the EOC. Scanlon identified the same problems in an article reviewing EOCs in Canadian incidents (Scanlon 1994b). Both noted the tendency for a number of agencies to have their own operations centre and that this can lead at best to a lack of coordination, at worst to conflict. Scanlon based his findings partly from a study of a fatal air crash that occurred in Gander in 1985. In that study, Carleton University's Emergency Communications Research Unit (ECRU) noted that the response was managed by what amounted to two EOCs, one at the crash site, one in a secure area of the airport (Emergency Communications Research Unit 1985). Once again, this is in sharp contrast to Gander, where there was coordination and consensus and divisions of responsibilities among the various EOCs, not conflict.

Gander's experience

Though Gander is a small town in Central Newfoundland, it is also an airport town – one of the main stopping points for military flights crossing the North Atlantic during the Second World War. It is still an important airport for private jets and visitors to its international transit lounge include persons such as George Bush, Sr., Oprah Winfrey, Tom Cruise, Greg Norman, and Tiger Woods. More significant, it is the first major airport on its side of the North Atlantic and, therefore, receives aircraft that get into trouble on the Great Circle Route. It is also the home of the Area Control Center for air traffic over the Western North Atlantic, monitoring flight separation as aircraft leave North America for Europe each evening and as flights arrive from Europe in the morning hours.

Gander thus sees itself as the aviation crossroads of North America, and its streets are named after aviation pioneers including John Alcock and Lieutenant Arthur Whitten Brown – who made the first nonstop aerial crossing of the Atlantic in 1919. Their feat is overshadowed by attention given to a man who flew the Atlantic eight years later, when it was not so unusual, Charles Lindbergh. There is a Lindbergh Street in Gander and one named after Amelia Earhart. Gander no longer handles regularly scheduled flights of major commercial airlines. It is accustomed to diversions, though not on the scale experienced on September 11.

Gander has had its share of local emergencies:

> On September 18, 1946, a Sabena Belgian aircraft crashed 22 miles southwest of Gander with 44 people on board. It was noon the next day before the wreckage was sighted and it was confirmed that there were 18 survivors. Because of the inaccessibility of the terrain, they did not make it to hospital for two more days, though a physician did treat them at the crash site.
>
> On September 5, 1967, a Czechoslovakian airline crashed just past the end of the existing runway. Thirty-four of the 69 passengers survived, though many had to be transported to burn units in Halifax and Montreal.
>
> On December 12, 1985, a U.S. charter aircraft crashed almost on takeoff. That took the lives of eight crew and 248 soldiers from the 101st Airborne.[4]

There is a monument to those soldiers at the crash site. There is also a show of appreciation from what was then Czechoslovakia – the Czech pavilion from Expo '67 was taken down and now forms part of the Gander Arts and Culture Centre.

More important, there is also a wealth of experience in Gander because many of those involved in the earlier crashes, especially the one in 1985, are still in town. The town, in other words, because of its history and its experience, has an airport and air crash subculture.[5] The importance of that history showed as soon as people in Gander heard about New York on September 11 – and became glued to CNN. Unlike others who watched in horror, many in Gander realized that their town was likely to be directly affected. Long before the Americans closed their air space, many in Gander began to prepare for the impact of such a shutdown – diversions to Gander. The EOCs at Canadian Forces Base (CFB) Gander, at the James Paton Hospital, at Gander airport, and at Gander town hall were all partially or completely activated prior to the closure of U.S. air space; and the Royal Canadian Mounted Police (RCMP) had already been asked to assist and had responded.

However, the situation that faced those responders on September 11 bore little resemblance to any of the situations described in the literature. The stranded travellers were strangers to Gander and to Newfoundland – many had to be shown a map so they knew where they were – and nothing had happened to them or their aircraft. They had been forced to seek refuge because of something that happened elsewhere and because a foreign government had shut down – without consultation – normal operations. Most important, instead of handling one or two diversions – something it was accustomed to – Gander airport found itself handling dozens of diverted flights and scores of diverted passengers. To do that, it needed assistance from the town, the hospital, the provincial government,

4. ECRU field researchers visited Gander on that occasion and produced a major study of the response to that crash (Emergency Communications Research Unit 1985). The study was also published as an appendix to the crash report by the Canadian Aviation Safety Board.
5. Anderson (1965) identified the concept of a disaster subculture in a study of a 1964 flood in Ohio. Perhaps the clearest description of a subculture can be found in the paper by Wenger and Weller (1973); see also Scanlon (1992a).

the private sector, social services, and voluntary agencies, as well as CFB Gander and the RCMP.

The first response came at CFB Gander, put on alert because of the terrorist threat. It opened its command post and increased perimeter security, though those actions were not connected with the possibility of flights being diverted to Gander. Next came the James Paton hospital: as a result of a call from Emergency Health Services in St. John's, it got ready to set up emergency hospitals.[6] Third to activate was the airport. Three staff members held a short meeting to discuss the possibility that Gander might receive extra flights if U.S. air space were to be closed – a decision not yet made. They decided that the tower would control part of the airport and direct incoming aircraft to appropriate parking spots and that one vehicle and one staff member of airport service staff would be assigned to act as the radio link between the tower and the ground staff. When there were concerns about widespread computer failures at the turn of the century, Gander had prepared to receive scores of aircraft and hold them until computers were again up and running. They had even prepared a parking plan for such an eventuality. Although no one could find that plan, the man who drew it up was one of the three at the meeting, and he recalled it well enough to use it on September 11. Right after that meeting, the airport activated its ECC and notified the Royal Canadian Mounted Police (RCMP) and the base. Both sent liaison officers.

After a call from the fire chief – someone at the airport called him – the town manager assembled some of those who staff its EOC. Soon the town, the base, the hospital and the airport all had their command posts operating, and they and other agencies – such as the provincial social services agency Human Resources and Employment (HR&E) – began to prepare for a mass invasion. All those EOCs were located and staffed according to well-established plans. The airport Emergency Control Center (ECC), for example, was in a secure area. Its members included not just airport staff but, as planned, representatives from the RCMP and CFB Gander. The town's EOC was in an upstairs committee room at town hall. Its members included not just town staff but also representatives from the James Paton Hospital, the Red Cross, NewTel Communications (telephone), and HR&E. The hospital's EOC was in an area away from normal patient traffic, the one at CFB in a secure area at the base, and the one at NewTel Communications in a secure area at its Gander offices.

