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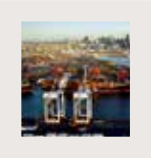

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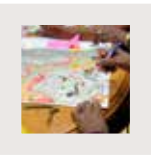

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AUSTRALIAN JOURNAL OF EMERGENCY MANAGEMENT

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COVER

During flood events such as those experienced in south west Queensland in 2010, 2011 and 2012, community members and emergency services volunteers work side by side to sandbag homes, get food to isolated properties, and evacuate vulnerable community members.

Image credit: Michael Marston, courtesy Emergency Management Queensland photo library

ABOUT THE JOURNAL

The *Australian Journal of Emergency Management* is Australia's premier Journal in emergency management. Its format and content are developed with reference to peak emergency management organisations and the emergency management sectors—nationally and internationally. The Journal focuses on both the academic and practitioner reader and its aim is to strengthen capabilities in the sector by documenting, growing and disseminating an emergency management body of knowledge. The Journal strongly supports the roles of Emergency Management Australia (EMA) and the Australian Emergency Management Institute (AEMI) as a national Centre of Excellence for knowledge and skills development in the emergency management sector. Papers are published in all areas of emergency management. The Journal emphasises empirical reports but may include specialised theoretical, methodological, case study and review papers and opinion pieces. The views in this journal are not necessarily the views of the Attorney-General's Department.

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The *Australian Journal of Emergency Management* welcomes submissions. The Contributors' Guidelines are available at www.em.gov.au/ajem. In brief, contributions should be no longer than 3 000 words, be submitted as a Word file and contain photographs, graphs and tables in their original software applications as separate files. All articles must contain an abstract and a small biographical paragraph about each author. A Copyright Release form and the Editorial Policy are available on the website. Authors should familiarise themselves with the Journal before making a submission. Contributions should be forwarded electronically to ajem@ag.gov.au. All academic papers are peer reviewed. Please note that the Australian Journal of Emergency Management is indexed by several indexing organisations throughout the world, please visit our website for details.

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DISASTER RESILIENT AUSTRALIA
GET READY

Foreword

The challenges ahead by Dr Laurie Hammond, Chairman Bushfire and Natural Hazards CRC.

In the last decade, we have seen natural disasters cause more damage and destruction across Australasia and our neighbouring region than ever before. Cyclones, flood, fire, earthquake, tsunami and heatwave have caused injury, death and widespread damage. The full impacts of these disasters often remain poorly quantified, but continue to be felt through their long-term consequences for individuals, communities, infrastructure, the landscape, and the economy.

Population growth and changing demographics feature highly among the factors that have increased exposure and vulnerability to natural disasters. A growing, ageing and more multi-cultural population places significant pressure on government policy, particularly around risk communication, land-use planning and infrastructure development.

The policies and settlement patterns of the past are proving inadequate for the challenges of the future and in many instances are intensifying the exposure to risk. This brings into focus the role of government and the concept of shared responsibility and mutual obligation towards managing personal and community risks.

These issues are a challenge for participants in the new Bushfire and Natural Hazards Cooperative Research Centre (BNHCRC). When then Prime Minister Julia Gillard announced the creation of the new CRC in February 2013, it was on the back of severe bushfires in Tasmania and New South Wales. At that time the Bushfire CRC was winding up its decade of research and there was a critical need for a renewed commitment to a national research capacity.

However, there was general agreement that this new research should not be solely about fire, but should recognise the combination of extreme weather and geophysical events that lead to bushfires, cyclones, earthquakes and other natural hazards, exposing human, infrastructural and institutional vulnerabilities and subjecting the community to great impact and loss.

Hence, the new CRC was given a welcomed expanded focus, and a generous eight-year term. The timelines for establishing the organisation were very tight, but on 1 July 2013—a mere five months later—the Bushfire and Natural Hazards CRC was officially in business, with a developing research agenda that is genuinely cross-hazard and user-driven. All involved should be congratulated.

There is still much to be done to become fully operational, but the new national research capacity is driving our ability to think differently about how to deal with natural disasters into the future.

This edition of the *Australian Journal of Emergency Management* touches on many of the issues that will keep the Bushfire and Natural Hazards CRC occupied over the next eight years—emergency management information sharing, disaster resilience, and the complexity of issues surrounding response, recovery and adaptation.

The Bushfire and Natural Hazards CRC will have a close relationship with the Journal, and will endeavour to use its pages regularly to promote our activities and their benefits to the wider emergency management community.

Dr Laurie Hammond
Chairman
Bushfire and Natural Hazards CRC

Maximum of Maximums

Kate Lahey explains the thinking behind 'maximum of maximums' planning with FEMA's Deputy Administrator for Protection and National Preparedness, Timothy Manning.

If a category-five hurricane landed in Miami, Florida, bringing winds of at least 250km/hour and a five-metre storm surge, three million households would need to be evacuated. That's potentially five million people in urgent need of shelter.

So how would United States authorities manage it?

The answer is, by following the plans they've already prepared for this almost-inconceivable event.

Emergency shelter for five million people is the kind of capability that the Federal Emergency Management Agency (FEMA) now works towards under its new policy of 'maximum of maximums' planning. The term itself comes from weather modelling.

FEMA's Deputy Administrator for Protection and National Preparedness, Tim Manning, said, 'It's the idea that through a number of different iterations of analysis you take the larger set of values from all the different models and average them together.

FEMA had come to realise that its disaster planning worked well for 'average' disasters, but beyond that, it failed catastrophically, he said.

The USA's response to disaster had traditionally been designed to adapt and scale up or down within the 'normal' confines of a disaster, Mr Manning said.

'When you get something that's so far beyond anything you've dealt with before, the normal systems can't compensate. So we needed a way to identify the real maximum variables we would have to deal with in any particular very large disaster, build to that level of capability, and then we would have it,' he explained.

By planning for the most extreme event imaginable, anything that occurs to a lesser degree is, therefore, within the scope of the USA's response capabilities.

Australian officials, Mark Crosweller, Director General, and Diane Podlich, Director Engagement from Emergency Management Australia, discussed this new approach with their US counterparts at a meeting in Seattle in June this year. The meeting was held to exchange ideas, plans and information under a Memorandum of Understanding between Australia and the USA on emergency co-operation. Australia is now considering the USA's 'maximums' planning approach.

Mark Crosweller, Director General, Emergency Management Australia met with FEMA Administrator, Craig Fugate in Seattle to share information and ideas on emergency management.

Some of the work the USA has done has included taking historical events and working out what the impact of those would be if they occurred today, with present-day populations and infrastructure. One of these was a magnitude nine earthquake and resulting tsunami from the 1700s. The earthquake occurred in the Cascadia Subduction Zone, a 1 000km fault line that runs from California north to British Columbia in Canada. If such a quake were to happen today, the modelling done for US authorities predicts it would kill

Image: EMA

Mark Crosweller and Craig Fugate sign the 2013–14 work plan on emergency management co-operation.

more than two million people and seriously affect about four million.

Over the past two years, the states of California, Oregon, and Washington, in partnership with other organisations, have been using this scenario to develop the *Cascadia Subduction Zone Earthquake and Tsunami Plan*[1].

Massive disasters in the USA in recent years, including *Hurricane Katrina* and the terrorist attacks of 11 September 2001, were part of the reason FEMA has shifted its approach, Mr Manning said.

'In the wake of *Hurricane Katrina* was the largest sheltering operation in the history of the United States. We had people in all 50 states in shelters and we flew evacuated people by aircraft all over the continent. We'd never considered doing anything like that before,' he said.

Preparing for the 'maximium' was also something that many people working at state level (including himself in his previous role as the Secretary of the New Mexico Department of Homeland Security and Emergency Management and Homeland Security Advisor to the Governor) had been discussing for many years, he said. The policy is now in its third year of operation.

In the United States, emergency management practices have often evolved separately from county to county, city to city, and state to state. Individual cities and towns, for example, have their own police departments. As of 2011, figures from the National Fire Protection Association indicated there were more than 30 000 fire departments in the USA.

In this landscape, orchestrating a massive, co-ordinated response to an extreme event takes some work. To help the entire nation prepare in a uniform way, FEMA has tied new criteria to grant money it allocates to local and state governments, which compels anyone receiving the grant to prepare their own community for its 'maximum of maximums' event.

Without making legislative changes, FEMA has sped up the adoption of the maximums philosophy by using the grants as incentive. Mr Manning said the grants comprised the vast majority of funding for planning and operational work.

All states and territories, as well as the 30 or so biggest cities in the United States, now use this approach to receive grant funding. Other counties have begun to plan for their own maximum of maximums without the grant funding as it is becoming a standard procedure.

Mr Manning said FEMA began this task by identifying 13 core activities under its National Preparedness Goal that were needed for every major disaster response. These included shelter, mass care, and evacuation.

FEMA modelled a variety of major disasters, including a category five hurricane in Miami, the magnitude nine earthquake, and a nuclear terrorist attack in New York City. It then compared the needs for each scenario to determine which one would require the largest response effort in each category, such as a need to shelter five million people. It then began building a national capacity to meet that need.

'You look across all these different threats and hazards and all the different communities that might be hit, and you come up with, let's say, if the hurricane hits Miami, we've got three million families, that's potentially five million people we need to shelter long term.

1 The Oregon State plan is at www.oregon.gov/OMD/OEM/plans_train/docs/CSZ/1_csz_plan_final.pdf.

'Then we look at earthquakes and we look at all the different disasters around the country and none of them come up to that number. We'd have a million here, 600 000 there, 1.6 million in this other area from another disaster. So we look at the maximum one—the Miami hurricane, where there are three million, four million families and that becomes our maximum sheltering target,' Mr Manning said.

FEMA has also shifted to a whole-community approach to emergency management: the idea that preparedness is everyone's responsibility and government is there to support the public. So building these enormous capabilities is not an investment the government makes alone, if at all.

'When we identified sheltering needs for example, it doesn't mean that the government has to build that capacity by itself. It may simply have to organise all the volunteer agencies, the NGOs, the Red Cross and similar groups that are out there that will do this work.

'We just have to work together to say "this is the actual target we're trying to meet, what can you do?",' he said

At the Seattle meeting, US officials spoke of a new way of building this capacity through volunteers, non-government organisations, and the private sector. For example, the US has 28 heavy-lift urban search and rescue teams and about 12 'Type 2' teams. However, US authorities recently discovered there were some areas of the country these teams would not be able to reach in an effective timeframe, due to their locations. To overcome this, they have now cleared the way for private teams, trained to do mining rescue, to operate in these areas.

For the cities and states preparing their own disaster responses, the strategy is the same. They are asked to determine the worst-case scenario for their community then build a response plan to it, using their own resources as well as mutual aid agreements with other communities.

Each state or city plans around the core capabilities using what FEMA calls the Threat Hazard Identification Risk Assessment (THIRA) approach. Mr Manning said THIRA set a process to figure out the various threats and hazards that may exist in a community, and the impacts of them on the community's core capabilities. Once the process is followed, each community or state should know what its different targets are for shelter, search and rescue, mass care, and emergency medical services.

'And that's where we are now,' he said.

The policy has other benefits. It fine-tuned the planning itself and helped to ensure training programs are necessary and relevant, Mr Manning said.

'For the last 20 years or so we've used the all-hazard approach to emergency management; the idea that we don't plan for a particular hazard we just plan to use all of our capabilities for anything that might happen.

'The trick is that without some idea of what it is you're worried about (hazard specific) you can't do that fine level of planning.

'The old way of planning was more a catalogue of authorities than it was an actual plan. So, shifting the way we do things—to put some level of detail and know that across all the different earthquakes, typhoons, hurricanes, tornadoes, whatever it may be—the worst search and rescue mission I can expect to have to do is going to be, say, 4 000 people.

'I now have more detailed planning done on how to do that,' he said.

This planning would include choosing which teams to use and determining the amount of work they could achieve in an appropriate time frame, then, how to access more teams if necessary. For example, a city might have enough rescuers to search for 500 people, but not for the other 3 500 people who would also be missing under its scenario. The extra teams could be sourced by agreements with other cities and states, under mutual aid planning, he said.

This kind of planning gave emergency managers an 'implementable and actionable plan' without focusing solely on a specific hazard – such as an earthquake plan would, he said.

'It's the best of both worlds,' he said.

Training programs are also expected to become better tailored to the USA's needs under this system. 'It really allows us to prioritise things and get a much higher level of fidelity in what we train to,' Mr Manning said.

Training until now had been somewhat demand-based. Courses that are popular are those that run more often. But the popularity of a course doesn't always reflect the need for so many people to be trained in it, and it doesn't indicate where training deficits might exist. Until recently there hadn't been a national system that allowed authorities to see, across the board, what training was required, Mr Manning said.

'If we have a good understanding of what the search and rescue mission requirement is across all the states around the country and then nationally, we know how many people need to be rescued and we can estimate our capability requirements.

'We know how many teams are needed. If a Type 1 search and rescue team means a certain number of people with equipment and training to do a particular mission, and clear 'this' much square footage of a building in a (time) window, then I know that I need x-number of search and rescue teams. This means I need x-number of people with a particular training. I can now design my training calendar throughout the year and do budgeting based on the number of people we need to deliver a certain kind of training.

'It's something we've never been able to do before. It gives us a much clearer window into the needs of the responders across the country,' he said.

Modelling for the 'maximum of maximum' scenarios occurs at different levels across different jurisdictions. The system was designed to make it easy for local governments to follow without the need to source extremely detailed data.

Much of the complex disaster work is done through the National Infrastructure Simulation and Analysis Centre. In addition, city officials may, for example, draw on some academic support, as well as their own knowledge in the area especially related to known risks and building codes.

'It would require really detailed modelling to achieve a fine-grained understanding of the potential behaviour of a structure, but if you're looking across the entire community, there's a margin of error you can work within (without the detailed modelling).

'The idea is: if the results are that I need 10 search and rescue teams, I could spend more time on getting very detailed modelling and I might find out I need 10 and a half, or 11, or nine. That margin of error is not of operational concern at the scale of actually responding to the disaster because there's so much safety built into the whole process,' he said.

State and local governments could access FEMA grants to help with modelling, and FEMA also supported the work through the science and technology directorate in the Department of Homeland Security and through its partnership with the National Laboratories and other academic communities.

FEMA is also working to create common terminology for use during disasters across the USA. A division called the National Integration Centre is devoted to this cause.

'Not everybody calls the same thing the same thing. On the west coast of the United States, if you're a firefighter and you ask for a tanker on a wildfire, a tanker is an airplane that drops water from the air and a truck with a tank on the back is called a tender. In the east coast of the United States, a tanker is a truck with a tank on the back,' he explained.

Search and rescue teams also have different names and these are among the terms now standardised so that when aid agreements are in place, everyone knows what they're getting.

'In the case of the tanker, that's actually one that has officially been settled for many many years, going back into the '70s,' Mr Manning said. It was now an example of how common terminology and tradition could co-exist.

Hurricane Sandy, which became a 'superstorm' by landfall in the US, was one of the first tests of how well this new planning performed, although Mr Manning said it was still too early for comprehensive assessment of the new system - particularly as other work had been occurring in parallel.

'The concept of 'maximum of maximums' is a consolidation of successful ideas into a new policy idea in emergency management.

'The actual doing of it, the planning and implementation work has been happening for years but in a disconnected way so we've knitted it together.

'What we saw with Sandy and the Boston bombing is the success of the work that's been happening over the past 10 years. Equipment has been bought, planning has been done, the incident command system and the concepts of common terminology have been established. The idea of planning using an 'outlier' event that we wouldn't normally have considered in the past has definitely delivered some successes,' he said.

The hardest part of bringing in the new system has been instilling the change in philosophy and steering the cultural shift that goes with it, Mr Manning said.

'Aside from the fact that it's largely reorganising efforts already undertaken, it still requires a higher level of detail initially. That should eventually become maintenance of the system but at the beginning there's a good deal of new work to be done. This means there's a lot of education at this stage,' Mr Manning said.

Much of the work involved discussing the concept with FEMA's partners to explain what the aims are and to convince others of the value. Once people understood how the system could work, it became easier, he said.

'That's a level of co-ordination and effort that hasn't been done in the past. In the very beginning there was considerable scepticism because there have been other attempts by the US Government, by FEMA and the department to institute a regime of coordination and monitoring so we know what everybody's doing. It wasn't really a tool to help everybody work together. It was always a one-way street.

'Once we were able to show everyone that really what we're doing wasn't a new idea from Washington that we're going to push into the states, this was an idea that the states have had for years that we've brought to Washington, that really turned the tables and we've been able to get to work,' said Mr Manning.

FEMA's Deputy Administrator of Protection and National Preparedness, Timothy Manning (left), after Hurricane Sandy. He says the response to Sandy shows that FEMA's new approach to preparedness is succeeding.

Metropolitan Melbourne in 2021: changes and implications for the emergency management sector

Dr Holly Foster (Fire Services Commissioner Victoria), Dr Joshua Whittaker, Dr Briony Towers, and Prof. John Handmer (RMIT University) consider the key economic and population changes that are taking place in metropolitan Melbourne.

ABSTRACT

The Victorian Fire Services Commissioner (FSC) has embarked on a program of research exploring anticipated changes across Victoria over the coming decade. Titled *2021*, the research aims to identify key changes taking place in Victorian communities and describe the likely impacts on the emergency management sector. This paper is the final in the series published in this journal. It outlines some of the key changes taking place in metropolitan Melbourne. Increases in the number of people, assets and infrastructure at risk and the increasing complexity of urban communities pose significant challenges for the emergency management sector. In particular, continued population growth due to overseas migration will require a capacity to communicate information and warnings to an increasingly culturally and linguistically diverse population, and to engage diverse groups in emergency preparedness, response and recovery. The large and growing number of people who visit the city each day for work, shopping and recreation adds to the challenge of managing all aspects of emergencies in the city's central business district (CBD) and inner suburbs.This paper does not provide a comprehensive list of possible changes and implications. A detailed report, which discusses a wide range of changes and their implications for emergency management and emergency services organisations, is available from the Victorian Fire Services Commissioner's (FSC) website.

Introduction

As the fastest growing city in Australia (Lord 2013), metropolitan Melbourne is expected to change significantly over the coming decade. Population growth, residential development and growing cultural and linguistic diversity are creating more interconnected and diverse urban settlements. These changes have implications for how the emergency management sector engages with, plans for, and delivers services to communities with highly varied capacities, needs and expectations.

This paper outlines some of the key changes taking place in metropolitan Melbourne and considers the implications for the emergency management sector (state-level policy and strategy) and emergency services organisations (service delivery, programs and local needs). The purpose of this paper is to provide an overview of some of the significant changes identified across Melbourne and some of the noteworthy implications for the Victorian emergency management sector.

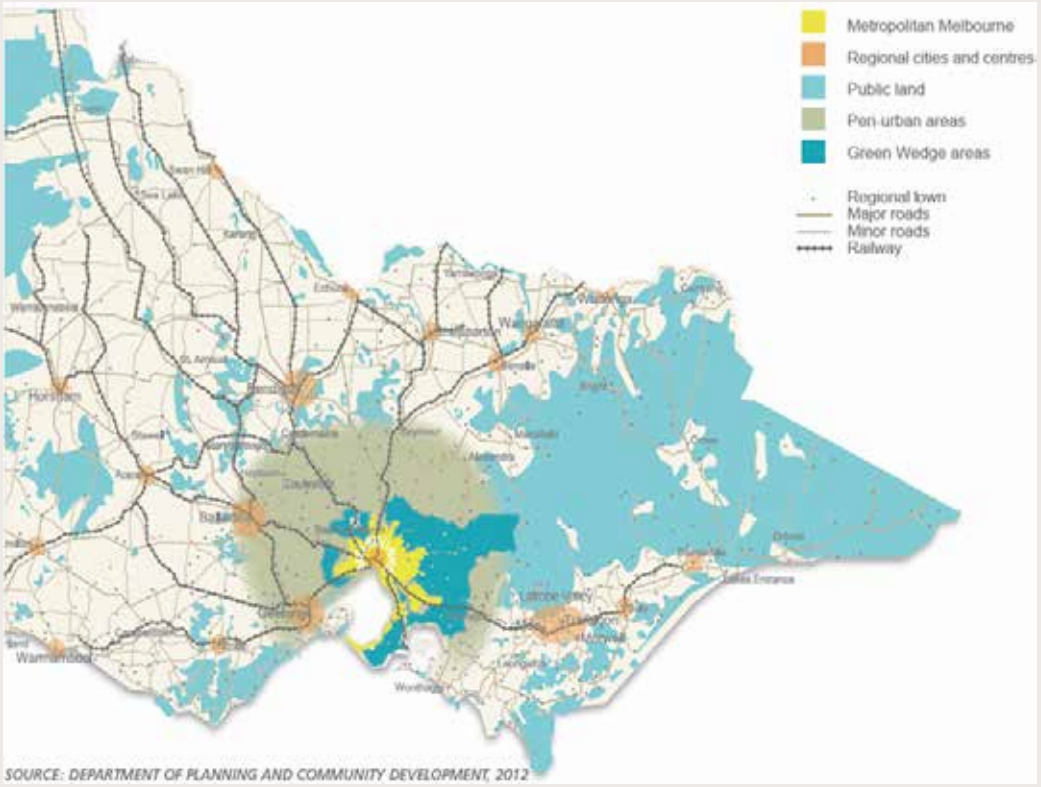
Population growth

Metropolitan Melbourne comprises almost 75 per cent of Victoria's population. This population is anticipated to increase from 4.1 million in 2011 to 4.8 million in 2021, representing an increase of over 670 000 people.[1] Net overseas migration is predicted to be a major driver of population growth over this period (an increase of 210 000), outstripping natural increase (165 070) (Department of Planning and Community Development 2012a).

The most significant growth is expected in the outer suburbs, including the Melton-Wyndham (148 900), South-Eastern Outer Melbourne (110 600) and Northern Outer Melbourne (74 300) Statistical Subdivisions (Department of Planning and Community Development 2012b). This growth is driven by the extension of the urban growth boundary and the associated increase in the supply of affordable housing

1 Figures are drawn from the Australian Bureau of Statistics (ABS) Melbourne Statistical Division.

Figure 1: Melbourne in its Victorian context (State Government Victoria 2012).



for young couples and families, new migrants, and retirees (Butt 2013, Department of Planning and Community Development 2012c, Growth Areas Authority 2011, Outer Suburban/Interface Services and Development Committee 2012, Regional Development Victoria 2012).

Significant growth is also expected in the CBD and inner suburbs. For example, the population of the Inner Melbourne and Southbank-Docklands Statistical Local Areas is expected to grow to 58 900, representing an increase of over 24 000 people since 2011 (Department of Planning and Community Development 2012b). Population growth in these areas is driven by the availability of employment and tertiary education opportunities, as well as recreation and entertainment facilities. The CBD also attracts permanent overseas migrants, particularly in inner suburbs such as Kensington and North Melbourne (Forecast.id 2011). Population density is projected to double in the City of Melbourne local government area over the 20-year period to 2026 (Victorian Environmental Assessment Council 2009).

