

# Australian Journal of **EMERGENCY MANAGEMENT**

Volume 32, No. 3, July 2017  
ISSN: 1324 1540

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# Australian Journal of Emergency Management

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## 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. 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 role of the Australian Institute for Disaster Resilience 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 encourages empirical reports but may include specialised theoretical, methodological, case study and review papers and opinion pieces. The views in the Journal are not necessarily the views of the Australian Government, AIDR or AIDR's partners.

## Publisher

The *Australian Journal of Emergency Management* is published by the Australian Institute for Disaster Resilience – a partnership between the Australian Government Attorney-General's Department, the Bushfire and Natural Hazards Cooperative Research Centre, the Australasian Fire and Emergency Service Authorities Council and the Australian Red Cross. The Journal is published online at [ajem.infoservices.com.au](http://ajem.infoservices.com.au).

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Print and distribution: CanPrint

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## Circulation

Approximate circulation (print and electronic): 5500.

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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@aidr.org.au](mailto:ajem@aidr.org.au). All research articles are peer reviewed. The *Australian Journal of Emergency Management* is indexed by several indexing organisations throughout the world.

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Contributions in the Research section of the *Australian Journal of Emergency Management* are peer-reviewed to appropriate academic standards by independent, qualified reviewers.

# Foreword

Dr John Bates, Director, Knowledge Management, Australian Institute for Disaster Resilience

Tropical Cyclone Debbie has reminded us of the influence that severe weather events can have on our lives. What started as a tropical cyclone crossing the coast near Airlie Beach in Queensland became a severe storm event that caused flooding in coastal towns from mid-Queensland down to northern New South Wales. If that wasn't enough, the same weather system then caused significant flooding on the north island of New Zealand.



The volume of rain that the weather system dropped on Queensland was so large and widespread that, at the recent Local Government Association of Queensland Disaster Management Conference, the mayor of a coastal municipality said that in their council area, there were five separate water catchments and, until this cyclone, they had never experienced all five of them in flood at the same time.

In this issue the breadth of topics covered reflects the complexity of the challenges facing us as we continue striving to build our national resilience to disasters. The papers include a contribution from Sunshine Coast Council that used their Resilient Australia Award-winning Disaster Hub to provide valuable and timely information to their community and to their disaster management team during Tropical Cyclone Debbie.

In contrast to the warnings that preceded the landfall of Tropical Cyclone Debbie, the thunderstorm asthma event that was experienced across the greater Melbourne and Geelong areas in late 2016 arrived without warning and with rapid onset. In the final report from the Victorian Inspector-General of Emergency Management, it is clearly stated that: 'There was no evidence to suggest that these storms and other non-meteorological factors would result in a health emergency of unprecedented scale and consequences'. The additional complication of this health emergency was that it was spread across the greater Melbourne and Geelong areas, with no single local focus that could be addressed by a concerted emergency response. The question for all of us is what do we need to do and how do we prepare for the next unexpected, rapid-onset emergency?

Core to the building of sustainable disaster resilience is:

- Easy access to and use of the knowledge that we have from past events; from inquiries and reviews, and from research. The recent launch of the upgraded Australian Disaster Resilience Knowledge Hub ([www.knowledge.aidr.org.au](http://www.knowledge.aidr.org.au)) is one important element in capturing and providing free access to important knowledge.
- A workforce with the skills and capabilities to review, analyse and interpret that knowledge and the ability to use it to guide our adaptation in a world of evolving and emerging natural and human-caused disasters.
- Moving away from a reliance on processes alone to guide our actions. The recent launch of the series of Australian Disaster Resilience Handbook publications on 'Managing the Floodplain' marks the beginning of the transformation of this valuable publication series, moving the focus from systems and processes to principles and guidance.

The challenge for us all is to embrace the changes and challenges that are confronting us and to be as prepared as we can for the future by engaging in discussion and dialogue on topics of national interest. This will, by necessity, take us all out of our comfort zones as we imagine what is possible and work hard to minimise the impact of the power and complexity of real disasters as they unfold before us.

**Dr John Bates**

# Disaster risk management: insights from the US

Andrew Gissing, Risk Frontiers

Andrew Gissing recently visited the United States to attend the annual Association of State Floodplain Managers Conference, American Planning Conference and to meet with representatives of FEMA, North Carolina Emergency Management and the University of North Carolina. Two key themes arising are summarised in this article.

## **Governments and communities should use disaster recovery as an opportunity to transform resilience and use hazard mitigation plans to inform post-event mitigation activities**

The scale of recent hurricane disasters in America has been beyond that of Australian experiences in terms of death toll, damage, disruption and displacement. Out of these events opportunities have arisen to enhance community resilience as a consequence of increased political and community interest in mitigation and the availability of additional funding. This is allowing the building of safer communities moving beyond a mantra of repair and restoration. This was observed in communities of North Carolina following Hurricane Matthew in October 2016.

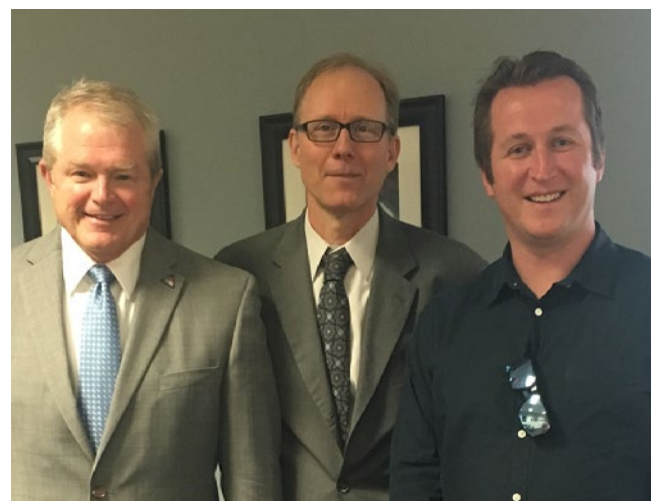
Previous major hurricanes in North Carolina in 1996 (Fran) and 1999 (Floyd) resulted in voluntary property buy-outs and the implementation of house-raising. These measures were said to have significantly reduced damages during Hurricane Matthew. Following Hurricane Matthew, voluntary property buy-outs and house-raising are again being pursued, along with the demolition and rebuild of structures to increased standards. Currently some 2600 households have volunteered for either buy-out, house-raising or demolition and rebuild.

For buy-outs, the state provides a fair market price for the property based on an independent appraisal, with an additional incentive provided if owners remain within the existing county. The home is demolished and the land deeded to the local government. There is often no systematic, community-wide approach to buy-outs resulting in a patchwork of buildings remaining on the floodplain and concerns by local government that buy-outs will reduce rates. Vacant land has also become a site for illegal dumping. The timeframe for executing individual buy-outs was often a challenge as the process can take several years, accounting for valuation, assessment of contamination, title searches, negotiation and completion of the transaction.

## **Integration across a whole of community approach is key to catastrophic disaster planning**

The US develops catastrophic disaster plans for identified scenarios including mass power outages, large hurricanes, earthquakes, floods and volcanic eruptions, and nuclear and biological incidents. The Department of Defence are integrated in the planning process to ensure logistical requirements for deployments in support of responses managed by states.

To build unity of effort through a whole-of-community approach, FEMA engages with private sector organisations through partnerships. Most partnerships are voluntary, with organisations motivated by public good and to ensure their own business continuity. FEMA maintains a private sector division and integrates business through a representative of Fortune 500 companies in their national operations centre. It was said that businesses appreciated that FEMA shares information with them, though there were challenges with businesses sharing information about their supply chains due to commercial interests.



Left to Right: North Carolina Emergency Management Director, Michael Sprayberry, Director Coastal Hazards Resilience Centre, Dr Gavin Smith and Risk Frontiers Director, Andrew Gissing.

Image: Andrew Gissing

# Global Platform for Disaster Risk Reduction: supporting international frameworks through science and technology

Professor Kevin R Ronan, CQUniversity Australia and Bushfire and Natural Hazards Cooperative Research Centre, Dr Matalena Tofa, Risk Frontiers, Macquarie University and Dr Marla Petal, Save the Children Australia

The recent United Nations (UN) Global Platform for Disaster Risk Reduction (DRR), held in Cancun, Mexico from 22-26 May 2017, is the fifth version of a biennial meeting of researchers, practitioners and policymakers. Starting in 2007, the meetings reflect UN-level efforts to reduce escalating hazards and disaster risks worldwide.

The Global Platform for DRR is intended to review progress, share experiences and identify actions and priorities for the most recent accord, the *Sendai Framework for Action 2015-2030* (SFDRR). At the 2017 Global Platform an emphasis on the role for science and technology was progressed, building on a much-enhanced emphasis for science and technology in the SFDRR versus the *Hyogo Framework for Action* (HFA). In particular, the role of science and technology in providing evidence for policy transfer was emphasised, for both policy development and implementation; two related but quite distinct processes. Another development in the SFDRR is a focus on outcome targets and related indicators.

## Focus on SFDRR targets and indicators

Given definite science-driven, policy-related 'wins' across the 10-year HFA, it is anticipated that the increased role for science and technology can drive greater change across the 15-year SFDRR. This includes increasingly sophisticated target and indicator development and monitoring mechanisms. At the 2017 Global Platform several sessions focused on SFDRR targets and related indicators. In addition to the seven main SFDRR targets (and their indicators), companion work goes on to supplement and extend monitoring. Additional forums discussed supplementary targets and indicators, such as those on 'comprehensive school safety' (linked to SFDRR Target D<sup>1</sup>), developed by the UNESCO/UNICEF-led Global Alliance for Disaster Risk Reduction and Resilience in the Education Section.

1 Target D: reduce damage to critical infrastructure and disruption to basis services, including health and educational facilities; including through developing their resilience; Indicator D-3: Number of destroyed or damaged educational facilities attributed to disasters; Indicator D-6: Number of disruptions to educational services attributed to disasters.



Professor Kevin Ronan attended the Global Platform for Disaster Risk Reduction that explored the role of science and technology in reducing natural hazard risks.

Creating input and outcome indices for monitoring is a landmark achievement on its own that reflects an increasing allegiance in DRR internationally to a more secure scientific foundation. However, it is a much more complex endeavour to systematically and scientifically monitor and evaluate a set of indicators, including reliably and against a set of validity criteria.

## Research-policy-practice networks: indicators and beyond

Across all seven main SFDRR targets, much work will be required. One way that is written into the SFDRR is establishing, mobilising and coordinating research-policy-practice networks. Given this direction, the Science and Technical Advisory Group (STAG) facilitated a networking mechanism called the Scientific and Technical Partnership for the implementation of the



SFDRR. Through the UNISDR STAG, networking analysis and advocacy is underway to help infuse science into SFDRR-related policy and practice.

In the child-centred DRR (CC-DRR) and educational sphere, much work was done prior to, and at the Global Platform, to facilitate increased networking and understanding of policy, practice and research needs. Two separate surveys commissioned by the Global Facility for Disaster Risk Reduction and Save the Children surveyed CC-DRR policymakers and CC-DRR practitioners and researchers globally. These surveys are part of a model-driven suite of 10 CC-DRR research projects and studies, following ground breaking support from the C&A Foundation to Save the Children. Preliminary findings were shared at a GlobalPlatform CC-DRR practitioner-researcher pre-meeting hosted by two of the authors. Alongside presenting those findings,

discussions were framed by a history of CC-DRR developments, current policy-practice-research developments, a suite of policy- and practice-friendly materials being developed (e.g. research-practice briefs, success story case examples; study findings), and social network analysis findings. Discussions are being summarised to promote a shared, science-supported agenda across the sector, including reconciling different traditions of research and research transfer mechanisms in CC-DRR work.

## The role of science in DRR

While solid progress was made across the HFA, including in the CC-DRR area, significant gaps have remained. The advent of the SFDRR, and its inclusion of an enhanced role for science and technology, serves as a reminder about functions that science and scientists can play to assist to close SFDRR-related gaps in policy and practice. More generally, it serves as a reminder that those in the DRR science community are not merely knowledge generators, but also have important roles as science communicators, practice and policy (and evidence-informed) advocates, science arbiters and policy alternative brokers. To this, we would add, based on our translational research programs and many others within the Bushfire and Natural Hazards CRC that we also can, and should be relationship, network, and vision facilitators. We should promote practice- and policy-friendly, research-driven models, agenda development and important utilisation products. In doing so, we can promote effective DRR-related knowledge transfer, guidance and tools development. These can realise important goals, targets and outcomes, whether at an international SFDRR level or here at home, reflecting the *Australian National Strategy for Disaster Resilience*.

# Sendai Framework: demonstrating progress

**| Dr John Bates, Australian Institute for Disaster Resilience**

At the Cancun meeting it was confirmed that official monitoring of progress towards achieving the global targets for reducing disaster losses will begin in early 2018. The challenge is to generate and make freely available the data that is essential to demonstrating progress towards achieving these important targets for reducing harm and suffering.

While current data from participating nations provides reasonable information on the physical damage and human impact of disasters, there is still work to be done to generate the same quality of information for economic losses, losses of specific assets and infrastructure, losses of cultural heritage and disruptions to basic services.

The increased focus on the role of science and scientists in improving disaster risk reduction is welcome and the opportunities for Australia to make a valuable contribution to global disaster risk reduction are immense. The challenges, however, are substantial in the changing world in which we live.

What we need is a solid and growing evidence base to support (or not) the value and benefits of the initiatives that we are undertaking. Without this evidence base it is increasingly difficult to ensure predictable and sustainable funding. These challenges are not unique to Australia. They open wonderful opportunities to expand global collaborations and to build case studies that can be shared and used to inspire communities, nations and decision-makers across the globe.

# New natural hazards science for Australia

**Nathan Maddock, Bushfire and Natural Hazards CRC**

An exciting series of new research has begun at the Bushfire and Natural Hazards CRC, with nine new projects now underway. Joining the existing platform of natural hazards science these new projects cover mental health and wellbeing, coastal management, emergency management capability, risk communication, land-use planning, sustainable volunteering and recovery post-disaster. Marking the next phase of national research into natural hazards, the projects will support fire, emergency services and land managers as they work to prevent, prepare for, respond to and recover from natural disasters.

The new projects are:

- National mental health and wellbeing study of police and emergency services
- Forecasting impact for severe weather
- Urban planning for natural hazard mitigation
- Flood risk communication
- Diversity: building strength and capability
- Catastrophic and cascading events: planning and capability
- Hazards, culture and Indigenous communities
- Factors affecting long-term community recovery
- Enabling sustainable emergency volunteering.

## New science

In conjunction with beyondblue<sup>1</sup>, up to 20,000 current and former personnel from 35 police and emergency organisations across Australia will be asked to participate in a survey about their mental health and risk of suicide. The 'National mental health and wellbeing study of police and emergency services' will be undertaken by the University of Western Australia. It will develop evidence-based strategies to support individuals, improve organisational culture and address systemic concerns that impact on mental health and wellbeing. These strategies will be developed in collaboration with a cross-section of the police and emergency services sector including agencies, unions, government departments, individuals and family and community groups

<sup>1</sup> beyondblue is an Australian, independent non-profit organisation addressing issues associated with depression, anxiety disorders and related mental disorders. At: [www.beyondblue.org.au/](http://www.beyondblue.org.au/).

The 'Forecasting impact for severe weather project', led by the Bureau of Meteorology and Geoscience Australia, will develop a pilot capability to make useful predictions of the effects of extreme weather to influence people to take actions to reduce damage. It will focus on case studies along the east coast, looking at damaging winds, flooding and heavy swells.

The 'Urban planning for natural hazard mitigation project', led by the University of Melbourne and the University of Adelaide will produce new and innovative ways of integrating urban planning and natural hazard risk management. It will increase the understanding of what planning and emergency management can and cannot do, separately and in synergy. It will develop new approaches to applying tools and methods available to planning systems to the design and management of communities as they change.

Previous CRC research has showed that most flood fatalities are avoidable. Continuing this line of research, the 'Flood risk communication project' will develop an understanding of the motivations, beliefs, decision-making processes and information needs of at-risk groups for flood fatalities. Led by Macquarie University, the study will cover both age and gender, including an understanding of what a Plan B would look like, how to motivate proactive decision-making ahead of the journey, what the current challenges and barriers are to this and what further support and information is needed. Outcomes from this project will include targeted risk communication materials.



For the first time, emergency services and police across Australia will be surveyed about their mental health and wellbeing.

Image: CFA



The 'Diversity: building strength and capability project', led by Victoria University, will investigate how diversity is understood and practiced in emergency management. The project will identify the constraints and enablers to implementing inclusion activities and understand how diversity can serve to enhance the current operational environment and systems.

The 'Catastrophic and cascading events: planning and capability project', led by Macquarie University, will identify ways to improve management approaches to catastrophic events. These events can take many years to recover from, with many of the effected population choosing to relocate to other areas permanently. Economic losses can be severe as industry is disrupted, businesses close and further demands for capital injections from government are made to support recovery costs.

The 'Hazards, culture and Indigenous communities project', led by Western Sydney University and Deakin University, will investigate the hazard priorities of diverse Indigenous communities in southern Australia and the emergency management sector's engagement with these communities. The project will conduct collaborative research with Indigenous peoples and emergency management practitioners to explore how better engagement can be supported, with a focus on the interaction of scientific, Indigenous and other knowledge sources.

The 'Factors affecting long-term community recovery project', led by the University of New England and Massey University, will investigate two complementary areas of research relating to the long-term recovery of communities after a disaster. The first area looks at community connectedness from the perspective of people who move home often and live in different locations and the role this plays in both their and the community's social recovery after an emergency. The second area will use case studies to examine the enablers and barriers to successful recovery, looking at natural, cultural, human, social, political, built and financial capital.

The 'Enabling sustainable emergency volunteering project', led by RMIT University and the University of Western Australia, will investigate how to adapt the emergency management sector to new ways of



SA SES volunteers cleaning up after a storm. Research is examining the change practices required by emergency services to adapt their volunteering strategies.

Image: South Australia SES

volunteering, and the change management practices required to achieve this.

These important new projects build on the existing foundation of natural hazards research established by the Bushfire and Natural Hazards CRC in 2013. The CRC has reached an exciting point in its existence with many of the many of its projects coming to maturity. Some of the original projects have been finalised while many others are set to begin next stages. These nine new projects broaden the scope of the national natural hazards research and offer vital outcomes for fire, emergency services and land managers and, through them, Australian communities.



New research will investigate planning for catastrophic events.

Image: Mick Reynolds, NSW Rural Fire Service

# Reducing the impacts of cyclones through technology: a case study of Cyclone Debbie and the Sunshine Coast Disaster Hub

John Gallina, Disaster Management Coordinator, Sunshine Coast Council

Ex-Tropical Cyclone Debbie wreaked havoc on the Sunshine Coast in March 2017. On Wednesday 29 March, the heavy rains began and by the next morning, Sunshine Coast roads were going underwater. With that rainfall came strong destructive winds of up to 108km per hour. On Thursday 30 March, all schools in the region were closed, along with beaches, shopping centres, the suspension of train services and 40 road closures. The SES and Sunshine Coast Local Disaster Management group responded to 547 calls for help in the region. 32,000 homes and businesses across the Sunshine Coast lost power during the event. By Friday 31st March, conditions were easing and the long road to recovery began.

Episodic rain events that occurred in Queensland during 2010 and 2011 resulted in the displacement of over 200,000 people and the inundation of 22 towns. The floods affected more than 78 per cent of Queensland, an area greater than the size of Germany and France combined. The floods caused the loss of 33 lives and damages exceeding \$5 billion. The scale of the disaster led to the establishment of the Queensland Floods Commission of Inquiry into the Queensland floods of 2010-2011 on 17 January 2011.

An Interim Report issued on 1 August 2011 made 165 recommendations for action and implementation. The Final Report, delivered on 16 March 2012, identified a further 174 recommendations for action. A great number of these recommendations related to the need for:

- improved public communications during disaster events
- improved information sharing
- improved early warning processes
- the communication of potential risks to the community
- improved disaster risk reduction strategies.

These recommendations provided the framework for the development and implementation of the Sunshine Coast Disaster Hub platform, a one-stop-shop for the community and disaster managers before, during, and after disaster events.

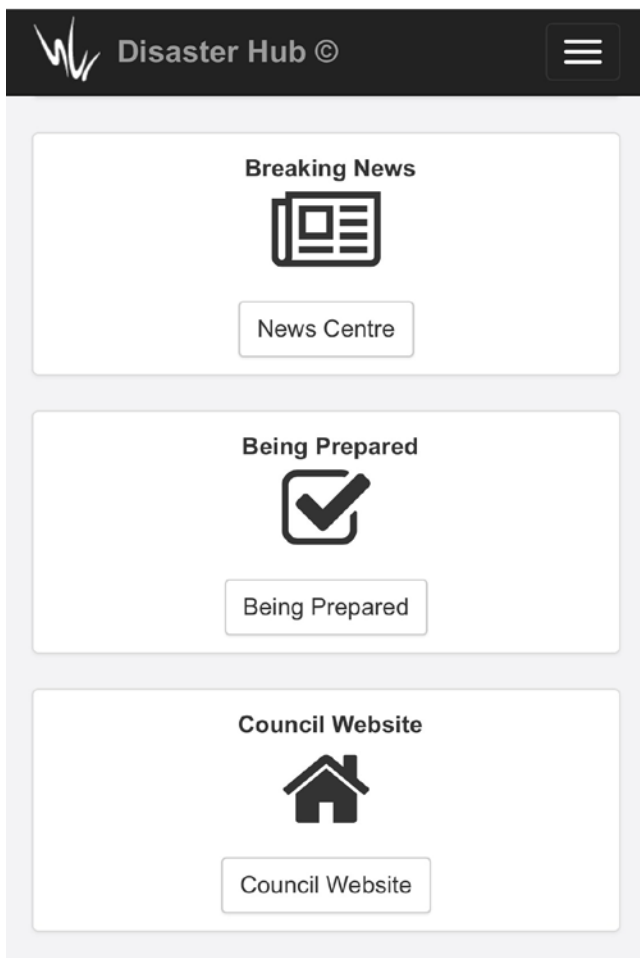
## Sunshine Coast Disaster Hub

The Sunshine Coast Council commenced development of the Sunshine Coast Disaster Hub in 2012 and launched the system in December 2014. Disaster Hub was first tested just three months later, receiving over 293,000 page views as Cyclone Marcia travelled through the region. The platform has been tested many times since its launch and was tested again during the Cyclone Debbie disaster activation. The weather system moved through the Sunshine Coast region in March and the Disaster Hub again highlighted the role that technology plays in keeping the community safe during emergency and disaster activations.

Designed as a contemporary and user-friendly technology space, the Disaster Hub provides comprehensive, centralised and real-time information for the public, media and external agencies before, during, and after a disaster event. It enables preparedness for events and has become a critical intelligence gathering and decision-making tool for the Sunshine Coast Council and the Sunshine Coast Local Disaster Management Group during events. The platform receives data from numerous real-time information feeds to provide up-to-the-minute information about emergency situations. The Hub works on any internet-connected device, providing information to the community any time of day.