Eventually, these various operations centres would each take on specific responsibilities. With RCMP and military assistance, the airport ECC dealt with the unloading of the flights and – along with Customs, Immigration, and other agencies – screened the passengers and cleared them for entry to Canada. The Red Cross assisted by Salvation Army volunteers registered the arrivals. Working with school bus drivers, the fire department looked after transportation. HR&E identified shelters, and the town EOC decided who would go where. The hospital provided health services to all the shelters, and the Salvation Army ran a central food and supply system. Their owners – church or service club members or school staff – ran the shelters. The telephone company provided extra telephones and other services as required.

Landing the aircraft

The first hijacked aircraft crashed into the north tower of the World Trade Center at 10:15 a.m. Gander time. (Gander is an hour and a half ahead of New York and half an hour ahead of Canada's Maritime Provinces.[7]) The second plane hit 18 minutes later at 10:33 a.m. Gander time. The United States Federal Aviation Administration (FAA) shut down U.S. airspace 37 minutes after that second crash – at 11:10 a.m. Gander time. Since the Area Control Center in Gander controls all traffic along the Western North Atlantic, it immediately began to communicate with U.S. aircraft, ordering the captains to land. It also contacted St. John's, Gander, Stephenville, and Goose Bay to see how many aircraft they could handle. Gander said it would handle as many as 50 flights. In fact it handled 38 and did this so efficiently that all landed on runway 22–04 coming straight in, turning off at exit Bravo, and heading to a parking spot.

Once the planes landed and were parked – and this meant using runway 13–31 and other areas as parking spots (13–31 was closed) – the pilots were told that everyone would have to remain on board. For some, that order would last well into the next day. The alternative would have been to allow 6,600 passengers and crew to flood into the terminal. Since it seemed more than possible there were terrorists on some flights, that was impractical. (The airport was also receiving 'delay' orders from the federal government: police and intelligence agencies were frantically reviewing passenger lists to see if there were suspects on any of the diverted aircraft.) The tension was heightened when the tower was unable to establish contact with five aircraft. Ground crews were instructed to plug his headset into

6. There are three 200-bed, fully-equipped emergency hospitals in Newfoundland, one in each part of the province. All three were used on September 11.
7. The unusual half-hour time difference means that all network radio and television programs are announced as, for example, '10 o'clock, 10:30 in Newfoundland.' It has led to the joke: 'The world will end tonight at midnight, 12:30 in Newfoundland.' A look at a globe explains the time difference. Newfoundland stretches well out from the Canadian mainland. From St. John's harbor – St. John's is the capital and is on the East Coast – the nearest point of land is Ireland.

each aircraft and try to reach the captains. That eased the tension: all were on the wrong frequency.

It appears that many if not most pilots did not tell their passengers exactly why they were being diverted until after they landed. One even said there had been a computer malfunction in the control system in New York City. When the first passenger off that aircraft saw CNN, he asked someone what movie it was. Others were more forthcoming:

> Our captain was as upfront as he could be with us from the beginning. After changing course, descending altitude and lowering the landing gear (to expend fuel) he came over the intercom and said: "I have two things to tell you folks, then I have to get back to work. First of all, we have a very healthy airplane. (That was a relief.) And, secondly, there has been an incident in the United States and all U.S. airspace is closed. I have been instructed to land in Gander, Newfoundland. Once we are settled on the ground, I will let you know more." Once we landed and taxied to our position, he came back on the system and told us about the four planes crashing. Within about 30 minutes of landing (I think) he got the Canadian Broadcasting Network, and we listened to that through the night.[8]

A passenger on another plane – flying from Rome to Philadelphia – gave a similar account:

> ... we were told that the Philadelphia airport had been closed and that we would be diverted to Newfoundland, Canada. Some of us believed it was due to bad weather; however, the Captain never really expounded on the reason. I had a window seat and as we approached the runway, I became alarmed because I could see no runway, only water and trees. I said to my husband, "Where are we going to land? There is no runway!" The descent was quick and quite short. Obviously it was because the runway was filled with 37 other planes! Once we landed, the captain came on the loudspeaker and told us the United States had been struck by terrorists and the Twin Tower Buildings in New York were totally destroyed and that there had been two other plane crashes, one at the Pentagon, and one in Pennsylvania. (This plane was headed to Pennsylvania.)

On the ground

On the ground, most of the passengers settled into their seats and tried to make themselves as comfortable as possible, but there were some concerns – diabetic problems and problems with other medication, smoker problems (Nicorettes were supplied), water problems, stress problems, and – on one aircraft – drinking problems. (Two passengers were taken to the police lockup to sober up.) At first, an ambulance responded to each medical call, but eventually the EOC at the James Paton hospital decided to send a team to the airport. Airport staff emptied toilets and provided water and eventually snacks. Every time a captain made a request, steps had to be moved to that aircraft.

In most cases, medication could be identified and supplied, though sometimes prescriptions written in Europe had to be puzzled out. When one passenger's description of his medication could not be understood, airport staff opened the cargo hold and located his baggage. Once the prescription was located, the medication was identified. All medication was cleared by a physician and delivered personally to the passenger. Servicing the planes had to be done by persons with clearance to work airside or persons accompanied by those with passes. That was fine for the volunteer firefighters – they back up the airport fire department – but not for the Royal Canadian Mounted Police (RCMP). There is no RCMP airport detachment, so RCMP had to be accompanied airside. So did the bus drivers who were brought in to move passengers from the parked aircraft to the terminal. The buses also had to be searched and cleared.

While the passengers were waiting, the town was making preparations. Gander has no community social services, so HR&E ran the hunt for shelters. It had previously identified possible shelters for up to 1,500 evacuees (presumably from nearby towns). Now it had to find places for four times that number. Its staff began contacting churches and schools and other facilities not only in Gander but also in nearby towns. It was flooded by calls from scores of local residents willing to assist.