A key feature of Melbourne's CBD and inner suburbs is the daily variation in the population. At present the largest variation takes place during office hours when the CBD population grows from 94 700 residents to 788 000 people (City of Melbourne 2011, Victorian Environmental Assessment Council 2009). Residential suburbs outside the CBD tend to experience the opposite trend, with population numbers declining during weekdays as commuters travel out of their suburb for work (Victorian Environmental Assessment Council 2009). In addition, at any one time, the Melbourne local government area hosts over 70 000 visitors from overseas, interstate and regional Victoria (City of Melbourne 2011).

The largest variation in population takes place during office hours when the CBD population grows from 94 700 residents to 788 000 people.

Growth in cultural and linguistic diversity

There are a range of demographic changes taking place in metropolitan Melbourne (FSC 2013). A key feature of Melbourne's population, and one that has significant implications for emergency management, is the cultural and linguistic diversity (CALD) of residents. A large majority of Victoria's CALD population resides in metropolitan Melbourne. Figures from the Australian Bureau of Statistics *2011 Census* show that almost 37 per cent of metropolitan Melbourne's population was born overseas and 29 per cent spoke a language other than English at home (Australian Bureau of Statistics 2013).

The Melbourne local government area has a large and growing CALD population. In 2011, 59 per cent of its population was born overseas and 38 per cent spoke a language other than English at home (Australian Bureau of Statistics 2013). A significant proportion of the overseas-born population was from Asian (30 per cent) and European (8 per cent) countries. This high level of diversity is driven by the large number of overseas migrants, primarily made up of international students studying at educational institutions in inner Melbourne. The Melbourne local government area also attracts a number of permanent overseas migrants, many of whom settle in areas such as Kensington and North Melbourne (Forecast.id 2011).

Melbourne's middle suburbs also accommodate large CALD populations. In most of these suburbs, 30-40 per cent of the population was born overseas and 20-30 per cent speak a language other than English at home (Australian Bureau of Statistics 2013). However, some areas have more diversity than others. For example, in the local government areas of Greater Dandenong and Brimbank, more than half the population was born overseas (62 and 53 per cent respectively) and speak a language other than English at home (66 and 56 per cent respectively). Culturally and linguistically diverse communities in these areas are driven by a number of factors including the availability of affordable rental accommodation and access to public transport (Forecast.id 2013c). It is anticipated that one-third of Melbourne's metropolitan population growth by 2021 will be due to overseas migration.

Housing tenure

A key feature of Melbourne's CBD and inner suburbs is the large proportion of renters. In 2011, the majority of residents in metropolitan Melbourne owned their home outright (32 per cent) or had a mortgage (35 per cent), and just over a quarter were renting (27 per cent). However, in the City of Melbourne, far fewer residents owned their home outright (13 per cent) or had a mortgage (17 per cent) and a much larger proportion was renting (58 per cent) (Forecast.id 2013a, 2013b).

Although this review did not identify specific forecasts for changes in housing tenure by 2021, a number of trends influencing residency and tenure were identified. In the Melbourne local government area, strong employment growth is expected to continue for the next two decades, which will drive demand for housing. This growth is expected to be oriented towards 'knowledge intensive' sectors such as property and business services, finance and insurance (SGS Economics & Planning 2013). As a result, the CBD and inner suburbs will attract increasing numbers of 'knowledge workers' seeking amenity and access to employment and services. Housing affordability may be an issue for 'key workers' (broadly defined as workers in service industries necessary for the efficient functioning of a city e.g. health, education, police and emergency services) who may need to find housing within commuting distance of the city. Growth in the Melbourne local government area's rental stock is expected to continue into the future (SGS Economic & Planning 2013).

The Port of Melbourne handled 2.58 million containers in the 2011-12 and this is forecast to double to more than 5 million containers over the next 10 to 12 years.

In the middle and outer suburbs, growth in home ownership rates (outright and mortgaged) is expected to continue (SGS Economics & Planning 2013). A report prepared for the National Housing Supply Council forecasts a 37 per cent growth in demand for public housing in metropolitan Melbourne by 2021 (compared to 30 per cent growth for all housing) (McDonald & Temple 2007).

Port, freight and logistics

As the nation's freight and logistics hub, the Port of Melbourne is critical to the functioning of the Victorian economy (Department of Premier and Cabinet 2012). The Port of Melbourne is Australasia's largest maritime hub for containerised, automotive and general cargo (Port of Melbourne Corporation 2013a). The total trade value of goods moving through the port is estimated at around $80 billion annually (Port of Melbourne Corporation 2013b).

The Port of Melbourne handled 2.58 million containers in the 2011-12 financial year. This is forecast to double to more than 5 million containers over the next 10 to 12 years, necessitating major expansion of the port and associated infrastructure (Port of Melbourne Corporation 2013c). To expand the capacity of the port, the Port of Melbourne Corporation has begun a project to expand existing, and construct new terminals and wharfs, dredge within the dock to accommodate modern vessels, build new connections to Melbourne's road network, and construct noise walls and open space development to create a continuous buffer between the port and the nearby city (Port of

Melbourne Corporation 2013d). These developments will facilitate an increase in the number of ships that visit the port, as well as the volume and value of goods that pass through it.

Government and specialist services

In addition to the port, the CBD and its immediate surrounds is also the focus of Victoria's rail and road transport systems. The area houses most government functions including police, emergency services and justice. Most of Victoria's specialist medical facilities are within the Melbourne CBD, as are three universities. In terms of both government and business it is the decision-making hub of the state. Victoria is known for its entertainment and recreational events—especially for sport. These are important both culturally and economically. Events are held mostly in or near the Melbourne CBD, often bringing 100 000 extra people into the city centre. There is no sign that this concentration is reducing, at least in the time frame to 2021.

Implications for emergency management

The changes taking place in metropolitan Melbourne will have a number of implications for emergency management strategy, policy and frameworks.

Communication

Almost a third of the population growth forecast to occur in metropolitan Melbourne by 2021 is expected to result from overseas migration (approximately 220 000) (Department of Planning and Community Development 2012a). Therefore, a key priority for emergency management policy and strategy is to develop a consistent, culturally sensitive approach to communicating with and engaging CALD communities in emergency preparedness, response and recovery. More effective communication and engagement with new migrants will help emergency services providers to better understand the risks, vulnerabilities and capacities within these communities, encourage greater planning and preparedness, and help to manage expectations by clarifying the roles and responsibilities of emergency services organisations and communities.

The high proportion of renters in the city and inner suburbs reflects the large number of young people and students living in inner Melbourne. These may be difficult groups to engage in emergency management as they are often short-term residents, live in high-density and centrally managed buildings, and may not have a financial interest in their home. In addition, rates of non-insurance for contents are known to be significantly higher among renters and those living in flats and other non-detached houses than for other groups (Tooth & Barker 2007). Greater use of social media such as Facebook, Twitter and YouTube for the provision of information and emergency management education and warnings presents opportunities to enhance communication with these groups. This includes engaging them in awareness and preparedness activities. Greater promotion of the need for and benefits of contents insurance is also required to increase the capacities of renters to recover financially after an emergency or disaster.

Evacuation

The Melbourne local government area's growing residential population and the increasing number of workers and other daily visitors presents a number of challenges for emergency management. As noted previously, population density is projected to double in the 20-year period to 2026. High-rise residential and commercial developments are enabling an increase in daily and residential populations without corresponding increases in open space or improvements to road and public transport infrastructure. This could limit people's relocation options during major emergencies and disasters.

Demands of emergency service response

The rapid growth and development of Melbourne's port may place additional pressure on emergency management and emergency services organisations. While the port is currently undergoing a major redevelopment and upgrade, Melbourne's other logistics systems and 'just-in-time' manufacturing rely on information technology, communications infrastructure, and road networks that may be disrupted during emergencies (City of Melbourne 2008). Continued growth in the value of Melbourne's freight and logistics industry is likely to place increasing pressure on emergency services organisations to respond to incidents quickly and to ensure that disruption is minimised. Ensuring the continuity of Australia's key transport and logistics hub is a shared responsibility of industry and emergency management agencies.

Similarly, the increasing concentration of government, emergency services and corporate headquarters (as well as the importance of the CBD to the state economy) highlight the importance of planning for continuity in government and business, and for minimising economic disruption during emergencies.

Implications for emergency services organisations

Substantial growth in the number of people and dwellings is leading to a significant increase in the number of people and assets exposed to extreme events or accidents. This places increased demands on the human and technical resources of emergency services organisations, particularly in the CBD and outer suburbs where population growth will be most rapid. Growth in the number of high-density apartment buildings, particularly in the CBD and the inner suburbs, is increasing the concentration of resident populations, which may lead to greater burden on

The port of Melbourne is currently undergoing infrastructure upgrades to cope with future demands.

response and relief agencies. For example, the CBD currently has four primary Emergency Relief Centres (Melbourne Cricket Ground, Etihad Stadium, Melbourne Exhibition Centre, and Melbourne Museum) which will reach capacity as the populations of the CBD and surrounding inner suburbs expand.

In addition, increasing numbers of people visiting the CBD for work, shopping, and recreation pose challenges for evacuation planning and management. In a major emergency, congestion would likely prevent most people from leaving the CBD by car. Significant delays and disruption to public transport are likely in major emergencies. Consequently, emergency services organisations would have to direct and manage the movement of large numbers of people by foot to the outskirts of the CBD (City of Melbourne 2012). Planning would need to account for those who may have limited mobility, such as the elderly and the disabled.

Engaging and communicating with culturally and linguistically diverse communities represents a significant challenge for emergency services organisation. This is particularly the case in the CBD and inner suburbs where the population comprises large proportions of international students and new migrants. Many of these residents have lived in Australia for a short period of time and may have limited knowledge of local emergency management organisations and their various roles and responsibilities. One way to engage such groups in emergency management is for agencies to work collaboratively with universities and other educational institutions to raise awareness and encourage students to reduce their risks (e.g. planning for what they would do in an emergency and by taking out contents insurance). There is also the potential to engage these residents in emergency management by providing convenient opportunities for access to minimum skills training or requirements that may assist in the pursuit of paid employment.

Another significant proportion of Melbourne's CALD population is comprised of newly arrived refugees and people seeking asylum. A recent consultation with 16-24 year olds from refugee and migrant backgrounds found that this group had limited knowledge about emergency management and emergency services in their communities. However, they saw themselves as having an important role to play in communicating essential information to their parents and to community members that are more recent arrivals (Australian Emergency Management Institute 2011). This provides a valuable opportunity for emergency management in Victoria to engage recent migrants in emergency preparedness, response and recovery. This will require emergency services organisations to continue to develop strategies and programs to engage with and build capacity in CALD populations across metropolitan Melbourne.

Conclusion

This paper has outlined some of the changes that are taking place in metropolitan Melbourne and the implications for emergency management and emergency services organisations. Continued population growth from migration will require a capacity to communicate information and warnings to an increasingly diverse population. Engaging young people, international students and others who live in the CBD and inner suburbs represents a significant challenge, particularly as many are renters who live in centrally managed buildings. Adding to the challenge of planning for and responding to emergencies in the CBD and inner suburbs is the large and growing number of people who visit the city each day for work, shopping and recreation.

Community participation and shared responsibility are key principles underpinning the Victorian Government's intent for a sustainable emergency management system (State Government of Victoria 2012). There are significant opportunities to engage residents and businesses in emergency management planning and response throughout metropolitan Melbourne. New initiatives and interactions between communities and emergency services organisations are required to inform and educate populations about risk and to foster a culture where community capacity is understood and used.

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Evaluating emergency management after an event: gaps and suggestions

Neil Dufty, Molino Stewart Pty Ltd, considers current evaluation practices in Australia and suggests possible improvements.®

ABSTRACT

Post-event evaluations of emergency management are critical to help emergency services providers and communities learn to build disaster resilience. This paper identifies five main types of formal post-event evaluations of emergency management that are used in Australia. It argues that these evaluations should be more consistent in their conduct and approach, more comprehensive in scope, and better timed. The paper also suggests that post-event evaluation reports should be released particularly to the affected communities.

Introduction

The performance of emergency services providers is usually quickly judged by the media and the public after a hazard event. For example, only days after *Hurricane Sandy* struck the eastern seaboard of the United States in 2012, there were judgements made by the US press of the Federal Emergency Management Agency's performance particularly in comparison to *Hurricane Katrina* in 2005. Similar scrutiny has been directed at Australia's emergency services providers (e.g. immediately after the 2009 Black Saturday fires and 2011 Queensland floods).

Many of these 'external' post-event judgements are based on perceived public expectations of emergency management, media bias, and incomplete evidence. However, the evaluations by the media tend to resonate with the public as they are usually persuasive and provided relatively immediately compared with government inquiries and formal reviews that may take up to a year to complete and be released.

It is debatable whether emergency services providers should counter this 'trial by media' with objective and technical evaluations. It is argued here that at least a consistent, comprehensive and timely approach to the post-event evaluation of emergency management performance is required for future emergency agency and community resilience learning.

This article is essentially a 'meta-evaluation': an evaluation of evaluations. It is based on an investigation of a sample of Australian emergency management evaluations available on the Internet and also the author's experience in conducting emergency management evaluations.

Based on this research, the article examines:

1. How is emergency management evaluated after an event in Australia?
2. What are the gaps and issues?
3. How can it be improved?

Evaluation and emergency management

Evaluation arguably is society's most fundamental discipline. It is oriented to assessing and helping to improve all aspects of society including emergency management (Stufflebeam & Shinkfield 2007, p. 5). It is a critical element of personal, societal and organisational learning.

While many definitions of evaluation are used, the term generally encompasses the systematic collection and analysis of information to make judgements, usually about the effectiveness, efficiency and/or appropriateness of an activity (Australasian Evaluation Society 2010, p. 3).

Due to its importance to communities and countries in protecting lives and property, emergency management performance is heavily evaluated by governments and their emergency agencies. Exercising, drilling, and after-action reviews are core internal emergency management evaluation activities. Other internal evaluations can be conducted in a range of areas including program delivery (e.g. training), system and staff performance, workforce satisfaction, and the extent of interoperability. Most of these evaluations are conducted by emergency services providers, with a few outsourced to academic institutions and private consultants.

Post-event evaluations

The large majority of emergency management evaluations occur between events as part of agency preparedness. However, there are some evaluations conducted as part of post-event learning, particularly related to improving emergency management performance for future events.

From the research for this paper, five main types of formal post-event emergency management evaluations were identified in Australia. There are:

- government inquiries and reviews
- after-action reviews and operational debriefs
- community meetings/debriefs
- community surveys and other social research, and
- independent evaluations.

Comrie (2013) differentiates an inquiry as 'a formal investigation to determine the facts of a case' from a review, being 'a general survey or assessment of a subject or thing'. Government inquiries and reviews are conducted when governments deem the disaster significant enough to warrant this level of evaluation. Recent examples in Australia include the 2009 Victorian Bushfires Royal Commission, the Queensland Floods Commission of Inquiry, and the Victorian Review of the 2010–11 flood warnings and response.

Each of these government inquiries and reviews was conducted by government-appointed senior personnel. They investigated issues such as disaster risk reduction (structural and non-structural measures), operations of dams (for flood), insurance, emergency response (e.g. command and control, evacuation), agency organisational structure, warning systems and recovery arrangements.

The inquiries and reviews were guided by terms of reference and included evaluation techniques such as consultation with affected communities, emergency agency consultations, public hearings and written submissions. These techniques were used to collect review data, with subsequent data analysis informing the findings, judgement and recommendations. The *Victorian Bushfires Royal Commission Final Report* made 67 recommendations, the final report of the Queensland Floods Commission of Inquiry made 177 recommendations, and the report of the Victorian Review of the 2010–11 flood warnings and response made 93 recommendations. All interim and final reports were released to the public including via websites.

After-action reviews (AARs) and debriefs are held by emergency services providers soon after significant emergencies and declared disaster events. An AAR is distinct from a debrief in that it begins with a clear comparison of intended versus actual results achieved (USAID, 2006). Both generally focus on what was planned, what worked well, what did not work well and what opportunities there are for improvement. The AAR and debrief reports are normally not released to the public in Australia.

Some Australian emergency services providers have held community meetings or community debriefs soon after an event. Outside of being part of a government inquiry, these appear to occur in an *ad hoc* fashion i.e. based on factors such as the priorities and resourcing of the agency or political pressure. They provide an opportunity for communities to discuss aspects of preparedness, response and recovery, and, invariably, their thoughts on the performance of emergency services providers. In some cases, community meeting reports are released to the public—an example being the *Review of the Tostaree Fire* (Office of the Emergency Services Commissioner 2011, p. 50).

Although some affected communities have complained that they have not been consulted after an event, there has been some criticism of the way in which community meetings and debriefs are run when they are held. For instance, some communities have felt that the post-event meetings did not allow for candid and open discussion if chaired by emergency services providers and have called for the use of skilled independent facilitators (see Molino Stewart 2009). This request is further supported by concern that meetings may 'get out of hand' due to the vehemence and dominance of some participants.

'Social research' refers to research conducted by social scientists, which follows a systematic plan. The main types of social research used in post-event evaluations of emergency management in Australia are community surveys (for quantitative data) and focus groups (for qualitative data). They can be standalone reports or part of the government inquiries and independent evaluations. Some are commissioned (Heath *et al.* 2011); others (e.g. Vachette & King 2011) are part of academic research. A particular focus for social research has been the performance of warning systems as these systems are at the interface between emergency management and communities.

Participants in the social research can include residents, businesses, special interest groups and potentially vulnerable groups (e.g. culturally and linguistically diverse communities, older people). Social research results usually enter the public domain as published articles and/or conference presentations, while only a few of the agency-commissioned reports are released to the affected communities and the public generally.

Independent post-event evaluations are normally conducted by private consultancies or academic institutions and are usually commissioned by emergency services providers. This outsourcing provides an objective and transparent appraisal of emergency management performance that would be difficult for the emergency services providers to achieve with possible vested interests. This type of evaluation appears to occur due to factors such as agency priorities, funding availability, and political pressure.

Independent, post-event evaluation can examine aspects of emergency management performance such as command and control, interoperability, warning systems, public information, community education, and evacuation and recovery arrangements. It can also include social research to gauge community interactions with emergency management organisations before, during and after the event.

A key requirement of the independent evaluation is the development of a negotiated evaluation plan preferably based on the evaluation terms of reference and the emergency agency's performance management measures. As Owen (2006) stresses:

> *'A major milestone that needs to be reached through negotiation is an evaluation plan. While there may be differences in emphasis in the degree of planning, effective use of evaluation findings is heavily dependent, in all arrangements and settings, on the degree to which the evaluator and clients agree on a plan for the evaluation. This is the up-front agreement that determines the directions the evaluation will take.'* (Owen 2006, p.67)

Most independent post-event emergency management evaluations are not released to the public possibly due to sensitivities. A recent example of an evaluation that was released to the public is the *2012 North East Victoria Flood Review* (Office of the Emergency Services Commissioner 2012).

Gaps

There is an inconsistency in the use of post-event emergency management evaluations in Australia. The agency AAR/debrief is the sole consistent method of post-event evaluation used. Government inquiries and major reviews, with their associated large costs and effort, are understandably only used for major disasters. Other evaluation methods tend to be triggered by a range of factors; the result being that, generally, there is no consistent, planned approach.

From reviewing several evaluations released to the public, apart from the AARs/debriefs which have a standard framework, there is little consistency in the evaluation approach and measurables (e.g. performance indicators and benchmarks), even when the evaluation is released by the same emergency services provider.

Other than the government inquiries/reviews, few of the post-event evaluations across the different types are released to the public.

The overall scope of the evaluations is narrow. Other than government inquiries, the evaluations tend to concentrate on specific aspects of emergency management (e.g. command and control, and emergency planning). Few consider the complex relationships between emergency agencies and communities that need to be examined to fully gauge the performance of emergency management in relation to the overall impact of the event.

The timing of the post-event evaluation is very important. Some evaluations are conducted several months after the event. This is appropriate to examine the recovery phase but if the details of the response need to be assessed, then community meetings and social research should occur soon (e.g. within one month) after an event.

An improved approach

Consistency

To deliver a more consistent approach, post-event evaluation should, along with pre-event evaluation, be part of an emergency agency's strategic and preparedness planning. From both a theoretical and practical point of view 'planning' and 'evaluation' are inseparable concepts. According to Khakee (1998):

> *'As soon as actions are put together in a plan, option possibilities arise. They do so even when one does not prepare an explicit plan. An organisation can choose between several alternative actions. This in turn requires possibilities in order to judge possible results of the alternative actions. The latter is termed 'evaluation'. In other words, evaluation is a necessary element of planning.'* (Khakee 1998, p. 359)

According to the 2009 Victorian Bushfires Royal Commission (p. 20),

> *'if fire agencies are to lift their capability and performance and improve the response capacity of individuals and communities, they need to become true evidence-based learning organisations. The Commission proposes that the fire agencies adopt and fund a culture of reflective practice that routinely pursues current research, searches for best practice, and habitually evaluates policies, programs and procedures with a view to improving internal practice and that of the communities they serve.'*

Some emergency agencies explicitly include as part of their corporate planning strategies a move towards being an evidence-based learning organisation. For example, the NSW State Emergency Services (NSW SES) in its *NSW SES Plan 2011–2015* has a service delivery goal (Goal 5) related to being a learning organisation through evaluation. However, for all emergency services providers this learning should include regular post-event evaluations that should not be limited to internal AARs/debriefs. Community input should form part of the evaluation process.

If possible, post-event evaluations should be conducted in relation to a standard set of emergency management performance indicators and benchmarks to help gauge improvement over time (although it can be difficult comparing different emergency scenarios within, let

alone across, hazards). Some emergency services providers have identified these measurables and are using them for post-event evaluations. For example:

> *'as part of its role to provide assurance on the effectiveness of Victoria's emergency management arrangements, the Office of the Emergency Services Commissioner (OESC) is developing a Performance Monitoring Framework to track the performance of elements of emergency management across all hazards. Once finalised, the Framework will enable the OESC to use a consistent post-incident approach to measure performance to support improvement across the emergency services sector.'* (Office of the Emergency Services Commissioner 2012)

Comprehensive scoping

The scope of the post-event evaluations should not only be introspective but also examine the external complex interrelationships of emergency management before, during and after an event. For instance, it may be that emergency management performance is heavily impacted by community behaviours (e.g. community unwillingness to evacuate may suggest poor performance even if community warnings are timely, relevant and tailored) and by aspects of disaster risk reduction (DRR) such as urban planning, structural mitigation works and building codes.

To visualise these interrelationships, Figure 1 shows a conceptual evaluation scoping 'framework' which links emergency management with DRR and communities prior to an event. Depending on the scope of the evaluation, other factors can be added to the Venn diagram such as governance, leadership and funding.