The platform centralises information to the one easy-to-access site, helping the community to make decisions about the risks they may need to consider when disasters arise. During Cyclone Debbie the Hub received over 143,000 page views on 30 March accessing information, advice, warnings and media releases that contained important information about anticipated high winds, heavy rainfall and possible flooding.

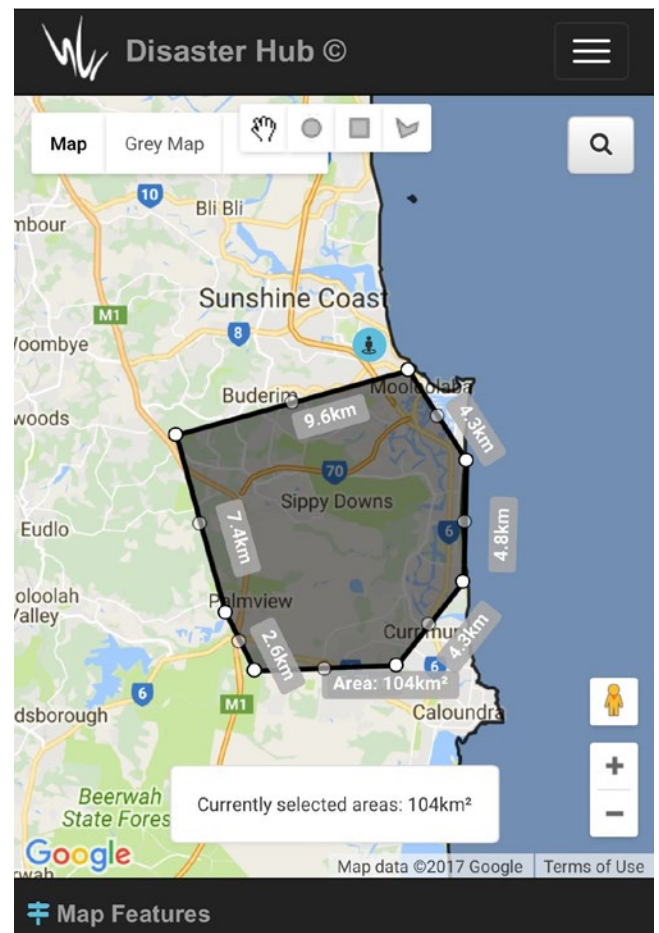
An increasingly popular section of the Disaster Hub is the social media section, which scans and displays the latest local social media feeds, including the Council's own Facebook page and posts. These reached over 520,000 people during the event, with 10,009 comments, likes and shares and with 15,257 disaster information video views. Event by event, the Hub is experiencing an increasing uptake of social media as the preferred method of information sharing during events.



The road closures section showed 52 local and state road closures at the height of the event, including detailed information about the closures or expected delays. Live traffic camera feeds provided real-time imagery of traffic flows across the region and beach cameras provided feeds of beach and surf conditions along the coastline.

The flood mapping section provided guidance on the locations that may be affected by estuarine flooding or storm surge. The maps were especially useful in providing an easy self-assessment process for checking flood risk, particularly for property owners wanting to know if their property was likely to be affected by floodwater. This significantly reduced unnecessary sandbagging operations for the SES by indicating the locations that could, or were unlikely to, be affected by floodwater. Live rainfall totals also provided further guidance about locations affected by heavy rainfall and localised flash flooding.

The revolving spotlight section on the Disaster Hub homepage provided information about dam overflows, emergency contacts, power outages, fallen power line safety and important information on what to do before, during and after the event. At the peak of the disaster activation over 32,000 properties lost power supply for up to three days. This equated to a quarter of the Sunshine Coast population without power, which in turn affected telecommunications and traffic control systems.



The news centre section provided vital information that was conveyed to the community, emergency services, local radio, television, social media and print media outlets. Council's media releases provided a single and reliable point of truth for the community throughout the event to minimise public risk by providing the latest information. This included dangerous road traffic conditions, limiting unnecessary travel, school closures, power outages and advice on how to stay safe and where to seek emergency assistance.

The Disaster Hub has become an integral technology for disaster operations and activations for the safety of the Sunshine Coast population. It has been recognised and awarded at state and national levels for its technical innovation and its contribution to building resilience across sectors and the community. It provides highly effective technology, particularly for local government, in protecting communities when emergencies arise.

Visit Disaster Hub website at: [www.disaster.sunshinecoast.qld.gov.au](http://www.disaster.sunshinecoast.qld.gov.au).

# Update of national guidance on flood risk management: the Handbook 7 collection

**Duncan McLuckie, Chair, National Flood Risk Advisory Group**

The recent devastating impacts of floods in different areas of Australia highlights the risks faced by communities when they interact with floods. It provides a demonstration that the occupation of floodplains, whether due to the legacy of former decisions or as a result of future decisions, comes with an inherent flood risk that needs to be managed.

Managing this risk and thereby improving community resilience to flooding needs to consider how to limit the interaction between communities and flooding. Fundamental to this is an understanding of the range of potential flood behaviours so that this can inform decision making.

To support this understanding, the National Flood Risk Advisory Group (NFRAG)<sup>1</sup> worked with the Australian Institute for Disaster Resilience (AIDR) and a range of industry professionals to update and expand the handbook collection, with financial assistance from the National Emergency Management Program. The collection now includes:

- Australian Disaster Resilience Handbook 7: Managing the floodplain: A guide to best practice in flood risk management in Australia (2017).
- Australian Disaster Resilience Guideline 7-1: Using the national generic brief for flood investigations to develop project specific specifications (2017).
- Australian Disaster Resilience Guideline 7-2: Flood emergency response classification of the floodplain (2017).
- Australian Disaster Resilience Guideline 7-3: Flood hazard (2017).
- Australian Disaster Resilience Template 7-4: Technical project brief template (2017).
- Australian Disaster Resilience Guideline 7-5: Flood information to support land-use planning (2017).
- Australian Disaster Resilience Guideline 7-6: Assessing options and service levels for treating existing risk (2017).
- Australian Disaster Resilience Practice Note 7-7: Considering flood risk in land-use planning activities (2017).

In addition, background documents were produced as part of development of this series, including:

- *Flood Hazard, UNSW Water Research Laboratory Technical Report 2014/07*
- *Approaches for Estimating Flood Fatalities Relevant to Floodplain Management UNSW Water Research Laboratory Technical Report 2015/09.*

This collection is available at [www.knowledge.aidr.org.au/handbook-7-managing-the-floodplain](http://www.knowledge.aidr.org.au/handbook-7-managing-the-floodplain).

The collection supports improved management of flood risk in Australia by promoting the consideration and, where necessary, management of flood impacts on existing and future development within the community.

It aims to improve community flood resilience using a broad risk management hierarchy of avoidance, minimisation and mitigation to reduce the health, social and financial costs of occupying the floodplain, increase the sustainable benefits of using the floodplain and improve or maintain flood-dependent ecosystems.

Handbook 7 outlines the flood risk management framework that can provide a sound basis for understanding how flood behaviour may vary across the floodplain and between events of different sizes, and assessing and deciding on management options to address flood risk. There are a wide range of management options which may be suitable depending upon the location. These may involve flood warning, flood mitigation, emergency management and land-use planning.

New Guideline 7-5 focuses on managing flood risk related to new development. Such development within the floodplain can expose land uses and their users to a significant risk of flooding, can impact on flood behaviour and can affect the flood vulnerability of existing developments and their users.

Therefore, managing the growth of risk due to increasing development density within the floodplain relies on an understanding of the range, extent and frequency of flood behaviour. In particular, it involves considering the full range of flood behaviour in identifying:

- how the flood functions of flow conveyance and flood storage vary across the floodplain areas where changes in the floodplain can significantly affect flood behaviour

<sup>1</sup> NFRAG is a working group of the Australian New Zealand Emergency Management Committee.

- how flood hazard varies across the floodplain (discussed in Guideline 7-3)
- the varying degree of isolation of areas of the floodplain from safety and the potential consequences for isolated areas (discussed in Guideline 7-2).

Guideline 7-5 provides advice on how flood risk managers can expect this often complex information to create a single map of four flood-planning constant to readily inform land-use planning activities. This makes information on the full range of flood events more readily available to inform land-use planning activities. It can also reduce the misunderstanding that a single event, such as the defined flood event, which may be an event that is exceeded on average in 1 per cent of years) is the limit of flooding.

The FPCCs also provide a clearer identification of the relative degree of flood constraints that may need to be addressed when considering whether to increase the density of, or change the allowable type of, development in different areas of the floodplain. Figure 1 provides an example of a floodplain broken down into four different FPCCs. FPCC 1 is the most constrained area of the floodplain due to the potential for significant impact on flood behaviour, with flood-related constraints progressively reducing as the FPCC number increases from FPCC 2 to FPCC 4. This breakdown can assist in steering development to areas with fewer flood

constraints where flood risk can more effectively be managed, and away from areas where the effects of changes in the floodplain on flood behaviour may be significant and flood-related constraints more difficult to manage.

The FPCC can be derived from flood studies under the floodplain-specific management process outlined in Handbook 7. They can inform land-use planning activities while work to examine management options continues.

To support use of the FPCC in informing land-use planning activities Guideline 7-5 also provides advice on the:

- typical flood-related development constraints in the different FPCC
- relative vulnerability of different types of development and their users to flooding
- typical roles different types of developments may play in emergency response to a flood

Guideline 7-5 also provide range of examples of the derivation and use of the FPCC and the supporting information.

The Handbook 7 collection will continue to evolve considering gaps in advice, changes in the needs of end users of flood information, technology changes and in response to lessons learnt in using guidance and from flood events. NFRAG will continue to work closely with AIDR and industry to develop and update guidance when the need and opportunity arise.

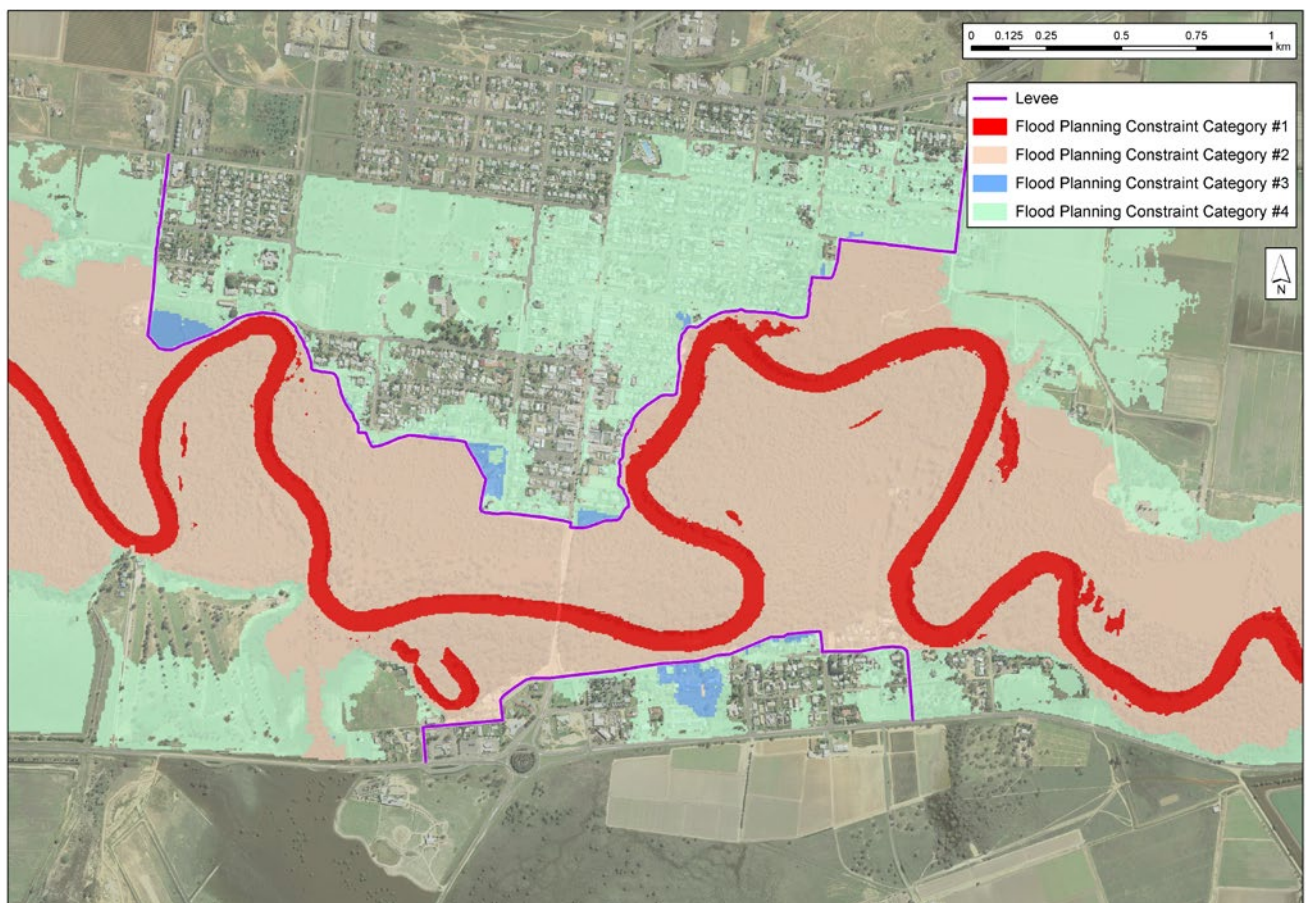


Figure 1: An example of flood planning constraint categories.

# Routines are integral to stabilising emergency event disruption

David Younger, Clinical and Consulting Psychologist, Victoria

Exposure to emergency events can have life-changing consequences. Although the majority of community members make a full recovery following an emergency, a common theme is of disruption to pre-existing routines. Various aspects of life can be affected as 'normal' routines are replaced with improvised crisis routines. Individuals are at risk of compromised health and wellbeing while community cohesion may be reduced. For those involved in providing psychosocial recovery services, it is important to assist affected community members to recognise, minimise and adapt to the effects of emergency event disruption. This article examines the role of routines in stabilising emergency disruption with reference to the epidemic thunderstorm asthma event that hit Melbourne in November 2016.

Routines form an integral part of everyday life. They contribute to a lived experience that seems predictable, secure and safe. Routines enhance individual health and wellbeing. When an emergency occurs, for example the epidemic thunderstorm asthma event that struck Melbourne on 21 and 22 November 2016, routines are disrupted and pre-existing stable functions of daily life may be compromised.

The inherent threat of the emergency facilitates heightened levels of stress and, even after the threat has passed, a reduced sense of predictability and safety may persist. In turn, normal routines are disrupted often without awareness that this is even occurring. Over time individuals are at risk of developing ill-health side effects and communities may experience less cohesive functioning. For community members, these are unexpected consequences of an emergency. It is therefore important that psychosocial recovery

processes assist people to recognise, minimise and adapt to the effects of emergency event disruption.

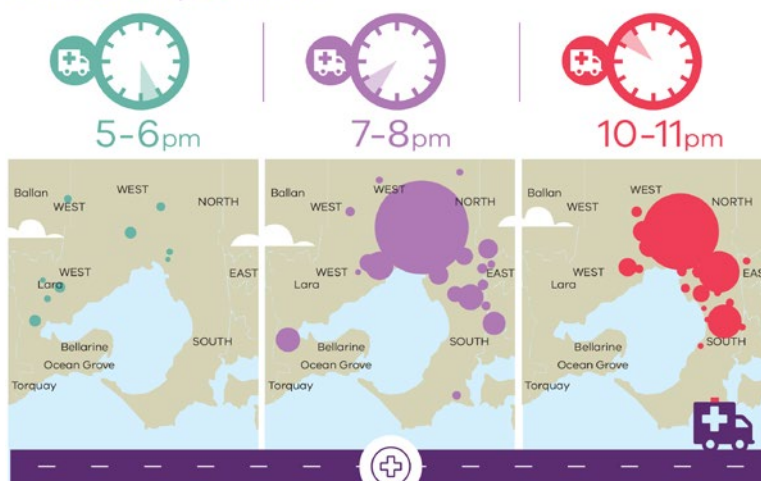
While participating in a series of epidemic thunderstorm asthma community information sessions held throughout Melbourne in February 2017, it became apparent that there was a range of experiences among attendees. Some had a very frightening, potentially life-threatening experience, others encountered a rapid change in their asthma symptoms that were manageable through significant effort, and a third group thought little of the event at the time it was occurring. Regardless of the severity of effect, the majority of attendees I spoke with reported some level of disruption to normal life in the days, weeks or months following the storm.

## Routines and habits

To understand the role of routines it is important to recognise the relationship with habits. Habits can be thought of as actions that are triggered automatically in response to certain cues in a person's environment (Neal *et al.* 2012). An example of a habit is pouring milk over one's breakfast (action) having filled a bowl with cereal (environmental cue).

However, Clark (2000, p. 128) defines routine as 'a type of higher-order habit that involves sequencing and combining processes, procedures, steps or occupations. Routines specify what a person will do and in what order and therefore constitute a mechanism for achieving given outcomes and an orderly life'. Consider a parent who awakens in the morning, gets dressed, makes

Ambulance Victoria call outs on 21 November 2016  
Priority 1 Breathing problem event



Dots represent volume of ambulance calls. Map not to scale. Approximate Ambulance Victoria response zone boundary.  
Ref: Inspector General for Emergency Management, Review of response to the thunderstorm asthma event of 21-22 November 2016 Final Report

breakfast for their children, helps the children get ready for school, packs lunches, drives the children to school, goes shopping at the supermarket, returns home, unpacks the shopping and responds to emails from the prior day. The process is then repeated multiple times during the following weeks and eventually it becomes a routine; a sequence of ordered tasks arranged according to priority and performed within a set period of time.

The benefits of routines are well identified. They help bind life together in a series of prioritised sequences. When these sequences are repeated a sense of predictability is created and this allows mental energy to be redirected elsewhere. With predictability comes a feeling of certainty, safety and security. This is evidenced by the fact that people make plans for their future and remain reliant on routines to get them there. Rarely is consideration given to the potential that something unexpected might occur and disrupt their automatic flow.

Importantly, routines are also associated with health and wellbeing. For instance, having good eating, sleeping and exercise routines have all been linked to positive physical and psychological health outcomes (Anderson & Whitaker 2010, Callaghan 2004, Haines *et al.* 2013). In an interesting study by Williams (2000) of 72 elderly people, it was found that those with fewer routines reported higher levels of distress when experiencing ill health and negative life events. These effects were not present for those who had more routines in daily life. Routines also contribute to child development and family functioning. For example, they assist children to anticipate what will occur during the course of a day. This provides opportunities to learn, try new activities and build self-confidence. In regards to families, various studies have shown that the existence of routines improve health outcomes (Anderson & Whitaker 2010, Denham 2003, Fiese 2007).

Just as individuals benefit from routines, so do communities. In fact, stable and effective community functioning is reliant upon routines. When we examine social structure we can see that people are bound together in community by common social elements (location, activities, resources, services, facilities, industry, attitude and interests) and that belonging to more than one community (education, business, sport, work, culture) is not uncommon. An example is a parent who works at a community bank and is also a member of the local football club. Every weekend they take their children to watch a match where they meet up with friends, support the players, purchase lunch from a fundraising barbeque and talk to some regular customers of the bank. In other words, the common social elements of community that bind people together are embedded in routines and, even at a community level, provide predictability, certainty and a sense of safety.

But what impact does an emergency event have on individual and community functioning? Although the answer is usually complex and dependent on the unique features of the event and the effected community, the common theme is of disruption. The pre-existing 'normal' patterns of living are interrupted due to the immediate

or ongoing threat, and there is a ripple effect that flows out into life for a period of time afterwards causing stress and anxiety. Normal routines are replaced with improvised crisis routines and the social fabric that provides certainty and security is destabilised.

During the epidemic thunderstorm asthma community sessions, one attendee spoke of the two weeks she took off work to care for her son who was hospitalised. Not long afterwards she became unwell with a stress-related condition and more time off work was needed. Another participant, whose asthma symptoms were triggered by the storm, described persisting fear of going outside. A family I spoke with explained that the father had become very unwell very quickly and they rushed him to the local hospital. The children had witnessed the incident and were continuing to express worry that the same could happen again.

Although the majority of people made a full recovery, there are those whose lives remain disrupted. When providing psychosocial recovery services, it is crucial to help individuals recognise, minimise and adapt to the effects of disruption. People can be assisted to understand the important role that routines play and encouraged to return to pre-emergency routines gradually.

Unfortunately for some it will not be possible for life to return to the way it was before the emergency. In such instances flexible adaptation, a key resilience contributor, can play a vital role. Approaches that activate and strengthen this ability will be helpful. In some cases a referral to a health service might be needed. However, regardless of the psychosocial recovery techniques devised and implemented the key message is that routines contribute to a more predictable life that feels safer, more secure and leads to better health outcomes for individuals as well as communities.

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# Lessons from Cyclone Debbie: how important is preparation?

| Susan Cullinan, Australian Red Cross

What does being prepared for a disaster look like? Red Cross asked three people how they prepared for Cyclone Debbie and whether they would do anything different next time.

One week after the flood waters of Lismore reached their peak, local business operator John Nolan was still coming to terms with what happened.

He lost \$100,000 worth of stock and equipment and damage to his building was estimated at \$60,000. John is a seasoned emergency worker with 30 years service as a marine rescue volunteer and 15 years in the fire service. He says even he didn't see what was coming.

'In something like this you should never ever be complacent. Don't ever think, "No, it's not going to happen to me", because you just never know. Noone honestly thought that this would ever happen here, ever, and it did.

'Be over-prepared. We did a lot here to try and be prepared because in 1954 [the last flood] only barely came through here, and that was before the levy bank was put in, so we honestly never thought we'd get as high as it did,' he said.



Lismore business owner John Nolan with Red Cross volunteer Tammy Evans.

Image: Amelia Wong, Australian Red Cross

Next time, he'll keep priceless items in a safe place.

'I've lost some photos and some bits and pieces in here, they're only silly little things to some people, things like pictures of rescue boats that I've driven in the years gone by; a silly little thing like that just sets you off.

'You can fix a building and you can replace stock eventually when you get the money to do it, but little things like that; you'll never get those back,' he said.

It's a similar story with Emmanuel Vella, whose family home was submerged by raging floodwaters in Drapers Siding, inland of Mackay.

He's lived there for 37 years and never experienced river heights anything like those during Cyclone Debbie. Everything stored underneath his house was destroyed. He lost two vehicles, a ride-on mower, washing machine, dryer, pool table and countless other items valuable only to him.

Emmanuel agrees you can't over-prepare.

'My advice would be, do not rely on past cyclones; do not rely on past heights. Think that it could be higher. When you go through a few cyclones and not much happens, you get familiar and, as the saying goes, "familiarity breeds contempt",' he said.