There was, however, a major problem. Members of the Newfoundland Association of Public Employees (NAPE) were on strike. Not only were schools not being fully serviced, but also there were pickets at all schools. The only local transportation – school buses – was not available. The drivers were members of NAPE. Even if a way could be found to transport passengers to schools, they would have to cross picket lines. (Looking after them once they reached the schools was less of a problem: teachers were not on strike.) After some informal contacts – some drivers said they wanted to help – the union decided that the situation was an emergency. It announced that the strike would continue but that strikers would picket only the school board offices. More important, the striking drivers would assist. The drivers would not end their strike but would work for no pay.

8. This quote from a passenger, like all other quotes from passengers, was obtained on the understanding that no individual would be identified. I would, however, like to thank the scores of passengers, including some personal friends, who were kind enough to answer my questions.

Although provincial HR&E was identifying what shelters were available, the town determined where to send people. It decided that it would start with locations in Gander then, if necessary, use smaller communities. It also decided that it would try to keep the passengers from each flight together. That would make it easier when they departed. At the request of the airport ECC, the town told hotels to give priority to crew. When some hotels queried this decision – they had already accepted bookings – the town declared, after consulting the airport again, a local state of local emergency and ordered the hotels in writing to cooperate.[9] (Passengers from two flights were sent to a hotel, though many slept on cots.)

The town asked the local Red Cross to take over Registration and Inquiry (R&I). By then, a local Salvation Army officer had realized what was happening, met the mayor, and had been invited to join the town EOC. When the Red Cross needed volunteers to assist with R&I, he passed that request to Army regional headquarters. Soon there were scores of Army volunteers. The Red Cross had registration forms copied and held a short training course to show volunteers how to fill them out. They had considered doing R&I in town, then decided to do it at the airport. With the help of airport staff, tables were set up in the international lounge, where transit passengers wait while a flight is being serviced. No passenger would leave the secure area until he or she was registered and checked against a passport. (The passport check ensured that the registration records would match the Customs forms.) Even while the Red Cross was arranging R&I, the Salvation Army contacted local suppliers and the airport caterers and arranged for hot food to be served as passengers came through the lounge. It also arranged for toiletries.

The town took two other steps. It asked the fire chief to move his department's mobile command van to the airport to manage transportation. (The chief became known humorously as the 'Minister of Transportation.') It asked the fire inspector – the town's emergency planner – to be town liaison to the airport ECC. The town felt it was crucial to have accurate and up-to-date information about which flights were being unloaded and how many passengers were on those flights. By then, the hospital had also established a command center at the airport to take care of the frequent requests for medication or medical assistance. While all this was happening, the passengers – on orders from Transport Canada – were still sitting in their aircraft. Concerned about the possibility that some flights were carrying terrorists, the federal government delayed while it considered how the flights should be handled.

Unloading the passengers

When the airport was ready to start unloading passengers, it began with the flights parked closest to the airport. As passengers came off their planes, they walked through a cordon of soldiers.[10] Once inside, they walked through a footbath set up by the Canadian Food Inspection Agency because of foot-and-mouth disease. Then at tables staffed by RCMP and military personnel, all hand baggage was searched. Then they reached Customs where they were screened and, if necessary, referred to Immigration or Health.

Once they passed this screening – still in the secure area – they were greeted by the tables of hot food and the volunteers who registered them, using pencil and paper. The registration was done by aircraft and by family, and the files were compiled in alphabetical order by flight. The forms from each flight were placed in a box. (The boxes were 'Tim-Bits' boxes supplied by Canada's most popular doughnut shop, Tim Horton's, started by Horton, a former Toronto Maple Leaf hockey player.) Only after the entire flight was checked in were the passengers taken to a school bus shuttle.

Once the bus' destination was known, it was noted on the box for that flight. At that point as well, the fire chief called the assigned shelter to say their passengers were en route. There was one hitch: there were pay phones in the lounge. Passengers started to line up to make calls, delaying the registration process. To stop this, a telephone company employee got the airport to prepare an 'Out of Order' sign and posted in on the phones. That was easier than disconnecting. Because officials were concerned about emotional stress, the airport arranged for clerics to be available in the registration area. They were cautioned only to respond if passengers approached them. Since uniformed Salvation Army personnel were doing registering, upset passengers usually talked to them.

To give the various schools and churches more time to prepare – they were all collecting blankets, mattresses, towels, and other supplies – the town sent the first flight to a Salvation Army summer camp, the second to an Anglican camp. It was just at the end of the camping season, so the camps were still staffed. Passengers were then sent to schools, churches, and service clubs in Gander, then to Appleton, Glenwood, Norris Arm,

9. This decision caused some confusion. When Air Canada tried to book rooms for a diverted flight, it was told that no rooms were available. It continued to Halifax and informed Transport Canada Gander airport was full. Transport Canada queried the Area Control Center, which queried Gander airport, which assured the ACC that it could still handle more aircraft.
10. CFB Gander provided personnel not only for security escorts but also to assist with baggage searches and baggage handling. The base had also provided extensive assistance after the 1985 crash. In 2001, CFB Gander also accommodated U.S. Air Force personnel and passengers from several other flights. Defense cutbacks had left the base with unused accommodations.

Lewisporte, and Gambo.[11] The largest facilities were used for the biggest flights. In some cases passengers signed in again when they reached a shelter, and in all cases they were asked to sign out if they moved. That meant finding a passenger simply involved knowing the name and flight number and contacting the shelter. (The hospital made certain some medically trained person was at every shelter and that pharmacists were available to provide a 24-hour service.)

Although the passengers were allowed to disembark with their hand luggage, it was possible that some had deliberately left objects on the aircraft. RCMP started searching some aircraft, then realized they would not know what to look for. After that, crews were asked to check their own planes.

In the shelters

Once in shelters, passengers had to be accommodated and fed – many churches and private citizens did the cooking – but supplies were needed, and the Salvation Army organised a food centre. At first this was in a citadel, but it was moved to the Community Center. The ice was in, and the rink became what residents called the world's largest walk-in cooler. (The town plan called for the center to be the morgue.) At first, passengers slept on blankets, in sleeping bags, or on air mattresses supplied by another leading Canadian store, Canadian Tire. Then military flights brought in emergency beds and blankets. These were ordered through Emergency Health Services in the provincial capital, St. John's, and then flown in on Hercules aircraft from CFB Trenton. These flights also brought in some extra personnel for Customs and Immigration.