A post-event evaluation that includes an examination of prevention and preparedness could use the conceptual triumvirate shown in Figure 1 to investigate some of the influences on emergency management performance. For example, community hazard education and engagement provided by emergency agencies should involve learning across these three complex systems

Figure 1. A relationship that should be considered in the evaluation of emergency management performance.

(Dufty, 2012, p. 155). The performance of community hazard education and engagement in motivating appropriate preparedness behaviours is not only a function of emergency agency programs, but also the learning emanating from DRR and the psychological and sociological makeup of the affected communities.

For the response phase, the post-event evaluation should examine the interrelationship directly between emergency management and communities (with the removal of DRR which provides a level of residual risk before the event). A key part of this interrelationship is the effectiveness of warning systems and disseminated public information.

For the recovery phase in Figure 1, DRR should be replaced in the evaluation scoping framework by 'economic support' (e.g. insurance, government assistance), as the performance of emergency management is largely influenced by this factor and the psychological and sociological dynamics of the affected communities.

Timing

As mentioned, some post-event evaluations of emergency management are usually conducted several months after an event. However, if response is being evaluated, social research should occur as soon as possible after the event. When interviewing or meeting with people it is important to be sensitive to the impact of the event on both the emergency agency staff and community members. According to the American Psychological Association (2011):

> *'there is not one 'standard' pattern of reaction to the extreme stress of traumatic experiences. Some people respond immediately, while others have delayed reactions—sometimes months or even years later. Some have adverse effects for a long period of time, while others recover rather quickly'.*

Providing evaluations to affected communities

Although there will always be media and public 'evaluations' (favourable and unfavourable) of the emergency management performance after an event, there are strong arguments for governments, through their emergency agencies, to provide formal evaluations to affected communities and the general public.

One of the priority outcomes of the National Strategy for Disaster Resilience (COAG 2011) is 'information on lessons learned—from local, national, and international sources—is accessible and available for use by governments, organisations and communities' in relation to risk reduction and emergency management. It is conceivable that this would include lessons learned after an event and that this evaluation should be co-ordinated and reported by emergency services providers.

There have been some direct requests from affected communities to receive post-event evaluations (e.g. Molino Stewart 2009). These communities want an objective assessment of the event and, if they participated in social research and meetings, want to know they have been heard. Furthermore, the Australian flood and fire emergency agencies have large numbers of volunteers who live in the affected communities. It may, in some circumstances, be difficult for them to cope with negative comments and innuendo (valid or not) in their communities after an event. An official post-event evaluation may help to 'clear the air' and provide an objective view on what occurred. It could also be used to acknowledge and help celebrate the achievements of the volunteers.

Conclusion

Post-event emergency management evaluations other than AARs/debriefs tend to be done on an *ad hoc* basis by Australian emergency services providers, possibly because they are not an integral part of agency preparedness planning and are open to the vagaries of funding and politics. Other than major disaster government inquiries, few post-event evaluation reports are released to the affected communities.

A more consistent, comprehensive, and timely approach to Australian post-event emergency management evaluation is suggested. These evaluations should be reported to affected communities. This will help in improving emergency agency and community learning for future hazard events and overall disaster resilience.

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About the author

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The Pilot Impacts Portal: experience in building an emergency management information sharing tool

Robert Power, Bella Robinson, Mark Cameron (CSIRO) and Nick Nicolopoulos (Fire & Rescue NSW) provide a first year review of the portal.®

ABSTRACT

Natural disasters have increased in severity and frequency in recent years. In 2010, for example, 385 natural disasters killed over 297 thousand people worldwide, impacted 217 million human lives and cost the global economy an estimated US$123.9 billion (Guha-Sapir *et al.* 2011). The World Disasters Report (IFRC 2012) notes that in 2011, 15 million people were forced to move worldwide due to hazards and disasters. Recent Australian examples of natural disasters include the decade-long drought (2003–2012), the 2010–2011 floods in Queensland which affected 70 towns, including Brisbane, with an estimated $8 billion in net additional spending for rebuilding (RBA 2011), *Cyclone Yasi* was originally estimated to cost $800 million for the cost of rebuilding public assets and providing support to the community (Queensland Government 2011, p.66), and Victoria's 2009 Black Saturday bushfires, killing 173 people, impacting 78 towns and having an estimated $2.9 billion in total losses (Stephenson, Handmer & Harwood 2012).

This article is an abridged version of a comprehensive report, *The Pilot Impacts Portal: Towards an Emergency Response Planning Tool*, which describes the portal and project in more detail (Power *et al.* 2012).

In order to effectively prepare and respond to such emergency situations it is critical that emergency managers have relevant and reliable information. This knowledge should include an understanding of the total cost of previous events being the social, economic and environmental costs incurred, the investment in a region on mitigation programs, and the community preparedness to counteract and overcome future disasters.

In summary, the issues facing the emergency management sector involve decisions of where to best allocate investment across the prevention, preparedness, response and recovery (PPRR) spectrum to increase community safety and reduce the costs and social effects of emergencies and disasters. This will be achieved by improving the quality, availability and management of data and these are some of the aims of the Pilot Impacts Portal.

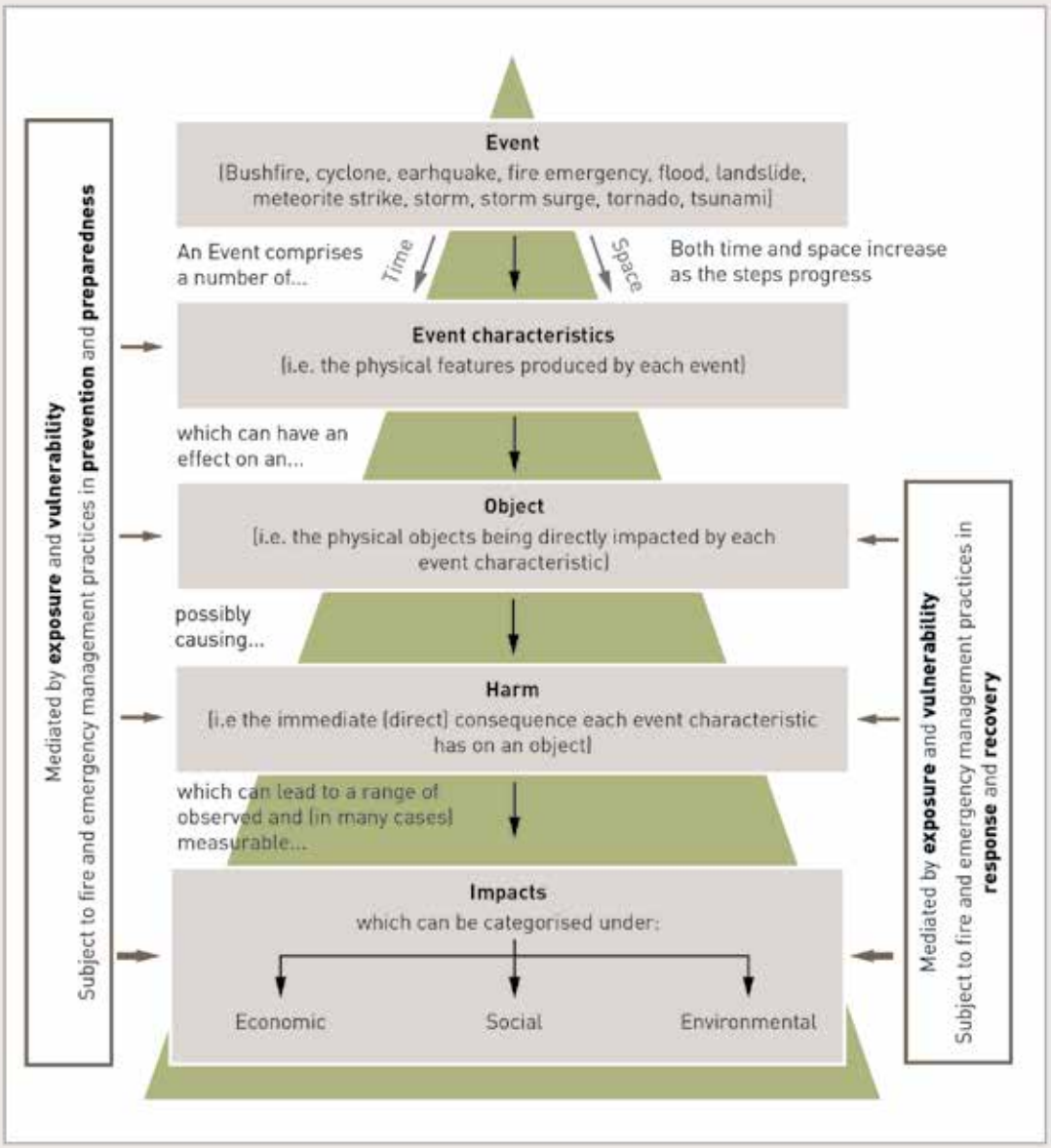
The Impacts Framework

The Pilot Impacts Portal is a web accessible user interface to a collection of data items relating to the Impacts Framework (Stephenson 2010). This framework, developed by RMIT University and the Bushfire CRC, is based on economic principles and defines the process used to determine the economic, social and environmental impacts, losses and benefits resulting from a natural disaster.

The framework is used as a guide to determine and measure the impacts resulting from an event. It achieves this by identifying the elements contributing to the consequences of an event, defining the relationships between them and by informing the collection of information on a wide range of natural disasters. It can be used across any temporal or geographic scale, limited or broad. The framework provides an extensive list of possible impacts that the user can select depending on their area of interest and requirements. The framework is not limited to any one phase of the PPRR spectrum and can be used for emergency management, policy-making or other purposes.

An overview of the Impacts Frameworks is depicted in Figure 1 (see Stephenson 2010). This figure is interpreted from top to bottom using the text below each box to explain the process of identifying an impact. Doing so reveals an *event* comprises a number of *event characteristics* which can have an effect on an *object* possibly causing *harm* which can lead to a range of observed and (in many cases) measurable *impacts*, which can be categorised under *economic*, *social* or *environmental*. Note that both space and time increase as these steps progress. Also, the *prevention*

Figure 1: The Impacts Framework (Stephenson 2010)



and *preparedness* aspects of emergency management practices are shown on the left while the role of *response* and *recovery* are on the right.

Figure 1 defines a 'top-down' approach for describing how to arrive at an impact by refining the disaster event into its constituent characteristics and considering the effects these have on real world objects in turn. This 'top-down' approach, common in management and organisations (for example a 'work breakdown structure'), partitions the problem into smaller sub-problems. In summary, starting from a specific event, the framework notes the possible event characteristics, how they interact with an object in the real world, and the harm that may be caused which results in a specific impact.

Impacts project drivers

The Australian Natural Disasters Impacts Framework Project (Impacts Project 2012), is managed by Fire & Rescue New South Wales (FRNSW). The motivation for the project can be summarised by the following question:

> *Do we know where to best allocate investment across the PPRR spectrum to increase community safety and reduce the costs and social effects of emergencies and disasters?*

Various Council of Australian Governments (COAG) reviews have highlighted the need for more comprehensive data on the full costs of natural disasters and emergency risk management services. This will enable governments and communities to undertake cost benefit assessments and identify the most cost effective mix of risk-based emergency management investment in PPRR interventions across all hazards.

At present, collating all the available data necessary to identify the total costs of emergency risk management

within a community is extremely difficult and beyond the capacity of most stakeholders. Some of the key data required is currently not collected or is inaccessible. Case studies tend to focus on one disaster or type of emergency and hence do not provide an 'all hazards' view of the costs and benefits of emergency risk management investment.

The COAG Report *Natural Disasters in Australia* (Australian Government 2002, p. 14) lists 12 recommendations for all levels of government to reform Australia's natural disaster management. The first two are:

- develop and implement a five-year national program of systematic and rigorous disaster risk assessments, and
- establish a nationally consistent system of data collection, research and analysis to ensure a sound knowledge base on natural disasters and disaster mitigation.

The second recommendation was the original motivation for the Impacts Project. This is the overriding requirement to be fulfilled.

There have also been other significant reports and findings recommending a unified and comprehensive approach to emergency management and reducing risks. A summary follows:

- The report of the ANZLIC Counter Terrorism Project (2003) (note that the report *Using Australia's Spatial Information Infrastructure for Counter-Terrorism* is confidential).
- The Parliamentary Report *A Nation Charred* (Australian Government 2003).
- OECD Report *Emerging Risks in the 21st Century: An Agenda for Action* (OECD 2003).
- The COAG report *National Inquiry on Bushfire Mitigation and Management* (COAG 2004).
- Management Advisory Committee Report *Connecting Government: Whole of government responses to Australia's challenges* (Australian Government 2004).
- Catastrophic Disasters Emergency Management Capability Working Group Report *Review of Australia's Ability to Respond to and Recover From Catastrophic Disasters* (Australian Government 2005).
- The formation of the National Information Management Advisory Group (NIMAG).
- The formation of the High Level Group on Information Management for National Security and Emergency Management.
- The international emergency management trend towards interoperability (shared data systems and access).
- The *Emergency Management Information Development Plan* (EMIDP 2006).
- The *Final Report—2009 Victorian Bushfires Royal Commission* (Victorian Government 2010).

There are also state and territory initiatives tackling similar issues. These groups and their reports all advocate, among other findings, the need for improved access to relevant information for the purposes of emergency planning and response.

In effect, it's important to deliver the *right* information to the *right* people in the *right* format in the *right* place at the *right* time.

The Pilot Impacts Portal (www.fend.org.au)

The portal is a platform to show the benefits of having a single point of access to a wide collection of data items that can be used for evidence-based decision making. The aim is to foster an emergency management user community focused on a national resource (the portal).

An example of the information available is shown in Figure 2 where various historical natural disaster events are displayed with icons and overlays showing the events matching the chosen options.

Figure 2 shows all the events that occurred from 2000–2012 which include impact information. The key to the icons and overlays can be seen next to its data source. For example cyclone tracks are shown as a red line, floods as a blue region and so on. There are more event details available in the portal when the restriction to only display those with associated impact information is relaxed. This can be seen in Figure 3 where the same screen shot is shown, except the check box '*Only show events with impact data*' has been un-checked.

The portal collates data from various sources to report against the Impacts Framework. The data is categorised as described in Table 1.

Table 1: Data item categories

Category	Description
Framework	The Impacts Framework
Baseline	Context in which an event occurs
Historical Events	Information about specific events
Historical Impacts	Measured impacts caused by an event
Mitigation & Recovery	History of funds spent and actions performed in a region for PPRR

What the portal is not

The portal does not provide the facility to conduct modelling or forecasting. It was not designed to analyse the total impacts of natural disasters on a community; nor was it designed to be used for monitoring the current situation during a disaster event. All data available in the portal is managed locally. For example, there are no live data feeds or data obtained from web services. Consequently, data management, adding new items and updating existing ones, is the responsibility of the portal administrator.

Figure 2: Displaying events with impacts

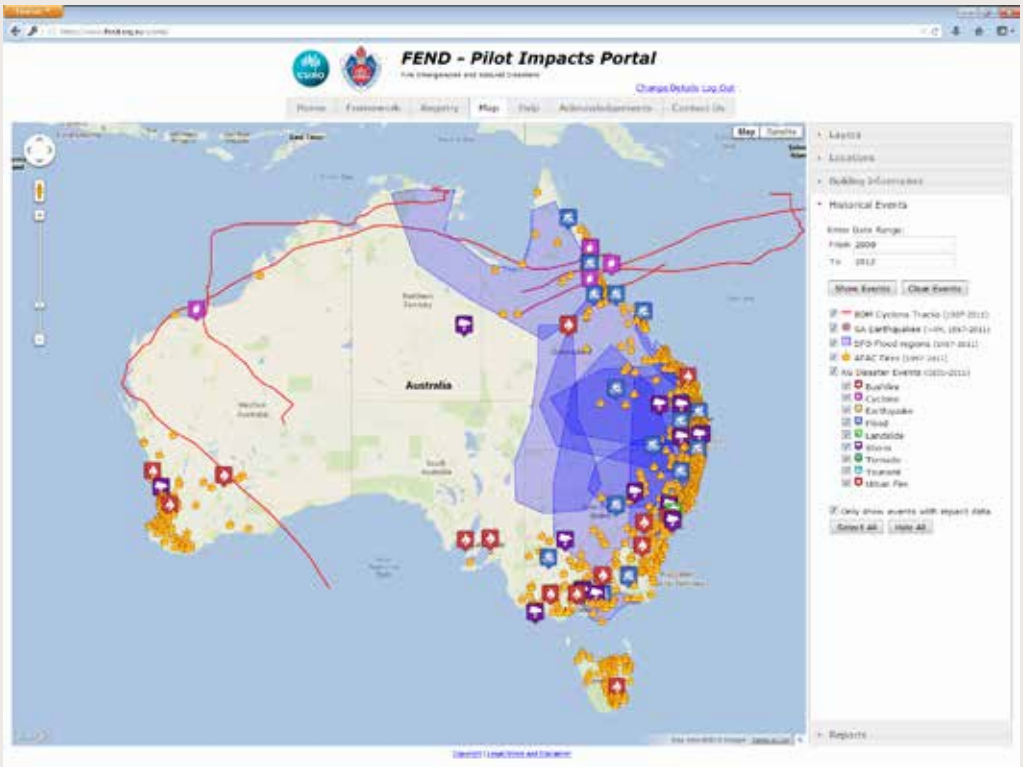
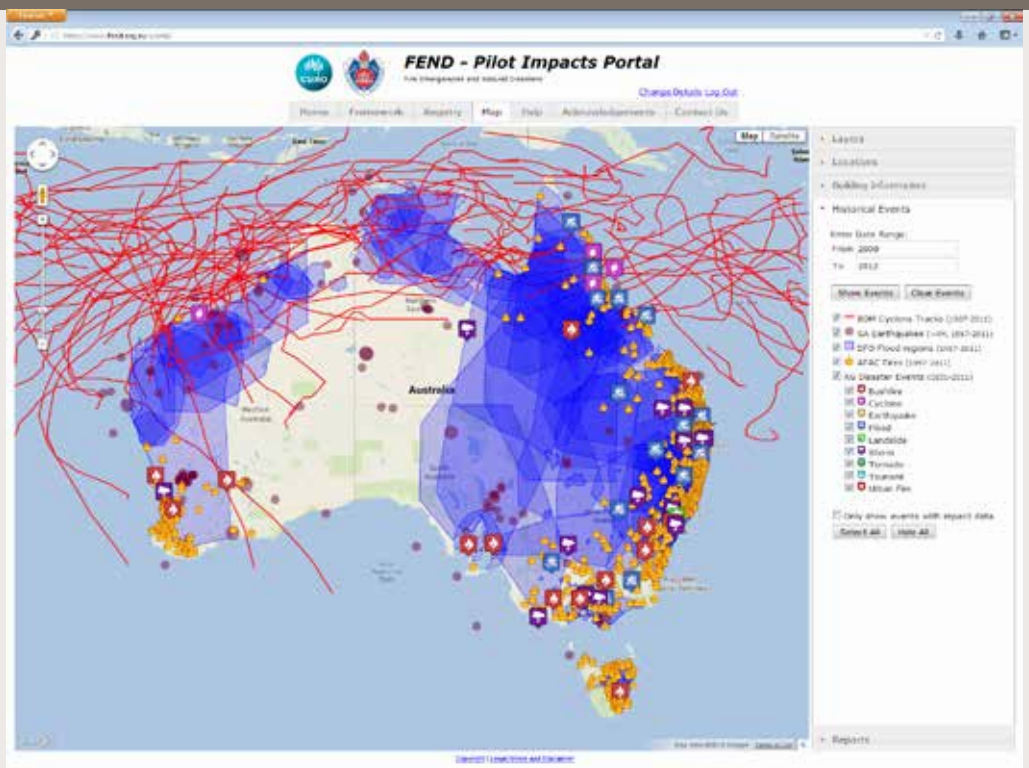


Figure 3: Displaying all events



Portal users

The portal user represents a large collection of possible users ranging from emergency management personnel (people associated with firefighters, ambulance officers, police, rescue personnel, SES, and so on), government (federal, state and local agencies), and community groups. These users will each have a particular objective when using the portal broadly defined as supporting evidence-based decision making on where best to allocate investment across the PPRR spectrum to increase community safety and reduce the costs and social effects of disasters.

User tasks

The Pilot Impacts Portal integrates data managed by various government agencies using a Google Map interface that allows users to access disaster event information by geographic region. The Google Map provides street map, terrain and satellite imagery backdrops for Australia and the map is overlaid with further geographic data. The example in Figure 4 shows historical fires in Tasmania with the local government areas layer displayed and the details of a specific fire incident shown in a popup window, activated by clicking the fire icon.

The user interface provides various access paths to this information allowing the portal user to:

- explore the Impacts Framework
- identify data items relevant to a specific event under investigation
- discover data items by geographical region and time
- discover data items by disaster category
- generate reports summarising the information found, and
- export data extracts for further investigation.

The content of the Impacts Framework can be explored as shown in Figure 5. In this example, the user has navigated to that part of the Impacts Framework associated with the destruction of roads, as a category of public infrastructure, caused by the flames of a bushfire. The result is the direct impact 'Destruction of Roads' which has been expanded to show the consequential impacts that can also result. These are termed indirect impacts. Note that an indirect impact may cause another subsequent indirect impact up to a 'depth' of five.