Meanwhile, in the township of Eton, inland of the north Queensland town of Mackay, Tanya Hornsby is still reeling from the suddenness of the flooding they lived through on their rural property.

She says even though she felt she was prepared and had been listening to the warnings about Cyclone Debbie's approach it wasn't until the river they live by burst its banks that it really hit her.

'I sort of don't cope. If I see my place in dire straits or whatever, I just hit the panic button and I don't listen, I don't comprehend anything. I just see devastation. But because I had the kids here, I thought, "No, I've got to keep it together". I put a pillow over my head, I have to admit, thinking if I didn't hear it, it wasn't there,' she said.





Emmanuel Vella surveys the devastation under his north Queensland home.

Image: Dilini Perera, Australian Red Cross

She says next time her preparation will include readying herself emotionally for the shock ahead. She aims to not get as emotional and she'd move the animals sooner. Tanya is still devastated at the loss of a heifer: 'Now she's gone, I can't do anything,' she said.

Australian Red Cross has been helping in emergencies in Australia since 1914. A critical aspect of this work is helping people and communities prepare for a crisis, both physically and emotionally. There is ample evidence that being prepared for an emergency can save lives and help people to recover and get back on their feet quickly.



Tanya Hornsby and son at the family's north Queensland property.

Image: Dilini Perera, Australian Red Cross

Red Cross encourages people to use a RediPlan, which helps people to be better prepared, better connected to each other and more resilient when emergencies happen.

RediPlan is at [www.redcross.org.au/prepare.aspx](http://www.redcross.org.au/prepare.aspx).

## CALL FOR PAPERS

### Disaster Recovery

The *Australian Journal of Emergency Management* is seeking submissions focused on disaster recovery for January 2018 including psychosocial impacts, economic impacts and community recovery.

The Journal is a refereed publication with original papers (academic and practitioner) in the areas of emergencies and natural disaster hazards, primarily for the Asia-Pacific region.

Practitioners, professionals and academics are encouraged to submit manuscripts for publication consideration. Submissions should contribute toward knowledge of emergency management and disaster resilience through research papers, case studies or other articles.

**CLOSING DATE FOR SUBMISSION: 31 August 2017**

Authors should refer to and comply with the Editorial Guidelines and the Contributor Guidelines available on the website. Papers will be evaluated on the basis of originality, content, clarity, and relevance to the theme.

For more information on how to submit your paper, email [ajem@aidr.org.au](mailto:ajem@aidr.org.au).

# Cascading and complex network failures

Dr John Bates, Australian Institute for Disaster Resilience

The extreme weather event that affected South Australia from 28 September to 5 October 2016 provided an opportunity to explore the impacts of the events themselves and more importantly, how the consequences of damage and disruption caused by the force of the storms (a combination of thunderstorms, destructive winds, large hailstones and heavy rain) impacted on the South Australian community. AIDR's Cascading and Complex Network Failures Forum explored the South Australian extreme weather event on 7 April 2017 through a range of guest speakers and panel sessions.

In the lead up to the extreme weather event in South Australia:

- there had already been multiple extreme weather events; the most recent in mid-September 2016 with widespread flooding in metropolitan areas
- the water catchments were saturated
- recovery activities were still underway from previous events
- emergency services and support agency staff and volunteers were fatigued.

The Independent Review of the Extreme Weather Event<sup>1</sup> concluded that:

- individuals, businesses and governments experienced difficulties with access to food, medications, fuel, credit card payments, cash, fuel, telecommunications, essential home and business appliances and water
- business continuity plans across government, business and some emergency services proved in some instances to be inadequate
- emergency plans to manage shortages of electricity, fuel and gas had not contemplated such a widespread impact from a loss of supply to the electricity grid.

At the Forum, Leanne Adams from South Australia State Emergency Service discussed some of the unanticipated consequences arising from the storms and power failure and lessons that can be learned to minimise future impact.

- IVF embryos were lost when parts of the Flinders Medical Centre lost power due to a failure of the main generator.

- Critical infrastructure systems, including communications towers and NBN phone and data connections, failed either because back-up power supplies failed or because there was no back-up power supply.
- Perishable food was lost in supermarkets, food outlets and homes.
- Public transport backup plans relied on an accessible electricity supply to run lighting and ventilation systems to manage fumes from diesel powered trains and safety at night. Available backup generators were either not available or ultimately failed.
- To preserve mobile telephony, data services were progressively switched off.
- Fuel was available but not readily accessible to either the public or emergency service organisations (ESO) and where fuel was accessible (typically where fuel providers had their own generators) customers needed cash (not credit card or EFTPOS) to make purchases.
- People who were unprepared panic-bought food and other supplies, quickly depleting available stocks.
- Triple Zero services were not available in some areas.
- Paging services used by ESOs for communication were switched off to conserve power.

Alongside all of this, there was significant physical damage across South Australia to roads, bridges, electricity infrastructure, residential and commercial buildings, coastal erosion and agricultural areas.

Beck Dawson, Chief Resilience Officer at Resilient Sydney, described cascading failure as invisible. All too often the flow-on failures from a single event are not well thought through and are either not considered or are thought to be so rare that it is better to focus on something that is more likely to occur. Resilience, she rightly said, is a team sport – no one can do it by themselves.

One topic that was explored by presenters and participants during the forum was the depth of the cascading effects of network failures linked to the availability of liquid fuel and food security. In our modern society, food distribution is managed from local distribution centres and relies heavily on road transport, which in turn is dependent on available and accessible fuel supplies. The events in South Australia demonstrated the vulnerabilities of fuel supplies in the event of loss of power arising from any event that

<sup>1</sup> Independent Review of the Extreme Weather Event, South Australia, 28 September-5 October 2016.

affects the electricity grid; from equipment failure through extreme weather events to criminal activities. Beyond that, however, is the absolute reliance on imported, liquefied fuels to meet demands. A series of reports commissioned by the NRMA and published in 2014<sup>2</sup> conclude that Australia imports more than 90 per cent of its liquid fuel needs. Those reports bring together information from a variety of sources to provide a snapshot of food distribution logistics:

- In the face of a significant liquid fuel crisis, and where this is the only shock affecting a community, the estimated stock available from point-of-sale outlets for essential items based on normal purchasing patterns is limited. For example, medical supplies (three days), petrol stations (three days) and chilled and frozen food (seven days).
- In September 2016, the Office of the Chief Economist reported<sup>3</sup> that the average holding of diesel oil within Australia was sufficient to cover demand for 17-20 days, and automotive gasoline for 23-27 days.
- The closure of refineries and reduction in onshore stocks of liquid fuels within Australia makes us more susceptible to global shocks and the decisions of oil-producing countries.

<sup>2</sup> [www.mynrma.com.au/about/australias-liquid-fuel-security.htm](http://www.mynrma.com.au/about/australias-liquid-fuel-security.htm)

<sup>3</sup> [https://industry.gov.au/Office-of-the-Chief-Economist/Publications/Documents/aps/2016/Australian\\_Petroleum\\_Statistics\\_242\\_September2016.pdf](https://industry.gov.au/Office-of-the-Chief-Economist/Publications/Documents/aps/2016/Australian_Petroleum_Statistics_242_September2016.pdf)

While it is important to understand the cascading effects of complex network failures, it is ultimately the impacts that these events have on individuals, communities, businesses and governments that is of fundamental importance.

There is no easy way to solve these complex challenges and we know that individuals, communities, businesses and governments will respond differently, depending on their experiences, their expectations and the context in which an emergency or disaster strikes them.

At a macro level, governments and private providers of critical infrastructure and essential services need to work harder on business continuity planning. They need to pay particular attention to a reliance on other critical systems and services and how the continuity of their business plays a critical role in the continuity of communities and other businesses and services.

In preparation for the next unexpected sequence of natural disasters, criminal acts and global shocks (and the one after that) individually and collectively we need to better imagine what is possible and how we can mitigate against, or adapt to, that reality. It is not a simple task and we will not always get it right. However, when we understand the complexity and we all own the risks that are relevant to us, we will be better able to minimise the impacts of these inevitable events.

## REGISTER NOW FOR THE NATIONAL DRANZSEN FORUM

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# Engagement matters

| Hansika Bhagani, Australian Institute for Disaster Resilience

In May the Australian Institute for Disaster Resilience co-hosted a two-day workshop focused on community engagement for disaster preparedness, response and recovery. Workshops were delivered by researchers and practitioners from a range of organisations including Tasmania Fire Service, QFES, RMIT University, Victoria SES, NSW Rural Fire Service and a keynote address from Tim Muirhead of CSD Network.

## **Tim Muirhead: Developing community, capacity and spirit: Strengthening the 'me and us' in communities**

Understanding what 'community' is, is vitally important Muirhead says, before we begin to explore how to engage with it. A failing of emergency services has been to treat communities as an entity that is locally based. 'We need to work with the shape of community as it is lived by different people. For some the relationships that they are a part of may be locality based, and for some it may be interests-based, or online-based. We should work with whatever we've got.'

By approaching community from a relationship-building model, Muirhead says, agencies and organisations will be better equipped to widen outreach efforts. 'The hard task of building community begins by finding your allies within the various networks of community. Find an ally and then ask how do we link with your world. You won't link with everybody; some people will say I don't go to meetings but they may quietly talk to their neighbour. If we've met with their neighbour and we've given their neighbour the equipment to talk to their friend, then that's good as well. An approach of relationship-building will cover as many different shapes of community as possible.'

While communities are rapidly changing, Muirhead notes that as most disasters are locality based, it remains critical to build links and relationships at the local level. 'Years ago I was complaining to a colleague about the loss of community. And she stamped her foot and said 'Tim, I've got community, it's just not your 1950's fantasy of what community looks like.' But in emergency services, a lot of our emergencies (besides pandemics) are locality based. That's where we need to do the work of building relationships.'

He admits it isn't easy to build these, especially in urban environments. 'You can get literally thousands of books on building a good marriage or how to build a good work team. Where are the books on how to build a good friendship or be a good neighbour? There's not much

there. It's taken for granted we'll all be good at it. But we're not always.

'We shouldn't put too high a threshold on what being part of the community feels like. A lot of our community development practices assumes we deal with extroverts. These practices probably bring together a lot of extroverts but don't bring together that shy self-contained person. What matters is that we're all linked in to networks of support that will nourish us in particular situations.'



Tim Muirhead delivered the keynote address at Engagement Matters.

Image: Hansika Bhagani

**Mark Sarago and Jennie Schoof: Empowering communities**

This session focused on improving the cultural understanding of participants and their engagement with Aboriginal communities. The session included examples that highlighted successful and not so successful engagement with Aboriginal communities. Participants were guided on a journey through a cultural lens to understand how to merge traditional knowledge, culture and respect for country with aspects of contemporary emergency management.

Top tips for engaging with Aboriginal and Torres Strait Islander communities:

1. understand the community
2. identify key stakeholders (including elders)
3. identify cultural concerns and customs
4. manage expectations and keep your promises
5. identify other supporter groups in the area
6. involve the community in decision-making.

Resources from all the Engagement Matters workshops are available at [www.knowledge.aidr.org.au](http://www.knowledge.aidr.org.au)

**Dr Yoko Akama: Identifying risks**

From research developed through the Bushfire CRC, Dr Akama explored the use of playful triggers to support disaster resilience in the community. Dr Akama noted that using asset-based techniques to engage communities and participant-led dialogue to build awareness could be effective for a range of organisations and agencies. This method of information sharing and pinpointing resources allowed local knowledge to emerge from participants as they identified 'safe areas', vulnerable households and highlighting aspects of a locality that may be taken for granted by emergency services agencies.

For more on Yoko Akama's resources in participatory risk identification visit the Knowledge Hub: [www.knowledge.aidr.org.au](http://www.knowledge.aidr.org.au).



The 'playful triggers' used to start mapping resources in Dr Yoko Akama's session at Engagement Matters.

Image: Hansika Bhagani



Jennie Schoof leads workshop participants through her story of working with Aboriginal communities.

Image: Hansika Bhagani

# Teaching emergency and disaster management in Australia: standards for higher education providers

Professor Gerry Fitzgerald, Dr Joanna Rego, Dr Valerie Ingham, Dr Ben Brooks, Associate Professor Alison Cottrell, Ian Manock, Associate Professor Akhilesh Surjan, Associate Professor Lidia Mayne, Chris Webb, Professor Brian Maguire, Heather Crawley, Dr Jane Mooney, Dr Sam Toloo and Professor Frank Archer

## Introduction

Over recent years there has been a strong public perception of the increased impact of disasters worldwide. This increase is compounded by the effects of climate change, population growth, the interconnectivity and complexity of modern societies, urbanisation and an increase in the proportion of vulnerable members of society.

There has thus been increased interest in enhancing the education and training of those charged with supporting, leading and managing communities. However, such programs need standardisation of curricula to ensure consistency and articulation between levels of training.

Tertiary education plays a key role in developing the capability of those tasked with leading efforts to improve emergency and disaster management. A curricula informed by industry needs and designed with a generic benchmark in mind is essential for effective tertiary education. Therefore, there is value in developing standards for emergency and disaster tertiary programs; standards that may facilitate international cooperation and exchange among emergency and disaster professionals and perhaps contribute to professionalisation.

The aim of this project was to develop a conceptual framework and standards for higher education programs in emergency and disaster management in Australia.

## Methods of development

The Generic Emergency and Disaster Management Standards (GEDMS) for higher education was developed through a mixed qualitative research approach. The sources of information included:

- a comprehensive, international literature review to identify recommendations for course content
- a detailed analysis of current emergency and disaster-related university programs throughout Australia and New Zealand
- five focus groups of 34 interdisciplinary experts from government organisations

- two rounds of feedback involving those who participated in the focus groups
- broad-based consultation with industry representatives to test the validity, utility and appropriateness of the standards
- a one-day final seminar with industry representatives and relevant stakeholders.

This approach ensured that GEDMS was drawn from a comprehensive set of diverse data and reflected a sophisticated and holistic approach to the data analysis.

## The context

The definition of 'disaster' is contested. The GEDMS do not focus on 'business as usual' but rather on those events that challenge communities and require special arrangements to be put in place. The standards focus on coping and adaptive capacities and building resilience. The GEDMS curricular goes beyond disaster response to encompass the strategies required to manage disasters and their effects throughout the continuum of the disaster cycle; the core concepts, principles and practices that, while complementing diverse expertise, also define the field.

The GEDMS should be read and applied within the following philosophical assumptions:

- disaster management is primarily local and community-based
- there is a wide diversity of roles and expertise involved in emergency and disaster management across individuals, organisations and communities
- there is a focus on the Australian tertiary education sector and the philosophies that underpin disaster management in Australia and the Australian Qualification Framework (AQF)
- there is a focus on core knowledge needed by the variety of participants in emergency and disaster management
- there is a comprehensive view that recognises the mitigation impact of strategies such as land-use planning, public health protections and building-construction standards
- there is a need for continual review and updating.

The GEDMS recognise that the scope of core competencies vary dependent on the role of the individual. All people should understand a small component of core knowledge while those accountable for leading policy development need an extensive understanding of the underpinning concepts, principles and practices.

The GEDMS also recognise that in addition to these core concepts there are task-specific, role-specific, context-specific and specialty-related knowledge and competencies required (Figure 1). These concepts can be described as:

- task-specific knowledge relates to the particular functions of various stakeholders
- role-specific knowledge relates to the roles and responsibilities of individuals and organisation
- context-specific knowledge relates to particular physical and socio-cultural environments
- specialty knowledge is required for key elements of the emergency and disaster management continuum (e.g. particular expertise such as media and communication).

The GEDMS are not intended to address these later two domains as their diversity means that they cannot normally be provided by centralised (multidisciplinary) education, but rather by operational and specialised agencies or through specialised, disciplinary programs.

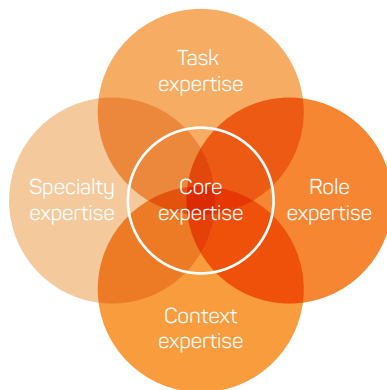


Figure 1: Relationship between core and specific expertise (knowledge and skills).

## The Generic Emergency and Disaster Management Standards

The GEDMS have been organised around the required knowledge and skills needed to practice. The three main themes within the knowledge domain are governance and policy frameworks, theoretical and conceptual basis for practice and contemporary disaster management. The three themes that emerged within the skills domain were leadership, communication and collaboration. The two themes that emerged from the application domain were professional practice and critical thinking. These are represented in Figure 2.



Figure 2: Domains of the Generic Emergency and Disaster Management Standards.

## Conclusion

The application of GEDMS to the development of university programs will vary according to the level of the program. All graduates would be expected to have a broad and coherent body of knowledge and be able to review critically, analyse, consolidate and synthesise knowledge, as well as identify and solve problems. However, the extent to which they do so and the complexity of the problems to which these core competencies are applied will vary.

The GEDMS project achieved extensive recognition regarding the value of the exercise. All parties involved recognised the need for a generic standard to inform the tertiary education of emergency and disaster managers. There remains a need for further consultation with the emergency and disaster management community to evaluate the GEDMS and to refine the main themes. The actual application of the GEDMS will inform future adjustments. Additionally, the implementation of these standards relies on a self-regulatory approach.

Further consideration should be given as to how the GEDMS inter-relate with vocational training programs. Any subsequent development of an integrated approach to training and education must facilitate an articulated education pathway for students.

Full text, peer-reviewed manuscript is available online at: <https://knowledge.aidr.org.au/collections/australian-journal-of-emergency-management/>

### About the authors

The project has been directed by a multidisciplinary team led by Professor Gerry FitzGerald. The team represented various academic and government organisations. The project was supported throughout by staff of the Attorney-General's Department and the support of the Capability Development Subcommittee of the Australia and New Zealand Emergency Management Committee.

# Developing communicators will improve prevention, response and recovery

Dr Barbara Ryan, University of Southern Queensland

Communication glitches in disaster management stubbornly remain on 20 per cent of total operational problems in Australian emergency response. This made the communication teaching team at the University of Southern Queensland think that something needed to change.

We looked at the many reasons for the predominance of communication in these statistics including changes in community expectations, systems, funding, leadership, education and skills, agency and team memory, power balances between operations and communication functions, and longevity of tenure within communication teams that look after communication.

One aspect we felt we could help improve was to better equip communication teams with skills and vision to deal with some of the obstacles to best practice.

Firstly, higher level and skills training could help communicators do their job better. Building a strategic view of how to do their jobs might encourage them to stay in the role longer. This 'memory' aspect of disaster management is critical, even as agencies develop methods of embedding this individual memory into the corporate memory.

Secondly, post-graduate study could help communicators address those power imbalances within organisations that sometimes see operational staff

dismiss communication needs or processes in moments of high stress.

Finally, this level of study would add a layer of intellect that could help during agency discussions about the communication function.

This led us to create a new Graduate Certificate of Business – Emergency and Disaster Communication, specifically developed for agency communication teams to help move their function up a level. It's also useful for disaster managers wanting to better understand human behaviour and communication techniques.

The four-course program covers each phase of disaster. Courses are offered in change communication, community engagement, response communication and disaster management focusing on communication. Study of social media is also an option.

We've developed this program using research as a base. We are pleased that the Bushfire and Natural Hazards CRC is building such a comprehensive foundation for understanding why people behave the way they do in preparation, response and recovery stages, and their communication needs at each phase.

The courses in this specialisation can also be used toward Masters-level qualifications in project management, leadership and business.

The staff in the program are Matt Grant and Dr Barbara Ryan, with contributions by Dr Chris Kossen and Andrew Mason. Matt has extensive crisis and disaster response experience, coordinated Australian whole-of-government communications from Banda Aceh, Indonesia after the Boxing Day tsunami in 2004, was regional news director for regional television and has held corporate public affairs roles. He has worked in journalism and public affairs for 25 years.

Dr Barbara Ryan has researched how people get information in disasters and has experience in response and recovery communications for bushfires and floods at local disaster management level. She spent seven years as a volunteer coordinator of communication for a district disaster management group in Queensland. She is a co-founder and former director of Emergency Media and Public Affairs and has more than 20 years public relations experience.



The USQ communication teaching team (back) Andrew Mason, Matt Grant, (front) Barbara Ryan and Chris Kossen.

Image: Barbara Ryan



# Developing a support program for the bereaved: personal reflections from the Christchurch earthquake experience

■ Jolie Wills, cognitive psychologist and independent consultant, Christchurch

This reflective article provides one practitioner's personal experiences and learnings gained from the process of designing and implementing a support program for those people bereaved by the 2011 Christchurch earthquake. It highlights some key principles and approaches underlying the program and some of the challenges and opportunities identified to help people after a disaster. While findings reflect the author's personal views, links are made to other research and guidance to reinforce key messages.

## Introduction

At 4.35am on 4 September 2010, a magnitude 7.1 earthquake struck 40 kilometres to the west of Christchurch, New Zealand. Although considerable damage occurred in the Canterbury region, no lives were lost. However, at 12.51pm on 22 February 2011, a magnitude 6.3 aftershock resulted in the death of 185 people. Lives lost totalled 133 as a result of the collapse of the Canterbury Television (CTV) and Pyne Gould Corporation buildings. Other deaths occurred due to falling masonry, landslides, toppling furniture and other causes linked directly to the earthquake. Both events stretched the coping capacity of individuals, families, *whānau*<sup>1</sup>, communities and organisations, both in the immediate and long-term aftermath.

From 2012-2015 the New Zealand Red Cross (NZRC) provided a support program for people bereaved by the February 2011 earthquake. Although initially focused on the bereaved, the program developed to assist the seriously injured and became known as the 'bereaved and seriously injured support program'.

This paper is based on my experiences and lessons identified as the NZRC program manager responsible for scoping, developing and leading psychosocial support programs during 2012-13 and focuses on bereavement support. This was not a role I had previously performed but from which I have been able to reflect and identify helpful lessons. My aim is to share my personal reflections in the hope they may benefit others doing similar roles in the future.

## Establishing the NZRC program

In the first months following the disaster, those whose loved ones died were provided with information and support through various agencies including the New Zealand Police and the Canterbury Earthquakes Royal Commission. The latter was established to report on the causes of building failure as a result of the earthquakes as well as the legal and best-practice requirements for buildings in New Zealand central business districts (Canterbury Earthquakes Royal Commission 2011). The inquiry ran from April 2011 to November 2012. Although the terms of reference for the Commission were wide-ranging they did not include providing psychosocial support. Nevertheless, the Royal Commission set up support groups for those who had lost family members to building failure.

The Commission approached the NZRC Earthquake Recovery team in March 2012 to take on the role of longer-term psychosocial support provider. The bereaved support program provided practical assistance and other activities including support groups, social activities, retreats and talks by experts. By 2015, the bereaved support program transitioned to self-management by the bereaved themselves.