All the shelters had television sets (usually several of them), and these were on continuously. At first, the passengers were glued to the sets, watching the replays of what had happened while they had been flying:

> There were TVs all over the school in which we occupied… We watched with horror when we first were there, but I could not seem to watch the events very much after that, it was too surreal. The TVs were on constantly and we had access to any staff member we wished to speak with. When the TV was on in the cafeteria and the 'Star Spangled Banner' played, we all stood, cried, and felt quite emotional, along with American pride. Even though we were in Canada, you felt a sense of patriotism with *everyone.*

All shelters were given extra phones, and many were able to arrange for email. (One group ran its office in New York by email.) There was also a phone bank set up in downtown Gander outside NewTel Communications. It included email, and there were arrangements for persons to pay after they had made a call. Because the cellphone towers were being overloaded, NewTel brought in an additional cellphone tower and installed it in 14 hours.[12] There were dedicated lines – already in place – linking the key EOCs, and there were radio links. To make certain the outlying towns were in touch, the town arranged for two key contact persons – the Salvation Army captain in Lewisporte and the deputy fire chief in Gambo. Information was relayed through them in both directions.

Stores like the Co-op and Wal-Mart stayed open 24 hours, but some supplies ran out – there were no flights coming in. In addition, the airport did two crew briefings – an RAF and a U.S.Air Force pilot discussed the flight situation – and crews were taken to meet their passengers, visits that were appreciated. The most asked question, of course, was 'When do we leave?' to which the answer was that was beyond the airport's control.

One passenger who had praised the quiet, calm way her captain dealt with the initial announcements reported:

> This is the same man who would come and see us daily in Gambo, with many from the crew, to keep us updated. They were very concerned for us and always acted in a caring and professional manner.

While leadership emerged among some groups of passengers, it did not in others. Passengers apparently felt that their hosts were doing all that could be done. When leaders emerged, they operated much as the stranded travellers did at the time of the snowstorm in Pennsylvania – seeking consensus, controlling facilities with limited access, asking for needed information:

> I'm not sure how our leaders finished up as leaders, it was, it seemed, a perfectly natural way for things to develop. A Dutch chap called Monty (he got the nickname 'The General') became our spokesman… Others, myself… included, just got drafted into doing the odds and sods of details of daily life, organizing showers, trips, monitoring the phone so no one spent too long on it and everyone got to phone home. Posting emails and phone messages on the notice board, getting laundry done. Ferrying people to houses for showers, meals, etc. We had a singer from Somerset in England who entertained us every night and was very proud of the fact that he didn't sing any song more than once, he sang over 100 songs in four nights… Whatever needed doing, someone was found to do it.
>
> I don't recall any leadership emerging from the community of friends that we established. There didn't seem to be a need to be a leader. We were taken care of from a physical standpoint; emotionally

11. Although most passengers stayed with their flight, unescorted children were taken to a home for battered women and looked after separately. Only one flight had to be moved: the health inspector ruled that there were too many persons in one of the Gander schools.
12. The tower had been intended for Newfoundland's West Coast. It was simply temporarily diverted.

> we were all crippled. We had freedom of movement, speech, etc. There was nothing we really needed, however just to get home. We were frightened and upset as much as any other American was during that time. As I stated before, we truly were in shock and having someone feed you and take care of you was all we expected at that time.

The town managed to keep both passengers and those making inquiries informed through the town Web site. The airport at first objected when the town posted the time at which flights were departing, then agreed it could list flights once they left. The Red Cross advertised a phone number that persons could call and identify someone's name and flight. Then, using its card file system – the convenient Tim-Bits boxes – it searched the alphabetical list and told the caller where the person was staying. One woman bypassed that system and called the town EOC. Her son had called her from a pub and had been drinking. The person who answered – the Mayor of Gambo – told her he would take care of it. He recognized the pub from the description, went there, found the young man, and told him, "Your mother's worried about you."

On the whole, however, passengers accepted their fate and expressed their appreciation for those who assisted them:

> Over the next few days the people of Gambo were absolutely magnificent. They did all and everything for us. Fed us. Clothed us. Entertained us. Took us on trips. Allowed us into their homes. They performed way above and beyond the call of duty. David's mother even prepared us 'hot' scones (Americans call them biscuits) and home made strawberry jam and a real pot of tea, when we went to their home for a shower. When we arrived, many people didn't have basic toiletries, razors, soap, toothbrushes, etc. All these, and then some, appeared as if by magic.

One thing that made things easier was the weather. It can be cold and windy and wet in Newfoundland. Power wires are built to a stronger standard because of the high winds. When the flights arrived in mid-September, the weather was superb. Environment Canada records show no precipitation during the five days the passengers were stranded. Only on Sunday as the last planes left did the wind pick up to more than a strong breeze. The daytime temperature was a pleasant 17 to a hot 26 degrees Celsius (that's 62 to 84 Fahrenheit), the night time lows never less than 10 degrees Celsius. (That's at least 50 degrees Fahrenheit.) Airport staff was able to walk around at night in T-shirts. The warm temperatures meant that the stranded passengers – whose luggage was still on their planes – were not uncomfortable without outdoor clothing.

Many passengers simply slept on makeshift beds and waited for their travels to resume, but a few tried to find a way out of Gander. Some tried to book taxis home – the drivers did agree to take them to a ferry for $450 – and several bought a car. However, when a travel agent in Lewisporte started booking some flights, the agent was told to stop, and the crew of the airline concerned brought in to explain to passengers why that could not be done. VIPs – and there were some – kept a low profile. Officials at the airport were surprised to learn later who had been among their guests.

The flights carried 20 dogs and cats and two pigmy chimpanzees en route from Belgium to a zoo in Columbus, Ohio. These were looked after – the dogs and cats got a daily stroll – by staff from Canadian Food Inspection Agency and the Society for Prevention of Cruelty to Animals (SPCA). The chimp's keeper was allowed to sleep on a couch in the hangar near his charges. The animals survived, but the female chimp lost her fetus, perhaps because of the stress.