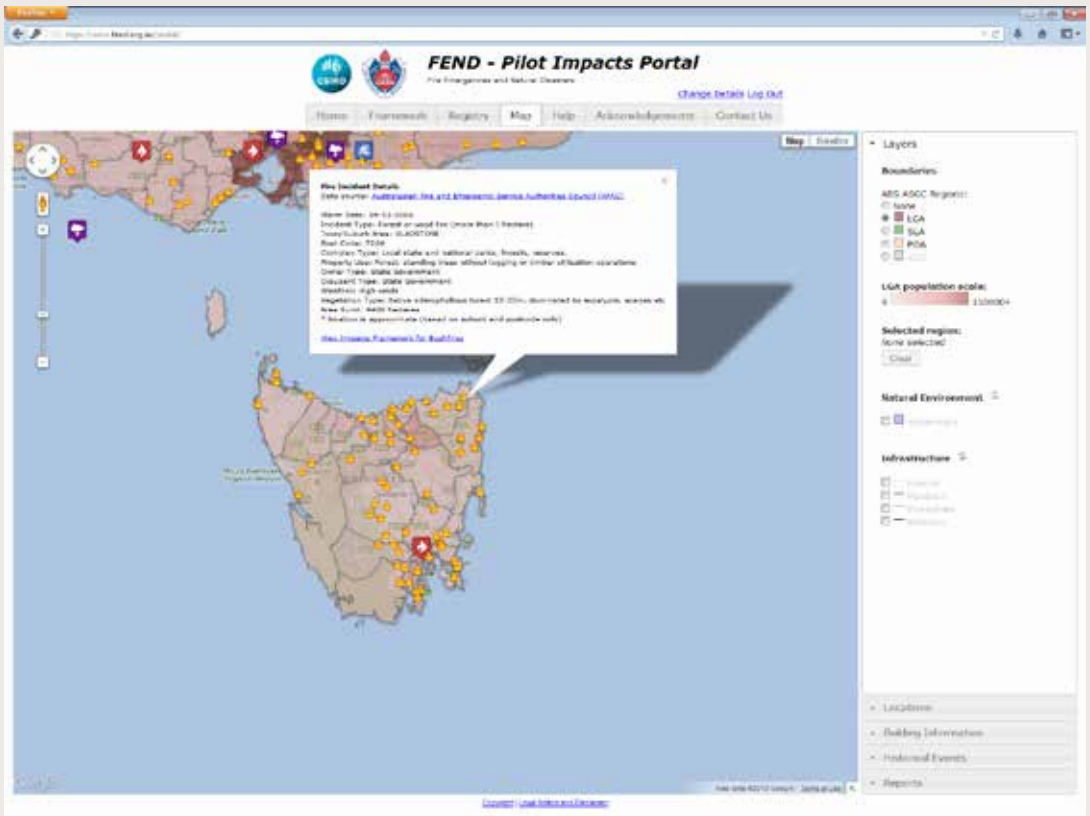
The reporting features are demonstrated in Figures 6 and 7.

Figure 6 shows the map zoomed to the Newcastle, NSW region, with the terrain relief enabled and further infrastructure and natural environment data included. Note there are three earthquake icons displayed—two from the Geoscience Australia Earthquakes database (the circles) and one from the Attorney-General's Department (AGD) Disasters Database (the icon). These datasets have different spatial resolution for the events they describe (explained further on).

Figure 7 shows a subset of an example report generated summarising the information of Figure 6. This information is expected to provide evidence for the user to support their investigation and is a PDF document which includes:

- a summary of when the report was created
- a map of the region chosen
- population estimates
- descriptions of the disaster events
- information about the built environment from Geoscience Australia's National Exposure Information System (NEXIS), and
- acknowledgements to the data providers.

Figure 4: The map view showing Tasmanian fires, local government areas and details of a selected event



Another output available for a user is a data extract. This is a comma-separated values (CSV) file containing a subset of the data items available in the portal for a selected region. This feature allows a user to explore relevant data items using tools available to them.

Further examples of how the portal may be used include:

- conducting state-wide assessments
- prioritising grant money for recovery processes
- identifying vulnerable communities
- informing operational management and resource allocation during large scale events, and
- identifying damage and losses to develop and prioritise prevention and preparedness programs.

The portal has been developed with these goals in mind and it is up to the user community to provide feedback on how successful this has been.

Figure 5: The Impacts Framework Internet Explorer user interface

Figure 6: Newcastle earthquake (1989)

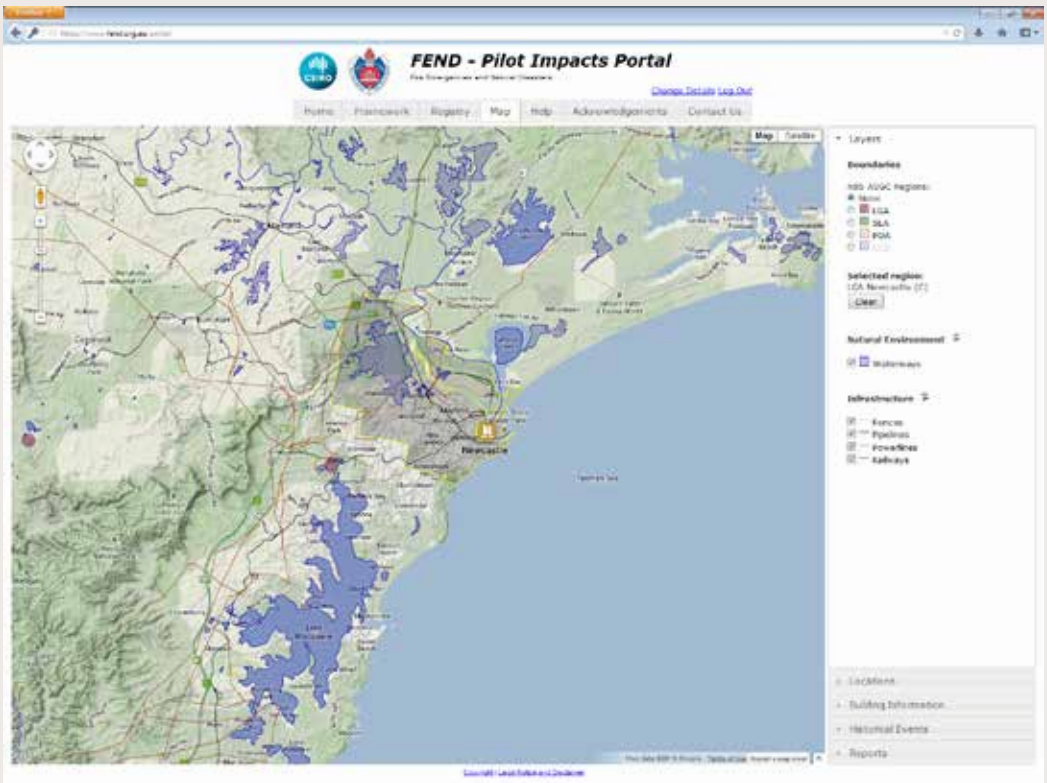
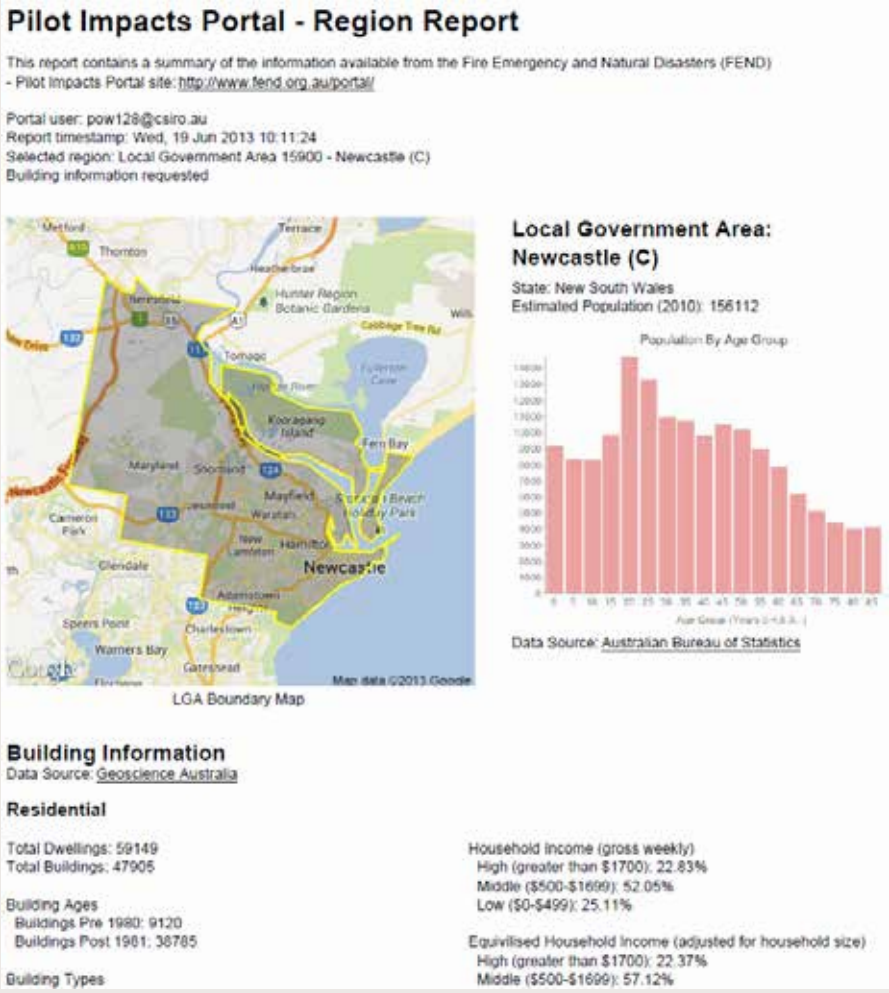


Figure 7: Generated report (subset) for the Newcastle local government area



Pilot Impacts Portal - Region Report

This report contains a summary of the information available from the Fire Emergency and Natural Disasters (FEND) - Pilot Impacts Portal site: http://www.fend.org.au/portal/

Portal user: pow128@csiro.au
Report timestamp: Wed, 19 Jun 2013 10:11:24
Selected region: Local Government Area 15900 - Newcastle (C)
Building information requested

LGA Boundary Map

Local Government Area: Newcastle (C)

State: New South Wales
Estimated Population (2010): 156112

Data Source: Australian Bureau of Statistics

Building Information

Data Source: Geoscience Australia

Residential

Total Dwellings: 59149
Total Buildings: 47905

Building Ages
Buildings Pre 1980: 9120
Buildings Post 1981: 38785

Building Types

Household Income (gross weekly)
High (greater than $1700): 22.83%
Middle ($500-$1699): 52.05%
Low ($0-$499): 25.11%

Equivilised Household Income (adjusted for household size)
High (greater than $1700): 22.37%
Middle ($500-$1699): 57.12%

Data items

A summary of the data items available in the portal is shown in Table 2. The data item 'custodian' is noted along with its category as defined in Table 1. Note that a mix (by years) of ABS Australian Standard Geographical Classification (ASGC) boundaries were used due to the availability of associated population demographics for these regions at the time of development.

Issues encountered

There have been a number of issues and obstacles encountered which include:

Locating events

The data describing historical disaster events has varying levels of accuracy. Some data items include specific geographic coordinates, such as earthquakes and cyclone tracks, whereas others are described with a general location. For example, the AGD Disasters Database sometimes includes only a very rough idea of where the event was geographically located. Each event is assigned to one or more of the 143 map regions defining a grid for Australia. These regions are used to

Table 2: Summary of portal data items

Data Item	Custodian	Categories
Impacts Framework	FRNSW	Framework
ASGC CD 2006	ABS	Baseline
ASGC LGA 2010	ABS	Baseline
ASGC POA 2010	ABS	Baseline
ASGC SLA 2010	ABS	Baseline
BCP 2006	ABS	Baseline
Populations 2010	ABS	Baseline
National AIRS DB	AFAC	Event/Impacts
Disasters Database	AGD	Event/Impacts
AHGF	BOM	Baseline
Tropical Cyclones	BOM	Event
DFO	Colorado Uni	Event/Impacts
Earthquakes DB	GA	Event
GEODATA Topo 250K	GA	Baseline
NEXIS	GA	Baseline

place icons on the portal's Map View corresponding to the events occurring in these regions.

Locating events in this way is only approximate and has the added problem that multiple events in the same region are given the same location resulting in icons being stacked on top of each other. This was resolved by including a small random offset in these cases to disperse the icons so they can be distinguished. This process is known as 'cartographic generalization' and is a standard practice when rendering information on a map. This example highlights a difficultly when repurposing data. This is not an issue when presenting data in tabular form, but it is when displaying on a map.

A similar issue was that some locations are defined using place names. The Yahoo GeoPlanet web service[1] was used to find a suitable place match. Note that the task of locating an event is performed during data loading to assign permanent geographic coordinates. The results were reviewed by a person and are subsequently used when displaying the events in the portal.

Data quality

There were data quality issues with some of the data items obtained which were manually fixed. The Dartmouth Flood Observatory (Brakenridge 2011) is a global archive of large flood events available as a Shapefile (a popular vector data format for geographic information) with further data available as a CSV file. When displaying the flood extents as polygons, some did not correspond to their descriptive text. For example, there were flood events in Western Australia described as occurring in New South Wales and there were floods in South East Asia that were noted as occurring in Australia. The problem seemed to be a 'shift' of one row for the data in the Shapefile and corresponding CSV. This problem was manually fixed and the data custodian notified.

Also, the content of the AGD Disasters Database was revised during the course of the Impacts Project.[2] The publicly available database was downloaded on four occasions and each time the amount of information available decreased as noted in Table 3. However, the quality of the information made available increased with each release.

Table 3: AGD Disasters Database summary

Date Obtained	# Events	# Impacts
26 October 2011	790	232
1 February 2012	517	180
7 May 2012	244	102
22 June 2012	240	86

1 http://developer.yahoo.com/geo/geoplanet/

2 The disaster event information contained in the Disaster Database has been integrated into the Australian Emergency Management Knowledge Hub, as of July 2012. The Knowledge Hub is a fully searchable online resource for emergency management information, research and media. www.emknowledge.gov.au

Improving the data is commendable, however an alternative would be to provide quality indicators at the record level. This would allow access to information that is otherwise not available, and places the responsibility on the user to interpret the data correctly.

Data availability

Some data custodians have data, but it is not readily available for use in the portal due to cost, licensing constraints, availability, or sensitivity of the data. For example, the Public Sector Mapping Agency data costs approximately $50 000 per year to licence and data from Risk Frontiers could not be made publicly available.

Existing data repositories

There are data items relating to the Impacts Framework which exists as collections of reports describing, for example, specific natural disaster events, post-event surveys and risk studies. Some of these reports have been collected when they are available from web sites for use in the portal. However in many cases these reports exist, but are not available for the following reasons:

- the reports are not managed as a single resource
- the report contents are often an aggregation of data from other sources (and these original sources should be identified for use in the portal)
- the data items are distributed throughout the organisation, and
- no one person knows where they are all located.

Data coverage

Comparing the list of data items currently available in the portal (see Table 2) against the content of the Impacts Framework identifies various gaps in the data obtained. Most notably, there has been no mitigation and recovery data items identified for use in the portal. While such data does exist the availability of this data has been an issue. Although agencies have data, it is not readily accessible since it only exists in individual reports distributed throughout organisations. Accessing these reports is problematic for the same reasons outlined above.

Future work

The portal went 'live' on 15 June 2012 and completed a 12-month trial at the end of June 2013. Members of the Australian emergency services community were notified of the release and in the first two weeks over 30 users registered. At publication there are over 100 registered users from over 40 agencies. Feedback from users about the usefulness of the portal is welcome especially related to ways it can be improved. FRNSW is planning the future deployment arrangements and in the meantime CSIRO will continue to host the portal.

The original aims of the Impacts Project were to provide emergency services organisations with better information about natural disaster events so they can improve their decision-making around PPRR investments in terms of community safety and reducing the impacts of future events. The Pilot Impacts Portal supports these aims. It is a tool to improve access to

information about relevant historical events, allowing users to review the frequency and intensity of previous events for specific geographic regions and includes information on the built environment (via NEXIS) and demographic details (ABS data).

Effective emergency management requires finding the right balance between preventing and preparing for disasters and responding to and recovering from them afterwards. The Impacts Framework, upon which the portal is based, provides a systematic process for understanding the economic, social and environmental impacts associated with natural disaster events. This allows detailed planning options for managing emergencies to be explored in terms of a cost-benefit analysis.

There are a number of areas for future work:

- The data items available should be extended to cover the gaps identified.
- The current centralised approach to managing the data items in a data warehouse should be extended to 'harvest' data from sources that provide up-to-date information.
- The 2011 Australian census data recently released by the ABS should be integrated into the portal.
- The user community should be allowed to directly contribute information to the portal for others to directly access.
- Standards should be investigated for information exchange describing natural disaster data.

Acknowledgments

The Impacts of Natural Disasters and Fire Emergencies is a national project managed by Fire & Rescue NSW. This project is part of the Natural Disaster Mitigation Program and is jointly funded by the Commonwealth and NSW Governments with 50 per cent contribution from the Commonwealth of Australia and 50 per cent from the NSW Government.

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Communication research needs for building societal disaster resilience

Dr Judy Burnside-Lawry and Dr Yoko Akama (RMIT University) and Dr Peter Rogers (Macquarie University) report on a symposium to identify practical, theoretical and conceptual communication issues for building resilience to disasters.®

ABSTRACT

Disaster resilience emphasises capacity building and generative coping mechanisms that involve communities in strategic planning. Participation of various stakeholders increases public confidence by sharing responsibility and reduces the reliance on government agencies alone. Recognising there may be no single definition of 'good community participation process', RMIT University's School of Media and Communication invited a multidisciplinary group of scholars from the United Kingdom, New Zealand and across Australia to a one-day symposium to identify practical, theoretical and conceptual communication issues and challenges associated with increasing the engagement of communities in building resilience to disasters. This paper presents outcomes from the workshop.

Introduction

For Australia and its Asia–Pacific neighbours, the past decade will be remembered as a period of large-scale disasters with devastating impacts on economies, the environment and above all, the communities across our region. These have included the Indian Ocean Tsunami in 2004, cyclones and typhoons in Myanmar, Bangladesh, The Philippines and Vietnam, floods in Pakistan, China, Thailand, raging fires in various parts of Australia, and earthquakes in New Zealand, Pakistan and China. In 2011 the region experienced the Great East Japan Earthquake, tsunami and the ensuing nuclear disaster. In 2011 alone, these disasters caused regional economic loss of $294 billion—representing 80 per cent of global losses that year (UNISDR 2012a p. 3). The United Nations Office for Disaster Risk Reduction (UNISDR) predicts that economic losses from disasters will continue to increase. It notes that, since 1981, economic deficit from disasters is growing faster than GDP per capita in the OECD countries, meaning that 'the risk of losing wealth in weather-related disasters is now exceeding the rate at which the wealth itself is being created' (UNISDR 2012a p. 3).

The UN General Assembly adopted the *International Strategy for Disaster Reduction* in December 1999, reflecting a major shift from the traditional emphasis on disaster response to disaster reduction, promoting a culture of prevention. The Strategy's focus is risk prevention to enable all communities to become resilient to the effects of natural, technological and environmental hazards by reducing the compound risks of social and economic vulnerabilities (UNISDR 2012b).

There is increasing recognition that emergency and disaster preparedness will not be effective without the engagement of 'vulnerable' communities. UNISDR (2009) define vulnerability as '[t]he characteristics and circumstances of a community, system or asset that makes it susceptible to the damaging effects of a hazard'. Given the scale and severity of recent disasters, this means most communities can be regarded as 'vulnerable'. Building a community's capacity through active involvement can create confidence and pave the way for collective and continuous development in strengthening resilience. While this may require a greater focus on communication (in both the quality of public information and the quality of conversations with communities) it is not the purpose in this article to offer up a conclusive definition of communication itself. Rather, the concern is to reflect on the definitions of resilience and vulnerability in the light of ongoing communication research. This discussion may help build capacities for experts and lay-people through a more structured understanding of what communication researchers bring to the table.

Resilience is defined in a number of ways. Most common definitions of resilience include the ability to cope in the face of adversity (Gilchrist 2009, McAslan 2011). Variations include economic, infrastructure, socio-ecological, psychological, individual, community, disaster and more (Rogers 2012). The term is also often coupled with adaptive capacity, the presence of a local, strong kinship network and its ability to adapt over time to buffer stress to psychological and potentially threatening

environment (Smit & Wandel 2006). Of particular interest to those working in the area of communication are the implications of strengths and abilities to overcome vulnerabilities inherent in the community, who are framed as being capable of positive adaptation to change (Australian Social Inclusion Board 2009). Drawing out this capability becomes a key challenge for engaging communities and communicating with them, both in terms of providing information but also actively listening to their needs. The resilience of communities may be dependent on social interaction and collective action, itself tied to the complex networks of relationships, reciprocity, trust, social norms (McAslan 2011) and linked to the capacity of individuals, households and groups to adapt after a disturbance (Norris 2008).

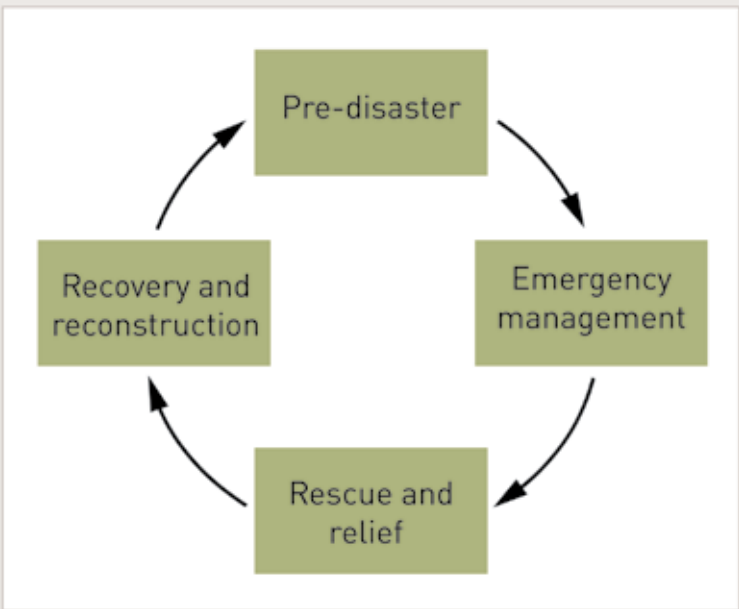
As such, strengthening community resilience with an emphasis on the principle of shared responsibility between governments, business, communities and individuals sits at the core of current Australian national policy detailed in the *National Strategy for Disaster Resilience* (NSDR) (AGD 2012). Since its release in February 2011, the NSDR provides a high-level framework to help practitioners think about resilience differently and move towards implementation of this strategy across federal, state and local levels. A key challenge for practitioners working in the field of disaster management is rethinking and rearticulating their established practices, moving away from the traditional top-down, chain-of-command styles of communication and planning. Significant cultural and organisational shifts need to take place in order to implement participatory strategic planning and dialogic communication between all stakeholders—federal, state and local governments, emergency management practitioners, civic organisations, residents, technical experts, business and community leaders. Rather than identifying effective methods of *disseminating information to* the community, the challenge is to design effective methods of *engaging with and listening to* the community.

Opportunities for communication research

Despite the rhetoric of community engagement, a coherent communication framework is noticeably absent. If engaging community capabilities and embedded knowledge and skills of local people is to be meaningful, then there *must* be a move beyond metrics and measurements. While the intra-organisational communication strategies for disaster resiliency are still being developed, these are often in-house steering documents focussed on communicating policy among experts, or informing the public. The challenge is how to engage while enabling and listening to the public, and how practitioners identify the skills and knowledge that is important, desirable and useful in the community. The expectations and needs of both groups must be taken into account but the complexity of challenges, both for capturing and capitalising the best way forward, remains traditional and poorly articulated throughout the different phases of a disaster management cycle (see Figure 1).