## Staffing the program

Initially, I was solely responsible for designing and implementing the program, as well as other psychosocial programs. A bereaved support coordinator was recruited in August 2012, supported by two counsellors who ran monthly support groups and additional support groups during the period of the Commission's inquiry hearings. I

<sup>1</sup> Extended family unit within the Māori world view.

continued to oversee the program until the end of 2013, after which I played an advisory role.

It was important to be clear about the overall aim and purpose of the program when recruiting the right staff and volunteers. The program was a vehicle to bring people together and help them create self-supporting networks. This aligns with the principles of promoting self- and group-efficacy and connectedness (Hobfoll *et al.* 2007). While recruiting a dedicated bereaved support coordinator, I found that applicants often had difficulty envisioning the role as being different to that of a social worker working primarily to support individual families or *whānau*. As such, people with well-developed people and project coordination skills were recruited as having the most appropriate skills and experiences for the role. They were provided with careful supervision and psychosocial training to support and guide them.

Independent counsellors were brought in to run the bereavement support groups. The need for these support groups extended to years rather than months. It was therefore crucial to build in support and breaks for the counsellors while ensuring continuity for group members. We did this by employing counsellors used by the Royal Commission and carefully introducing a second pair of counsellors who, once a relationship with the group was established, could run the support groups when relief was needed. This provided continuity. Ensuring counsellors accessed good supervisory and staff support systems was also vital.

### Learning:

A key consideration for future groups is to risk manage the impact on both the bereaved and the counsellors of facilitating, staffing and transitioning such intense and meaningful support groups that may run for an uncertain or lengthy period of time. Ensuring the wellbeing of all parties is a crucial aspect of planning and management.

Counsellors were recruited based on their previous experience with running support groups. During this time I found it helpful to connect with other practitioners experienced with those bereaved by disasters such as the Black Saturday bushfires, the Pike River mine explosion and Bali bombings. I sought their support and found their encouragement and wisdom was vital. They highlighted possible challenges ahead, shared helpful strategies and linked me to relevant literature, including online information from organisations such as Disaster Action (2017).

### Learning:

I recommend future service providers actively call on the help, experience and guidance of others.

## Identifying the bereaved

A key challenge was to identify and access people needing support. The list of the people bereaved provided to the NZRC by the Commission was incomplete because the Commission's mandate related to deaths occurring as a result of building failure. This meant that those bereaved by other aspects of the earthquake were not included on the list. In addition, people out of Canterbury were often not represented. Greater than 20 nations were represented by those who died and the bereaved included those within and outside New Zealand.

### Learning:

A lesson from this is to be aware of the challenges in collating and maintaining comprehensive lists of people affected by disaster, especially when lists are being shared across organisations and the target group is dispersed. Steps need to be taken (including ongoing publicity and outreach) to address the risks of people not knowing about or missing the opportunity to take up offers of support. In our case, two to three years after the event we were still encountering bereaved individuals seeking support for the first time.

## Being guided by the bereaved

A core approach from the start of this program was to be guided by group participants in designing and implementing the support program. We sought feedback through discussion at the end of support groups, at retreats, through email communications and at a dedicated feedback event. This was a guiding philosophy and I believe it was this approach that resulted in getting things more right than wrong. This meant being flexible to respond to changing and diverse needs and to being open to learn about and explore unanticipated issues. Many times the experience of the bereaved helped us shape our services and those of other professionals.

For example, two years after the earthquake a number of group members sought to access the coronial files of their family members. They wanted to understand more about their loved one's last moments but faced hesitancy from officials to allow viewing of files. The family members involved had a strong sense of what

they needed. Listening to and being guided by the bereaved was important. It transpired that at the time of the disaster the opportunity to view the deceased had been denied on the basis of what is a common misunderstanding, namely the assumption that viewing after death might inflict further trauma on the bereaved. The evidence and good practice guidance suggests the opposite; that informed choices and providing appropriate support around viewing can make a significant difference to making sense of loss after sudden, traumatic death. In fact being denied such a choice can have negative rather than positive outcomes for them (Chapple & Ziebland 2010, Mowll 2007).

### Learning:

A key lesson was listening to and acting on feedback, seeking further information and guidance on best practice and then supporting the bereaved in their self-advocacy by passing on that knowledge and reassurance to decision-makers such as the Chief Coroner and Ministry of Justice staff.

## Connections and mutual support

A bereaved support program can create space for those bereaved to connect with and support each other. This can be even more important than the provision of direct support. This was an early realisation informed by advice and resources received from members of the Black Saturday bushfire bereaved community and practitioners from other disasters. It was recommended that designing informal events that facilitate mingling may be more useful for creating connections between the bereaved than arranging outings, although the latter was still appreciated.

Support group members indicated that an organised break would help them escape the tangled processes that follow death after a disaster. They sought sanctuary



Friendships have developed among those who lost loved ones in the earthquake and many continue to meet to support each other.

Image: Laisa Cordes

from grieving in the public spotlight and from well-meaning others who didn't understand. The retreats arranged by the NZRC achieved this and helped to create and sustain connections between those who had lost loved ones. Being with others who could appreciate and understand their situation was often cited as being helpful. The retreats allowed for quiet reflection and solitude for those who needed it, for social connection for others and a range of activities that involved various subgroups such as young people, women, families, men and so on. They attracted a wider range of participants and facilitated more connections than other support groups. The connections made at these events were an enduring source of support for many.

Subgroups and special interest groups were formed, some independently and some with assistance, such as those wanting to advocate for improved building standards and those now parenting alone as a result of the earthquake. These subgroups were run by the members themselves. We offered practical support such as a venue, catering and running costs or access to facilitation training. This freed up the members to focus on forming connections that served as the source of continuing mutual support. In addition, group members connected with other people with similar experiences from different disasters or with their written accounts (Westall *et al.* 2011, Tuesday's Children 2011). This helped group members feel understood and less alone in their experience.

## Intrinsic and symbolic value of practical support

Program support often meant assisting the bereaved to address practical challenges as they arose. At times people felt overwhelmed when managing tasks and using skills they had never needed before, such as navigating bureaucracies with which they were unfamiliar.

An older lady with health concerns, whose husband died in the earthquake, was moving to a lower-maintenance house and was finding the process of preparing her home for sale very difficult. A carefully selected volunteer helped to tidy the garden, a task that would have previously been performed by her husband. The volunteer was a trained NZRC psychosocial volunteer with previous experience working with vulnerable people who also happened to be a gardener.

Another example relates to the experience people had with dealing with the media. Some chose not to engage with the media, some experienced positive, respectful and helpful interactions and others were hurt by the process because of unethical, disrespectful interactions. Knowing that dealing with the media can be challenging, a media trainer was engaged to provide information sessions and a tip sheet was disseminated to group

members. The aim was to help people understand their rights and make informed choices about whether or not, or how they might engage with the media. On another occasion, practical support involved completing background research and assisting a family with the closure of a loved one's social media accounts. Other practical support involved assisting with transport to and from anniversary events.

### Learning:

I came to appreciate the symbolic value of such gestures and realised that having transport and parking taken care of on such a stressful day can mean a great deal. A key skill is being able to gauge when such help could be offered and when it is best to let people ask for it. It's about *how* help is given and getting the balance right in making things easier without disempowering people.

The availability of support is in itself helpful for some people, even if offers are not taken up. For example when we sent email updates about support initiatives, we regularly received replies along the lines of:

*Even though I don't come to support groups or activities, please keep me on the email list. I don't feel that I need or want to attend right at the moment, but knowing support is there should I need it is reassuring.*  
Anonymous

## Enabling wellbeing

NZRC distributed an initial cash grant of \$10,000 to the next of kin of those who had died in the Christchurch earthquake. However, a year on, addressing financial concerns and practical challenges compounded the emotional load of those who had lost a loved one. For example, some who had lost a partner and co-parent, talked about the only time being available to mow the lawns was while the young children napped. However, the children could not sleep through the lawn mowing. A weekly mowing service would make all the difference. Childcare or babysitting services allowed time to engage in activities that assisted coping and supported wellbeing. Many people understood the need to monitor and support their wellbeing through the grief process.

Next of kin generally felt it was important to use grant money for the long-term, such as earmarking it for their children's future education. This dictated how they used the first cash grant. In response to the financial challenges raised in the second year, another cash grant of \$10,000 was made available. The intent of the grant was for the bereaved to address practical challenges and support their wellbeing. In actuality, the grant recipients

could again spend the grant as they saw appropriate. Family members greatly appreciated the intent of the grant. It recognised the pressures and realities of their circumstances and they felt more able to use the grant to support their wellbeing and to make life a little easier.

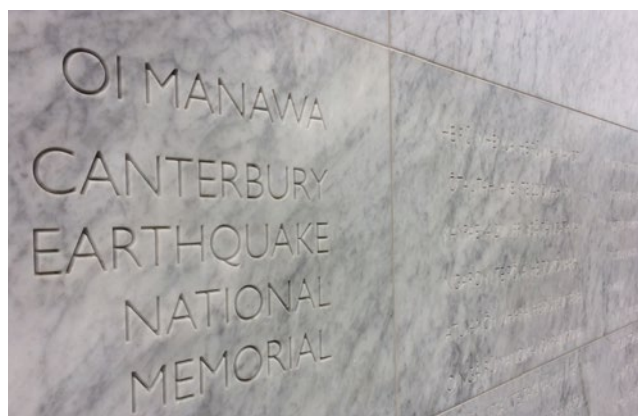
### Learning:

Wherever possible, consider how resources might support people to feel they can make choices that enhance their wellbeing and the wellbeing of those close to them.

## Two-directional gateway

The program acted as a gateway or connection point linking people with relevant services and expertise. It is therefore important to maintain a well-developed, relevant and up-to-date list of services for individuals, families and *whānau*. However, an essential, but unanticipated role of the program was acting as a gateway in the opposite direction—with agencies needing to communicate or consult with the bereaved. This gateway function involved being a conduit to the bereaved while simultaneously attempting to protect from unnecessary harm. A delicate balance was sought between respecting the rights of the bereaved to receive information, be consulted and make choices, while at the same time buffering them from insensitive or inappropriately worded information and requests. In some cases it meant suggesting alternative language for communications, advising the timing of messaging or suggesting having supports available for the delivery of sensitive messages.

For example property developers wanted to inform families of those who had died on private, commercial property of decisions and developments associated with



The memorial wall in Christchurch lists the names all those who died due to the earthquake in 2011.

Image: Jolie Wills

the rebuild. We also advised people arranging earthquake preparedness campaigns to consider the implications of screening advertisements using graphic images resembling the manner in which people had died. We were asked to participate in the planning process for a permanent memorial and attended an initial meeting to advocate for the direct involvement of the bereaved. We did not want our presence misconstrued as a substitute for involving the bereaved themselves.

### Learning:

A key lesson was finding the balance between acting as a buffer without removing choice and between being prepared to advocate for the rights of the bereaved without becoming seen as a spokesperson for the bereaved.

## Supporting the supporters

A powerful dynamic in this program was that the NZRC recovery staff and volunteers working to support disaster-affected communities were at times disaster-affected themselves. For myself, I had earthquake-related challenges to overcome and a team of people to support. I felt honoured and fretful about the responsibility of supporting people whose loved ones had died. I worried about providing support that was relevant, helpful and not harmful. I wanted to get it right for those who had already lost so much and I feared getting it wrong. For these reasons taking on the role was daunting, challenging and stressful.

### Learning:

Training, supervision, wellbeing initiatives and the development of self-care plans for personnel involved are essential, as are other best-practice methods of staff and volunteer support.

Understanding how best to support people working and living in disaster recovery areas led me to undertake a Winston Churchill Fellowship (Wills 2014). The resulting guidance was a great help in supporting those working on the program.

## Conclusion

Challenging though it was, the provision of meaningful support to those who had lost loved ones to a disaster was a privilege. Real and honest reflections from other practitioners shaped the program we provided and were a great support to me through the process. These

reflections and learnings are shared with the similar aim of aiding those providing support after disaster.

## Acknowledgment

I thank Anne Eyre for her assistance with this article.

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## About the author

**Jolie Wills** is a cognitive psychologist who led the development and implementation of New Zealand Red Cross psychosocial program in response to the Christchurch earthquakes. She is an independent consultant in recovery practice. Jolie was awarded a Winston Churchill Fellowship in 2014 to explore support strategies for personnel working in disaster recovery (<http://supportingthesupporters.org>).

## ABSTRACT

Despite great advances in emergency management, we live in a world where the incidence of individual and collective loss, bereavement and trauma and the need for post-disaster support is as great as ever. The provision of formal and informal psychosocial support is not new. However, some interesting models of post-disaster support have emerged following recent disasters such as earthquakes, tsunamis and deliberate acts of violence including terrorism. This paper highlights the implications for future psychosocial support provision as identified through a review of three post-disaster psychosocial support programs. Following a review of evidence-based principles, guidance on the organisation and delivery of support is contrasted with recent evidence. This suggests that bereaved people and survivors can fall through gaps in post-disaster support and struggle to access peer-support services. Those who have received support have provided feedback to benefit others. The aim of this review is to assist the sharing of lessons and implications identified by participants of an evaluation and review of three bespoke support programs.

# Lessons in providing psychosocial support: a review of three post-disaster programs

Dr Anne Eyre, Trauma Training, United Kingdom.

Submitted: 1 April 2017. Accepted: 12 May 2017.

## Introduction

The availability of social support has long been recognised as an important factor influencing levels of psychosocial health and welfare after disasters. As well as social embeddedness (the size, activeness and closeness of a survivor's network) received and perceived social support is critical for disaster victims. Norris (2008) states that:

*With few exceptions, disaster survivors who subsequently believe that they are cared for by others and that help will be available if needed, fare better psychologically than disaster survivors who believe they are unloved and alone.* (Norris 2008)

## Principles of psychosocial support

The Australian Red Cross is among those organisations that recognise the significant ways in which people's lives change as a result of a disaster and what it means to adopt a psychosocial approach to preparedness and recovery activities. Drawing on empirically supported intervention principles aimed at intervention and prevention efforts after mass traumatic events (Hobfoll *et al.* 2007), John Richardson (2016) describes how organised support activities can reduce the psychosocial impacts of disasters. Promoting a sense of safety (by encouraging people to understand the risks they face and having an emergency plan to manage their safety), a sense of calm (through stress management strategies) and hope (through preparedness activities) are all fundamental.

Hobfoll and colleagues (2007) highlight two further key approaches focused specifically on enhancing resilience as fundamental to psychosocial support and recovery strategies. These are promoting connections and promoting a sense of self- and community-efficacy. A focus on self-efficacy does not mean that assistance such as mentalhealth and other services are not needed. Rather, such services should be delivered in a way that provides resources without threatening those resources. For example some people are more likely to accept help for 'problems in living' than to accept help for 'mentalhealth problems'. Norris (2008) states:

*In exercising our good intentions to help victims, we must not inadvertently rob them of the very psychological resources they need to persevere over the long term.* (Norris 2008)

The emphasis here is that it is not just a question of *what* support is provided but how it is given, *who* by and *how long* for.

## Organising post-disaster psychosocial support

Psychosocial approaches should be proactive, pre-planned and integrated with other elements of a person's recovery. The organisational implication of this is that long-term psychosocial support should be intrinsic to any pre-incident planning and post-incident recovery arrangements (Department of Health 2009).

Good practice (NICE 2005) and government guidance documents reinforce this. For example, current UK government guidance states that addressing the human aspects of emergencies requires leadership and careful coordination as part of the response effort (Cabinet Office 2016, p. 11). It reinforces earlier strategic guidance stating that when a humanitarian assistance capability is fully embedded a community can expect to receive a coordinated, effective and sustainable response from public, private and third sector organisations in the UK over the immediate and longer term (DCMS 2011, p. 8).

## Falling through the gaps

The evidence-based planning principles and moral arguments for providing appropriate psychological and social support after disasters are not contentious. It is often the case that immediate measures are taken to help affected groups and that, overall, such help has become more organised and structured than in the past (Dyregrov *et al.* 2009). It is also true that in the long-term people affected by major incidents find themselves feeling isolated, unsupported and falling through gaps in accessing psychosocial support (Reifels *et al.* 2013).

Research in the UK in 2016 with bereaved families and survivors of terrorism commented on the severe ripple effect of disasters and found that gaps in recovery support means those affected often struggle to access what they need to move beyond the incident (Barker & Dinisman 2016, p. 7). One reason is that in the absence of a widely recognised definition of a 'victim' of terrorism, 'witnesses' are not always considered to be victims. The result is that there is no guarantee that a British national or resident who has suffered psychological injuries or less serious physical injuries as a result of an act of terrorism overseas will be referred to victim services (Barker & Dinisman 2016, p. 8). Furthermore there is a lack of clarity as to where survivors should seek information about the support they can receive and the options available. In addition, for some survivors and bereaved family members, the waiting times to receive counselling or therapy services through the UK National Health Service can seem too long. Access to peer-support groups, particularly locally, can also be problematic.

Notwithstanding this, there are examples of good practice in psychosocial support provision that have been implemented in the aftermath of disasters. Three case studies are used to consider practice types. Although each was initiated in response to a different type of incident, in different countries, at different times and in the context of different emergency management frameworks, some common experiences and implications emerge. These examples illustrate the issues and challenges and offer lessons to consider for the future.

## The British Red Cross Tsunami Support Network, 2004-2005

On 26 December 2004, the Indian Ocean tsunami killed an estimated 280,000 people across 14 countries with Indonesia being the worst-hit country, followed by Sri Lanka, India and Thailand. Approximately 10,000 British nationals were in areas affected by the tsunami and 151 British lives were lost (the exact number of injured is not known) (National Audit Office 2006, p. 3).

In the aftermath of the disaster the British Red Cross established a telephone support line and, with other specialist and voluntary organisations, deployed a psychosocial support team to Thailand. Red Cross representatives also met people returning home through UK airports. The Foreign and Commonwealth Office asked the British Red Cross to also assist in addressing the long-term needs of affected UK citizens. Consequently, in the UK, the British Red Cross established a family and peer-support network for bereaved families and survivors. This became the Tsunami Support Network (TSN) that ran for 18 months. The British Red Cross Support Network also managed the Tsunami Hardship Fund from November 2005.

The TSN provided a range of services during the 18 months including a dedicated website, telephone and email support, newsletters, information meetings and regional bereaved and survivor support groups. The aim was to provide individuals affected by the tsunami access to information, guidance and advice and opportunities to share experiences and benefit from peer support. In keeping with the principle of enhancing resilience and efficacy, a fundamental aim was to enable the network to become self-sustaining as soon as possible. A multi-agency steering group included an advisory role for Disaster Action.<sup>1</sup>

The National Audit Office conducted a review of the experiences of British nationals affected by the tsunami. The Office found that the provision of aftercare generally (as experienced by respondents) was often variable and lacking. However, the TSN and other agencies provided supportive advocacy and were experienced and effective. The services and support provided by the TSN had the highest satisfaction ratings reported by the survey respondents. Based on the findings,

<sup>1</sup> Disaster Action is a charity where members have direct experience as bereaved people or survivors and who have experienced disasters and understand their consequences.

the National Audit Office report identified a number of recommendations for planning, preparation and long-term support including government departments having plans to establish comparable support networks (i.e. independent of government and accessible via a variety of means as quickly as possible following a major disaster). The report stated:

*Regard should be given to the good practice seen in the establishment and development of the Tsunami Support Network, particularly the way in which survivors and families acquire(d) ownership of the Network over time. (NAO 2006, p. 15)*

## Norway's collective assistance following terror attacks in 2011

On 22 July 2011, a lone gunman killed 77 Norwegians in a series of terror attacks on government buildings in Oslo and then on a youth camp on the island of Utøya. This was the deadliest attack on a largely peaceful country since World War II. It represented a national tragedy that profoundly affected the entire society (Dyregrov *et al.* 2014, p. 1, Reifels *et al.* 2013). The killings on Utøya meant that about 210 parents and siblings lost a child or a sibling. In addition, some lost their partners or parents and many adolescents lost a close friend (Dyregrov *et al.* 2014).

A Scandinavian collective assistance approach to support the bereaved following disasters had already been established in Norway (Dyregrov *et al.* 2009). In 2011, the approach was implemented again when public health authorities instructed municipalities to offer outreach to those affected. They advised that helpers should initiate contact with the bereaved and offer everyone affected, including survivors, a designated contact person and follow-up contact points for at least a year. Frequent contact, for example weekly, was recommended during the initial period, with ongoing support adapted to individual needs. In addition, educational institutions offered outreach support to pupils and students. For those directly affected, four weekend gatherings were organised.



The granite monolith outside London's Natural History Museum commemorates victims of the 2004 Indian Ocean Tsunami. The design was developed through dialogue with UK survivors and bereaved families.

Image: Natural History Museum

The Center for Crisis Psychology (CCP) in Norway conducted research with parents and siblings 18 months after the attacks on Utøya and collated the views, experiences and advice for future public support systems (Dyregrov *et al.* 2014). The CCP found that bereaved people expressed greater need for help and had been given more comprehensive and proactive support services than others bereaved by previous violent events in Norway. It was suggested that the increased intervention was due to help being locally provided as well as increased general knowledge of the serious consequences that follow violent death. They also cited increased levels of psychosocial preparedness in the municipalities as a factor and a positive move away from earlier 'wait and see' or 'watchful waiting' practices to an acceptance of the value and importance of early outreach. Dyregrov and colleagues (2014) concluded that:

*...consensus has moved in the direction of professionals discussing only to a limited extent whether it is necessary to help after potentially traumatizing events, and to a greater extent discussing how that help should be, and what kind of help is needed. (Dyregrov *et al.* 2014)*

## New Zealand Earthquake Support Program, 2011-2015

Earthquakes in Canterbury in 2011 resulted in 185 deaths. The New Zealand Red Cross (NZRC) provided support for those who were bereaved or seriously injured. The range of services and activities included cash grants, support groups, social activities (including children's activities), retreats and expert talks. The program was transitioned to the Quake Families Trust in 2015.

To evaluate the services and inform future programming the NZRC used semi-structured interviews with program participants and involved current and former NZRC staff and a NZRC Board member. While the study had its limitations (including self-selection and limited representation of seriously injured and overseas families), useful feedback was received (NZRC 2016, Wills 2017).

While the number of regular attendees at the monthly support groups was small, its value increased after time. Bereaved interviewees appreciated the NZRC encouraging people to be open to accepting support. They also appreciated the NZRC organising counselling venues for them and respecting privacy by withdrawing from facilitated sessions. It was suggested that opportunities for new and prospective members to meet socially prior to attending a bereavement group, for example by attending quiz nights or children's activities, was helpful.

Similar to the Norway experience, four retreat weekends were held allowing bereaved people to meet up and to socialise. Despite some initial anxiety about attending these occasions they proved beneficial to many. Helpful aspects included the wide range of activities offered, chances to participate in planning to ensure the right mix, variety and suitability of activities and supervision for children giving parents some time out. Attendees



also appreciated the freedom to not talk about their experiences and did not feel pressured to participate in activities.