Special attention

Inevitably some passengers needed or got special attention. Twenty-nine of the 6,600 passengers had to be taken to the hospital at some time during their stay, and about half were admitted. However, all were able to leave the hospital and board their flight when it left Gander. One went directly from the hospital to the aircraft. There was also one serious health concern. One passenger developed salmonella poisoning. Until it was clear where he had gotten it, all those with him had to be quarantined. They were taken from the Gander Academy to a Salvation Army Camp. Now, instead of being able to wander around town, they were isolated in the bush. They all complained until it was established that the passenger had been ill when he boarded his flight – the food was all right – and that no one else had become ill.

A number of couples were on their honeymoons. When Salvation Army personnel found one couple seeking privacy in a closet, it arranged for them to move to a private home. However, when an Italian honeymoon couple was offered private accommodation, they declined. They preferred to stay with the other passengers. Although some passengers accepted billets in private homes immediately after arrival, once a few hours had passed such offers were refused. Persons preferred to remain with their fellow passengers. When the couple that offered to take the Italian couple showed up to get them, they were refused again, but they ended up with another honeymoon couple.

When a teacher who was helping look after passengers at one school noticed three passengers were not eating, she realized – the man's dress made that easy – that they were Orthodox Jews. She called the airport and arranged for delivery of kosher food. Later she and her husband

invited the Rabbi to stay at their home and arranged for the necessary utensils. When someone called the Rabbi, the teacher's husband told the caller that he was eating. When the caller said that could not be possible, the husband said, "Oh, we keep a kosher kitchen – and we're Catholics."

When a Hungarian woman could not leave with her flight because her daughter had an infected ear, Gander firefighters arranged a hotel room for her (the rooms were now available) and paid for the tickets when the infection cleared up. (They had gotten to know the woman because the Malev flight from Budapest had been billeted at the fire hall.) When firefighters learned a couple had a missing son, a firefighter who had been at Ground Zero, they sent a young firefighter to talk to them.

Although most passengers declined the offer of private accommodation, many did accept the offer to have laundry done or to visit someone's home for a shower. One man was astonished when a Salvation Army officer told him to go ahead – the door was open. He could not believe there were communities where everyone was so trusting they could leave their homes unlocked and welcome strangers into their homes while they were busy elsewhere. The most common complaint was that it was difficult to go for a walk: someone would always stop and offer a lift. There was some local entertainment. Some passengers went on a boat trip. Most experimented with Newfoundland food and drink, and some tried the local custom of kissing a codfish:

> A few of us actually became honoree Newfies by kissing the codfish, drinking the rum, and saying the words. Personally, I preferred drinking the rum to kissing the fish.

Departure

Getting the passengers out of Gander proved more complicated than handling their arrival. For one thing, the aircraft could only be moved under their own power. That presented three problems. First, the U.S. initially opened its air space only to U.S.-registered aircraft. That meant that these flights were free to leave but could get out only if non-U.S. planes were out of their way.[13] Second, some planes refused to start: it was unusual for so many aircraft to be parked so long with their motors off. Third, on one occasion, the pilot was not available. When the airport called him to inform him he could get ready to leave, he confessed that he had not expected to leave so quickly. He had been drinking. His plane was finally moved when another pilot from the same airline agreed to assist. There was also a lot of work involved cleaning out the planes: international regulations require all food be removed and incinerated.

After varying instructions, the airport was told that the planes could leave without checking the luggage, provided that all passengers were on board. If even one passenger was missing, all baggage had to be taken off and identified. (In some aircraft, baggage for a single passenger could be spotted, but in other cases every bag had to be taken out of the hold and each bag inspected.) To avoid this, local authorities launched a frantic last minute hunt sometimes for one or two passengers. One passenger had to be brought back from a moose hunt. In another case, the RCMP went pub to pub looking for a missing passenger. They finally found him at a house party. He was startled when police told him he was wanted – until they explained he was the last passenger on his flight. One pilot asked if he could take off if all the baggage was unloaded and left in Newfoundland. He was told yes, and after he checked with his company that was done. A few days later, his airline sent a plane to pick up the baggage.

Under new security rules, airport personnel had to search every outgoing passenger and crew member. That process was slow because of limited staff resources. It was slowed as well by the fact that new security directives meant that some items – such as nail scissors – were no longer allowed. Items seized were put in a cardboard box that was then sealed and put into the cargo hold. Gander has only eight women who are licensed to screen baggage – but the security directives insisted that they alone do that. Eventually the directive was changed so that RCMP could assist. The pressure was relieved when Air Canada flew in additional licensed screeners from Toronto. (That was when domestic flights started moving again.) During the process, the passengers also had something new to look at – an RCMP officer in full dress Red Serge. One of the officers had received permission to wear dress uniform after incoming passengers had asked him where the 'Mounties' were. He replied that he was a Mountie, but the person insisted, "I mean a Red Mountie." He felt the presence of his red uniform would make persons feel more comfortable, and that appeared to be true. The same positive reaction was noticed in Stephenville when persons wearing Red Cross vests greeted the passengers.

The biggest problems – and the few major disputes – arose when passengers discovered that their flight was returning to Europe. That satisfied a few Europeans who were anxious to return home. It did not satisfy Americans on European aircraft. They wanted to get home. On one flight, the passengers learned that their plane was going to Milan rather than Newark only after boarding. Three revolted. It took a lengthy discussion including an intervention by a psychologist before all agreed to stay on board. The flight returned to Italy, then turned around and flew back to the U.S. The pilot

13. The pilots of all aircraft were given a new, confidential code number that would identify them when they entered U.S. airspace.

radioed the Area Control Center to say hello when he passed over with the same passengers.

There was a more serious revolt when some passengers on an Air France flight decided to charter a bus to Port Aux Basques, to pick up a ferry to North Sydney, Nova Scotia. Airport authorities told them that they were free to travel on their own but without their luggage. (Any luggage removed from the aircraft would have to be screened and searched, and the facilities and staff to do this were limited.) The debate became quite heated, partly because an airport official tried to point out that they would probably get to the U.S. faster by flying back to Europe and then back to the U.S. than by traveling by bus and ferry. (His statement was accurate but did not seem that way to the exasperated travellers.) The passengers cooled off later when the senior officer from CFB Gander reminded them about New York City and pointed out that the airport authorities had to follow security directives. He promised he would have their baggage searched by military personnel and made available. Nevertheless, the flight was delayed while all baggage was identified.