Some critical questions emerge as opportunities for communication researchers. Where in the cycle of disaster management does the community reside? At what stage should the community be engaged and involved as participants rather than recipients of service provision? How can they be empowered and

Figure 1. Disaster Management Cycle from the RMIT Symposium.



their voices enhanced in developing the participatory potential of meaningful resilience? This is even more vital when an overemphasis on expert-driven services may replicate existing top-down (and potentially) exclusionary delivery methods and thus fail to meet the needs or engage the potential of communities to contribute and take ownership of 'everyday' resilience (Rogers 2013).

There are a number of opportunities for communication research to be woven into the disaster management cycle. This can occur at various stages in the cycle:

Pre-disaster—through proactive community engagement for the identification of risk and vulnerability (see Akama et al. 2012) or the provision of better insurance assessment applications (e.g. Know Risk)[1]. UNISDR's emphasis on disaster reduction and preparedness means that effective engagement at this stage can be the most critical in reducing negative impacts for disaster events.

In emergency management—throughout the established techniques for the assessment, preparation and planning activities and the potential for re-skilling community liaison officers and community development organisations in disaster management. This also includes ways that communication could scaffold more effective collaboration between various agencies and the community, or how social media like Twitter can aggregate and disseminate real-time information during disasters (see Burns & Burgess 2012, Cheong & Cheong 2011, Elmer & Dugan 2011).

In the post-event stages of rescue and relief operations—ranging from the potential of social networking platforms to provide real-time information and the dangers of managing misinformation from unverified or insecure sources to the potential of emergency information platforms (e.g. 'DisasterWatch') to provide more reliable up-to-the-minute information (Larkin 2009).

In recovery and reconstruction—where lessons learned can provide examples for the resilience of communities and show how they can flourish and creatively solve many problems. Such lessons could also critically reflect upon challenges, obstacles and mistakes that stymie local agency for individuals, groups and organisations. Removing these roadblocks can be possible, demonstrated by the Student Volunteer Army after the Christchurch earthquakes in New Zealand in 2010–11 and the 'Go List' in Victoria following the 2009 Black Saturday bushfires.

2012 Symposium

With the aim of exploring these opportunities, an international gathering of Australian, UK and New Zealand researchers from RMIT University, Macquarie University, the University of Salford and University of Canterbury, came together in late 2012. The symposium generated lively discussion, helping to shape the research agenda and focus the media, communication and social science contributions in ongoing research that not only enhanced community engagement and communication but also informed a grounded and practical framework for community resilience. Hosted by RMIT's School of Media and Communication, 15 scholars from design, communication and anthropology disciplines with experience in national and/or international disaster resilience or management projects shared their expertise with Professors Dilanthi Amaratunga and Richard Haigh, from the Centre for Disaster Resilience, University of Salford.[2] The resulting debates showed how focussing a collective research agenda on a number of topical themes can generate a co-ordinated drive to secure funding for research. This helps to frame, enhance and develop community-driven projects, particularly in the areas of engagement, participation and communication for increased resilience. The focus of the research agenda is on the following six themes.

Theme 1—Interface and partnerships

Cyclical patterns of disasters creates particular communication challenges for diverse stakeholders attempting to create effective partnerships and shared responsibility. There is a need for different stakeholders to be involved to different degrees at each stage of the disaster management cycle (Figure 1). For example inter-agency communication in the pre-disaster stage can often be limited as there is no expectation for agencies to lead specific activities. However, in the response stage emergency services or civil protection services [3] take the lead role in communication and inter-agency co-ordination. In recovery, civil services and local government are more likely to take the initiative. It is critical for us to understand how and where the lead responsibility changes. Communication flow must be fluid to aid in transition and engagement, with various stakeholders understanding their role in the critical interfaces. There is a need for research focussed on exploring the interfaces and partnerships between stakeholders involved in the various stages of the disaster management cycle, and during transition between stages. Case study examples of communication methods to stabilise these interfaces will provide valuable learning for policy makers, agencies and practitioners. Grounded research is

1 'Know Risk' here refers to a tool for mobile communications devices developed by the insurance industry to assist the private individuals in the self-assessment of risks and documentation and registration of possessions in their homes. It should not be confused with the UNISDR (2005) 'Know Risk' document.

2 The professors are Co-chairs of the EU-funded Academic Network for Disaster Resilience to Optimise Educational Development (ANDROID).

3 Civil protection services refers to the broader range of agencies involved in mitigation and response activities. This term is used broadly internationally; in the UK it is used to refer to 'Blue-Light' (e.g. fire, police, ambulance) (Rogers 2010) and can include local and regional civil government—in no small part this is due to the expansion and integration of capabilities in the resilience policy agenda (see for example Coaffee et al. 2009).

needed to identify where flows and blockages in communication could or have happened as well as where and why communication may have broken down and, more importantly, how to learn from this and avoid these failures in future.

Theme 2—Communication strategies to build community resilience

Participatory communication, stakeholder and community engagement are familiar concepts to communication scholars and practitioners and are increasingly recognised for emergency response and reconstruction, though there is a need for a greater cross-over of experience and skills in this emergent area of expertise. Key communication strategies need to be considered that assist constructive collective action, democratic participation and participatory communication among all stakeholders involved in disaster risk reduction. In order to build this area of research, there is a need to investigate a variety of community engagement methods, including design and social media, taking into account the variations in hazard experience, community make-up and social capital.

Examples of effective communication strategies have been piloted already, often in regard to bushfire preparedness, using participatory design-led research methods to facilitate co-creation and communication of local knowledge on risks and resources of their specific locality (Akama 2010, 2012). Through these processes residents share their perspectives and understandings of neighbours, neighbourhood environment and potential hazards, and question assumptions and generalisations. The process of visualising tacit or informal knowledge can make it tangible, concrete, valuable and significant for mitigation and planning. These design methods show the importance of social interactions and demonstrate potential of bridging relationships between neighbours that can lead to better preparation for all hazards. Key research questions to guide this research are; how can participatory methods of engagement be built into the practice of communication beyond the well-established risk communication practices? How can all players manage the expectations of stakeholders before, during and after a disaster? How does the knowledge embedded in diverse communities play into being more prepared, being better able to act? How does it help all players learn to be more informed with higher confidence and ownership of the process for individuals, households and communities? How can we better communicate to tease this knowledge out in participatory communication? Outcomes from empirical research answering these questions could inform further studies to explore whether communication strategies used in small, rural communities can be used in larger, urban centres to build community resilience.

Consultation between emergency services personnel and community representatives on disaster risk reduction.

Theme 3—Theories of communication and the disaster management cycle

During the Symposium participants referred to the disaster management cycle as a framework to identify where communication theory can contribute to building resilience (Figure 1). As communication scholars, we have theoretical frameworks and models that guide our research which can be applied to the disaster management cycle. For example, theories on crisis and risk communication (Merkelsen 2011, Roeser 2012), change communication (Zoller 2005), Grunig's model of public relations (Grunig & Grunig 2002), relationship management (Cheney & Dionisopoulos 1989), participatory communication models (Burnside-Lawry 2011, 2012, Burnside-Lawry, Lee & Rui in press, Burnside-Lawry & Carvalho in press; Jacobson & Storey 2004), and Habermas's theory of communicative action (Habermas 2001). However, these frameworks may not be familiar to scholars and practitioners working in disaster management. These theories have to be re-contextualised to the complexity of disasters in ways that highlight the potential for more engaged and empowered communication. They can also highlight the importance and value of listening and provide better tools for training. Theory can inform practice, and an applied series of workshops, discussions and skill-based learning can draw out the value of communication theory in the field of disaster resilience. This can also help expand the growing interest in ethical considerations surrounding the role and behaviour of media organisations, which operate in a 24-hour media news cycle, and balance the hunger for live information with the responsibility to provide accurate information (especially during and after disaster events). Such considerations have been highlighted (Muller & Gawenda 2010) and draw theoretical and ethical research together with the real-life experiences and needs of the communities affected by traumatic events. Tensions between free access to information, security of affected locations, and the privacy of traumatised communities can all become issues for communication in theory and in practice.

Theme 4—Gendered work and community leadership

Gender tends to be a peripheral theme in disaster literature (Tyler *et al.* 2012) even though Fothergill (1998) states that women and men perform distinct preparedness activities. Tyler and colleagues (2012) explain that women are more likely to receive risk communication from to their social networks. Women, in particular, can be a critical link between the family unit and those beyond. Women's participation in voluntary organisations such as the Rural Women's Network or Country Women's Association are historically known to support members of rural communities and enhance community interaction. Fothergill (1998) explains that women become active in such groups through female friendship networks, and they see such memberships as an 'extension to their traditional domestic roles and responsibilities' because disasters pose a threat to their home and family. Research by Akama and colleagues (2013) in Australia examines the role of social networks in bushfire preparedness, using participatory visualisation methods as a way to analyse how knowledge related to bushfire might flow, either in preparation for, or during a fire. They examine social relations and characteristics, including gender and leadership within the networks to contextualise this knowledge flow. Gender will continue to emerge as an important aspect of disaster research and it requires further examination. This is never more important than when mapping how informal networks operate in the pre-disaster phase, for identifying the emergent roles different people play, and understanding better what they can enable and what diverse groups and services (like Meals on Wheels) can bring to the table.

Theme 5—What is the relationship between communication and resilience?

Evidence shows that in the hazards field, provision of information is not directly related to the adoption of hazards adjustment (Brenkert-Smith 2010). Despite the effectiveness of distributing information to the broader public, this method alone is not enough to increase people's preparedness for fire (Robinson 2003). Irrespective of clear, accessible information displayed on websites, or dissemination of printed materials, these have not led residents to be more proactive towards preparation or to building their resilience (Akama *et al.* 2012). During the Symposium participants explored possible reasons for gaps between awareness and behaviour change, concluding that more research is needed to examine the way communication is framed at different stages in the disaster management cycle. For example, the communication-as-transmission process is often seen as a way to achieve immediate, unimpeded transmission of messages and a form of control of distance and people. This view of the audience as passive agents reinforces the power-dynamics that currently exist between authorities and local communities (Carey 1998). Participants agreed on the need for more empirical data that examines the way communication is framed for different community sectors and demographic groups. Among the key research issues for this theme to address is how communication capacity may both create vulnerability and reduce vulnerability before, during and after a disaster event in different ways. There is also a need for an improved understanding of how different 'communities' are composed—especially the content and form of 'communication capacity' in different locations. This last feature of future research is particularly important in balancing the hunger for technical information and measurements with community needs. Such information must be rendered both legible and relevant to the public if it is to be useful.

Community-based dialogue: Aboriginal elders and volunteers in Cherbourg, Queensland, share their knowledge by mapping local risks and resources and build preparedness for floods.

Theme 6—How do we measure community resilience?

Often, governments and funding bodies expect a quantifiable 'Return on Investment' as ways to evaluate and measure research outcomes. If community is the central fulcrum that can tackle social ills and build greater resilience against calamities, how do we evaluate the quality of community resilience and could it be measured? These are questions prompted by the UK's 'Big Society' agenda. A report by the Royal Society of the Arts aims to provide such measurements by adopting a scientific approach (Rowson, Broome & Jones 2010). Their 'connected communities' project measured social capital by the network size and shape to make the 'Big Society' more tangible. Social network analysis and measurements are also being conducted by researchers in Australia, to understand how communities recover from disasters such as the 2009 Black Saturday bushfires (Gallagher 2012) and examining effective network structures for organisations responding to the 2011 Queensland floods (Robins 2012). In contrast, examples of qualitative research methods to evaluate the quality of community resilience within a city, town or region were presented by other symposium participants.

A number of researchers promote the concept of 'capital' in their assessment of the positive adaptive potential of community resilience to the disruption caused by diverse hazards. The attraction of using a 'capital' approach is the ability to apply measurements to various factors such as *social* capital (trust, norms and networks), economic capital (income, savings and investment) and *human* capital (education, health, skills, knowledge and information) as indicators for community resilience (McAslan 2011). Other researchers take a qualitative, grounded theory approach in defining resilience that is contextually specific to communities. Interviews with bushfire survivors in northeast Victoria by Stelling's (2011) research team examine what the interviewee's sense of 'community' means, how it is demonstrated and how that led to their survival and recovery. The analysis evidences support by neighbours, friends, family, services or those beyond the community, echoing findings from other studies (see Rowson 2010, Akama & Chaplin 2013). Stelling (2011) also points out the importance of media and communication to provide education, infrastructure, risk awareness, warning and greater preparedness strategies, supporting the need for further research.

Conclusion

It is acknowledged that this is a rapidly changing environment. Communication with the community members and listening to them is a growing feature of policy and practice. This paper provides a brief summary of some potential future research themes and salient questions that would contribute to the development of policies and processes associated with community engagement, public participation and empowerment within the context of disaster management. The study of communication research needs for building societal disaster resilience is a multidisciplinary endeavour. As such, a significant outcome of RMIT University's Symposium is the commitment by international scholars to collaborate as a research group, in order to advance practical, theoretical and conceptual communication solutions for increasing the engagement of communities in building societal resilience to disasters. We invite scholars, policy-makers and practitioners to join us in this endeavour, contributing the knowledge and expertise. The aim and outcome is to optimise effective partnerships between local communities, cities and nations for sustainable growth of resilience for all parties, now and into the future.

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Response, recovery and adaptation in flood-affected communities in Queensland and Victoria

Dr Deanne Bird, Pamela Box, Tetsuya Okada and Dr Katharine Haynes (Macquarie University) and Assoc Prof. David King (James Cook University) provide insights into the recovery and adaptation to reduce flood risk.®

ABSTRACT

This research aims to identify the factors that inhibit and enable adaptation strategies within flood-affected communities. To achieve this, a mixed methods survey was carried out in three case study locations of Brisbane and Emerald in Queensland, and in Donald, Victoria. Resident experiences of the flooding in terms of response and recovery were also examined in order to understand the broader story from a local perspective.

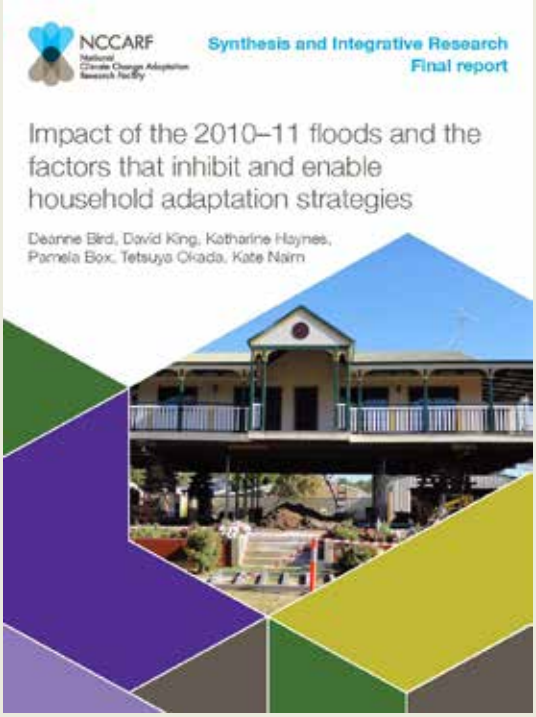
Introduction

Severe floods in 2010–11 impacted extensive areas on Australia's east coast, especially in Queensland and Victoria. Small centres are regularly flooded, but the 2010/11 events included extensive flooding of a major city and consequent extreme economic impacts. Regular repeats of such events will force change and adaptation on communities and governments in the long term (IPCC 2012). These events provide an opportunity to explore the challenges and opportunities for adaptation facing residents and local government officers during the reconstruction period, and to identify the extent to which resilience and adaptive capacity are already present in flood-affected communities.

Research was carried out in Emerald and selected suburbs of Brisbane in Queensland, and in Donald in Victoria. People were evacuated from the flood danger in all of these places and some experienced severe losses. Emerald and Donald are both inland rural settlements that have previously faced extended drought. Suburbs in Brisbane that were flooded are in existing flood prone areas where future floods may be expected.

In Brisbane the suburbs of Chelmer, Graceville, Tennyson, and Rocklea were surveyed. These suburbs were chosen following discussion with officials at the Department of Communities, Child Safety, Youth and Families, as residents within each represent a variety of demographic groups.

This paper provides a condensed overview of the findings of this research published in the full report *Impact of the 2010/11 floods and the factors that inhibit and enable household adaptation strategies* by Bird *et al.*



Surveying flood-affected communities

Interviews were carried out with emergency management staff, planners, engineers and administrators in local councils and state government departments responsible for flood and natural hazard risk reduction. Interviews were also conducted at the community level to gain an idea of the household experience before, during and after the floods. During the interviews, residents were asked to give information

on the warnings they received, how they responded, what adjustments they made to their houses, the extent of damage to their property and what, if any, adaptations they had made, or were planning to make, to reduce future risk.

Some interviewees were recruited through door knocking in flood-affected communities. Other interviewees were approached using an opportunistic technique—where the initial respondent (council official or resident) suggested others who might be willing to participate in the research.

Questionnaires were delivered by researchers to households for self-completion, with assistance from the Community Flood Recovery Group in Donald. Questionnaires were also available online and advertised by the Central Highlands Regional Council in Emerald and regional Queensland ABC Radio. The questionnaires gathered information on householder capacity to cope with the 2010–11 events, the implementation of any current changes during the reconstruction phase, and views, expectations and plans for further adaptations. A copy of the questionnaires is included in the NCCARF report (Bird *et al.* 2013).

Fieldwork was undertaken in August and September 2011. Overall, 18 interviews and 62 questionnaires were completed in Brisbane, 16 interviews and 53 questionnaires were completed in Donald and 21 interviews and 95 questionnaires were completed in Emerald.

Overview of case study results

Impacts and findings from Brisbane, Queensland

The majority of Brisbane respondents were aware that their home was vulnerable to flood yet very few tried to protect their house with sandbags. This could be due, according to survey respondents, to the difficulty of obtaining sandbags in some flood-affected neighbourhoods. The most common form of adjustment prior to or during the flood was raising or relocating household items to a safe location. There was a widely held assumption that Wivenhoe Dam had 'flood proofed' Brisbane, and that the risk should have been minimal. A lack of awareness of flood risk was evident in some residents' responses, due both to the long amount of time since Brisbane was last flooded and a belief that Wivenhoe Dam would prevent any potential flooding.

Flood damage was still evident around Brisbane eight months on. In all, 56 per cent of respondents had either yet to complete or start rebuilding and 15 per cent had not returned to their property on a permanent basis. This was due to a number of factors, including cost, the need to wait for insurance decisions, and there being more properties to be rebuilt than there were builders. A number of abandoned properties were evident in the case study area with a local councillor suggesting up to 10 per cent of properties may be abandoned permanently.

Respondents voiced their dissatisfaction of how the flood response had been handled; a number believed that the rest of the city had 'moved on' while they continued to deal with the flood's aftermath. The emotional stress of the flood event and recovery process has had an impact on wellbeing, with 63 per cent of women and 56 per cent of men reporting that the flood had negatively affected their wellbeing, in terms of at least one of the following factors: relationships with family / friends, financial status, physical health, mental health, and general happiness. The loss of sentimental items was also deeply felt by many respondents.

Flood insurance was a source of dissatisfaction for many respondents, with 33 per cent having thought their insurance covered them for all types of flood. The percentage was even higher for those with incomes over $100 000 (57 per cent). Those residents also did not qualify for the Premier's Relief Fund—a restriction a number of residents felt was unfair. While some respondents believed flood should be a standard inclusion on insurance policies, others expressed cynicism and distrust in the insurance industry believing they would not make flood coverage more accessible. Some considered insurance to be too expensive.

Respondents were largely positive about the considerable amount of help from volunteers provided on the first and second weekends after the flood, but there was a feeling that the volunteers, while eager, were not well organised. The volunteers were held in much higher regard than the city council and SES, but many residents reported not having seen either council workers or SES volunteers during the flood or in the immediate clean up. This was reflected in a high level of dissatisfaction with both organisations' responses to the flood. The one exception to this was a local councillor who was held in high regard by residents for her involvement in the flood response.

Most Brisbane respondents were not considering significant changes to reduce their flood risk. While 50 per cent stated they were likely to or had modified their insurance policy, few other changes were likely to be implemented. While some properties were being raised or rebuilt at a higher level, many respondents did not see the value in this. Residents largely felt responsibility for flood mitigation was in the hands of the city council, as well as better management of Wivenhoe Dam, and felt there was little they could do personally to reduce their risk.

While cynicism towards insurance and the local council were very common, there was a strong feeling of resilience in the community. Many respondents talked of how much closer they felt to their neighbours and wider community, expressing that, while the flood was a negative experience, it had produced some positive outcomes.

Image: Risk Frontiers

Researchers came across two girls offering free drinks to flood victims and volunteers. The driver of this vehicle had lost the contents of her home in Gympie due to flooding and wanted to help others affected by the floods.

Impacts and findings from Donald, Victoria

In Donald, the perception of risk was low with few residents making adjustments to protect their family and home from flood. This is not surprising since 55 per cent of respondents indicated that their house was not vulnerable to flood and a further 37 per cent stated they were not aware their home was vulnerable. It is therefore understandable that nearly all respondents indicated nothing had prevented them from making adjustments since they did not believe it was necessary to do so.

The lack of information available to residents prior to and during the flood may also have contributed to their lack of motivation to make changes, such as raising household items, sandbagging the house, devising an evacuation plan, or preparing an evacuation kit. Residents did not receive detailed hazard information and were therefore uncertain about the risk during this specific event.

Known and trusted sources of information (e.g. the SES and ABC Radio) were unable to provide appropriate, relevant and timely advice to residents and, on the whole, residents lacked knowledge of the various measures that could be taken to reduce the impact of flooding on their home. However, it would be fair to assume that, in light of recent flooding in September 2010, respondents should have had adequate awareness of how they could protect their homes and properties. Nevertheless, the January 2011 flood was much larger than that experienced in September 2010, there was a lack of sandbags during the 2011 event, the SES was unable to gain access to Donald, and volunteers focused their efforts on specific places instead of working throughout the town where needed. The cumulative effect of all these issues resulted in many residents being ill prepared.

Most respondents' low risk perceptions were reasonable as few reported flood damage to their house contents and building structure although more than half reported property damage and some revealed that their businesses were impacted. It is likely that some, but not all, of the recorded property/business damage occurred outside the urban area as a number of residents living within the township of Donald own and run farms on the periphery. This might explain the fact that a higher proportion of men who completed the survey indicated that they had suffered negative impacts to their wellbeing as a result of the flood as it is predominantly men who physically operate the farm. However, this result contradicts observations by social workers who reported an increase in women suffering from depression.

As with other parts of Australia that were flooded during the 2010–11 summer, the preceding prolonged drought resulted in flood mitigation efforts being placed on the backburner in Donald. Local government feared criticism from the public if they maintained or implemented flood mitigation works during the 14-year drought and some residents pushed for development in flood-prone areas based on the fact that properties had not flooded since they had lived in Donald.