A program for the seriously injured, which was jointly organised with Burwood Hospital, experienced a delayed start due to the lack of a clear mandate. Once up and running, participants appreciated the time taken to identify their needs and determine what sort of assistance would be most suitable. A series of talks given by Australian trauma psychologist, Dr Rob Gordon, was considered one of the most valuable components of the program. These sessions were open to family members and children, where appropriate. The talks were made available on DVD as an ongoing resource and this increased the outreach to those who might not seek support.

## Using qualitative insights to review post-disaster support

Due to their very nature it is neither easy nor appropriate to produce large-scale, purely quantifiable and objective indicators for measuring the impact and value of psychosocial support services after disaster. Relying on numbers of individuals accessing services to measure effectiveness is inappropriate where the existence and symbolic offer of support has value and therapeutic effect (perceived support) even though it may not materialise into uptake of services. Similarly a sign of 'success' for services may mean uptake drops off precisely because users have been able, through initial help, to access their own self-efficacy and resilience and no longer need to rely on external services. In the case of the Norway program, continued help beyond the first year and a half was identified as important even though the scale of help showed a natural decrease, a pattern also found with the TSN.

In these three support programs, although the number of participants and survey respondents were small relative to the number of people affected by the disasters and the studies suffered from other limitations, they offer useful, qualitative insights into opportunities and limitations in post-disaster support. There is also intrinsic value in the fact that users were consulted, listened to and affirmed. By participating in the reviews they felt they were making a difference to those who might find themselves in similar positions in the future.

## Lessons and implications for future psychosocial support programs

### Effective communication and information-sharing

In these three cases, notwithstanding overall satisfaction, users made suggestions for future

support services based on their experiences. Finding out about available programs and activities was often a challenge for those affected particularly for people in geographically dispersed areas. For example, people outside Christchurch or overseas who were affected by the Christchurch earthquake had difficulty staying informed of the recovery process. Similar problems were faced by service providers in NZ and the UK in accessing details of those affected (and thereby knowing who could benefit from outreach) due to restrictive information-sharing protocols. In the UK similar challenges arose after the tsunami in 2004 and the 7 July 2005 bombings that led to the issuing of guidance on data protection and data sharing for emergency planners (Cabinet Office 2007). Having effective communication strategies for raising awareness of services and appropriate protocols around information-sharing, privacy and confidentiality remain important considerations (Disaster Action 2017).

### Expertise, understanding and 'chemistry' with helpers

In all three programs the involvement of specialist health practitioners, including access to experts in disaster grief and trauma, made a difference to participants. The TSN included helping individuals access specialist psychological counselling where needed as well as linking to online discussion forums organised by a charity offering specialist grief support for bereaved children. In all three programs specific help and support targeted at children and young people was identified as an important factor that made a real difference.

In the Norway experience bereaved people highlighted the importance of understanding, empathy and 'chemistry' with their helpers. Dyregrov and colleagues (2014) assert that ensuring the chemistry between the two parties is 'right' is also decisive when applying good, professional competence in meeting with the bereaved. In New Zealand, Dr Rob Gordon was identified as the type of professional with the special qualifications and ability to explain post-disaster grief and stress in a way that participants found familiar and helpful. As one interviewee said 'he doesn't use psychobabble, he just talks like an ordinary person' (NZRC 2016).

### Promoting efficacy and facilitating ownership

An important lesson was the need for support services and program coordinators to balance providing specialist help and support with an approach that enabled people to feel validated and be 'experts' in their own experience and providers of mutual support. Facilitating supported sharing, knowing when to leave a meeting and allowing people to take ownership of their recovery as well as the evolution of a program or support group all promote self and community efficacy.

The National Audit Office report outlined learning points from the TSN as:

*...the way the Network moved quickly away from methods based on "experts talking at" those affected, towards approaches that allowed people real participation and ownership in the Network's activities.* (NAO 2006, p. 14)

Similarly, in New Zealand, feedback from the bereaved suggested they greatly appreciated being able to provide direct feedback throughout the program and felt in control of its direction. In Norway, researchers concluded that the bereaved need to be listened to so that advice can be adapted to the situation of the individual and the family. As a result users are taken seriously, and their empowerment and autonomy are strengthened (Dyregrov *et al.* 2014).

## Conclusion

The conclusions and implications from Norway are echoed by the other programs reviewed here. The similar and repeated feedback from those bereaved by traumatic death highlights the importance of our listening to them. Other key messages from this cross-program review are that user satisfaction among survivors and the bereaved is increased when help is proactive, well communicated and coordinated, is provided by helpers with the right knowledge, competence and understanding, reinforces evidence-based principles for enhancing psychosocial resilience and efficacy and continues over a longer period of time.

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## ABSTRACT

# The value of peer support groups following terrorism: reflections following the September 11 and Paris attacks

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Submitted: 1 April 2017. Accepted: 30 May 2017.

This paper discusses the role of peer support groups for victims of terrorism and the implications for including this provision in disaster psychosocial planning and response. Peer support here is defined as mutual support by people who have been through the same or similar experience and can help each other through giving emotional and practical support and advocacy. Building on the evidence that social connectedness and peer support are important for trauma relief and recovery, different types of peer support groups are described and are illustrated through two case studies. This paper reviews the creation, facilitation and contribution of two United Kingdom (UK) peer support groups initiated after the 11 September attacks in 2001 and the Paris attacks in 2015.

## Introduction

Terrorist attacks are not new but seem more prevalent than ever in this time of global uncertainty, political change and the ubiquitous coverage of unfolding tragedy through social media. For those directly affected by a terrorist incident, either by losing a loved one or themselves surviving an attack (and sometimes both), the traumatic experience of this type of disaster can be compounded by a sense of complete randomness. A heightened sense of personal risk and realisation of the vulnerability of people going about their daily business often brings a prolonged struggle to heal from the wounds of such sudden and violent assault. This results in a longer-term need for understanding, help with sense-making and broader psychosocial support.

Those who have been through the same or similar experiences can be especially well-placed to help and offer mutual support. In the context of post-terrorism support, peer support can be either mutual support among people affected by the same terrorist incident, or between the victims of different attacks. Best practice guidelines identify the importance of promoting social connectedness following mass trauma events (Hobfoll *et al.* 2007). Social support has been identified as the single most powerful protective factor for trauma victim connectedness (Norris & Stevens 2007). Mental health advocates have also highlighted the value of peer support in assisting relief from trauma and recovery as a vital complement to professional services delivering disaster recovery (Fisher *et al.* 2006). This approach reflects a shift towards understanding the role of those affected by disaster as being less 'passive victims' of disaster and more 'active agents' as providers of assistance by and for each other.

## A role for peer support groups

In this context peer-based support groups, appropriately organised and carefully facilitated, offer an important and effective form of psychosocial intervention. Three different approaches to the initiation and facilitation of peer support are:

- 'vertical groups' (providing support for) are initiated and facilitated by professional service providers. Group leaders facilitate on the basis of their professional expertise versus direct disaster experience. Ideally this is pre-planned in order to secure in advance the services, funding

and authority of those with appropriate expertise in disaster-related trauma support.

- 'horizontal groups' (providing support by) are initiated by and for those directly affected. This may arise spontaneously, often without funding and in the absence of any pre-planned or organised support. Members' participation and belonging is based on direct experience of the same disaster.
- 'multidimensional groups' (providing support with) are initiated and facilitated by those with previous personal experience of disaster for those with newer experience. Facilitators' credentials may be a mix of both direct personal experience and professional experience in providing disaster-related support. Although a rarer combination of skills and experience, this was the case with those recruited to facilitate the bereaved and survivor support groups within the British Red Cross Tsunami Support Network (Eyre 2017) and is the model used with the Paris group.

The arrangements for the planning, organisation and provision of support groups may reflect variations or blending of the three ideal types and there can be advantages and disadvantages associated with each type.

## New York, Paris and peer support

The focus of this paper is two small-scale peer support programs initiated in London in response to two major, international terrorist incidents affecting British nationals. The first was the attacks of 11 September 2001 where 67 British citizens died and several other victims had UK family connections. The second is the Paris attacks of 13 November 2015 in which a British man was killed and a number of other British citizens were caught up in the series of coordinated attacks across the city.

The review of the peer support groups following these events reflects an unusual perspective and one that inherently challenges a simplistic victim and service provider dichotomy. Based on my personal experience as a bereaved relative from 9/11, I became actively involved in organising and participating in a peer support group in the UK after those attacks. This experience contributed to the evolution of a professional practice as a trauma psychotherapist and development of specialist interest in post-disaster psychosocial support. By 2015 I was working with a service funded by the UK Government's Homicide Support Programme to provide specialist counselling and peer support. This brought me into contact with British survivors of the Paris attacks for whom a peer support group was initiated and facilitated.

## The UK families of September 11th

On the morning of Tuesday 11 September 2001, four simultaneous terrorist attacks occurred in the USA; the main ones being the attacks on the New York World Trade Centre, where nearly 3000 people perished as the

twin towers collapsed. Of these, 67 were British nationals and several others had UK family connections. Of the dead, some were UK residents who went to New York for a few days on a business trip, while others were living in the USA permanently. My own brother, a dual Canadian–Serbian citizen, went to New York from his home in Toronto to attend a conference on the 106th floor of the North Tower. No one survived from this floor.

After these attacks relatives needed information about their missing loved ones. Although it is not unusual in disasters for people to be considered 'missing' for some days, with 9/11 this uncertainty continued for weeks and months. Waiting for news and information was agonising for the families and their anguish was aggravated by confusing and often contradictory information from the media.

The main place for support was the Families Assistance Centre, opened in New York in the first week after the attacks. Its purpose was to provide a one-stop-shop for all support services required by the families; from police updates to financial and psychological help. Many UK citizens visited the centre briefly during their visits to New York but they could not make repeat visits over the months that followed or access the services from a distance.

## Formation of the September 11 UK Families Support Group

Like many others, my need for psychosocial support in the aftermath was great. In addition to the stress of dealing with my own loss, I encountered numerous practical difficulties in obtaining information from the US regarding victim identification processes and how best to access charitable funds. I needed to finance another fact-finding trip to New York. I knew many support groups had been set up for the bereaved in the US and firmly believed I would benefit from meeting other people in the same situation, but such support groups were unavailable in the UK. At the time I did not know any other affected people in Britain so I channelled my energy into finding other 9/11 families. Repeated requests to officials for information or to share my details with others affected were met, at best, with ambivalence.

The key to the formation of peer support groups in these early stages is understanding of people's needs, empowerment and self-efficacy through bringing people together. In our case this was achieved through Disaster Action—an umbrella organisation of support groups formed in 1991 by bereaved people and survivors of terrorist attacks and other disasters (Eyre & Dix 2014). Based on their collective experience of mutual social support they instantly understood my need to be part of a group and, in many instances, had learned from the experience of initiating and facilitating peer groups themselves (horizontally). In addition, over the 10 years of existence, the organisation had secured the trust and respect of officials who could authorise information sharing and facilitate the coming together of the 9/11



The September 11 Memorial Garden in London is a focal point for commemorations.

Image: Paul Watkins

families. In effect Disaster Action functioned as a vertical power broker<sup>1</sup>. Six months after the disaster the September 11 UK Families Support Group was formally created. At the time of writing, the group continues to meet and I remain one of the trustees.

## The benefits of the 9/11 Peer Support Group

The benefits of having the group varied over time and was not limited to mutual understanding and emotional support. In the early months dealing with the victim identification process was a pressing issue for most people and so the group organised regular briefings from senior police representatives. The value was being able to access official information first-hand about how the identification process was progressing in New York instead of dealing with conflicting information from the media.

Another early benefit of the group was sharing information and experiences in accessing charitable funds. Although families had high expenditure related to their loss (for example, travel to the USA and many international phone calls) their access to humanitarian funds was limited due to their distance from the US organisations distributing funds. The group made sure that the list of available funds was distributed and helped each other through complicated application processes. With the passage of time, this 'power in numbers' and being identifiable as a cohesive, representative group allowed government and others to consult with the group over decisions such as memorials. This included the creation of the September 11th Memorial Garden in London; a focal point for commemorations.

For a relatively short time, in addition to the regular information meetings, the group organised a small, therapeutic support group facilitated by an external

psychotherapist. This subgroup was relatively short lived. Over the long-term peer support has been primarily about overcoming isolation and being in the company of others who share a common experience, albeit one that is profoundly difficult and unique to deal with. It is for this reason that the group has been a lifeline for many.

## UK victims of the 2015 Paris attacks

On 13 November 2015, 130 people were killed and many more injured in coordinated terrorist attacks across restaurants, cafés and the national football stadium in Paris. The deadliest attack took place at the Bataclan Theatre where over 1000 people were attending an American rock band concert. At 9:40pm, halfway through the concert, three gunmen wearing suicide belts burst in, firing indiscriminately into the crowd. 90 people were killed and hundreds of others injured in a traumatic ordeal lasting over two hours.

Given the proximity of France to Britain it is unsurprising that Britons were among the many nationalities involved. One British person died and a 15 people survived; some with physical injuries such as gunshot wounds.

It is often the case following mass traumatic events that it is difficult to determine the exact number of people affected. This is for several reasons, not least that many (perhaps most) people do not identify or present themselves to support services even when these exist and where proactive outreach is attempted. As with 9/11 the challenges with Paris were compounded by the bereaved and survivors being geographically disparate.

<sup>1</sup> Shortly after this, Disaster Action facilitated a first meeting of UK bereaved and survivors affected by the Bali bombings of 2002.

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## Shortcomings in psychosocial support after terrorism

Research conducted by Victim Support with victims of terrorism, including Paris survivors, has highlighted shortcomings in the existing support framework in the UK for survivors and families (Barker & Dinisman 2016). The study highlights how British citizens affected by terrorism abroad encounter inconsistent referral mechanisms for accessing victim support organisations. They found that for some survivors and bereaved family members the waiting time to receive counselling or therapy services on the UK National Health System can feel too long. Accessing peer support groups, particularly locally, can also be problematic (Barker & Dinisman 2016).

This became clear when I met some of the Paris survivors in my role as a specialist trauma psychotherapist with ASSIST Trauma Care. This is a charity commissioned by the Ministry of Justice and Victim Support to provide specialist one-to-one psychotherapy to people affected by homicide or terrorism. Survivors reported that searching for, finding and accessing appropriately qualified therapists had been complicated and had caused secondary distress and trauma, compounding their sense of isolation and disorientation.

Barker and Dinisman (2016) found that in the absence of a recognised definition of a 'victim' of terrorism 'witnesses' are not always considered to be victims by agencies and organisations involved in supporting them. This situation, they state, may have implications for the support they receive. Survivors spoke of mixed experiences in accessing help. Those who had physical injuries tended to be recognised as legitimate victims and were put in touch with victim support services. However, those who had minor injuries or walked away without physical wounds did not seem to be recognised as victims. As such, they struggled to understand what their rights were and what sort of support was available. The need for organised peer support is even more important for those affected by terrorism abroad because of cross-border complexities (Victim Support Europe 2017).

## Formation of the Paris Survivors Support Group

In the absence of clear, coordinated information and psychosocial support for Paris survivors the need for mutual support seemed great, so I offered and facilitated a support group for survivors. I was keen to offer the value of a 'multidimensional' approach, sharing the benefits of my experiences after September 11 where appropriate and drawing on my expertise as a trauma therapist with the help of a fellow psychotherapist.

As with September 11, a key challenge was effective outreach. Even when official lists of victims became available, gatekeepers remained wary of sharing details of the group to people on those lists. However, access

to internet resources and social media means that today it is much easier for survivors to find each other and share information from the grassroots up. Two survivors with whom I was working promoted the group through a Paris-based social media site dedicated to victims of the attacks and so other people learned about the group in this way.

## The Paris Survivors Peer Support Group

The first meeting of the group was held in March 2016, four months after the attacks. As expected, the number attending was small. The meeting was difficult to access for some; being held in London and on a weekend. However, based on experiences of facilitating similar groups, the value of the group cannot be reduced to quantitative measures, such as numbers attending.

By March 2017, the group had met 10 times and these regular monthly meetings lasted for 2.5 hours. Discussion topics included the first anniversary of the attacks and dealing with the media; both aspects familiar to me and I could draw on personal information and experience.

'Disaster time' differs from other timelines. At the time of writing, a criminal trial is forthcoming and as this group still exists, it is too early for formal evaluation. However, my observations and comments from group members suggest that the main benefits for survivors has, most fundamentally and powerfully, been in meeting each other and understanding they are not alone in their experience. Importantly, although some of the participants had previously met on social media, face-to-face contact has been beneficial for them.

The group interaction, managed from a therapeutic perspective, helped each member make sense of the events. As one survivor said, 'What happened at the Bataclan is like a puzzle that I've been able to piece together by talking to other people'. Group members have also shared information about resources such as compensation from the French government. Survivors without access to formal information-sharing platforms were unaware of their entitlement. As such, just as with the 9/11 group, the Paris peer support group addressed many aspects of psychosocial need and emotional support.

The survivors have expressed a wish to expand the group to include survivors and bereaved people of recent attacks such as the Tunisia shootings and Brussels attacks (both in 2015) and Westminster attacks (2017). The aspiration is to build on the example set by Disaster Action by connecting group members with people affected by previous events and develop peer facilitators for future support groups. If achieved, this would be an example of multidimensional support, potentially with further therapeutic benefit for givers and receivers.

## Implications for emergency managers

This review has focused mainly on the value of the peer groups and the challenges to organising them. Challenges include:

- overcoming resistance by gatekeepers (for example to enabling information sharing)
- obstacles to accessing funding
- securing appropriate meeting rooms
- the psychological impact on group members of the limitations associated with an insecure funding future.
- In each of these areas, emergency manager could include peer support group initiatives at the planning stage.

## Conclusion

While the case for the value of peer support after disasters has been made by others, this does not always translate into the inclusion of peer support groups in psychosocial preparedness, planning or response. The establishment and organisation of particular disaster peer support groups will inevitably vary with the unique social and organisational setting and circumstances of each disaster.

The aim of this review has been to illustrate what the initiation, organisation and facilitation of peer support groups can mean in practice with a view to encouraging more reflection, discussion and research within the emergency management community. Further research and evaluation is necessary to fully understand the impact on and implications for the organisation, management and support of this approach within psychosocial practice.

### Acknowledgement

The author would like to thank Anne Eyre for her assistance with the preparation of this article.

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## ABSTRACT

The study of disaster risk is primarily aimed at identifying who may be at risk (vulnerable populations) from specific events (causes) so as to prevent and/or facilitate timely responses to them. These causes are predominantly defined by historical data rather than from forecasting potential risks. Many of the threats to health and security today are trans-national, whether it is the spread of an infectious disease, migration of displaced people, or the widespread impact of a weather event. There is a paucity of discussion and literature that attempts to describe new and emerging causes of disasters, or the potential impact of these events. Reasons for this may include perceptions of these causes as being non-traditional threats and, therefore, not readily interpreted as causes of disasters and thus not as disasters at all. They may include climate change, social disruptions such as terrorism, economic crisis, drug trafficking or increased drug usage. The risks and impacts are changing because of societal and social change, economic changes and rapidly changing technology and interconnectedness. Traditional views of disaster are limiting, as they do not include high-impact events that are not associated with emergency service responses. The health consequences of these events are complex to understand. Nevertheless, careful analysis of these events reveals alignment of their human impact against established criteria that define disasters. The aim of this paper is to examine emerging causes of disasters and non-traditional health threats, consider their relationship to contemporary emergency management risk assessment, and consider what is required for emergency management to adapt and confront this emerging reality.

# Non-traditional health threats: redefining the emergency management landscape

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Submitted: 20 May 2016. Accepted: 21 May 2017.

## Introduction

In his First National Security Statement to Parliament on 4 December 2008, the then Australian Prime Minister, Kevin Rudd, broadened the consideration of traditional threats to national security to include that 'new and emerging challenges represent emerging non-traditional threats' (e.g. climate change, cyber security, food security, energy security, trans-national crime, globalisation and demographic changes), which introduce further sources of vulnerability in the Australian community (Rudd 2008). To these, financial collapse, economic crisis and the public health consequences of cascading natural disasters could be added (Little 2002). Other authors (Barnes, Bergin & Nicola 2014) have placed this Prime Ministerial Statement as the pivotal point in initiating an awareness of non-traditional threats in the Australian context. A 2015 Monash University Disaster Resilience Initiative (MUDRI) Forum, entitled 'Broadening Resilience to Emerging Non-traditional Events', and a 2016 national conference on this theme further consolidated non-traditional events on the national landscape for emergency management.

The *National Strategy for Disaster Resilience* has identified that disasters are increasing in their complexity and frequency (Attorney-General's Department 2011). Priorities for prevention and mitigation have been firmly embedded within this strategy; however, this is dependent on a whole-of-government approach to analyse and manage causal factors of disasters to achieve disaster risk reduction. Further support for action on activities that enhance mitigation, risk awareness and disaster risk reduction were demonstrated in the final report of the Productivity Commission (Productivity Commission 2014), which was accepted by the Australian government in 2016 (Attorney-General's Department 2016).

## Background: emerging disaster risk

The theme of non-traditional threat and emerging disasters, and the need to develop robust risk assessment practices, is evident when analysing contemporary global events. The rapid destabilisation in political relationships between East and West was not predicted, nor the extent or speed to which this occurred. Breakdown in relationships resulting in government destabilisation contributes to protracted population emergencies, such as the



Ukrainian Crisis and the Syrian refugee crisis in Europe (Guha-Sapir *et al.* 2015).

Arnold (2002) postulated that future disaster risks during this 21st century would include: population growth, environmental degradation, global warming, deforestation, infectious diseases, hazardous materials, chemical warfare, nuclear risks, economic imbalance and cultural tribalism. Further to this, Arnold predicted that 'there will be more natural and anthropogenic disasters of every type, as well as some not yet imagined'.

Burkle (2010) identified the evolving nature of complex emergencies and the globalisation of public health emergencies. The effects of conflict, climate change, large-scale natural disasters, globalisation and urbanisation, epidemics and pandemics, and emergencies of scarcity are identified from the current burden of humanitarian action as future indices of risk (Burkle 2010). In the context of change in the nature and scale of crisis, Burkle emphasises the importance of public health practice as essential for community support and protection. The premise of this assertion is based on public health being a multi-disciplinary practice, which is case- and population-focused rather than individual- and treatment-focused and establishes health as the goal of interventions.

In March 2015, Sendai hosted the UNISDR conference for disaster risk reduction. The program of presentations over four days contained 10 separate sessions devoted to emerging risk, constituting five hours of working presentations and committing nearly 20 per cent of conference time to examination of this single topic. Topic areas included rural resilience, lessons from mega disasters, global risk trends, water resource management, ecosystem management and resilience, disaster risk and poverty, epidemic and pandemic risk, economic risks of disaster risk reduction, land-use planning and disaster risk reduction, disaster and climate risk (UNISDR 2015). This array of sessions provided a broad cross-section of new and potentially evolving threats. In particular, the Global Risk Trend presentation sought to analyse the current disaster risk environment. It identified that the disaster risk environment is increasing and that many countries 'have understood and practiced disaster risk reduction as disaster management' (UNISDR 2015). The outcome of these efforts is an improvement in response capacity, and minimal impact on risk mitigation or management.