Security problems

The requirement that baggage be removed when a passenger was not on the aircraft and the new security rules were only one of the security issues that arose in Gander. There were also problems with different agencies receiving new directives at different times. On occasion, officials would call Gander about a change in security rules only to be told a newer one had replaced the directive they were quoting. The problem seemed to be that the directives came originally from Transport Canada, which sent them to its own personnel, then to other agencies.

At one point, airport authorities agreed to let a passenger change planes. (The passenger had been flying to the U.S. but had received bad news and now wanted to go back to England.) The pilot of a London-bound aircraft agreed to take the passenger, and airline staff wrote out a new ticket by hand. The passenger was cleared by Canadian authorities, boarded, and headed home. Her plane was scarcely off the ground when a new security directive insisted no passengers change flights. Another passenger – for whom similar arrangements had been made – had to be taken off her aircraft by the RCMP.

RCMP, with help from the Canadian Security Intelligence Service (CSIS), checked out a number of passengers. They were able to find them easily because of the efficient registration system. There were a few alarums:

- Police received a number of tips from crew and passengers about persons who, to them, seemed suspicious. All were meticulously checked out. None proved valid.
- Some passengers at a shelter passed the word that some passengers appeared suspicious and were talking among themselves in a suspicious way in an Arabic language. It turned out those passengers were from the Middle East and were worried that the other passengers might attack them because of the terrorist attacks. They were discussing what they could do. The situation was defused when their concerns were explained.
- The Area Control Center reported that four men had tried to gain entry. It turned out the men were pilots who had often talked to the ACC as they flew overheard but had never actually seen it. They had decided to call in and say hello. They left immediately when a security person informed them they could not enter.

The biggest flap, however, occurred when passengers at the Roman Catholic parish hall in Gambo wrote thank you notes on a bristle board. One said, "Yahoo, Osama Bin Laden." The pilot demanded the RCMP do something. A constable brought the board to the RCMP offices, and police went to the airport to ask who had written that message. A man explained that he had been so well treated in Gambo that he wanted to acknowledge the man who had made the visit possible – Osama Bin Laden! He had not intended to upset anyone. When the pilot refused to allow the man on board, he offered to fly handcuffed. Satisfied no harm was intended, the RCMP persuaded the pilot to allow the man on board. If he had not boarded, all the passengers would have had to identify their luggage.

The RCMP did not have to worry about crime. There was not a single incident of robbery, theft, or any other crime during the entire time the diverted passengers were in Gander. No visitor or local resident had to be arrested or charged with anything. The nearest incident involved a brawl at a bar. The RCMP found one of those involved was one of the two passengers removed from one of the diverted aircraft. However, he not been the cause of the brawl but an effective peacemaker. But he was inebriated, and his flight was almost ready to leave. The RCMP sobered him up by pouring coffee into him, found him some sunglasses, told him to stay away from alcohol, and got him on board.

These various delays – one passenger missing, some passengers refusing to fly, a security problem – meant that it was difficult to predict how long it would take a flight to depart and, thus, when the next set of passengers could leave for the airport. That created headaches for the fire chief – who was managing transportation – and for the town – which was trying to advise shelters when passengers could start on their way. But the major problems were at the shelters. If a flight was delayed they sometimes had to schedule an extra meal or even provide an additional night's

accommodation. They also had to notify the Salvation Army that more supplies might be required. Since the departures continued around the clock, passengers were not sure whether it was worth trying to get some sleep or whether they should wait for the call to board the buses. All of this meant that once again there had to be very good coordination between the airport EOC – which was deciding the order of departure – the town – which was notifying the various shelters when their flight was to leave – and the fire chief, who was making sure the buses were at a shelter when passengers were scheduled to depart. Each time there was an unexpected delay, the whole system had to pause until the problem was resolved.

Aftermath

Just before the last diverted flight left Gander at 6:20 p.m. on Sunday – more than five days after the first one arrived – airport staff posed with its crew to celebrate the end of the road. However, there was still a lot to do.

All the schools had to be cleaned and made ready for classes the following day. (Classes were suspended while the passengers were in Gander.) This proved no problem in outlying communities that were cleaned on the weekend, but the work ground to a halt in Gander Monday morning (the day after the last flight left) when NAPE put the picket lines back up. Workers from a number of unionized plants refused to cross the picket lines. The Salvation Army conducted some delicate negotiations with the union before volunteers were allowed across the picket lines so the schools could be cleaned.

The litters brought in by CF Hercules aircraft also needed cleaning and no one wanted to pay for that. They were finally returned as they were. There was linen, much of it donated, to wash – the hospital did that free of charge. There was food left over: it was given to food banks. There were many donated items not reclaimed. There was overtime to be calculated – except for the school bus drivers. They worked without pay, then went back on the picket lines. The Salvation Army used its own funds to pay some local merchants who had provided supplies for the shelters. This was done because some small merchants were running into a serious cash flow problem and would have been in financial straits in they had not been paid immediately. The Army was reimbursed when it submitted its accounts to the municipality, which sent them to the province.

The postincident debriefings left most officials satisfied, though there were a few concerns. One was that some persons had worked too many hours. This was, perhaps, inevitable in a small town with limited resources, but it did lead to short tempers and to some passenger irritation. Another concern was that senior fire personnel had taken on major jobs – as liaison between the town and the airport, in charge of transportation, and assisting with airport security. (Because the firefighters as airport backup had clearances, they could escort others in the secure area of the airport.) There would have been serious personnel problems if the firefighters had had another emergency. In previous studies, this has been referred to as the 'two hat' problem, the situation, not uncommon in smaller communities, when one person has several functions – and all are important in an emergency.[14] There were a few information breakdowns. For example, the hospital and the town had not been aware that the military flights would simply dump the pallets containing litters on the tarmac and leave them there. They assumed that local military personnel would deliver them to the shelters.

Why system worked

The literature on emergency response shows that it is not uncommon for existing emergency agencies to establish their own command posts and for conflict to arise among those posts. It also shows that, when emergent groups take over specific functions, they tend to come into conflict with the existing agencies, though – as Scanlon's study of the Canadian ice storm shows – this does not need to happen if the existing organisations blend in the newcomers and their function (Scanlon 1999). How did it happen that there was so little conflict in Newfoundland and that the various operations centres worked so well together? There appear to be a number of reasons.