Many respondents in Donald *thought* they had full insurance cover but very few actually *knew* they were covered for all types of flood. The remaining respondents, a little more than half, knew that they were not covered or were covered for storm damage only. Nearly half those who were unaware of their

insurance cover indicated they had no previous experience of flood. All respondents who knew they did not have any insurance cover at the time of flood had a household income of less than $50 000, possibly indicating that full insurance cover was too expensive.

Despite many respondents believing in the likelihood of a flood in the next 10 years, many do not intend to make changes to reduce their risk. Of those who indicated they would consider changes, the most popular methods were to modify insurance policies, improve garden drainage and build permanent barriers around properties, which could prove difficult due to local government restrictions. Respondents whose wellbeing suffered after the flood perceive that they are less able to make changes to reduce flood risk compared to others in their community.

An interesting adaptation that some farmers were making for drought and flood was the planting of River Saltbush as fodder for sheep. While River Saltbush and Old Man Saltbush grass varieties survive well in high-salinity soils and drought conditions, the River Saltbush survived the flood even though it was submerged for an extended period. In comparison, Old Man Saltbush died off. These findings may prove valuable to other sheep farmers in the area.

The resident-formed 'Donald Community Flood Recovery Group' was awarded $135 000 in government funding to conduct a flood study that includes the simulation of a once-in-200-year event. Although policy changes are hoped to result from such studies, it may take a long time until they are implemented. Nevertheless, local residents are very positive about the group and the work they are undertaking. The dedication and persistence of this group of residents is not only encouraging to Donald residents, but should serve as a good example to other communities in Australia.

Impacts and findings from Emerald, Queensland

Despite the recent flood in 2008, two-thirds of Emerald respondents were unaware that their home was vulnerable to flood. This is surprising given the fact that the majority of respondents were living in single storey buildings, which were not raised on stumps or stilts and located in a flood-prone area. Nearly all residents undertook some form of adjustment prior to or during the flood, possibly due to the persistent and detailed flood messages communicated via SMS by the local council. Many people raised household items up from the floor, followed warning advice, sandbagged their homes or moved household items to a safe location. As with other communities, Emerald residents reported a lack of sandbags which instigated innovative ideas using pillow cases and potting mix.

Only a quarter of respondents indicated that their house was not impacted by the flood but more than a third suffered major impacts to their house contents or noted that house contents were completely destroyed. Repairs to flood-affected homes were slow to complete with 38 per cent of respondents stating that repairs were ongoing and, for a few, they had not yet begun. For some, this process had been delayed by a lack of builders in the town (possibly due to outside contractors unable to find or unable to afford accommodation) or due to the long process of waiting for outcomes on insurance claims.

A vast majority of people evacuated their homes and, at August 2011, several householders had not returned on a permanent basis. The housing shortage in Emerald exacerbated this situation with many evacuees forced to live with family and friends or leave town altogether. Although Emerald residents were clearly upset about the flooding disaster and the impact it had on their home, family and community, around two-thirds indicated they were neither better nor worse off following the flood in relation to their financial status, general happiness, physical health, mental health, and relationships. Where there was change, however, it was overwhelmingly negative (around a third of respondents) with respect to their financial status, general happiness, physical health, and mental health. In contrast to this result, officials discussed how the flood had a significant impact on personal relationships, particularly where others were relying on friends or family to provide accommodation. Surprisingly, those respondents with a mid-to-high household income indicated more negative impacts in terms of wellbeing compared to those in the low and low-to-mid income brackets.

Some new residents who moved to Emerald after January 2011 were renting in flood-affected houses with no flood insurance, as there were no other options available to them. The inability to acquire adequate flood insurance was a concern to many existing residents. Leading up to the flood a greater percentage (42 per cent) of Emerald respondents knew they had insurance cover for all types of flood. Of these, most were high-income earners (>$150 000), homeowners, had lived at that address for more than a year and had previous flood experience. During the rebuild, many insurance companies did not support or encourage improvements to reduce flood impact. However, there were stories of a few householders who took steps to mitigate their flood risk. For example, one homeowner who was denied full insurance cover raised their home after the 2008 flood impacted it. They were subsequently offered full cover, which they accepted.

Nevertheless, when rebuilding after the 2008 flood many residents opted to rebuild 'better' (i.e. upgrade old with more desirable) instead of rebuilding with the aim of becoming more resilient to flood. This was repeated again after the 2010 flood. Understandably, residents were concerned about property values and wanted to rebuild their homes to a level that would increase a sale price. However, few respondents understood that building a more flood resilient home may possibly increase value of those located in flood hazard zones (by, e.g., replacing carpet with tiles, raising air conditioning units and power points). Many respondents who had made changes to reduce their flood-risk did so based on their own intuition and experience.

The process of raising houses in flood-prone areas is complex and expensive.

Unfortunately, the experience and knowledge gained from floods in 2008 and 2010 had not transferred to other development projects around Emerald with many new developments consisting of slab-on-ground construction, even in high flood-risk areas. More alarming was the reconstruction of the Coles shopping complex located adjacent to the Nogoa River. The entire building was gutted after the 2010 flood and tenants within the complex were unable to break their lease, according to reports. Some new developers were building homes on stilts and a new shopping complex was being constructed on higher ground, on the eastern side of the river. This was considered a positive step for the community, as it would provide service to those isolated from the main part of town (on the western side) during future floods.

Although Emerald is considered to be a wealthy town and therefore one might assume that residents are more resilient, it is obvious that wealth does not necessarily ensure that people are less vulnerable to natural hazard events. Wealth appeared to be a constraint to many people's recovery, as most were not entitled to the Queensland Premier's Flood Appeal payments because their annual income was above the cut-off level. Many people had lost income due to their businesses suffering flood damage, their insurance companies were not paying up, and they could not afford the repairs to their homes. Officials noted that many of these people, particularly men, were reluctant to come forward and ask for assistance. In response, local council and state government agencies, non-government organisations and community groups are working together to ensure that all flood-affected people receive help where needed.

As a result of the 2010 flood, the changes that ranked highest that had already been done or were likely to be done, were 'modify insurance policy' and 'move air conditioning unit higher'. Significantly, those respondents who did not own their home at the time of the flood were unlikely, or not at all likely, to make changes following the flood (57 per cent c.f. 37 per cent who have made, or are likely to make, changes). Of those people who owned their home, there was a very significant difference between those who were unlikely, or not at all likely, to make changes following the flood (63 per cent) compared to those who have made, or are likely to make changes (28 per cent). Again, this could relate to the fact that many people wanted to rebuild 'better' instead of 'more resilient' or they lived in slab-on-ground constructions and did not think improvements were possible.

Similarities and differences inherent within each case study

Overall, Emerald residents were more proactive in their attempts to reduce their risk to flood than those in Brisbane and Donald (Table 1), which could relate to their recent experience. Emerald residents not only had more flood experience (52 per cent) than Brisbane (26 per cent) and Donald residents (32 per cent), but many of them had experienced flood in December 2008. Although Donald flooded in September 2010, this event was only minor compared to the January 2011 flood and very few residents acknowledged this as past experience.

Brisbane and Emerald residents suffered more damage within and around the home compared to Donald residents, whereas slightly more businesses were affected in Donald (Table 2). However, this is most likely

Table 1: Adjustments made to help protect family and home prior to and during the flood.

Flood risk adjustment	Brisbane	Donald	Emerald
Devised an evacuation plan	23	13	26
Prepared an evacuation kit	13	2	25
Followed warning advice on radio / television / Internet	42	17	57
Sandbagged house	13	32	40
Built temporary flood barriers around property	-	11	12
Kept drainage clear of debris	8	15	20
Raised household items up off floor	65	17	64
Moved household items to a safe place	61	9	40

a reflection of the survey methods since businesses were not specifically targeted in the study.

More residents in Emerald reported that their flood repairs were complete while more Brisbane residents reported that repairs were ongoing or had not yet begun. A similar amount of respondents from each location stated that they had not returned to their home on a permanent basis.

Most interestingly, there was a significant difference between the numbers of female respondents who suffered some negative impact to at least one of the following:

- relationships with family and friends
- financial status
- physical and mental health, and
- general happiness.

That is, 36 per cent of female Donald respondents reported some negative impact compared to 63 per cent in both Brisbane and Emerald. Moreover, there was a significant difference between male and female respondents within Donald. More male respondents (52 per cent) reported negative impacts than female (36 per cent), which is different to the situation recorded in Brisbane and Emerald.

These anomalies could relate to the many years of hardship experienced in Donald during the drought and the complexity of issues that were compounding its effects. For example, Kiem *et al.* (2010) found that farmers around Donald and Mildura felt that they could deal with the drought, but other factors were exacerbating the situation, such as the closure of the Australian Wheat Board, lower international agricultural commodity prices, and issues surrounding irrigation and water trading policies associated with the Murray River. It is possible that the much-anticipated but untimely arrival of the rain at harvesting time brought further disappointment and stress to male respondents.

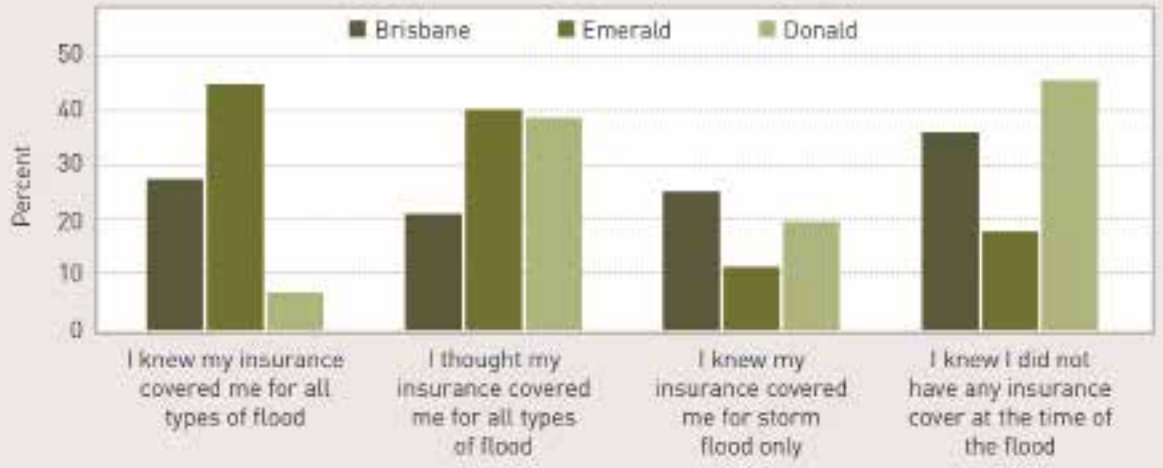
On the other hand, rural women often take secondary employment in order to ensure the financial stability of their family (Kiem *et al.* 2010; Shaw, van Unen & Lang 2013) and although the rain caused crop damage at harvest time, farmers were better off now than they were during the drought. It is possible that female respondents perceived the rain as a positive thing since it had improved their financial situation.

This result contradicts observations by social workers who reported an increase in women suffering from depression. A viable reason for this anomaly cannot be offered without further investigation. However, in

Table 2: Comparisons between estimated impacts and level of recovery.

Percent of:	Brisbane	Donald	Emerald
• respondents who evacuated	77	27	81
• respondents who perceived some damage to home contents	73	29	74
• respondents who perceived some damage to building structure	85	35	76
• respondents who perceived some damage to property / yard	93	56	87
• respondents who perceived some damage to own business	37	41	23
• respondents whose flood repairs are complete	31	10	58
• respondents whose flood repairs are ongoing	44	20	38
• respondents whose flood repairs have not started	12	-	5
• evacuated respondents who had not returned home on a permanent basis	15	16	15
• female respondents who suffered some negative impacts	63	36	63
• male respondents who suffered some negative impacts	56	52	41

Figure 1: Comparisons between insurance knowledge.



line with the literature and previous research (e.g. Enarson 2000, Hazeleger 2013, Women's Health 2012), we suggest that men are more reluctant than women to present themselves for counselling but are comfortable discussing such matters anonymously. Other factors to consider are whether or not men have a stronger emotional connection to the land or are more or less affected by the financial stress of farming than women.

The result that many more respondents in Emerald knew their insurance covered them for all types of flood is not surprising since many had experienced flood in 2008 (Figure 1). Similarly, the result that fewer Emerald respondents knew they were not covered or covered for storm flood only is also expected when considering recent experiences. It is surprising that more Emerald respondents *thought* they were covered for all types of flood compared to Brisbane and Donald respondents.

From the available data, it is difficult to draw any conclusions about those likely to know or not know about their type of coverage in Brisbane. The result that more Donald respondents knew they did not have any insurance cover at the time of the flood could relate to their belief that they were not vulnerable to flood. It is also possible that these respondents could not afford insurance since all had a household income of less than $50 000.

Due to the transient nature of the Emerald community, it is not surprising to learn that Emerald residents were the least likely to be living at the same place in the years to come (Table 3). In comparison, the result that most Donald respondents planned to be in the same place in years to come was expected. When the question was framed in terms of reducing flood vulnerability, fewer Emerald residents were likely to move to a flood-safe location. This result is most probably related to the fact that there is little available housing outside of the flood zones, and also because many expect to be moving anyway—the transience of a mining town population—and will accept the risk of flooding in the meantime.

Despite many residents recognising that a flood is likely to occur within the next year in Brisbane and Emerald and within the next 10 years in Donald, most have not, or do not, intend to make changes. When asked what was preventing people from making changes, the most common answers were financial cost, design and construction of the home, insurance limitations, council / government restrictions to build levees on private properties, and they were renting. Others simply could not fathom how one could prevent Nature from occurring and believed that it was too hard: *'I'm not God'*.

There were also issues associated with people wanting to replace for 'better' instead of 'more flood resilient' and this was possibly exacerbated by situations where residents witnessed businesses, councils and governments rebuilding like for like. There was little or no support coming from the insurance industry to assist people to make changes to reduce their risk.

Nevertheless, there were some factors that encouraged people to make changes. These included the history of flood events, the inconvenience and stress associated with being flooded, a need to protect the children, belongings and assets, and a desire to

Table 3: Comparisons between intentions to relocate.

Intention	Brisbane	Donald	Emerald
I plan to live where I am for many years to come	62	85	49
I plan to move elsewhere in this town in the coming years	13	6	7
I plan to move to another town in the coming years	8	2	17
Undecided /don't know	10	6	16
Permanently move to a flood safe location (not at all likely & unlikely)	62	73	55

One example of preparing property for flood is the construction of a concrete wall which is reinforced along the river-side with a trench that forms the garden bed. The property owner worked with a carpenter, concreter, plumber and several engineers to develop this measure.

have peace of mind. Additionally, people stated the pain and heartache experienced during the floods was a significant factor driving their desire to reduce their vulnerability.

Conclusion

The survey results provide a great deal of valuable information on the various barriers and opportunities people face in making changes to reduce their vulnerability to flood prior to, during and after an event. A number of significant factors identified as either enabling or inhibiting response, recovery and/or adaptation are direct experience, outcome expectancy, communication and information, governance and physical protection, insurance, financial restraint and relief assistance, housing including design/construction, rental properties, builders and guidance, health and wellbeing, relocation, and volunteers and community initiatives.

A dominant finding from the study is that a greater number of constraints inhibit adaptation than factors that enable adaptive change and behaviour. Balanced against the criticisms and fault identification the study showed that resilient communities do get on with their lives and largely drive recovery themselves. The extensive qualitative comments and opinions garnered from interviews and questionnaires reflect high levels of acceptance of catastrophe and stoic endurance. This does not necessarily translate to adaptation to future events and a changed hazard landscape, but it does reflect strong resilience in the community. As strong resilience exists in the community the next step to adaptation is a logical and achievable transition. Resilience can be built on to advance adaptive behaviour, but it needs to be nurtured and facilitated by external agencies.

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Exploring a rights-based approach to disaster management

Megan Krolik, Emergency Management Queensland, takes an historical view of disaster management and considers two of its developmental changes.®

ABSTRACT

The protection of human rights is an integral part of the disaster management process. However is there a need for a 'rights-based approach to disaster management'? Is it necessary? What would it look like? This paper takes an historical perspective of disaster management, including the use of the military's 'command and control' model, and explores two significant changes in its development that challenge current ideology. The paper also considers the use of Web 2.0 technology in the disaster management process as one pathway to achieving a participatory, rights-based approach to disaster management.

Introduction

Despite the vast amount of research conducted in the field of disaster management and in the integration of a rights-based approach to community development, little has been written about a rights-based approach to disaster management within international humanitarian response and national disaster management systems. The idea that rights such as shelter, food and security should be met and protected during a disaster event is now a familiar concept for many disaster management practitioners. Further, the idea that disaster management professionals should also value community participation in the disaster management process is also gaining attention.

While human rights should be the foundation of any aid or development interaction, they are often overlooked due to expediency, ignorance or self-interest (IASC 2011, p.1). This is particularly pertinent in the field of disaster management despite the fact disaster-affected communities are often those where rights are most in danger of not being met.

Two significant changes that have shaped an evolving community development and disaster management field are the move to a human rights-based framework and the recognition within the disaster management sector itself of the critical role that community members play in the disaster management process. In addition, the use of Web 2.0 platforms engender a greater integration of a rights-based, participatory model in the disaster management process and encourages disaster practitioners to consider the value of participation as a means of promoting and protecting human rights in disaster-affected communities.

Historical perspective

The disaster management discipline has not traditionally been seen as a participatory space. With its roots in the Civil Defence era of the mid-twentieth century, modern disaster management is 'derived from the military centralised command and control model, (which) assumes and treats the affected population as helpless victims, without the ability to help themselves, let alone other human beings' (Gunawan *et al.* 2011, p. 309). As the Cold War era ended and disaster management became a fully-fledged sector in its own right, many military personnel transferred to disaster management organisations, bringing with them not only their valuable operational skills and experience, but also their entrenched military assumptions and ideologies (Auf der Heide 2004, p. 358, Dynes 1994, p. 142, Orlando 2010, Pearce 2003, p. 211).

This grounding in military practice means that many of the systems in use in contemporary disaster management are directly sourced from, or influenced by, military operations and a strict adherence to military tradition and hierarchy is often observed (Orlando 2010, Pearce 2003, p. 211). The 'command and control' model, which comprises a 'centralised response with a few select experts issuing orders down the line to responders, employees or the public' (Orlando 2010), has historically been the standard when providing support to communities (Auf der Heide 2004, Dynes 1994, Orlando 2010). According to Orlando (2010), this model 'assumes the response needs to be placed in the hands of trained experts who will direct and care for the untrained masses to keep them out of harm's way'. Orlando's analysis positions the general population as helpless and separate from the real 'professionals' whose job it is to save the 'powerless victims'.

The 'command and control' model is evident throughout the co-ordination of disaster management operations, particularly through the use of co-ordinating mechanisms such as incident management systems and emergency operating centres. These systems employ a strict reporting hierarchy and are often controlled by small groups of experts generally consisting of police and military personnel (Coppola 2007, pp. 280–282). While there is no doubt that successful disaster management requires strong co-ordinating mechanisms, it is useful to recognise that co-ordination has traditionally taken place in isolation, away from the impacted communities. While this is changing, particularly at a community or local government level, disaster management professionals in these operational environments, unencumbered by community consultation, make critical decisions about a community of which they often have little or no firsthand knowledge.

Two significant changes have occurred in the last 20 years that challenge this centralised, top-down paradigm. These are:

- the move within the international development sector towards a community development, or human rights-based framework, which seeks to empower communities to play an active role in shaping the development of their communities, and
- that the disaster management sector itself has started to recognise and value the role of community-based responders in the disaster management process.

A rights-based approach

A rights-based approach to development is one that positions the human rights of a community as central to the development of that community. This is in stark contrast to previous 'charity' or 'needs' frameworks, which positioned community members as passive receivers of goods and services (Boesen & Martin 2007, p. 10, UNICEF 2003).

A rights-based approach shifts the emphasis from impact and influence on communities to protection and fulfilment of the community's rights. Within this framework, governments, development agencies and other stakeholders have legal obligations to provide not only assistance, but to promote and protect the rights of citizens. At the same time a rights-based approach acknowledges the rights and responsibilities of community members and encourages and empowers them to play an active part in claiming those rights (Boesen & Martin 2007, p. 10, Gosling & Edwards 2007, p. 9). The principles of a rights-based approach include empowerment, inclusiveness, sustainability and local ownership (Boesen & Martin 2007, p. 15, Gosling & Edwards 2007, pp. 8–9, UNICEF 2003, pp. 92–93). There is also a particular focus on participation within the rights-based framework, which encourages community members to be actively involved in analysing their own situation and developing solutions based on needs and desires identified by community. This stems from the knowledge that community members understand their own needs better than others and are able to address issues in a manner that is practical and sustainable for that community (Kingsbury *et al.* 2004, p. 222).

There are increasing efforts within the international humanitarian space to incorporate a rights-based, participatory approach to disaster and humanitarian response. Two significant international bodies, the Inter-Agency Standing Committee (IASC) and the Sphere Project, have developed humanitarian guidelines that incorporate a rights-based approach to the management process.

The IASC is an inter-agency forum for co-ordination, policy development and decision-making involving key United Nations (UN) and non-UN humanitarian partners. The organisation's guidelines, *The IASC Operational Guidelines on the Protection of Persons in Situations of Natural Disasters* help 'international and non-governmental humanitarian organisations and members of the Inter-Agency Standing Committee to ensure that disaster relief and recovery efforts are conducted within a framework that protects and furthers human rights of affected persons' (IASC 2008, p. 7). The document identifies key principles and activities which should guide humanitarian action in situations of natural disasters. The focus is on four core groups:

- life, security and physical integrity and family ties
- food, health, shelter and education
- housing, land and property, livelihoods and secondary and higher education, and
- documentation, movement, expression and opinions and elections. (IASC 2008, pp. 15, 29, 39, 45).

The guidelines state that affected persons 'should be informed and consulted on measures taken on their behalf and given the opportunity to take charge of their own affairs to the maximum extent and as early as possible' (IASC 2008, p. 11). The guidelines also maintain that disaster-affected communities must be involved in all stages of the disaster management process, particularly those that are 'traditionally marginalised from participation in decision-making' (IASC 2008, p. 11).

Similarly, *The Sphere Humanitarian Charter and Minimum Standards in Humanitarian Response* (The Sphere Project 2011, pp. 21–23) places the right to life with dignity, humanitarian assistance, protection and security and to asylum and sanctuary, as fundamental to the response process. Its Humanitarian Charter is an internationally recognised set of common principles and universal minimum standards in humanitarian response. It also includes that 'People Centred Humanitarian Response' is one of its core standards (The Sphere Project 2011, pp. 55–56). In this core standard, the use of local capacity, the participation of local groups, local feedback and a respect for traditional practices, are advocated as minimum criteria for a rights-based humanitarian response. Other core standards advocated by the Charter include effective

Image: Michael Marston © The State of Queensland

Community members work together during flooding in south west Queensland.

co-ordination and an understanding that the needs and concerns of the affected population must be identified and prioritised (The Sphere Project 2011, p. 58, 61).