Furthermore, descriptors of risk areas within the report (i.e. poverty, employment, and environment) display strong correlation with the contemporary social determinants of health approach (Marmot *et al.* 2008).

While these findings are important in the context of identifying and improving disaster risk, risk and cause are not synonymous. The Global Risk Report (World Economic Forum 2015) provides an updated analysis of risk and factors impacting risk variance. There is opportunity to complement these efforts through further examination of current and emergent disaster cause and threat. Contextualising threat and risk analysis

can assist in appropriate investment for planning and prevention strategies.

Burkle, Martone and Greenough (2014) reviewed contemporary trends in humanitarian action and proposed that the scale and complexity of disasters is changing and that current emergency and humanitarian operational frameworks will be unable to meet future needs. The ecological, social and economic effects of climate change, extreme weather events, unsustainable urbanisation, biodiversity crisis, scarcity of resources, increasing armed conflict and lack of pandemics have been suggested as future, and likely interacting, threats to community health and wellbeing. The challenge of anticipating disasters promoted by the concept of resilience (Murray & Ebi 2012) can be achieved on the condition of being aware of their existence and root causes.

## Non-traditional health threats and climate change

Burkle (2013) examined emerging disasters in the setting of climate change and highlights the disconnect between leadership and science. He provides commentary on an editorial published in *Nature* by an investment strategist. A gap in health research influence on policymakers and government leaders, as compared to the closer relationship that economists have established, is noted. Jeremy Grantham, the investment strategist and author of the editorial, calls on health professionals to be greater advocates for the health impacts of global warming. Achieving this will require health professionals and scientists to step beyond the traditional publication and conference presentations to communicate to a broader audience. Burkle notes this will invariably come with challenges and risks. In addition, Grantham proposes that these efforts need to be more realistic, more persuasive and gain better traction with government leaders (Burkle 2013). The context of this review highlights climate change as an emerging threat to health and demonstrates the need for coordinated, multi-disciplinary practice in the setting of action on disaster risk reduction. Of particular relevance is that this call is from a professional outside of health to the scientific community for action; a call that should bring into question not only what we do, but also to whom we communicate and how to achieve an effect.

The second volume of the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report examined impact adaptation and vulnerability. In particular, the human health chapter identifies future risks relative to climate change and, as in many cases of health disparity, the greater burden of impact is expected to occur in poor and vulnerable groups, exacerbating health inequalities (Field *et al.* 2014). This action is reflective of the IPCC report identifying injuries, hospitalisations and deaths due to intense heatwaves as a significant health impact category, and evidence associating poor health outcomes

associated with extreme heat exposure in the workplace (Kjellstrom, Homer & Lemke 2009).

The effect of extreme weather events is emerging in Australia (Tong *et al.* 2014). At a national level, the Australian Department for Climate Change has recognised the increasing risk to the built and natural environment posed by increasing frequency and intensity of extreme weather events. Heatwave impact on southern Australia has, in some states, shifted the responsibility of preparedness, response and recovery to emergency management sections of government. The assignment of responsibility to emergency management structure contextualises a shift in perception and application of traditional disaster definition to developing, non-traditional threats (Schipper & Pelling 2006).

## Non-traditional health threats and social disruption

Urban population growth has expanded rapidly and, in many cases, in an unsustainable manner. UN-Habitat reported on the trend in urbanisation, with the majority of the global population now existing in urban spaces compared to rural living (UN-Habitat 2013). This trend is expected to continue and the consequences will be multi-faceted. Increased demand on lands in urban spaces will drive the need for resources and subsequent increased pressure on the environment through exploitation of resources or via increased emission outputs. A high proportion of this demand is in coastal regions to access ports and transport infrastructure. These same areas are also under increasing threat from weather-related events and climate change; further compounding the risk associated with unsustainable urbanisation (Burkle 2010). That and other impacts, such as increased prevalence and spread of disease in urban slums, are evident; the full effects are yet to be realised.

Using disaster definitions and descriptors applied by UNISDR (UNISDR 2009), the impact of illegal drug use and trafficking represents a contemporary, societal disaster. The impact of drug trade and usage on society is rapidly increasing. In 2012, the Australian Institute of Criminology reported Oceania as having the highest global usage and trade of methamphetamine, also known as 'ice' (Schloenhardt 2007). In Indonesia, President Joko Widodo has stated that 'Indonesia is in a state of emergency with regard to drug use' (Times 2014). The emerging impact of methamphetamines in Victoria has been labelled a crisis and led to the establishment of a workforce appointed by the incumbent government in response to a parliamentary report. The Victorian Police have publicly stated that 'we can't simply arrest our way out of this crisis. We need to get to the heart of the problem and listen to the experts who see the effects of this tragedy every single day.' The importance of revealing the underlying causes of these invisible crises are exemplified in recent studies by Case and Deaton. These authors recently revealed a disproportionate upward trend in mortality rates due to drug overdose, alcohol and suicide among white male US Americans,

calling them 'deaths of despair' (Case & Deaton 2017). Determinants associated with this trend were economic distress and high unemployment in working class populations without university education. Importantly, as in the case of drought, these social disasters unfold progressively. In America this trend emerged in the late 20th century with the move of manufacturing centres to Asia and increased as these population groups were impacted by the Global Financial Crisis of 2008. The same crisis had public health impacts in many European countries (Stuckler *et al.* 2011). Emerging research is now able to demonstrate the connection between a political decision, such as austerity measures, and the connection to health deterioration (Robertson 2011).

Additionally, like many commonly recognised disasters, this impact extends across borders and countries in a globalising world, and disproportionately affects vulnerable groups within communities. While addiction has previously been identified as a causal factor of poor health, it is not construed as a risk factor within emergency management paradigms, and, as a consequence, the capacity to operationalise either addiction programs or trafficking action is limited, if not non-existent. The recognition of the complexity of illicit drug impact should be heeded as a call to collaborative action across professions to engage in action. Public health practice has a unique and valuable skillset to offer, and should be engaged by leadership in this field, particularly in understanding the social environment favouring drug use and addiction.

Domestic violence has been reported as the cause of one death per week of women in Australia (Chan & Payne 2013) and one in three women have experienced violence since 15 years of age (Cox 2015). The magnitude and impact of these events meets conceptual definition of a diffuse disaster as a primary event. Recent national and state inquiries have resulted in the adoption of targeted strategies to address this national imperative. Many of the proposed strategies reflect attributes of a public health and disaster risk reduction approach.

While there is not a single agreed definition of domestic violence in Australia, Parkinson and Zara (2013) referred to domestic violence as a 'hidden disaster' in their research that identified an increase in domestic violence post-Australia's Black Saturday bushfires. In this context the impact of domestic violence could be considered a secondary event associated with the recovery phase following the initial event. Domestic violence is also included as a 'chronic stressor' in the Resilience Strategy, auspiced by the Rockefeller Foundation's 100 Resilient Cities program. Akin to many disasters the long term impact on health attributable to domestic violence is poorly understood and underpins a need to examine emergency management frameworks to address awareness and action on domestic violence as both a primary and secondary disaster event.

## Discussion

### Considerations for action and public health interconnectedness with emergency management

Non-traditional health threats are difficult to define, as definitions of disaster vary and are contextual to need and to governmental purpose to apply disaster definitions for the application and enabling of support services. However, research institutions may apply definitions for data gathering purposes. The Centre for Research and Epidemiology of Disasters defines a disaster as 10 or more people deceased and/or greater than 100 injured and/or declaration by the country of a state of emergency and/or an appeal for international assistance (Guha-Sapir *et al.* 2012). Non-traditional threats are not easily recognisable as disasters by emergency managers yet, when compared to currently accepted types of disasters, the impact on individuals is as significant, if not more so. A comprehensive approach to reduce disaster risk was mandated in the United Nations *Sendai Framework for Disaster Risk Reduction*, whose declaration was 'to enhance efforts to strengthen disaster risk reduction and to reduce disaster losses of lives and assets from disasters worldwide' (Glantz 2015). A comprehensive approach requires a deeper understanding of the drivers of disaster risk and challenges traditional norms of hazard and vulnerability assessment.

Ranson (1993), a forensic pathologist in Melbourne, coined the term 'The Diffuse Disaster Syndrome'. Ranson suggests that 'what separates the diffuse disaster from the mass disaster is its temporal and spatial distribution with deaths and injuries taking place as isolated events that are not easily recognised as being related. As an example, large droughts in the Horn of Africa causing famine and death are more visible than smaller, long-term droughts but are still responsible for many deaths. In a slow-onset, invisible crisis like this, deaths will not be temporally or spatially aggregated and thus difficult to attribute to the drought. It is only by bringing cases together that the impact of such deaths on community can be fully appreciated and the resources needed to research the mechanisms that result in these deaths be appropriately addressed (Ranson 1992). On this basis, road trauma, workplace death and injury, child abuse, domestic violence, youth suicide, opiate and 'ice' epidemics could be structured as 'diffuse disasters'. They could be approached and studied through a public health lens, an approach that has seen the national road toll reduced dramatically since the 1970s. One implication is that national and international disaster databases (e.g. CRED, Australian Disaster Information) would need to capture new fields. At present, an examination of both these databases suggests that data variables to capture and to examine disasters are not adequate. The 2015 Monash Disaster Resilience Initiative Forum on this theme strongly supported the proposal that these non-traditional events would benefit from examination

through a disaster risk reduction lens. A strategy of resilience-thinking and analysis would provide greater focus on the study on the long-term health consequences of disasters.

As new threats emerge and causal factors are identified, emergency management practice will require evolution beyond traditional response-based frameworks. An increasingly connected world requires collective action to address complex problems that arise. Public health practice, as an evidence-based means of enquiry and action, can provide a solid foundation for future practitioners (Keim 2008). Epidemiology is a fundamental toolbox to systematically investigate the underlying (sometimes distal) drivers of these societal or diffuse disasters, not just vulnerable groups and their age or sex.

Increasing connectedness across nations has led to the emergence of global public health practice. As boundaries between nations and continents decrease, variations in health threats are evolving as common concerns and require commitments in global health to address them (Labonté & Schrecker 2007).

Governments face complex challenges in the face of changing disaster profiles. Demands to maintain constituent support can shift political objectives from long-term structural solutions to more popular short-term agendas. Contributing to this is that many of the factors are often outside a single government's control. Economic and environmental change, regional population shifts, and climate-related events affecting regional security have domestic consequences. Solutions to these require collaborative efforts for enduring success and require sound, strategic leadership to engage societal support (Clark 2012). Delays in achieving this will make impacts more severe and mitigation more costly (World Bank 2013).

Schipper and Pelling (2006) previously examined interconnectedness across broad policy areas of disaster risk, climate change and international development. Specifically, they note that the divide between these disciplines requires bridging to ensure that projects to address needs are complementary, not conflicting (Schipper & Pelling 2006). Recommendations are provided for improved interaction and integration between these communities of practice to reduce overlap, and provide uniformity in language and methods (Schipper & Pelling 2006).

Further action in 2015 included the conclusion of the Millennium Development Goal project and the initiation of the Sustainable Development Goals as their successor. The opportunity to achieve action on causal factors of health is inextricably linked to disaster vulnerability and sustainable development (United Nations 2014). Helen Clark, former New Zealand Prime Minister and United Nations Development Program Administrator, has highlighted the interconnectedness of resilience and sustainable development. Significantly, Clark identifies resilience-based activity with developmental programs as not only a responsible course of action, but one that is practicable, delivers the greatest output and aligns sustainable development-based activity

with aims described within strategic disaster risk reduction policy. This proposal draws practitioners together towards common goals and emphasises the need for comprehensive analysis of need and long-term commitment to reduce vulnerability (Clark 2012). A global public health agenda linking these initiatives is imperative to ensure optimum results are delivered from future projects. The scientific community may support these initiatives by identifying drivers and outcome indicators common to sustainable development, resilience and disaster risk reduction.

At a pragmatic level, the public health consequences of the Hazelwood mine fire in Victoria (Victorian Government 2014) and the 2017 'thunderstorm asthma' event in Victoria, which resulted in a reported nine deaths, an 8500 patient surge in ambulance and emergency department attendances over one evening, and a broadcast of public health alerts (Guest 2016) suggests a priority in re-examining these non-traditional events through a new, but complementary, lens.

## Conclusion

Broader examination of emerging disasters and non-traditional health threats is fundamental to understanding the health of communities and the vulnerabilities within them (Keleher & MacDougall 2009, Marmot, *et al.* 2005) particularly in a rapidly changing and globalising world. Once exposed, the effects of disaster on vulnerable groups can be magnified, resulting in marginalisation and increased suffering. Vulnerability arises from social, cultural, health and environmental interactions (Lindsay 2003); as such no single agency is equipped to adequately respond to identified needs and a multi-disciplinary approach is required. Further examination of emerging disasters and non-traditional health threats is warranted. However, the challenge for the emergency management discipline is to examine this in more depth and re-evaluate contemporary practice (Paul & Raisa 2012). Research and case study analysis of specific non-traditional disasters and emerging threats in Australian emergency management is recommended and will provide opportunity to redefine risk and develop a dialogue for future practice.

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## ABSTRACT

Climate change is a material threat to Australia's economic, social and environmental interests. Strong emergency management frameworks that enable agile responses to these threats are an important element to ensure a resilient economy. This paper considers recent blue green algae outbreaks in the Murray Darling Basin and considers some of the limitations to effective prevention, preparation, response and recovery. This paper proposes an alternative model that includes the responsibilities of the Commonwealth and the state and territory governments in the management of the basin's resources.

# Blue green algae in the Murray Darling Basin: a case for Commonwealth leadership

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Submitted: 20 December 2016. Accepted: 24 April 2017.

## Introduction

Australia's *National Strategy for Disaster Resilience* (Attorney-General's Department 2011) outlines how extreme environmental events have an impact on 'people, the economy, our infrastructure and the environment'. These events are projected to increase in frequency and severity with climate change. The strategy identifies environmental events as issues of significance for their long-term impacts. Although described narrowly for the purposes of disaster relief in Australia (Attorney-General's Department 2012, p. 6), it is useful to consider a broader, international view of disasters as events that overwhelm the response capacity of the community (Coppola 2015, p. 33). In this context it is not only sudden-onset events such as fires, floods, storms and cyclones that are identified as natural disasters, (Attorney-General's Department 2012, p. 6), 'creeping disasters', which arise through the prolonged degradation of the community's capacity to respond (Coppola 2015, p. 33) are included. In this way, the broad-based blue green algae (BGA) contamination of the waters of the Murray Darling Basin (MDB) is a slow-forming hazard that is not covered by current natural disaster recovery strategies and yet it is projected to increase as a negative consequence of climate change (Baldwin 2016).

The MDB is located in south-eastern Australia and includes the Murray River (2530km) and the Darling River (2740km); Australia's two longest rivers (Bureau of Meteorology 2015). The topography of the MDB is predominantly low-lying or flat (except the mountain ranges to the east and south-east) and features slow, meandering waterways (Murray Darling Basin Authority (a) n.d.). Rainfall in the MDB is highly variable with average annual rainfall varying from 1500mm in the east to less than 300mm in the west (Murray Darling Basin Authority (a) n.d.). The semi-arid climate of much of the basin coupled with the topography results in high evaporation rates, with 94 per cent of rainfall in the MDB consumed by plants or lost to evaporation (Murray Darling Basin Authority (a) n.d.). Climate change is projected to exacerbate this variability with rainfall projected to decline by 4 per cent and runoff by 12 per cent across the MDB by 2030 (CSIRO 2011).

The MDB occupies 14 per cent (1,059,000 km<sup>2</sup>) of Australia's land area and contains 10 per cent of Australia's population. It contributes significantly to the Australian economy (Australian Bureau of Statistics 2008). It comprises parts of Queensland, New South Wales, the Australian Capital Territory, Victoria and South Australia – known collectively as 'the Basin States' (*Water Act 2007* (Cth) s 4). Approximately one third of Australia's agricultural

production occurs in the MDB, including 50 per cent of Australia's irrigated produce estimated to be worth \$6.7 billion annually (Murray Darling Basin Authority (b) n.d.). Further, the diverse geography, climate, environment and internationally recognised wetlands of the MDB contribute millions of dollars annually from tourism to regional economies (Department of Environment and Energy (a) n.d., Murray Darling Basin Authority (b) n.d.).

BGA events occur naturally as a result of low stream flows, extended periods of warm weather and the entry of nutrients into waterways as a consequence of adjacent urban and agricultural land-use and stormwater flows (Department of Environment and Energy (b) n.d.). The impact of BGA contamination presents a threat to public health and local economies that rely on the waters of the basin to meet 'critical human water needs' (*Water Act 2007* (Cth) s 86A). BGA can, but does not always, produce toxins that cause a variety of conditions for humans, pets and livestock. These range from skin irritations through to liver damage if ingested in sufficient quantities (NHMRC 2008, NHMRC/NRMMC 2011). BGA can also block irrigation infrastructure reducing irrigation efficiency and productivity (Agriculture Victoria 2016).

In recent history the MDB has experienced significant BGA events in 1983, 1991, 2009, 2010 and 2016 (Murray Darling Basin Authority (c) n.d.). While the first four events were related to low stream flows as a consequence of drought, the nature of the bloom in 2016 was different in that it was related to elevated water temperature. This highlights the significance for future climate scenarios that are anticipated to increase as the climate continues to change and BGA events become more frequent in the MDB (Baldwin 2016).

BGA events are generally resolved by natural events, that is, lower water temperatures or higher stream flows. Consequently, control measures to alleviate BGA generally comprise changes to the management of river flows. This is done through the release of water from upstream storages, avoiding contact with and use of the water until the bloom subsides and, in some limited circumstances, applying algaecides to remove the algae (Department of Environment and Energy (b) n.d., Murray Darling Basin Authority (c) n.d., NHMRC/NRMMC 2011).

Given the importance of the MDB to the Australian economy and the increased likelihood of BGA events, it is conceivable that a significant event impacting on the use of the MDB water resources could manifest as a natural disaster. Australian states and territories are generally responsible for all aspects of emergency management, while the Commonwealth contributes financial and non-financial resources in consultation with each jurisdiction (Attorney-General's Department 2012). However, this paper proposes that the Commonwealth has a greater responsibility for all aspects of emergency management by ensuring appropriate prevention of, preparation for, response to, and recovery from events that impact on the use of MDB water resources.

## Exercise of Commonwealth control

Access to and the control of MDB water resources to support economic growth and development in the Basin States has been contested since before federation (Kildea & Williams 2010). In 2007, the Basin States and the Commonwealth reached agreement on the management of the MDB. The *Murray Darling Basin Agreement* (the Basin Agreement) is set out in Schedule 1 of the *Water Act 2007* (Cth). The purpose of the Basin Agreement is to:

*... promote and co-ordinate effective planning and management for the equitable, efficient and sustainable use of the water and other natural resources of the Murray Darling Basin, including by implementing arrangements agreed between the Contracting Governments to give effect to the Basin Plan, the Water Act and State water entitlements.* (Water Act 2007 (Cth))

The Basin Agreement establishes key administrative functions for its implementation including roles, responsibilities and administrative functions for the management of MDB water resources and agreed water-sharing arrangements between the Basin States. To give effect to the Basin Agreement, the Basin States referred relevant legislative power to the Commonwealth. These referrals gave the Commonwealth the necessary constitutional authority to pass the *Water Act 2007* and to establish the Murray Darling Basin Authority (MDBA) (*Water Act 2007* (Cth) ss 9 and 18B, *Australian Constitution* s 51(xxxvii)).

Thus the Commonwealth has legislative authority through the MDBA, to assert control over the MDB water resources. The *Water Act 2007* allows the Commonwealth and the MDBA to address threats to basin water resources and to protect, restore and provide for the ecological values and ecosystem services of the MDB. The aim is to improve water security for all uses of basin water resources (*Water Act 2007* (Cth) s 3).

One key function of the MDBA is:

*...to develop, or assist the development of, measures for the equitable, efficient and sustainable use of the basin water resources (including measures for the delivery of environmental water).* (Water Act 2007 (Cth) s 172(1)(e))

These objectives are formalised through the *Basin Plan 2012*, which is prepared by the MDBA and adopted by the Minister (*Water Act 2007* (Cth) s 41). The plan details water quality targets, including those relating to BGA in recreational waters, to which the MDBA must have regard when performing its functions (*Basin Plan 2012*, s 9.14(1)). Further, the MDBA 'must' implement an emergency response to any event in which triggers or thresholds relating to water quality are exceeded (*Water Act 2007* (Cth), s 86F(1)).

These provisions demonstrate that the management of the MDB, including management of any emergency that may impact on the waters of the MDB, is a matter of Commonwealth responsibility. Even without those provisions it is arguable that, in the case of a significant BGA event manifesting as a natural disaster, the Commonwealth is empowered through the Executive Powers prescribed by s61 of the *Australian Constitution*, to assume control over natural disasters whether it has legislative authority or not (Eburn 2011, p. 89). It follows therefore, that the Commonwealth should assume control of the entire emergency management spectrum—prevention, preparation, response and recovery—with respect to MDB water resource outcomes to ensure the alignment of both short-term incident management response actions as well as longer-term disaster resilience objectives (Coppola 2015, p. 14). A consequence of this is the establishment of minimum standards to inform state-based catchment management activities.

## Managing the impacts of BGA in the MDB

BGA events are not unanticipated in the waters of the MDB, having been recognised since the times of early explorers (Murray Darling Basin Authority (c) n.d.). In 1994 the then Murray Darling Basin Ministerial Council adopted an Algal Management Strategy to inform management of these events as part of a broader natural resource management strategy (Murray Darling Basin Ministerial Council 1994). The strategy was based on four objectives:

- reducing nutrient concentrations in the streams and reservoirs of the basin
- improving stream flows and flow management
- increasing community awareness
- research and development.

A key element of the strategy was the operating presumption that while a coordinated, whole-of-catchment response was required to address the underlying issues of BGA, the role of the Commonwealth related largely to leadership and relationships. The Basin States were responsible for the activities that directly impacted on water quality such as catchment management and flow enhancement (Murray Darling Basin Ministerial Council 1994).

Despite the passage of the *Water Act 2007*, the response to BGA threats remains very much driven by the Basin States. Primarily the response relates largely to assessing the threat to the waterway over which the state has management control, identifying and monitoring the development and progress of blooms and notification of impacted water users and regulatory authorities, including those in other jurisdictions, that the water is not safe for use (New South Wales Department of Primary Industries n.d., Murray Darling Basin Authority

(c) n.d., Victorian Department of Environment, Land, Water and Planning 2016).