The first is that the events of September 11 gripped Canadians just as they gripped Americans. As was the case in the wake of the Kennedy assassination, news of the terrorist attacks spread at incredibly high speed – and the reaction was shock, horror, and sympathy. The residents of Gander – as in other towns – were anxious to do anything possible to assist the diverted passengers, the 'other victims' of September 11. The residents saw the diverted passengers as homeless victims, persons not responsible for their misfortune. They wanted to help.

The second is that Gander is an airport town. Its economy is largely dependent on the prosperity of the airport and on the existence of the Area Control Center. Most persons in town are aware of the economic situation at the airport. They were also aware that the closing of U.S. airspace would impact Gander. They

14. In Petawawa, ambulance drivers were also auxiliary police, and professional firefighters from CFB Petawawa were also town volunteers. When ambulance, police, and both fire departments were needed for a train derailment and toxic spill, the so-called 'two hat' problem was identified (Scanlon et al. 1985).

were already preparing their response before U.S. airspace was closed.

Third, Gander has significant emergency experience – and that experience is tied to the airport-related incidents. Equally important, most local persons who were involved on September 11 were around for at least one of the previous incidents. That was true for the staff at the airport, the town, the fire department, and the hospital, though not so true of for the RCMP and not true for the base.

Fourth, many of the various players had plans and their staff was familiar with those plans. That was true of the base, the town, and the hospital, and it was especially true of the airport. It activates its ECC – if only briefly – each time an incoming aircraft reports an onboard emergency.

Fifth, Newfoundland consists of a number of small, separated communities strong across more than 1,000 kilometers [621 miles] of highway. Many in those communities come from even more isolated communities, communities where there is only annual or biannual contact with a supply ship. They are used to coping on their own.

Sixth, Gander is a small community where virtually everyone knows everyone else. Even those who rotate in often have roots in the community. The latest RCMP detachment commander, for example, grew up in Gander, and his family stills live there.

Seventh, the airport realized immediately that the magnitude of the event made it impossible for it to be handled as usual. During the response to the 1985 crash, the town was not invited to the airport EOC, and, when the deputy mayor became a participant, she was not made welcome. This time, the airport welcomed the support of the town, and, in turn, the town welcomed the support of various emergent groups. They were allowed to work unhindered by direction from any EOC. In fact, the only time outsiders got involved in shelter management was when the salmonella was identified and the Lufthansa passengers were moved from Gander Academy.

Eighth, and most important, the various operations centres were dealing with separate concerns. They each carved out an area of responsibility and stuck to it. There was no significant overlapping responsibility. The airport ECC, for example, made all the decisions about unloading and loading and about what flights would leave when. The others accepted that and adjusted to those decisions as required. Similarly, HR&E identified what places would be used as shelters – and the town stayed out of that – but HR&E did not get involved in deciding what flights would be sent to what shelters. The various command posts needed to keep in touch with each other – shared information is crucial to an effective response – but their decisions could be made independently. This cooperative acceptance also occurred on a smaller level. For example, when a teacher went to assist setting up the high school, she was surprised when the computers were unplugged and pack away. However, she made no comment. But when she returned to her own school, she saw to it that all the computers were made available to the passengers.

If this had not happened and all the players had tried to work from one EOC, there would have been significant overcrowding and a tendency – as noted by Quarantelli and by Scanlon – for key players to leave the EOC and make decisions independently. Even if one assumes that the various shelter managers would not have become part of an EOC, there were at least 31 players involved in the response in Gander: seven federal agencies – Customs, the Canadian Food Inspection Agency, Immigration, Health Canada, the Canadian Security Intelligence Service, the Royal Canadian Mounted Police,[15] and Canadian Forces Base Gander; eight from the private sector – the area control center, the airport, the tower, the service company, the fuel company, the food service company, NewTel Communications, and the baggage screeners; three voluntary agencies – the Society for Prevention of Cruelty to Animals (SPCA), Red Cross, and Salvation Army; two provincial agencies – HR&E and Health; six players associated with local or regional government or community services – the town, the hospital, ambulance, the school board, the fire department, and the arena; three political leaders – the mayors of Gander, Gambo, and Lewisporte; and at least four other significant participants – the school bus drivers, the Newfoundland Association of Public Employees and the key persons in Gambo and Lewisporte, the deputy fire chief of Gambo, and the Salvation Army Captain in Lewisporte. The situation could have become comparable to that described in Scanlon's study of the Nanticoke tire fire and his subsequent observations on official convergence (Scanlon 1992b, p. 5; Fritz and Mathewson 1957).

In short, the effectiveness of the response in Gander came from the fact that it was managed by a number of EOCs, each of them handling a particular task. The airport ECC decided what services should be provided to a plane parked on the tarmac and when and how an aircraft should be unloaded. It also controlled departure times. The fire department EOC, working from the mobile command van at the airport, managed transportation. The hospital EOC kept track of health services and remained linked, through the ambulance

15. In eight Canadian provinces including Newfoundland, the RCMP wear three hats: they are the local, provincial, and federal police. They were wearing all three during the response to 9/11.

radio, to the medical service post at the airport. The Province of Newfoundland, through Human Resources Development (HR&E), identified shelters that were available and how many persons each shelter could handle. The town EOC decided where passengers should be sent and passed that information along to the fire chief at the airport. The town EOC also handled communications between the town and the various shelters in Gander and – through the Salvation Army captain in Lewisporte and the deputy fire chief in Gambo – with communications to the shelters in those communities.

There was also an EOC at Canadian Forces Base Gander that kept in touch with the National Defence command system and with its liaison personnel in the airport ECC. And there was a command post at NewTel Communications that, working with the town, kept in touch with the telephone and other services needed at the airport and in the various shelters. Finally, the Salvation Army had what amounted to a command post at its regional headquarters. From there it coordinated the central food service run out of the community center.