Community-led disaster management

Other challenges to the centralised, top-down approach in disaster management are the growing empirical evidence revealing how people and organisations react when faced with a disaster event. Despite a long-held belief that 'victims' of disasters will respond with helplessness, panic and anti-social behaviours such as looting, social researchers have shown that the opposite is true (Auf der Heide 2004, p. 357, Drabek & McEntire 2003, p. 99, Dynes 1994, p. 146). Members of communities impacted by a disaster event are often the first on the scene and the first to provide assistance and they will continue to self-organise throughout the response and recovery phases. According to Drabek and McEntire (2003, p. 99), 'individuals and organisations typically become more cohesive and unified during situations of collective stress', and cite 'search and rescue, operations, coordination, the collection of relief supplies, provision of shelter and emotional support' as just some of the ways communities respond to disaster events. Auf der Heide (2004, p. 342–343, 355) discusses the role of individuals in disaster response settings and provides examples of incident co-ordination and evacuation assistance following significant disaster events such as the 9/11 terrorist attacks in New York, the Sioux City air crash in 1989 and the 1995 sarin gas attack in Tokyo. In Auf der Heide's examples, only a small percent of victims were transported by emergency services—the rest either self-evacuated or were transported by the community members who were first on the scene. Similarly, Kendra & Watchendorf (2007, p. 324) discuss the spontaneous evacuation of Manhattan by commuter ferries and other harbour traffic during the 9/11 terrorist attacks and suggest this as an example of community innovation in the face of disaster.

These examples highlight that the first responder role is often carried out by the community members, at odds with the assumption of a helpless, disorganised group of 'victims' needed to sustain the 'command and control' paradigm. By playing a role in the disaster management process, community members are actively accessing their right to participation, empowerment and inclusiveness. One practical example of how communities are achieving this is through the use of new and innovative online communication models—collectively known as Web 2.0.

Rights-based disaster management in action

Web 2.0 refers to interactive technology that allows users to create, share, contribute to and access information, effectively making them both producers and consumers of information and communication practices (Keim & Noji 2012). Web 2.0 includes communication platforms such as Facebook and

Myspace (online communities), Twitter (micro-blogging), YouTube (video sharing), Flickr (photo sharing) and mobile phone technology (including phone and tablet 'applications'), as well as crowd-sourced interactive mapping (Goldfine 2011, p. 11, Yates & Paquette 2010, p. 6). Although most of these platforms are more commonly known as sources of entertainment and general communication, they are increasingly becoming integral tools in the disaster management field (Goldfine 2011, pp. 17–18).

Web 2.0 has already been used extensively during disaster events. Following the 2004 Indian Ocean tsunami, blogging was used to locate missing people. Facebook and Wikipedia emerged as a vital communication link between students, responders and family during the Virginia Tech shootings, while blogs and crowd-sourced information gathering proved critical following *Hurricane Katrina*. Other examples of Web 2.0 being used in disaster management over the past 10 years include intelligence gathering using community networks and SMS during the 2007 California wildfires and real-time monitoring and information sharing by means of Twitter during the Alabama tornado outbreak (Orlando 2011, Sutton, Palen & Shklovski 2008). Other uses of social media in disaster situations include mobile telephone communications in China during the 2003 SARS epidemic, photo sharing during and after the 2005 London bombings and the use of mobile telephones as a news extension relay system following the 2006 Java earthquake (Haddow & Haddow 2008, pp. 41–43).

It was not until 2010 that the use of Web 2.0 as a disaster management tool really came into its own. Following the devastating earthquake in Haiti in 2010, volunteers from around the world worked with community members, the Haitian government and aid workers on the ground to co-ordinate a truly global response. Responders were able to gather critical information from the community, develop comprehensive maps, co-ordinate response operations and direct search and rescue efforts through the use of blogs, SMS and social media platforms (Slagh 2010, pp. 16–19). In these examples, Web 2.0 platforms were used to keep people informed, to communicate, and to play a role in the management process. Web 2.0 platforms complement the rights-based approach as it provides an interactive space for community members to connect and play a role in the disaster management process. Whereas the 'command and control' model has historically separated disaster-affected communities from the decision-making process, the use of Web 2.0 as a disaster management tool provides an increasingly egalitarian way for community members to participate in shaping the community in which they live. As evidenced during the 2013 bushfires in Tasmania, it can be used as a forum for community members to identify their own needs and issues, and enable them to access critical information and to organise collectively. The 'Tassie Fires—We Can Help' Facebook page was created spontaneously during the bushfire emergency, linking community members in need with those offering support and resources. The Facebook page rapidly became the primary communication channel for the fire-affected communities, addressing operational issues the emergency services were unable to deal with due to the magnitude of the disaster event (ABC 2013).

The interactive nature of crowd-sourced crisis mapping provides community members with a voice to communicate information about themselves and about the environment they are in. Widespread access to participation and contribution is one of the most positive elements of the use of social media in a disaster setting (Slagh 2010, p. 47). This participation is important because it gives the disaster-affected community a sense of ownership of their circumstances. IKEN (2011) states that by sharing images, texts and tweets, 'the public is already becoming a part of the response network, rather than remaining mere bystanders or casualties'.

Meier & Monro (2010, p. 102) believe that local knowledge of the disaster-affected region, including language and geographical knowledge, can be used through crowd sourcing platforms. They argue that crisis responders do not always have all of the information about a particular place, but by tapping into local knowledge and encouraging local contribution, it is possible to create a better understanding of the disaster situation.

Local knowledge and participation play an important role in the disaster management process. After a major disaster 'community involvement ...is of incomparable importance in increasing resident trust of the emergency information and in promoting coordination between residents and responders' (Jaegar *et al*. 2007). Furthermore, Jaegar et al (2007) believe that 'residents need information and coordination to self-organise and respond by helping each other when scarce centralised services are overwhelmed by an emergency'. In this case, social media becomes a valuable and accessible way to communicate and organise existing networks within a community. While Web 2.0 has definite value in other aspects of a disaster management, its contribution to mainstreaming a rights-based approach may well be social media's most significant contribution to the disaster management paradigm.

Conclusion

Despite its military background, disaster management is becoming a more participatory discipline. Changes to both the community development sector and the disaster management paradigm have foreshadowed a shift to the use of a rights-based approach in the disaster management field and the concept is becoming embedded in the guidelines and procedures of the international humanitarian sector.

The use of Web 2.0 products, by their interactive and connective nature, are valuable means of implementing a rights-based approach to disaster management. Web 2.0 technologies provide a space for community members to communicate with each other and with disaster management practitioners, as well as a space

to identify and voice their own needs. It provides a means for affected communities to realise their right to participate in the disaster management process and to share valuable local knowledge with disaster practitioners.

By incorporating a rights-based approach to disaster management, practitioners are not only ensuring that the rights of affected communities are being protected, but that the affected communities are participating in and helping to shape the disaster management activities that impact on and involve them. This participation should be recognised and valued by the disaster management community and incorporated into all phases of the disaster management cycle. Disaster management practitioners should consider the value of community participation as not just a means of promoting and protecting human rights in disaster-affected communities, but more importantly, as a way of strengthening the disaster management process.

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Future considerations for Australian nurses and their disaster educational preparedness: a discussion

Jamie Ranse (University of Canberra), Karen Hammad (Flinders University) and Dr Kristen Ranse (University of Canberra) examine the education challenges and needs to prepare Australian nurses for disaster response.®

ABSTRACT

Australian nurses have been active participants in disaster assistance both within the in-hospital and out-of-hospital environment. This paper discusses the current disaster education opportunities and challenges for nurses. Additionally, various educational strategies for different cohorts of nurses are discussed highlighting the need for education to be targeted at the right cohort of nurses, at the right time, using the right strategy.

To enhance the educational preparedness of Australian nurses and subsequently their willingness to assist in a disaster it is suggested that the education should replicate the realities of 'what it is like' to assist in a disaster. Additionally, education should be positioned within a national framework for disaster health education.

Introduction

A disaster can be broadly defined as an event which results in the interruption of the functioning of a community resulting in the need for external resources to maintain essential services (TFQCDM/WADEM, 2002). One such resource includes the mobilisation of health professionals, including nurses, to provide assistance and maintain or re-establish the day-to-day operational capacity of a health service facility following a disaster event.

Australian nurses have actively participated in disaster assistance[1] in both the in-hospital and out-of-hospital contexts in local, national and international environments (Arbon *et al.* 2006, Grindlay *et al.* 2010, McArdle 2011, Ranse, Lenson & Aimers 2010, Serghis 1998, Taylor *et al.* 2003). In Australia, nurses have traditionally assisted during natural or conventional disasters such as extreme weather events and bushfires, while assistance in man-made or non-conventional disasters such as terrorist events has been limited. When a disaster happens, emergency, intensive care and peri-operative areas are commonly affected and, as such, nurses from these specialities assist. It is usually this nursing cohort that participates in out-of-hospital events. In addition, there is an increasing amount of literature highlighting the role of nurses from other specialty areas participating in disaster assistance (Hayes 2011, McArdle 2011).

While there is an increasing amount of literature pertaining to the involvement of Australian nurses in disasters, these accounts are predominately descriptive in nature. However, we do know that Australian nurses have an increased willingness to assist in a disaster if they have completed formal education that includes disaster content (Arbon *et al.* 2013b, Considine & Mitchell 2009). Therefore, fundamental to the participation of nurses in disaster assistance, is the nurse's individual educational preparedness.

Disaster event exercising in hospitals is an important part of hospital and nursing staff emergency preparations.

1 The term 'disaster assistance' is used throughout this paper to describe all phases of disaster as Australian nurses participate in disaster assistance across the disaster continuum from disaster prevention to disaster recovery.

This paper explores the current situation regarding the educational preparedness of Australian nurses and the appropriateness of this education. Additionally, this paper comments on future opportunities and strategies for Australian nurses in both the in-hospital and out-of-hospital environment to enhance the educational preparedness of Australian nurses to assist in disasters. Overall, this paper aims to generate discussion regarding the future considerations for Australian nurses and their disaster educational preparedness.

Current situation

Undergraduate education

The amount and type of disaster-related content in Australian undergraduate nursing courses is minimal. A recent survey highlighted that only seven out of 19 participating Australian universities had included disaster-related content in their curriculum (Usher & Mayner 2011). Of those, only one covered disaster-related content as a standalone unit while the other six stated that disaster-related content was embedded within other non-disaster specific units (Usher & Mayner 2011). It has been suggested that Australian nursing students could be used in a disaster to support the work of nurses (Cusack, Arbon & Ranse 2010). This notion would therefore require nursing students to have some awareness of the disaster environment.

Postgraduate education

Four Australian universities currently offer postgraduate courses specific to disaster-related health. However, the disaster-related content within these courses is commonly embedded in a broader global management, humanitarian, or public health focused courses rather than being specific to nursing. Although the disaster-related content of Australian postgraduate nursing courses across different specialties remains unknown, a survey of Australian postgraduate emergency nursing courses identified variation in both disaster-related content and the time dedicated to disaster-related topics in the curriculum (Ranse *et al.* 2013).

Hospital-based education

If minimal disaster-related content exists at a tertiary level, this places the onus on health services or hospitals to provide nurses with the education necessary to prepare them for disaster assistance situations (Hammad *et al.* 2011). Commonly, hospitals in Australia provide education via in-service style education. Anecdotally, hospital in-service style education constitutes topics relating to the day-to-day activities of the environment, such as the latest technologies, management plans, or clinical updates (Hammad, Arbon & Gebbie 2011, Ranse *et al.* 2013). As such, topics pertaining to disaster situations are likely to receive little attention in in-service education planning. This is a notion supported by research conducted in South Australia which found

A nursing team practice taking a patient down a flight of stairs.

A stretcher is secured with ropes as a nursing team manoeuvre it down the stairs.

that approximately half of the emergency nurses surveyed had not received education pertaining to disaster situations in the past 12 months. Additionally, it has been reported that nurses who perceive a decreased level of disaster preparedness attribute these feelings to decreased opportunities for in-service style education (Duong 2009), or decreased experience and exposure to disasters (Hammad, Arbon & Gebbie 2011). It should be noted that the availability and subsequent attendance at disaster education in-services by nurses is unknown and no conclusions regarding the factors which contribute to the decreased participation in disaster-related education can be made. Of significance, when in-service disaster-related education is provided to Australian nurses it has been

suggested that this education may not be appropriate or relevant in preparing nurses (Hammad, Arbon & Gebbie 2011).

Other education

This discussion highlights the limited availability and appropriateness of disaster-related education for nurses, and implies that disaster preparedness education needs to be sought independently through other avenues. On occasions this may be at the personal expense of nurses themselves. Various Australian organisations and associations provide vocational courses pertaining to disaster-related health such as the Australasian Inter-service Management Systems [AIMS] and Major Incident Medical Management and Support [MIMMS] courses. Additionally, vocational training is commonly offered to nursing members of organisations such as St John Ambulance Australia, the Australian Red Cross, and the Australian Defence Force.

Following deployment to the Sumatra-Andaman earthquake and tsunami in 2004, members of the Australian Disaster Medical Assistance team were invited to participate in a survey about disaster-related education (Aitken *et al.* 2011). This research highlighted that these health professionals were poorly prepared from an educational perspective. In particular, most participants reported having had no specific education specifically relating to disasters. Of those who had undertaken education specific to disasters, the majority felt that existing education programs, such as MIMMS, did not adequately prepare them for deployment, particularly in relation to aspects of cultural awareness and the use of communications equipment. It has also been suggested that courses which have a pre-hospital focus, such as MIMMS, are arguably limited in the ability to adequately prepare nurses for in-hospital assistance (Hammad, Arbon & Gebbie 2011).

In a study of nurses involved in the disaster assistance to the Black Saturday and Victorian bushfires in 2009 it was highlighted that nurses had participated in mock education related to airport disaster and non-specific mass casualty incidents, yet their disaster assistance experience primarily related to bushfire and extreme weather events. This shows a miss-match between the focus on current disaster-related education for nurses and Australian nurses' real-life experiences of out-of-hospital disasters assistance (Ranse, Lenson & Aimers 2010). Additionally, research from these bushfires indicated that nurses undertook minimal clinical activities. Instead, their work included psychosocial support, problem solving and care co-ordination; aspects which are often not present in disaster-related education programs (Ranse & Lenson 2012).

Disaster-related education strategies

There is no doubt that disaster-related education is essential for Australian nurses given their previous involvement in disaster assistance. However, the need for education is often identified in retrospect by those nurses who assist in a disaster with little or no prior disaster-related education or experience.

Staff wearing breathing apparatus and biohazard suits practice decontaminating a potential victim.

In-hospital

If a disaster occurs within a hospital's immediate vicinity, it is highly likely that nurses who are employed in that hospital will have a role in assisting in that disaster. This assistance can take many forms from assisting in the emergency department, to evacuating patients from the hospital (Hayes 2011, McArdle 2011). It has been suggested that multi-agency, real-time exercises are rated as highly desirable among Australian nurses to enhance knowledge and understanding of in-hospital disaster assistance (Duong 2009). However, these education experiences are costly and time consuming for exercise planners, the participating agencies and nurses. Alternatively, in-service education has been rated as desirable by nurses for in-hospital disaster-related education (Duong 2009). This approach is less costly and can be conveniently conducted however, the appropriateness of and access to this type of education should be adequately addressed (Duong 2009). Access to this type of education could be solved by introducing e-learning opportunities that can be accessed from any location and on any device.

Out-of-hospital

Nurses deployed to an out-of-hospital disaster situation within their immediate vicinity will, commonly, have minutes to hours to prepare, travel and assist. As such, these nurses rely on the knowledge they have previously received, that is, there is limited to no time for further education and preparation in this type of assistance. For nurses who are likely to assist in out-of-hospital emergency environments, they require education pertaining to the realities of working in the out-of-hospital disaster environment, such as working with fewer resources and working in uncontrolled environments.

There is an opportunity for education for nurses who assist during national or international responses as

A post-exercise white board displaying key elements of the disaster management exercise.

they have a number of hours to prepare, travel and assist. This time provides opportunity for situation-specific education, predominately incorporating principles of just-in-time and mobile education. Just-in-time education approaches have been used internationally to prepare nurses for disasters. This was used effectively in China to educate more than 10 000 people regarding the Sichuan earthquake in 2008 and the H1N1 Influenza outbreak in 2009 (Yang *et al.* 2010). For Australian nurses just-in-time education could be employed to raise cultural awareness, familiarise nurses with communications equipment, and gain awareness of the current disaster situation and resources available (Aitken *et al.* 2011).

Preparing nurses for working in out-of-hospital or hazardous areas, builds a familiarity with these situations and requirements, like working in protective clothing.

All nurses and nursing students

Given that disasters are non-discriminatory in terms of their onset, veracity and consequence, nurses and nursing students should have a basic awareness of 'what it is like to assist' in a disaster event (Cusack, Arbon & Ranse 2010). This awareness education should include both professional and personal aspects of disaster awareness and preparation to enhance a nurse's willingness to assist in a disaster (Arbon *et al.* 2013a, Arbon *et al.* 2013b). Awareness of local disaster plans and understanding the roles nurses play in local disaster assistance (Duong 2009) are expected to better prepare nurses to quickly respond when emergencies strike. As such, disaster event awareness could be included in undergraduate courses. This would require the uptake of disaster-related content in undergraduate nursing courses. Unfortunately, this content is currently scantly offered (Usher & Mayner 2011). Internet-based programs that include lecture presentations and interactive case studies similar to those developed for the Palliative Care Curriculum for Undergraduates project may be effective in increasing disaster awareness for undergraduates (Hegarty *et al.* 2010).

Education frameworks

A national framework for disaster-related education has been proposed specifically for the Australian context (FitzGerald *et al.* 2010). This is a multidisciplinary framework that provides guidance for education providers to target disaster-related content at appropriate levels to the appropriate audiences. This framework has seven distinct levels from 'community information' to 'innovation'. These levels consist of education outcomes and recommended content and are aligned to existing recognised education frameworks, such as the Australian Qualifications Framework. It is acknowledged that the proposed national framework is not a curriculum, but a guide to develop programs at various levels (FitzGerald *et al.* 2010).

Conclusion

This exploration of the educational preparedness of Australian nurses for disaster events has also considered associated challenges surrounding current levels of education. It has highlighted that education opportunities for disaster-related education in Australia are minimal. Having an awareness of the realities of a disaster is important for all responders, nurses included. Further, an Australian nursing workforce that is well prepared for a disaster is more likely and willing to assist during a disaster. Despite the important role of health professionals and nurses in particular, in disaster, the understanding of nurses' educational preparations for these important events are not well understood. Further research is required to ascertain the appropriateness of various education strategies for nurses in a variety of contexts.

This paper has focused on the disaster-related education of clinical nurses. As such, the educational preparedness of managers, health service executives and other disciplines has not been specifically addressed. Overall, disaster-related education for Australian nurses needs to be targeted at the right cohort of nurses, at the right time, using the right strategy. Strategies include multi-agency real-time exercises, internet-based education, in-service education and just-in-time education. Regardless of which approach is employed the education of nurses should be focused on their likely disaster experience and replicate the realities of such experiences. A national framework is suggested to maintain appropriate standards and provide consistency across Australia that will aid in the mobility of nurses nationally for deployment in times of disaster assistance.

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Communicating in Recovery – professional development for recovery practitioners

By Lauren Gould, Australian Red Cross

Introduction

In 2011, the Red Cross released *Communicating in Recovery* - an all-hazards, best-practice guide aimed at those working with disaster-affected communities. The guide was developed after the 2009 Victorian bushfires and following consultation with communities and government agencies to identify gaps within the recovery sector. Communication was highlighted as a constant challenge that created barriers for those receiving and disseminating information. In direct response to this, Red Cross identified a need for, and have since produced, this practical guide to effective post-disaster communication.

Communicating in Recovery was hailed as the 'first of its kind' internationally when it was first released, partly because recovery communication is rarely recognised as a niche area that requires unique skills. Red Cross consultations indicated that effectively managing information after a disaster can often be just as difficult as responding to the event itself. One of the major challenges of communicating in a post-emergency environment is that the very people who become responsible for managing information often have limited or no formal training in communication or recovery. It is critical that a recovery workforce is skilled in identifying and responding to the needs of audiences during times of disaster recovery to ensure that communities are informed and connected. Access to quality information before, during and after an emergency can have a profound effect on the resilience and recovery of individuals and their communities.

Creating a practical tool

After receiving positive feedback about *Communicating in Recovery,* the next step was to ensure the guide was regarded as a practical tool that could strengthen the recovery sector. The Bendigo Bank Community Enterprise Foundation provided funding to scope a range of professional development activities which would reinforce the messages in *Communicating in Recovery.*

Extensive consultation with key stakeholders informed the development of six training modules which were co-written by media consultant Steve Ahern, and two staff, Loren Hackett and Lauren Gould, from the Red Cross Emergency Recovery team. The modules were based on content from the guide and the training was designed in a workshop format. A working group was established to guide the initial development of the training and included representatives from ABC Local Radio, the Australian Emergency Management Institute, and the Red Cross.

Two pilot workshops were held in Melbourne in late 2011 to test the training materials. Participants represented a broad spectrum of the emergency management and community sectors, including local and state governments, community leaders, emergency services providers and community organisations. Valuable feedback was used to improve training content before officially commencing delivery.

What the training includes

The guide is the primary training resource. To ensure it is accessible and practical in a post-emergency environment, workshop participants are asked to consider how group activities, case studies, examples and anecdotes could be applied to their own work or community context. The workshop allows participants time to discuss their own experiences, hear other people's stories, and connect with others working in the sector.

Communicating in Recovery is an all-hazards, best-practice guide.

Training is available in four formats and is flexible and tailored for particular groups. These are:

- a 45-minute 'taster session' designed for executive management and senior government representatives
- a two-hour session for Red Cross staff, members and volunteers
- a one-day workshop which covers six modules including recovery communication, two-way communication, identifying audiences, prioritising messages and self care. Participants are required to complete pre-course work prior to attending the workshop, and
- a two-day workshop which covers the same modules as the one-day workshop but allows more time for discussion and case studies. It has an additional module on the role of the media in long-term recovery.

Who can do the training

Anyone who is involved in communicating with disaster-effected audiences can attend the training. This may include senior management or staff working in recovery, communication or community engagement activities. Business and community leaders are welcome as are other people who play a key role in their community like sports club coaches, teachers, religious or cultural leaders.

In Victoria, local government has been targeted as a priority audience. Councils are encouraged to identify organisation representatives or community leaders who may be involved in emergency recovery. This provides an opportunity to network and balance the learning dynamic. Emergency response agencies such as Victoria Police and the Victorian State Emergency Service have also attended the workshops. This is a positive step in strengthening relationships between response and recovery agencies.