Despite the long-held recognition that flow regimes are an important element of the response to BGA events (Murray Darling Basin Ministerial Council 1994, p. 11), the focus of the state-based response to BGA events relates to monitoring algal blooms and informing and enabling communities to avoid contact with contaminated waters (New South Wales Department of Primary Industries n.d., Victorian Department of Environment, Land, Water and Planning 2016). This reflects a lack of capacity to negotiate and coordinate the sharing of large volumes of water to be flushed through the system given the existing water-sharing arrangements between the Basin States (*Water Act 2007* (Cth) Schedule 1, Part XII). It may also reflect concerns relating to limiting future water availability for water users and the potential future economic damage that arises from such actions since water stored for irrigation outcomes is managed at a state level (New South Wales Office of Water n.d.).

## Stronger leadership from the Commonwealth

The key question for future management of the MDB is whether the Commonwealth should play a stronger role in the prevention and preparation for, and the response to and recovery from, BGA events in the MDB than it currently does. While this question remains hypothetical for the immediate future, it assumes relevance in July 2019 when, in accordance with the Commonwealth Water Amendment Regulation No. 1 (2012), Victoria will refer relevant legislative powers to the Commonwealth.

BGA events in the MDB impact communities and regional economies and, such is the magnitude of the threat, it requires the intervention of multiple jurisdictions. The risk accruing from BGA is related to water quality and the effects are distributed according to the relative consumption of water rather than the relative state entitlement to the MDB water resource.

The Commonwealth, through the *Water Act 2007*, has assumed a critical role in planning for the sustainable use of MDB water resources and ensuring the implementation of the Basin Plan, particularly as it applies to the maintenance of water quality objectives. Further, as noted, s86F of the *Water Act 2007* requires the MDBA to act to ensure an appropriate response is implemented if objectives are not met (*Water Act 2007* (Cth), s86F(1)). The Commonwealth should take the lead in establishing expectations through the prevention and preparation for BGA events in the MDB as well as the establishment of emergency management priorities for response and recovery from BGA events.

This reflects a significant shift in the relative roles and responsibilities compared with the current operating environment. Specifically, it shifts the Commonwealth from a 'hands-off' leadership role as articulated in the 1994 Algal Management Strategy (Murray Darling



Basin Ministerial Council 1994), to one of leadership and direction of prevention, preparation, response and recovery (PPRR) from BGA events (historically the domain of the Basin States (Geoscience Australia n.d.). Despite the significant shift, many of the structures required for the Commonwealth to achieve this goal already exist, but there is a lack of a suitable framework to ensure integrated outcomes.

## A proposed PPRR model for Commonwealth leadership

The *National Disaster Response and Recovery Arrangements* (NDRRA) assert that effective emergency responses to natural disasters are underpinned by adequate PPRR activities, supported by an all-agencies approach involving government and non-government entities (Attorney-General's Department 2012, p. 13). A PPRR model to enable Commonwealth leadership is proposed. This model highlights elements that are in existence, as well as gaps that would need to be resolved.

### Prevention

There are adequate existing elements to enable effective prevention of water quality incidents in the MDB, including:

- Legislation - the Commonwealth has asserted control over MDB water resources and Basin States have referred specific powers to enable the implementation of Commonwealth authority (*Water Act 2007* [Cth]).
- Basin Plan - water quality risks have been identified, resource plans and catchment targets have been implemented, extraction and trading rules have been established and enforcement mechanisms recognised (*Basin Plan 2012*).
- Environmental watering - water for the purposes of enhanced environmental outcomes in water-dependent ecosystems is held by Commonwealth (Commonwealth Environmental Water Holder n.d.) and state and territory (Victorian Environmental Water Holder n.d.) governments.
- Land management programs - federally funded programs, such as Landcare, actively rehabilitate landscapes and protect catchments in the MDB (National Landcare Programme n.d.).
- Incentives and inducements - by virtue of the referral of powers from the states, the Commonwealth is empowered to provide for the development of programs to support protection of the MDB.

### Preparation

Existing within-jurisdiction response protocols (for example the Victorian Blue Green Algae Coordination Framework (Victorian Department of Environment, Land, Water and Planning 2016)), enable effective management

of incidents. However, these state-based approaches are less applicable when multiple jurisdictions are effected. Although information is shared between Basin States as BGA events increase in size (Murray Darling Basin Authority (c) n.d.), decision-making responsibility remains with the individual Basin State members.

Additional elements that would enhance preparation outcomes are:

- harmonisation of incident response through establishment of uniform protocols, consistent with the Australasian Inter-service Incident Management System (AIIMS)<sup>1</sup> framework that establishes clear coordination, control and command responsibilities, could improve the effectiveness of cross-jurisdictional incident response (Australasian Fire and Emergency Services Authority Council 2013).
- inter-agency planning to ensure appropriate understanding of the protocols and the respective roles and responsibilities of coordination, control and command agencies.

### Response

Since the Commonwealth does not currently lead the response to BGA events in the MDB, the authority to develop and implement Commonwealth-led incident protocols would need to be established and agreed with the Basin States. As part of that agreement uniform response protocols consistent with the AIIMS framework are required for implementation. A key element is the adoption of agreed emergency management priorities that reflect the imperatives of the Commonwealth as opposed to those of individual states.

### Recovery

Existing elements to enable effective recovery from significant water quality events in the MDB, including the NDRRA (Attorney-General's Department 2012) would be markedly enhanced by agreed response protocols implemented at a local, regional and state and national scale. These are represented as Level 1, Level 2 and Level 3 in Table 1.

## A Commonwealth-led integrated response

Underpinning an integrated response to BGA events in the MDB consistent with the AIIMS framework is the assertion of incident control through a central body (Australasian Fire and Emergency Service Authorities Council 2013). The MDBA is required to set water quality trigger points at which water becomes unsuitable for human needs (*Water Act 2007* [Cth] s86B(1)(c)). In addition, in the event that water quality trigger points are

<sup>1</sup> Australasian Inter-service Incident Management System. At: <http://trove.nla.gov.au/work/33563486?selectedversion=NBD43069108>

reached, it must formulate an emergency response to ensure water is available and take the necessary action to implement a response (*Water Act 2007* (Cth) s86F(1)). Therefore it is reasonable that the MDBA would assume the role of the control agency.

Applying the AIIMS framework in this context enables the implementation of an integrated response that is flexible, appropriately resourced and effective across multiple jurisdictions. The scenario outlined in Table 1 shows how the integrated response could be applied during a BGA event.

A uniform incident response protocol based on the AIIMS framework could be established under the control of the MDBA as the control agency for water quality incidents in the MDB. Incident control would be exercised through the MDBA, leveraging existing response resources where appropriate. For example, for a Level 1 event, state-based response entities would ensure the delivery of outcomes, as is currently the approach. However, incident control objectives would be determined in accordance with agreed MDBA protocols. Specialist MDBA regional and national incident controllers would be appointed for Level 2 and Level 3 events. It is important to note that for Level 2 and Level 3 incidents, some sectorisation of the incident (eg NSW sector, Victorian sector etc) may be considered to ensure that objectives are met in the most effective manner (Australasian Fire and Emergency Service Authorities Council 2013). Further, in each of these scenarios, command of personnel would remain with the state-based entities providing the resources.

The Ministerial Council would provide the coordination required for an effective incident response. Each Basin

State is represented on the Ministerial Council, as such, it is the appropriate body to ensure the availability of resources to meet the complexities of incidents and the appropriate escalation of incident response, including the declaration of a Level 3 emergency situation.

## Conclusion

Blue green algae events in the MDB are not unanticipated and are expected to increase in severity and prevalence. They present a material threat to regional communities and economies and, by extension, the national economy. Consequently, the loss of access to MDB water resources due to contamination by BGA could manifest as a natural disaster. The Commonwealth has assumed responsibility for the management of water quality in the MDB and importantly, enhancing the resilience of current management. For the Commonwealth to fulfil this obligation and encourage greater resilience of basin communities to the BGA events, existing approaches must be changed. While the current prevention mechanisms are appropriate to mitigate the threat of BGA, preparation, response and recovery approaches are not. The current state-based approaches should be set aside and recast under the control of the Commonwealth, coordinated by the Murray Darling Basin Ministerial Council and under the control of the MDBA. Aligning this central coordination and control of the Commonwealth entities with the command of personnel at the state level provides the effective management of BGA incidents across multiple jurisdictions and, importantly, meets the objectives of the nation in managing these events in the waters of the MDB.

Table 1: Summary of the implementation of MDBA control over an emerging BGA event in the MDB.

Incident Response Level	Scenario	Incident Control
Level 1 Local Incident Response	BGA is detected in the upper reaches of the MDB. The BGA is monitored and community safety managed at the local level with the MDBA providing oversight of the incident.	A local incident control team is established. Incident control is provided using established, state-based local resources. <sup>1</sup> MDBA Level 1 incident response protocols adopted.
Level 2 Regional Incident Response	The BGA bloom spreads to a number of storages in the upper Murray River effecting water resources shared between NSW and Victoria. The MDBA Regional Incident Controller assumes control, directing local resources to manage the response to meet regional objectives.	An MDBA Regional Incident Control Centre is established. MDBA Level 2 incident response protocols adopted.
Level 3 National Incident Response	The BGA bloom extends along significant reaches of the MDB reducing the quality of water shared by more than two states. The Ministerial Council <sup>2</sup> declares a Level 3 emergency and a National Incident Controller is appointed and assumes control of the incident. <sup>3</sup> At this point the incident is of national significance with a long and protracted recovery period anticipated.	The MDBA establishes a National Control Centre. MDBA Level 3 incident response protocols are initiated and the incident is managed in accordance with national interest objectives.

1 See for example New South Wales Department of Primary Industries (Water), Algal Contacts, Regional Algal Coordinating Committees, [www.water.nsw.gov.au/water-management/water-quality/algal-information/algal-contacts](http://www.water.nsw.gov.au/water-management/water-quality/algal-information/algal-contacts).

2 *Water Act 2007*, Schedule 1, s9(a).

3 It is important that for the incident to escalate to Level 3 it requires an appropriate body that can declare the shift (Australasian Fire and Emergency Service Authorities Council 2013, p. 23).

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## ABSTRACT

The 2012-13 Australian Capital Territory fire season saw no loss of life, no major property loss and minimal environmental damage. It was therefore successful according to the main aims of bushfire management. This outcome hinged on a few critical moments when, due to a combination of strategy and good fortune, things went right. This case study demonstrates how influential chance can be in determining the outcome of bushfires and this in turn begs the question: should agencies be held responsible for factors that are beyond human control? It is proposed that holding agencies responsible for outcomes that are not entirely within their control, acts to reduce community resilience because it implicitly removes the onus on individuals to take personal responsibility; a vital component for good outcomes.

# Defining success in bushfire management: critical moments in the 2012-13 ACT bushfire season

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Submitted: 29 March 2017. Accepted: 29 April 2017.

## Introduction

The successes of bushfire managers are rarely acknowledged by the community because their work passes largely unnoticed unless there's a catastrophic failure. In effect the scale of success ranges from zero to minus-10 with zero awarded when there are no lives lost, no property damaged and no adverse environmental outcomes. Bushfire and land management agencies are aware of this perverse situation (Eburn & Dovers 2012). For example, Mick Keelty (2011) in his review of the Perth Hills fire stated:

*There remains one question the answer to which eluded the Special Inquiry but it is an answer that requires further examination and that is: What is the measure of success of the outcome of a bushfire (sic). Is the loss of no lives the only performance measure? If so, how many houses is an acceptable number to lose? Does one performance indicator have the potential to cloud the 'Shared Responsibility' of all to build resilience of our community?*

This paper is a case study from the successful 2012-13 fire season in the Australian Capital Territory (ACT) with the aims of:

- highlighting the critical factors that contributed to the outcome
- examining the implications of the events for defining robust measures of success in bushfire management.

## Preparing for the season

Heading into the 2012-13 fire season, the ACT had experienced two years of record rainfall brought about by the coincidence of a positive Southern Oscillation Index (*La Niña* conditions), a negative Indian Ocean Dipole and a positive Southern Annular Mode (Bureau of Meteorology 2012). This caused rapid grass growth particularly of the exotic pasture species *Phalaris aquatica* that could not be consumed by livestock as quickly as it grew. This resulted in high fuel loads up to 12t/ha<sup>-1</sup> (Leavesley *et al.* 2012) and high fuel continuity

within the grasslands, woodlands and dry forests that surround and dissect Canberra. The climate outlook for the 2012-13 fire season was for below-average rainfall, average temperatures and for a reduction in soil moisture as the season progressed. The immediate concern for fire managers was that damaging grass fires were possible as soon as curing was greater than 70 per cent and that the potential for forest fires may develop as forest fuel moisture declined.

Bushfire management in the ACT is the responsibility of the Emergency Services Agency (Emergency Services Agency 2009), however, the role of the ACT Parks and Conservation Service is important for several reasons:

- It is the largest land manager - 72 per cent of ACT is zoned National Park or Nature Reserve (ACT Auditor-General 2013).
- It provides 150 bushfire-trained personnel (i.e. approximately one-quarter of the ACT bush firefighters).
- It is responsible for meeting the fuel management standards in the asset protection zones around the city.
- It is responsible for delivering much of the ACT's bushfire infrastructure such as fire trails, helicopter pads, stock fences and water points (ACT Government 2012).

The wet weather through the summer of 2010-11 was a welcome change for Parks and Conservation bushfire fighters. Agency firefighters were authorised to take the public holidays over Christmas 2010. The season ended with the fire management unit budget underspent due to the small number of hours spent stood-up, minimal expenditure on fire suppression and the reduced expenditure on the burning program. While the burning program was delayed, the physical fuel removal program, which involved the construction and maintenance of defensible space across the Canberra urban-rural interface (Emergency Services Agency 2009), was ahead of schedule. The other factor that occupied fire management staff during the season was repair of

the fire access trails following a major storm event on 3 December 2010. Temporary repairs re-established light-unit access to most of the mountain country but the full network of trails required for heavy tankers and floats was scheduled to take many months.

Preparations for the end of the wet weather commenced at the end of the fire season with the development of the 2011-12 Bushfire Operations Plan (BOP). The plan recognised that the burning program was behind schedule and, in addition, the ACT region had an unusually high fuel load of cured grass (Cheney *et al.* 1998) that would need treatment. In the ACT, burns cannot be conducted by contractors so a case was made—and granted—for additional seasonal fire crews. In parallel, an internal research project was launched to investigate the effect of winter burning on grass fuel loads during the following summer (Leavesley *et al.* 2012). With fuel hazard reduction burning restricted in spring due to ecological considerations (Kitchin & Matthews 2012), winter burning could provide greater capacity to reduce fuel without employing more staff.

In late August 2011 the Bureau of Meteorology presented data at the AFAC Conference that showed that many strong *La Niña* events last for two years and some for three (Bureau of Meteorology 2012). This was the first indication for many ACT bushfire staff that above average rainfall conditions may continue into a second year.

The extra seasonal fire crews brought the physical fuel removal program even further ahead. The burning program got further behind and the fire management unit budget was further underspent. Another big storm in March 2012 caused even more severe damage to the rural road network than the one the previous summer. On the plus side, the grass research project showed that burning in winter, when the fuel loads were at 12t/ha<sup>-1</sup>, delivered a fire management benefit the following summer because the treated areas had lower fuel loads and higher fuel moisture than untreated sites (Leavesley *et al.* 2012).



Hazard reduction burning in heavy *Phalaris* grass at Fraser on the Canberra urban-rural interface in August 2012.

Image: Tom Gibbs

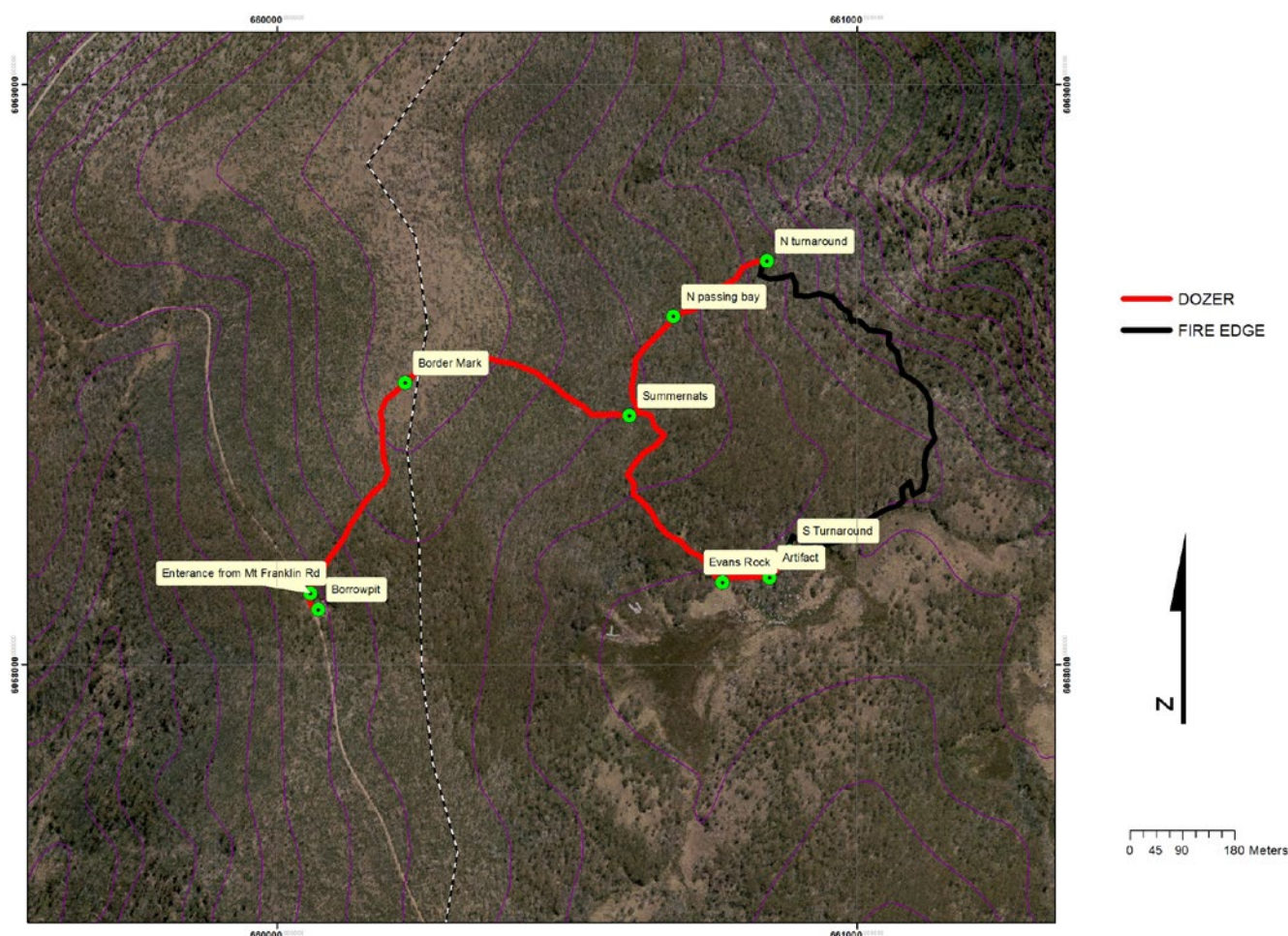
## Putting all the fires out

The 2012-13 BOP made a case for additional bushfire seasonal crews, which was granted. An intensive program of grass burns in the urban-rural interface was conducted through the winter and by mid-spring the Parks and Conservation Service fire management crews were well practiced. In early December a fire that started to the north-west of the ACT crossed the border and burnt fiercely through grassland until it was brought under control in the evening. At that stage it was clear that the long-awaited, post-rain bushfire season had arrived.

On the afternoon and evening of 5 January 2013 a lightning storm caused multiple ignitions across the ACT and an Incident Management Team (IMT) was set up. Two fires in remote alpine areas near the NSW border were of particular concern. One of these was high on the Brindabella Range adjacent to Mount Franklin Road. It was burning towards one of the most important ecological assets in Australia, the Ginini Flats wetland. Ginini Flats is a one of the few places that supports the critically endangered Northern Corroboree Frog

(*Pseudophryne pengilleyi*, DSEWPAC 2013). The other fire was high on Sentry Box Mountain in rugged, untracked country accessible only by helicopter.

The following morning crews completed the mop-up of accessible sites. At the same time a D4 bulldozer was working its way into the Ginini fire followed up by a D6 bulldozer. The rapid deployment of the bigger machine was only possible due to the recent completion of an upgrade to Mount Franklin Road by the Parks and Conservation Service. The Divisional Commander directed the machines around a European heritage site and down to the fire that was burning in a south-easterly direction towards the Ginini Flats wetland and backing slowly down a steep slope where access was only possible on foot or by helicopter. The two machines separated when they reached the burnt ground and began a flanking movement (Figure 1). At Sentry Box Mountain two winch-qualified Remote Area Fire Teams (RAFT) were deployed with dedicated aerial resources. In this remote location on the east face of the mountain, the two crews used dry firefighting techniques against two-metre-high flames. Aerial resources were increased but the task was difficult.



An aerial photo of the site of the Ginini fire that was ignited by lightning on 5 January and extinguished on 7 January. The Ginini wetland, the low ground immediately adjacent to the southern edge of the fire supports the critically endangered Northern Corroboree Frog. Bulldozers were directed around the historic ACT-NSW border mark by the Divisional Commander. The extent of the fire was 26ha but planning for containment lines in the event that it got away encompassed 70,000ha.

Figure 1: Site location of the Ginini fire in the mountains surrounding the ACT.



The Ginini fire beat the bulldozer to the Ginini wetland (middle of picture) but was extinguished by helicopters before it could run up the hill (foreground of picture). The control line and vehicle turnaround is faintly visible in the middle of the picture beyond the tree line.

**Figure 2: Burnt areas on Mount Ginini.**

Time was of the essence as the weather forecasts for 6 and 7 January was for High Fire Danger with afternoon storms. Catastrophic fire weather was predicted for 8 January. Planners calculated that if the fires escaped containment they could burn out 50,000ha in the first 24 hours and the final contained size was likely to exceed 70,000ha.

At Ginini, the southern flank of the fire spread into the wetland ahead of the approaching bulldozer. Luckily, timely, well-aimed helicopter drops extinguished the outbreak (Figure 2). The rugged eastern edge of the burn also received concentrated aerial water-bombing activity. At about 4:30pm a thunderstorm moved across the ACT delivering much-needed rain but also more lightning.

On the morning of 7 January 2013 resources were marshalled in a final attempt to put the fires out. At both fire sites the intensity was much reduced and by 4:30pm both commanders considered the fires contained. Throughout the day the IMT organised searches for new ignitions and nothing was found. Attention turned to preparing for the catastrophic weather forecast for the following day.