Airport the key

The airport ECC was still the key. Its decisions about which flight was unloaded and when a flight would leave affected every other response. But the airport was not free to act as it chose. For one thing, its decisions were influenced by security directives flowing in from Newfoundland's capital, St. John's, from various regional headquarters, and from the federal capital, Ottawa. For another, sometimes its plans were thwarted by the fact a pilot had been drinking or an aircraft would not start, or, more likely, some passengers did not show up or did show up and refused to leave. Often, its ability to get a flight off the ground promptly was determined by whether a shelter or the RCMP could locate a missing passenger or by the ability of its staff to persuade a passenger that it was best to get or stay on board. It had to be in continual touch with these agencies and the town to be certain the passengers would arrive as required.

The town EOC was next most important. Based on information from the airport ECC, it had to make certain that transportation was available when a flight was called and that the shelter knew it was next in line – and that had to be coordinated with the fire command post at the airport and, in turn, with the drivers. The town also needed to keep the shelters and the Salvation Army informed about probable schedules so food was on hand if an extra meal was needed and so shelter managers knew if they would be open for another night. That affected the volunteers who agreed to assist with cleaning up. Their services could not be used until a shelter was emptied. Finally it affected the hospital. Its staff was keeping a careful eye on a handful of patients, trying to make certain their health would allow them to join their flight when it was called.

All this meant that it was crucial to have good communications and effective liaison among the various EOCs and command posts. That is why the town's early decision to send the fire inspector to the airport was so important. While communications is important, liaison is, perhaps, even more important. Because the inspector was in on the discussions, he could convey to the town EOC not only the import of what was happening but the underlying tone. He, for example, could explain why the airport was becoming frustrated at its inability to get flights off on schedule because one passenger failed to show or was delayed or because a few passengers decided at the last minute they did not want to board their aircraft. He could also make sure the airport was aware of the town's concerns. Similarly, the HR&E person and the NewTel person at the town EOC kept information flowing back and forth between their organisations and the town.

It is true that some places described as EOCs might better be described as command posts or support locations since their function was to assist others. This was certainly true of the fire mobile command post at the airport that handled transportation requests relayed to it from the airport ECC (when passengers had to be unloaded or loaded) and from the town EOC (when passengers had to be moved from the airport to a shelter or from a shelter to the airport). However, it was not so true of the EOC at the hospital (which made medical decisions on its own) or at NewTel Communications (which serviced the various facilities but also took its own initiatives.) It was certainly not true of the EOC at CFB Gander, which, though it responded to the needs of the airport, also had its own concerns about base security during a period of heightened tension. And it was clearly not true of either the airport ECC or the town EOC. Both were full-fledged EOCs handling major problems and coordinating the response of a number of agencies. Gander's response to the other victims of 9/11, therefore, is a model of how divided responsibilities can be an affective way of managing an unexpected emergency.

Finally, there was something else at work in Gander: the fact that the victims – having seen the visuals from New York City – were grateful to be alive and thankful for anything that was done for them. Most were also overwhelmed by the compelling generosity of the local residents and anxious to do anything to avoid offending their hosts. In fact, it was only some time after the stranded travellers had left that the local residents began to swap stories about who had been in their midst. Their guests had included senior executives of the Rockefeller Foundation (the Foundation donated new computers to the Lakewood school), a distinguished

Dutch artist, and a world-renowned fashion designer, plus one of the senior U.S. military officers involved in counterterrorism. All had quietly accepted their fate. Werner Baldessarini, the chairman of Hugo Boss, had even stayed with his fellow passengers after a private jet had been sent to pick him up. After sampling the underwear in Wal-Mart however, Baldessarini did gratefully accept some underwear brought to him personally by a storekeeper in St. John's who drove all the way to Gander to look after his distinguished guest. The story is told in Jim Defede's touching book after Gander and 9/11, The Day the World Came to Town (Defede 2002).

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CANADA

NOTES FROM THE FIELD

Winning design for national emergency services memorial

By Neil Head

EMA was one of a number of key organisations invited to Parliament House for the March announcement by the Prime Minister of the winning design for the Australian Emergency Services Memorial.

Photo courtesy of the National Capital Authority

The Prime Minister, Mr John Howard, congratulating the winning designer of the Australian Emergency Services Memorial at Parliament House

In his remarks the Prime Minister included:

> *"Australia has long needed a national memorial to mark the nation's respect for the enormous sacrifices that so many people in our emergency services make in the interests of our own personal safety and in the interests of our national well-being.*
>
> *This announcement (of the winning design) takes place only a short period of time after the Australian community living in Canberra has been particularly reminded of the ferocity of natural events, and has had the opportunity of seeing on full and such effective display the capacity of our emergency services.*
>
> *We were all greatly touched by what they did, we're all very grateful to them for what they did. And at a time when people are... young Australians, young Australian men and women have their lives on the line in the service of the nation around the world we are particularly conscious of people who do things that involve a great personal risk to them for their fellow Australians.*
>
> *Today is an opportunity to announce the winner of this competition and to recommit the Government to the construction of the Memorial and to look forward to its opening*
>
> *The National Emergency Services Memorial will honour both career personnel and volunteers. And when we think of Australian mateship, nothing better expresses it than the way in which people work together at a time of adversity. We all saw it in the Canberra community quite magnificently and other communities have seen it over the years, not only in relation to bushfires and floods but also in relation to other events and tragedies.*

The winning design

Photo courtesy of the National Capital Authority

The Prime Minister, Mr John Howard, with emegency services representatives attending the announcement of the winning designer for the Australian Emergency Services Memorial at Parliament House.

And on every occasion there's a magnificent willingness on the part of Australians to come together – the community – differences are forgotten, inhibitions fall away and people work together.

This Memorial will honour especially those who've died making Australia a safer place and helping their fellow Australians. The Memorial will be located at the western edge of Kings Park (at the site previously dedicated) and is scheduled for completion within the next 12 months.

I have great pleasure in announcing the winning design, and the winning design fulfils very much the requirements of the design brief to commemorate the contribution and sacrifice of emergency services personnel in a sensitive, yet very powerful way. A simple yet moving design that allows for visits to the Memorial to be both private and shared. And the winner – the design was submitted by ASPECT Melbourne Proprietary Limited ."

EMA is represented on the Steering Committee for the project through DGEMA, David Templeman. David was represented at this event by EMA Director Development, Neil Head. Neil will co-ordinate a more a more detailed coverage of the Memorial, and its implications for future commemorations and activities at the site, for the next edition of AJEM.