Training results so far

Official training delivery commenced in Victoria in early 2012 while national training delivery commenced later that year. To date, over 350 people have been trained in 23 workshops across Victoria, New South Wales, Tasmania and Western Australia. As a result of the training participant feedback has been that:

- 85 per cent feel more confident about communicating with disaster-affected communities and other stakeholders
- 80 per cent feel more confident about recognising and responding to the needs of disaster-affected audiences, and
- 94 per cent would recommend the training to others.

The Communicating in Recovery website was launched in February 2012 and has been further developed as an online learning hub which hosts training module content, video case studies, and a research and template library.

The training is being promoted as key sector training by the International Federation of the Red Cross and the international Communicating with Disaster Affected Communities Network. Red Cross colleagues in New Zealand are also interested in providing the training to recovery workers in the Canterbury region.

Image: Red Cross

The Red Cross website has all the information about the training modules.

Ongoing development

Subject to funding, the Red Cross would like to expand its target audiences in the future to include corporate and philanthropic organisations, media, universities, and state/territory and federal government departments.

The Red Cross continues to measure the impact of the training on the recovery workforce and disaster-affected communities. Feedback is collected after each workshop and a post-training survey is sent to participants to measure the training's impact in the field. External evaluation is planned for 2014/15 to assess if participants have gained skills and knowledge to communicate more effectively and positively impact emergency-affected communities.

Further information

For training dates or to register interest in the training, visit www.redcross.org.au/communicatinginrecovery.

Carisbrook: From Pigs Might Fly to flying high

In the lead up to the 2013 Resilient Australia Awards, Linley Wilkie revisits winners from last year's awards, in the Victorian town of Carisbrook.

This spring, Carisbrook residents are sure to be busy planting roses and other blooms in the town's new reflective rose and sensory gardens, designed to be enjoyed by everyone in the small Victorian community. Such was the anticipation of this new feature, local paper, *The Carisbrook Mercury* printed progress photographs on its front page. The picturesque project is just one of many that Carisbrook's 'Pigs Might Fly' (now Carisbrook Projects) has organised since winning a state and national 2012 Resilient Australia Award.

The Resilient Australia Awards are sponsored by the Attorney-General's Department and recognises innovative and successful approaches to making Australian communities safer, stronger, more resilient and ready in an emergency situation.

Demonstrating real substance behind its novel name, Carisbrook's 'Pigs Might Fly' project won the Volunteer and Community category last year.

Carisbrook was devastated by floods in January 2011, with hundreds of homes inundated and some townsfolk displaced for more than a year. Morale became troublingly low, and after unsuccessful attempts by Central Goldfields Shire Council to engage the community, they decided to connect with other disaster-affected towns instead, who guided the people of Carisbrook through ways to rebuild their lives and the community.

Locals were asked to submit three wishes for Carisbrook and a total of nearly 1000 wishes were presented in a meeting in July last year. More than 100 residents devoured a spit roast pig as they pored over the ideas and the community steering committee, christened 'Pigs Might Fly', was born. This and subsequent gatherings resulted in six major projects, a number of smaller projects and a Resilient Australia Award championing their efforts.

Locals were naturally delighted by the accolade, displaying the award in the local post office and touting the win on the home page of the Carisbrook Projects website (carisbrook.org.au). Daily newspaper, the *Bendigo Advertiser* (Carisbrook sits within the greater

Carisbrook residents clear debris from a local creek.

Carisbrook residents burn off debris cleared from a local creek.

Bendigo district, an hour drive away) regarded the win to be so newsworthy, it devoted a full page to the award.

'It was just a wonderful feeling that others could see the value in what we'd been doing and saw that this was a legitimate way of assisting ourselves recover,' says Lyn Symons, secretary of Carisbrook Projects.

'Pigs Might Fly' changed its name to Carisbrook Projects late in 2012 to better identity the town at the heart of the mission.

The group's vice president, John Taylor said, 'We wanted something that would identify the town for the next five, 10, 15, 20 years. What we're doing now in its initial stages is setting the wheels in motion for this to last as long as the town is here.'

Never short on volunteers, Carisbrook Projects is made up of several committees which meet independently to organise events such as an annual festival, and developments such as a playground, skate park and the rose garden.

Lyn Symons has already produced a Welcome Kit for new residents. 'What the project did was give people permission not to wait for others; you can actually do these things yourself. It doesn't need to be generated by an external group. If you wanted to do something and you've got a couple of like-minded people, do it. Then everyone benefits,' she says.

Symons says Pigs Might Fly/Carisbrook Projects also got more people talking to each other. 'There's a collective understanding that there is a lot of people who are really proud of the town.' Indeed, no sports team or business has closed since the 2011 floods and Taylor says the population of about 800 has increased slightly in that time, with eight new homes built.

Recognising the success of the Pigs Might Fly/ Carisbrook Projects model, Central Goldfields Shire Council, Australian Red Cross and Monash Disaster Resilience Initiative joined forces in 2012 to create the Community Resilience Mentorship Initiative (CRMI). Funded by the Victorian Office of Emergency Services Commissioner, the CRMI plan is to replicate Carisbrook's achievements and help other communities help each other.

'There's a huge amount of knowledge and experience embedded in communities that have recovered that is not being effectively accessed and we wanted a way to shift that from being an ad hoc process to a more formalised resource,' says CRMI project manager, Sonny Neale. 'The goal it is to build a network of communities to learn from and support each other in their own recovery, enhance their own capacity for social resilience following an emergency and allow communities to take charge of their own responses by working together.'

A new gazebo under construction.

Following the mentoring from other disaster-affected communities, Carisbrook Projects has tried to assist other Victorian communities searching for guidance. The organisation spoke with the residents of Chewton late last year about their achievements. 'It's a town that has been part of a busy road, quite divided and (they are) wanting to make it more of a village,' Symons says. 'They were looking to engage with the community like we have.'

Carisbrook Projects continues to work on their plans for improving the town and its community, locals operating with a renewed trust in themselves and their abilities. 'The way the whole town decided on the projects and how they wanted things done was something that hadn't been done in that format,' Taylor says. 'They got extremely excited and the excitement that evolved through the different projects is still there, from July last year to today. They all want to be part of the future of Carisbrook. That's the biggest plus for any town.'

Further information

For more information about the CRMI, email Sonny Neale at SonnyN@cgoldshire.vic.gov.au.

Image: Lyn Symons

Carisbrook Projects has produced a Welcome Kit for new residents.

Image: John Taylor

The Carisbrook community gather as the town unites after the 2011 floods.

Science adds value to danger ratings

Nathan Maddock, Communcations Officer, Bushfire CRC, explains how the new Bushfire and Natural Hazards CRC continues the work begun by the Bushfire CRC to develop a new fire danger rating system.

A scientifically-based, fire danger rating system provides early warning to communities at danger of fire.

Across Australia, fire agencies use the Forest Fire Danger Index (FFDI) and Grass Fire Danger Index (GFDI) to assess the risk of a fire. These indices describe the conditions that allow fires to start and continue burning. They were developed largely in the 1950s and 1960s to determine the risk posed to forestry assets. However, there are a number of limitations to the current Fire Danger Rating system; most notably, that it is based on science that is now not sufficiently robust and comprehensive to underpin such an important decision support tool.

But this is changing. A seven-year research project begun by the Bushfire CRC, the Attorney-General's Department, and all states and territories is working to implement a new fire danger rating system. The new system will improve the ability of fire and emergency service agencies to provide public warnings, engage with the community generally about fire danger, to set levels of fire preparedness and to support fire protection decision making.

The new fire danger rating system uses a series of discrete modules to calculate aspects of fire risk. These modules measure:

- fire weather indices, such as landscape moisture and atmospheric conditions
- fire behaviour indices, such as terrain and fuel characteristics
- fire damage indices, such as measures of vulnerability and extent of exposure to fire
- ignition factors, such as fire history and ignition mechanisms, and
- social factors, such as the potential impact of fire on communications and the community.

The CEO of the Bushfire and Natural Hazards CRC, Dr Richard Thornton, said the project addresses a recommendation from the Victorian Bushfires Royal Commission.

'This is a nationally significant research project. While the Royal Commission findings were largely based on the Black Saturday bushfires, its recommendations are relevant across the nation. The research is helping to forecast fire risk in a much more accurate way,' he said.

Part of the project included (in partnership with CSIRO) an analysis of the 825 known civilian and firefighter fatalities recorded from 1901–2011. This is the most comprehensive dataset of these fatalities ever assembled and reinforces the need for the new fire danger rating system to indicate the potential for damage to communities.

In 110 years, 65 per cent of all civilian fatalities have occurred on just 10 days.

The analysis of these fatalities focused on the relationship between where the death occurred, the arrival of the fire to that location, weather conditions, proximity to fuel, and the person's activity and decision-making leading up to their death. From this analysis it is evident that fire weather and proximity to bushland are very strong drivers for defining the potential for fatalities to occur.

Over 78 per cent of all fatalities occurred within 30 metres of bushland, and 50 per cent of all fatalities occurred on days where the fire danger index exceeded 100. The current FFDI threshold for declaring a day as 'catastrophic' is 100, while the GFDI trigger for a 'catastrophic' rating is 120 (except for Western Australia, where it is 100). The proximity to bush will be taken into account in the new fire danger ratings, which can be localised to specific towns.

Several iconic Australian bushfires have occurred under very severe weather conditions. Black Friday in 1939, Ash Wednesday in 1983, and Black Saturday in 2009 were all horrific bushfires that have made their mark on our way of life. Australian bushfire fatalities are dominated by fires like these. So much so, that in 110 years, 65 per cent of all civilian fatalities have occurred on just 10 days.

'We need to know more about the days on which these large numbers of deaths occur,' says Dr Thornton.

'Increasing our understanding of these large events allows for substantial improvements in being able to help communities understand their level of fire risk and alert them to the potential loss of life.

'Issuing effective fire danger ratings to individual towns will better inform local communities,' he explained.

The new system also integrates the probability of property loss. Work in this area is being undertaken with the assistance of the Centre for Risk Management of Bushfires at the University of Wollongong. This study delivers a spatially-explicit framework capable of generating daily maps that represent the distribution of the probability of property loss down to 10 kilometres accuracy. This will allow fire agencies to provide more accurate warnings and community advice.

The role of weather forecasts is also being refined by the Bureau of Meteorology. Part of this has been achieved by calculating the long-term average for a comprehensive set of fire danger indicators. These data cover the period from 1979 to the present, and is the most complete nation-wide assessment of fire weather ever undertaken in Australia. Dr Thornton highlights this as a major advancement in fire weather science in Australia.

Image: Bushfire CRC

The fire danger rating sign near Siding Springs, Coonabarabran, NSW.

'This will highlight which indicators are the best predictors of bad fire risk days across the country. The time lapse since our current system was developed is large, and the leaps in the science great.

'Our knowledge will be greatly improved if we can predict more accurately days like Black Saturday even further ahead than we can now. The next step is to try to determine a better index to capture these factors,' he said.

The summary reports detailing Australia's bushfire fatalities, the probability of property loss, and fire danger indicators are available at www.bushfirecrc.com by searching 'fire danger rating review'.

This project is part of the Australian Government's $3.6 million National Emergency Management Program, and the Bushfire and Natural Hazards CRC will complete the research.

Notes from the Field

Establishing the Emergency Management Assistance Team

Following the 2011 Queensland floods and cyclones, Emergency Management Australia (EMA), in consultation with Emergency Management Queensland (EMQ), developed an Emergency Management Assistance Team (EMAT) concept. EMAT is comprised of experienced emergency management personnel from Australian states and territories who can rapidly deploy to support emergency management operations across all hazards events.

Background

Disasters have the potential to stretch the operational capacity of emergency management agencies and personnel during heightened times of crisis. Over the course of the 2011 Queensland floods and cyclones, EMQ carried out a sustained period of operational duties. The scope, magnitude and duration of the operation began to stretch the capacity of EMQ personnel. EMQ subsequently requested that EMA identify and deploy experienced emergency management personnel who could provide operational support to the Queensland State Disaster Coordination Centre. EMA responded and deployed highly-skilled emergency management practitioners from different states and territories to assist.

Following the event, EMA and EMQ discussed the benefits of establishing a pool of emergency management personnel who have a comprehensive understanding of emergency management arrangements across Australia. The lessons learned from the 2011 Queensland floods and cyclones identified the need to develop capability that could enhance emergency management sector interoperability and augment operational capabilities during an event.

Establishing EMAT capability

The initial EMAT Working Group, agreed to by all states and territories, met in June 2012 in Canberra. Emergency management representatives from each state and territory participated in the meeting. Participants explored options for the development of a flexible EMAT Strategy that could address both current and emerging threats.

Discussions from the meeting informed the inaugural EMAT Capability Development Workshop held in September 2012 in Sydney. Workshop participants gained an understanding of emergency management arrangements across Australia and how to quickly assimilate into jurisdictional teams during a deployment. Working Group members also delivered presentations on their jurisdictional arrangements. Presentation material covered issues including state/territory emergency management arrangements, typical risks, likely major activations, key planning and co-ordination considerations, historical events, and possible applications for EMAT.

Emergency Management Assistance Team Capability explained

The EMAT capability consists of a network of emergency management personnel who have a high level of experience in disaster planning and

Participants in the EMAT capability workshop.

The EMAT capability workshop in progress.

co-ordination. They also have an understanding of each state and territory emergency management arrangements and understand the broad diversity of Australia's emergency management arrangements. EMAT members provide operational support to affected states and territories and associated regions during a significant event.

The EMAT capability supports the growth of interoperability by facilitating networking opportunities. In particular, the EMAT Working Group and workshops provide a platform for collaboration between members. EMAT networking has increased operational awareness and contributed to the development of a consistent approach to emergency management arrangements across Australia. During heightened times of crisis, the EMAT can rapidly deploy emergency management personnel in order to support and sustain disaster management operations. EMAT deployments are also reviewed regularly in order to ensure the continual growth of operational capabilities.

The first EMAT deployment to Queensland

EMAT has already proven its value. In January 2013, ex-tropical Cyclone Oswald and an associated monsoon trough passed over parts of Queensland. The system was considered a severe natural disaster event and generated very heavy rain, strong winds and produced a number of tornadoes. Queensland coastal communities and low lying areas in rural, regional and city locations were significantly impacted with Mundubbera, Eidsvold, Gayndah and Bundaberg amongst the worst affected. In many places, the total rainfall for the system set new records. Due to the scale and complexity of the disaster, EMQ requested that an EMAT be deployed to assist with the operation. EMA, in consultation with EMQ, requested three planning and recovery specialists drawn from the ACT and NSW to be deployed to the Queensland Disaster Coordination Centre to support operational activities.

EMAT capability workshop in September 2013

The second EMAT capability workshop was held in September 2013 in Adelaide. The workshop gave participants a deeper understanding of emergency management arrangements across Australia. EMAT members discussed lessons learned from the initial EMAT deployment and reflected on recent trends within the emergency management sector. Participants also discussed international trends in emergency management surge capacity and how non-operational activities could be used to encourage growth of the EMAT capability.

EMAT continues to work closely with Australia's emergency management sector to ensure the capability remains current with the latest emergency management developments. EMAT capability workshops are planned on an annual basis to ensure information and knowledge remains current with emergency management issues.

Acknowledgements

Article supplied by the Planning Section, Crisis Coordination Branch of EMA. EMA acknowledges the commitment of the Working Group and EMQ's leadership in establishing the EMAT. EMA recognises the extensive support received from states and territories to ensure the EMAT aligns with emergency management trends.

Children and youth in emergencies 'Paper-in-a-Day'

Professionals and practitioners in the field of emergency management came together in Melbourne for the 'paper-in-a-day' workshop.

In early August, 29 professionals and practitioners in the field of emergency management came together to discuss and write a series of papers related to selected topics in emergency management. The workshop was co-ordinated by Save the Children Australia and included a variety of organisations from academia, emergency management, non-government, state and federal government, and young people.

The papers related to seven critical topics:

- Children and youth participation in emergency management planning in the Australian context
- Child protection in emergencies
- Recovery from emergencies
- Disaster resilience
- Emergency management education
- Disaster risk reduction
- Young people's perspective on emergency management planning

Group members collectively developed a title for their paper, confirmed the style and the key areas of content. A variety of hard copy reference material was supplied to assist with the papers, including the *Australian Journal of Emergency Management* editorial policy and contributors guidelines.

'Paper-in-a-day' was a great opportunity to draw on experience, collaborate across sectors and document best-practice and key learning in the area of children and youth in emergency management.

Participants collaborated across their organisations to share diverse viewpoints promote discussion.

During the workshop members discussed their expertise and focused on their strengths. The allocation of tasks in writing the papers was organic as some individuals wrote sections, while others researched references or provided case studies. The workshop allowed participants to collaborate across organisations. This provided diverse viewpoints and many robust discussions.

Two secondary school students participated in the workshop to document their recent experience of engaging with local government emergency management planning. This was a new experience for the students and was an opportunity to give young people a voice in emergency management.

By the end of the day all groups had achieved a draft of a paper. They further liaised to develop their papers post workshop. Drafts were provided to the workshop co-ordinator for circulation to all participants for comment. Some of the papers addressed similar concepts and this provided cross referencing between papers and an informal peer review. Resulting papers will be formally peer reviewed and submitted for publication in the January 2014 special *Australian Journal of Emergency Management* edition on this topic.

...children and youth in emergencies, an area attracting increasing focus and recognition worldwide. This aspect is the theme of the January 2014 edition of the *Australian Journal of Emergency Management.*

'Paper-in-a-day' was a great opportunity to draw on experience, collaborate across sectors and document best-practice and key learning in the area of children and youth in emergency management.

One of the benefits of the paper-in-a-day format was the opportunity for people with a common interest to work together, develop and refine their ideas and document this in a way that can be shared broadly with the emergency management sector. Focusing on a particular theme helped to make a significant contribution to the literature and provides a basis to further develop knowledge and share best practice. An added benefit was the opportunity to form new relationships particularly between practitioners and academics.

'Paper-in-a-day' originated from a concept derived by Dr Eva Alisic (Monash University), and has, more recently, been adopted as a Victorian Department of Human Services initiative. The workshop was funded by the Attorney-General's Department National Emergency Management Projects. It highlights the need for continued discussion and action surrounding children and youth in emergencies, an area attracting increasing focus and recognition worldwide. This aspect is the theme of the January 2014 edition of the *Australian Journal of Emergency Management.*

> *"The paper-in-a-day concept, held with like-minded colleagues in the field, was a great networking opportunity and an opportunity to start more conversations around child/youth empowerment." Dawn Hartog, CFA*

> *"Paper-in-a-day was an unusual experience in writing an academic paper but also very rewarding. The groups were multi-disciplinary and writing a paper together helped us to tease out different perspectives on a topic of shared interest." Dr Lisa Gibbs, University of Melbourne*

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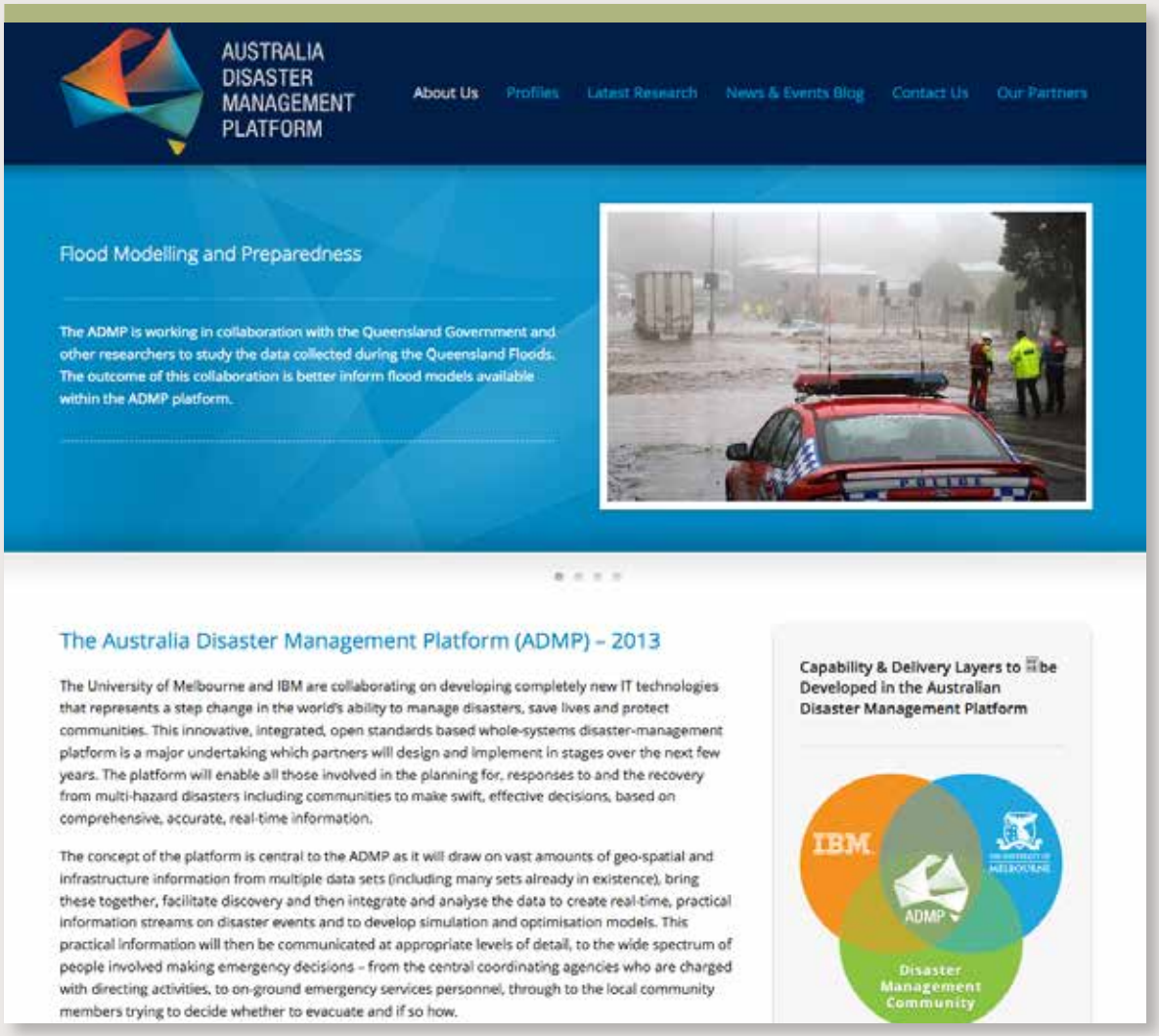

Researchers from the Melbourne School of Engineering at the University of Melbourne and IBM have collaborated to develop the Australia Disaster Management Platform (ADMP).

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The ADMP is an open standards-based IT platform aimed at improving disaster management, protecting communities, and saving lives.

The current content includes research, latest news and profiles.

For further information

The ADMP is at http://admp.org.au/.

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