On 8 January firefighters assembled for briefings. Catastrophic weather arrived as forecast and winds were so strong during the afternoon that the helicopter fleet was grounded. Fifteen ignitions occurred but the patrolling staff were able to get to all of them before they became uncontrollable. One ignition to the west of Canberra fortunately occurred next to a patch of sand that restricted its spread until crews arrived. The fire had the potential to cross the paddocks and threaten the suburbs of Canberra. The crews on the Sentry Box

Mountain and Mount Ginini were proven to have done their job thoroughly and the ACT avoided what could have been a repeat of 2003. The success that day—10 years after devastating 2003 fires—was the key to the whole season. An environmental team assessed the Ginini fire site on 11 January and rehabilitation of the bulldozer trail was completed before the end of the month.



The northern containment line after the fire. The bulldozers were instructed by the Divisional Commander to retain topsoil to aid rehabilitation. The D4 removed the shrub layer while the bigger blade on the D6 was used to remove branches from the Snow Gums (*Eucalyptus pauciflora*).

Image: ACT Parks and Conservation Service



The northern containment line after rehabilitation. Logs, litter and topsoil were scattered over the containment line by an excavator supported by a fire management crew. If the fire had broken containment, staff would have been committed to suppression and rehabilitation would have been delayed.

Image: Chris Troth

## Conclusion

The ACT Parks and Conservation Service can point to a range of factors that contributed to positive outcomes during the 2012-2013 bushfire season.

- The advance allocation of additional resources (seasonal firefighters) in the lead-up to the expected difficult fire season. Fire risk varies from season to season due to stochastic factors (e.g. Allan & Southgate 2002) and small jurisdictions such the ACT and Northern Territory have limited scope to reallocate resources within recurrent budgets so this was a welcome development.
- The planned focus on grass fuel treatment activities, backed up by research (Cary *et al.* 2009; Leavesley *et al.* 2012, Gibbons *et al.* 2012, Penman *et al.* 2013, 2014) through the winter and spring of 2012 ensured that defensible space was created most cost-effectively in the most important place, immediately adjacent to assets.
- The high state of readiness of the Parks and Conservation Service crews following the intensive pre-season fuel management program.
- The focus on the repair and upgrade of the fire trail network, in particular the major access route along Mount Franklin Road.
- The clarity of understanding of the importance of fire weather in determining fire behaviour (Cheney *et al.* 1998, Gould *et al.* 2007) and the extinguishment of all going fires prior to the forecast catastrophic weather of 8 January (Cary *et al.* 2009, Penman *et al.* 2014).
- The commitment of maximum resources to early suppression of ignitions that occurred on 8 January (Cary *et al.* 2009, Penman *et al.* 2013, 2014).

But this is not the whole story. The outcome in the ACT was close and good fortune with the weather and the

location of ignitions played a large part. The Sentry Box Hill fire was next to a large natural clearing that facilitated early deployment of RAFT crews and increased the safety margin. The Ginini fire occurred near to a recently upgraded road that allowed rapid access by suitable plant. The 15 ignitions that occurred on 8 January were in locations and at times that allowed them to be extinguished. Benign weather conditions on 6-7 January aided containment of the Sentry Box Mountain and Ginini fires. Had any of these situations developed differently then the ACT may have experienced a season in which the extent of land burnt was near the maximum recorded in the fire history. The size of the jurisdiction is clearly important in this respect. ACT authorities had to deal with several hundred lightning strikes and two fires of concern, while those in NSW and Victoria had to deal with many thousands of lightning strikes and hundreds of fires. In this context the success rate of the ACT in completing operational tasks is unlikely to be exceptional. Had the ACT fires not been contained then the proportion of the area of the jurisdiction that would have been burnt would have far exceeded the proportion of NSW and Victoria that were burnt.

Regardless of what might have been, the 2012-13 ACT fire season saw no loss of life, no major property loss and minimal environmental damage. It was therefore by normal measures successful. This examination of events highlights the successful strategies and illustrates that the outcome was not entirely within the power of fire authorities to control. This situation is relevant to all Australian jurisdictions and acceptance of this situation within communities is an important step in building the resilience described by Mick Keelty (2011). There is inherent tension in a definition of success based on the number of human lives lost, property destroyed or damage to the environment. While an agency can be held to account for 'plans and procedures' (Eburn & Dovers 2012) such as meeting targets for trained staff, meeting



fuel management standards, maintaining fire trails and success in extinguishing ignitions within a fixed timeframe, it is not logical to hold them accountable for outcomes that are beyond their control. This examination supports the view of Mick Keelty (2011) that a particular danger in adopting measures of success for bushfire agencies that focus on outcomes described by Eburn and Dovers (2012) as perhaps 'aspirational' is that it implicitly contradicts the need for increased community engagement and acts to negate efforts to build community resilience.

## Acknowledgments

Thanks to Peter Galvin, Scott Farquhar, Simon Bretherton, Trish D'Abrera and Lexi Williams for their recollections of events described in this paper. Special thanks to Chris Troth, Tom Gibbs and the other photographers who contributed their work. Extra special thanks to our colleagues in the Parks Brigade, ACT Rural Fire Service, ACT Fire and Rescue, plant operators and pilots who turned out during the season.

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## ABSTRACT

This article presents a case study of bushfire risk communication in the Blue Mountains of New South Wales, Australia is one of the most bushfire-prone areas in the world. A documentary film, 'Fire Stories - A Lesson in Time' was locally produced to raise community awareness of the risk of fire. The film presented a devastating bushfire event for townships in the Blue Mountains in 1957. The film was released in 2013 just months before devastating fires again struck the region. The impact of viewing the film in relation to the 2013 fires was evaluated. The film was found to have contributed to community resilience in areas of fire preparedness and response. This evaluation highlights the need for alternative, community-based approaches to enhance the effectiveness of community bushfire safety endeavours.

# Communicating bushfire risk in the Blue Mountains: a case study of the *Fire Stories* film

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Submitted: 24 February 2017. Accepted: 17 March 2017.

## Introduction

### Bushfire policy context and community engagement

Since the 2009 Black Saturday fires in Victoria, there has been a fundamental shift in policy for fire management and response. This includes a focus on empowering communities through knowledge of risk. The *National Strategy for Disaster Resilience* states:

*'The fundamental change is that achieving increased disaster resilience is not solely the domain of emergency management agencies; rather, it is a shared responsibility across the whole of society'* (Attorney-General's Department 2011, p. 5).

The National Inquiry on Bushfire Mitigation and Management noted the frequent complacency of communities before major bushfire events (Ellis, Kanowski & Whelan 2004). The relatively low levels of bushfire risk mitigation actions by at-risk householders is a key issue (McLennan, Paton & Wright 2015), with a consequent need for agencies and communities to develop new, community-based approaches. The policy of shared responsibility requires active community engagement and empowerment, encouraging people to identify their own risks and to be prepared for bushfire. Dimensions of preparedness include awareness, understanding, planning, physical preparation and psychological readiness.

Risk education therefore needs to reinforce values of personal responsibility and risk acceptance. Co-construction or shared understanding of risk is one of the guiding principles for emergency management community engagement (Australian Government 2010). Others include the importance of localised approaches and shared narratives about past experiences and the value of local community-specific knowledge over (often generic) emergency management information.

### Research context

The understanding of community engagement for disaster management is growing rapidly (Australian Government 2010, Attorney-General's Department 2011, Federal Emergency Management Agency 2012). Government agencies and universities are involved in theoretical research, case studies

and evaluations. In Australia this includes reviews of community education, awareness and engagement for natural hazards (Elsworth *et al.* 2011) and studies on bushfire risk communication to foster awareness and preparedness (e.g. Paton *et al.* 2006, Paton, Burdelt & Pryor 2008, Australian Government 2010, Eriksen & Gill 2010, McLennan, Paton & Wright 2015, McLennan, Paton & Beatson 2015, Eriksen *et al.* 2016, McLennan *et al.* 2017). Key areas of research are risk perception, homeowner preparedness and response during fires and community safety (e.g. Moritz *et al.* 2014, McLennan *et al.* 2017). Key studies in these areas in the US include Daniel, Carroll and Moseley (2007), McCaffrey and colleagues (2012) and Steelman and McCaffrey (2014). These studies identify a lack of empirical case studies on risk and crisis communication and highlight the value of communication that takes an event-based approach. Similarly in Australia, there are few published accounts of community-based bushfire safety initiatives with data about their impact. Research by Eriksen and Gill (2010) explores the 'disconnect' that exists between bushfire awareness and preparedness in relation to bushfire in rural landscapes in Australia. This 'awareness-action gap' reflects the complex and paradoxical relationship between action, awareness and attitudes (Eriksen & Gill 2010, p. 814) and reinforces the need for more studies that evaluate effects of communications that aim to educate people about risk.

The risk communication case study reported here is based in the Blue Mountains of New South Wales, where a largely transient population has never experienced a high-intensity fire event. Motivating residents to be prepared for a fire despite the lack of a sense of immediacy is challenging. This case study presents an evaluation of the effectiveness of a film that takes an event-based approach to demonstrate fire risk. Use of the film to internalise risk awareness and to motivate residents to be bushfire-prepared is examined.

Audiovisual material developed for community bushfire safety education includes two films about fires in Tasmania in 1961 and 1967 produced by the Bushfire Cooperative Research Centre and state fire and land management agencies. The use of film and oral history as a tool for learning about natural disasters is well researched. For example, exploring the role of narrative in relation to memory of floods in England (McEwen *et al.* 2016, Garde-Hansen *et al.* 2016). McEwen and colleagues take an approach to memory work that is community-focused and archival, 'to increase understanding of how flood memories provide a platform for developing and sharing lay knowledges, creating social learning opportunities to increase communities' adaptive capacities for resilience' (2016, p. 14).

## Setting

The Blue Mountains is part of the Great Dividing Range to the west of Sydney and one of the most fire-prone areas in the world (Chapple *et al.* 2011). On average, the region has 28 bushfires a year and up to seven of these can be classified as 'major' fires (Blue Mountains Bushfire

Risk Management Plan 2013). The area's townships have a total population of about 80,000, mostly clustered around the Great Western Highway that runs along a ridge-top. The townships are surrounded by a one million-hectare conservation area (the Greater Blue Mountains World Heritage Area) dominated by fire-dependent eucalypt forest. The Blue Mountains Local Government Area covers 143,000 hectares. There is a narrow transition zone between the unpopulated, fire-adapted natural landscape and the populated areas. In this landscape, fire management is government-driven by the NSW Rural Fire Service, the NSW National Parks and Wildlife Service of the Office of Environment and Heritage and the Blue Mountains City Council. Yet the policy of shared responsibility increases the onus on communities to be better prepared to respond to bushfire threat. The effects of climate change and altered fire regimes since European settlement and the number of severe, uncontrolled bushfires in Australia has increased (Whelan *et al.* 2006, Kingsford & Watson 2011). A transient and increasingly urbanised population adds to the challenge, with many residents in the Blue Mountains having little or no experience of bushfire. Eriksen and Gill (2010) conclude that diverse communities with lifestyles and values more aligned with urban living present challenges for bushfire policy implementation.

## 'Fire Stories – A Lesson in Time'

The documentary film, *Fire Stories - A Lesson in Time*, presents a narrative of devastating fires in the upper Blue Mountains in 1957 that destroyed over 170 homes. The film's purpose was to allow local communities to learn from a previous disaster. The 35-minute film was produced by the Blue Mountains World Heritage Institute in partnership with the NSW National Parks and Wildlife Service, NSW Rural Fire Service and the Blue Mountains City Council. The film portrays local residents describing their experience of the 1957 bushfires and reflecting on what they learnt. Historical and contemporary material was used to show the 1957 fires and the impact. This included archival and private film of the fires, personal and community stories from witnesses to the event, graphic mapping of the path of the fire and contemporary fire awareness and safety messages delivered by people from the local community and fire and emergency services personnel.

*Fire Stories* was part of a community engagement project designed to convert community recognition of bushfire threat into the actions of 'Prepare, Act, Survive' as outlined in the NSW Rural Fire Service strategy.<sup>1</sup>

In June and July 2013 (when the threat of fire is low) the film was viewed by 2600 people at two cinema events that included a bushfire information expo and presentations by fire agency personnel to generate information exchange and discussion. In addition, the local community newspaper, the *Blue Mountains Gazette*, ran a series of articles on the project, including 1957

<sup>1</sup> NSW Rural Fire Service Plan and Prepare. At: [www.rfs.nsw.gov.au/plan-and-prepare](http://www.rfs.nsw.gov.au/plan-and-prepare).



A burned-out wreck at the Wentworth Falls service station after fires in 1957.

Image: Blue Mountains Library Local Studies Collection

eyewitness accounts, in the lead-up to and coinciding with the film screenings. To date, another 12,000 people have viewed the film on YouTube or DVD.<sup>2</sup>

In October 2013, four months after the release of *Fire Stories*, severe bushfires struck the Blue Mountains. Around 200 families lost their homes and a similar number of homes were damaged, approximating the property losses of 1957. This presented an opportunity to examine whether viewing *Fire Stories* had prompted a change in behaviour before, during and after the 2013 fire by people who had seen the film. This evaluation is important for informing community education for bushfire awareness and preparedness.

## Methods

### Design

Eighteen months after the 2013 fires (allowing for a period of recovery) people who had seen the film either in the cinema or via YouTube/DVD were invited to complete an online survey using Survey Monkey. The survey sought to understand:

- What did they do to increase safety after viewing the film up until the end of 2014?
- How did they respond to the 2013 bushfire season in terms of safety-enhancing activity?
- Whether, and to what extent, did *Fire Stories* and other factors contribute to safety-enhancing activity?

- What aspects of *Fire Stories* contributed most to safety-enhancing activity?

### Recruitment

Respondents were recruited via direct email from the film audience database and through promotion in newspapers and via social media. The survey was conducted over four weeks in April–May 2015.

### Instruments

Two survey questionnaires were developed, tailored to different audiences:

- Cinema Audience Survey for those who attended the June and July 2013 film events that included presentations and information stalls.
- YouTube and DVD Audience Survey for those who viewed the film any time since July 2013, usually in a private setting.

Survey data were collected on a range of variables, mostly through precoded questions that allowed multiple responses. Fields for open text encouraged people to elaborate on their answers. Three different time periods were specified. For the cinema audience these were:

- before viewing *Fire Stories*
- after viewing *Fire Stories* and before the 2013 fires
- during or after the 2013 bushfires.

Two survey sections asked about bushfire preparation. The first related to bushfire preparedness activities. The

<sup>2</sup> Based on sales.



*Fire Stories* screening in June 2013.

Image: Laura Zusters

second related to spheres of concern around bushfire threat, namely:

- home and household
- pets
- immediate neighbour
- someone nearby who needs help
- street
- neighbourhood
- wildlife.

If respondents reported changes in activities or spheres of concern over time, they were asked for the reasons. To assist respondents distinguish the film's effects from that of other bushfire awareness-raising activities (and from the experience of the 2013 fires) other known community education and engagement activities were included in the response options. Other sections of the survey asked about thinking and talking about *Fire Stories* and the impact (high, moderate or minimal) of the various film elements on bushfire risk perception.

## Analysis

Answers to precoded questions were tabulated and converted into percentages (of the total number of responses to the question and the number of survey participants who responded to the question) for comparison across the different time periods. Answers to open-ended questions were reviewed for additional information and insights. To analyse the responses for bushfire preparedness, the classification system developed by McLennan, Elliot and Wright (2014) was used (see Figure 1). The five categories reflect a graduation in time and effort (note this does not imply a linear relationship from one to the next) from becoming risk aware, to being informed and preparing a plan, to preparing for relocation or evacuation, to reducing risk to houses and property. The last category includes more complex and often costly activities associated with altering the property to make it less vulnerable, and preparing to defend it.

## Community feedback

A public seminar was held at the Blue Mountains Cultural Centre in November 2015 to present and discuss the findings. It drew 80 attendees including survey participants, local government and community organisation representatives and the general public.

## Results

### Participants

A total of 104 online questionnaires were completed: 84 from the cinema audience and 20 from the YouTube/DVD audience. Results are based on responses from the cinema audience attendees who saw the film in the context of an information and discussion-rich environment:

- 66 per cent of respondents lived in the upper Blue Mountains
- 87 per cent were homeowners
- 57 per cent were female



Participants at the information expo in the Blue Mountains.

Image: Rosalie Chapple

1. Information and communication
<ul style="list-style-type: none"> <li>a. Sought more information about the risk to my home and area (e.g. looked at resources such as the RFS website, contacted the Community Fire Unit in my area).</li> <li>b. Spoke with my household or significant others about fire preparedness.</li> <li>c. Spoke with friends and community members about fire preparedness.</li> </ul>
2. Bushfire safety planning
<ul style="list-style-type: none"> <li>a. Completed RFS Bushfire Survival Plan.</li> <li>b. Developed other household bushfire plan.</li> <li>c. Rehearsed my Bushfire Survival Plan or household bushfire plan.</li> </ul>
3. Preparation for relocation or evacuation
<ul style="list-style-type: none"> <li>a. Organised possessions for possible evacuation.</li> <li>b. Organised a plan for the evacuation of self or others during a fire.</li> <li>c. Organised plans for pets during a fire.</li> </ul>
4. Reduced danger to house (ember attack preparation)
<ul style="list-style-type: none"> <li>a. Prepared the gutters and garden (e.g. remove flammable materials).</li> <li>b. Removed clutter from my house.</li> </ul>
5. Protection of property
<ul style="list-style-type: none"> <li>a. Reduced house vulnerability. <ul style="list-style-type: none"> <li>• Altered my house and/or garden to reduce risk (e.g. installed shutters, created shelter, closed gaps in house and roof, altered landscaping).</li> </ul> </li> <li>b. Preparation to defend house <ul style="list-style-type: none"> <li>• Installed water tanks, pool, fire pump.</li> <li>• Purchased fire protection equipment (e.g. hoses, buckets, protective clothing, masks).</li> </ul> </li> </ul>

\* Activities are adapted from the RFS Bushfire Survival Plan. Classification of activities is adapted from McLennan, Elliot and Wright 2014.

Figure 1: Behaviour change: activity list classification\*

- 43 per cent were male
- 52 per cent were aged over 60 years.

Due to the relatively small number in the YouTube/DVD audience sample, extensive analysis was not undertaken; however the general trends were consistent with the larger survey group.

## Bushfire preparedness activities

Table 1 shows bushfire preparedness activities reported by category and time period. In the 3-4 months between watching the film and the 2013 fires, the 84 cinema audience respondents reported a total of 257 activities of which 153 were undertaken for the first time ('new' activities) and 104 were additional ('more' activities). For the period during and after the 2013 bushfires, 378 activities were reported (see last row of Table 1).

For the two most easily achieved categories, reported activity after viewing *Fire Stories* approached that associated with the 2013 bushfires. Reported information and communication activity after the film and before the fire was 87 per cent of that during or after the fire. Further, 56 per cent of that activity was new. Reported bushfire safety planning and rehearsal after viewing/before the fire, was 82 per cent of that after the fire, with 82 per cent being new. Relative to the before-film baseline of 58 activities, this category showed

the largest proportional increase in activity. Indeed, completion of a Rural Fire Service Bushfire Survival Plan after the film and before the fire was on par with that during or after the fire.

A total of 103 activities around preparation for relocation/evacuation occurred before the film. In the period after the film and before the fire, 63 actions (35 'new' and 28 'more') were undertaken: 29 for possessions, 19 for persons (self or others) and 15 for pets. This was 62 per cent of the activity reported during or after the fire. Reported activity to reduce danger to the house in the after viewing/before fire period was 52 per cent of that after the fire. Roughly half as many respondents prepared the gutters and garden before the fire as did after (33 per cent and 63 per cent, respectively). With respect to protection of property, few respondents reported installing or purchasing fire protection equipment in the 3-4 months after viewing *Fire Stories*; more reported these activities after the fire.

Respondents gave 111 reasons for additional bushfire safety activity between viewing the film and the 2013 fire event, of which 79 (72 per cent) were related to *Fire Stories*, including the film, newspaper articles and the information expo. The following quotations are illustrative:

Table 1: Cinema audience bushfire preparedness activities by time period.

Activity options		Time before film (Bf) (N=84)	Time after film and before bushfires (AV/BBf)(N=84)			Time during/ after bushfires (ABf) (N=83*)
			New	More	Total	
1. Information and communication	Sought more information about risk to home/area	45	19	7	26	33
	Spoken with my household or significant others about fire preparedness	44	19	18	37	39
	Spoken with friends/community about fire preparedness	40	16	17	33	38
	<b>Subtotal activities</b>	<b>129</b>	<b>54</b>	<b>42</b>	<b>96</b>	<b>110</b>
2. Bushfire safety planning	Completed a RFS Bushfire Survival Plan	24	14	3	17	17
	Developed another household bushfire plan	20	15	3	18	18
	Rehearsed my Bushfire Survival Plan or household bushfire plan	14	6	1	7	16
	<b>Subtotal activities</b>	<b>58</b>	<b>35</b>	<b>7</b>	<b>42</b>	<b>51</b>
3. Preparation, relocation, evacuation	Organised possessions for possible evacuation	39	18	11	29	41
	Organised plan for evacuation of self or others	34	10	9	19	36
	Organised plans for pets during fire	30	7	8	15	24
	<b>Subtotal activities</b>	<b>103</b>	<b>35</b>	<b>28</b>	<b>63</b>	<b>101</b>
4. Reduced danger to house	Prepared the gutters and garden	57	11	17	28	52
	Removed clutter from my house	34	9	6	15	31
	<b>Subtotal activities</b>	<b>84</b>	<b>20</b>	<b>23</b>	<b>43</b>	<b>83</b>
5a. Protection of property - reduced house vulnerability	Altered house and garden to reduce risk	25	5	3	8	17
	<b>Subtotal activities</b>	<b>25</b>	<b>5</b>	<b>3</b>	<b>8</b>	<b>17</b>
5b. Protection of property - preparation to defend house	Installed water tanks, pool, fire pump	23	1	0	1	5
	Purchased fire protection equipment	28	3	1	4	11
<b>Subtotal Activities</b>		<b>43</b>	<b>4</b>	<b>1</b>	<b>5</b>	<b>16</b>
<b>Grand total activities</b>		<b>457</b>	<b>153</b>	<b>104</b>	<b>257</b>	<b>378</b>

*It confirmed my fears [I] had seen the Black Saturday docco but was not sure if it could be as bad here. Now I get it.*

*I have experienced bushfires in the Blue Mountains and said I would never leave my home. However after seeing Fire Stories and the force of the fire and realising our age and handicaps, I have accepted we would probably have to evacuate.*

Once the 2013 bushfire began, from a total of 152 reasons for additional bushfire safety activity, 43 per cent related to *Fire Stories* and 39 per cent to the experience of the fires.

### Spheres of concern

There was a noticeable broadening of spheres of concerns after the film and before the fire (see Figure 2). Before viewing the film, the overwhelming focus of concern was 'home and household' (reported by 86 per cent of respondents), followed by 'pets' (52 per cent) and 'immediate neighbour' (49 per cent). Approximately one-third of respondents nominated 'street', 'neighbourhood' and 'someone nearby who needs help'. In the period after seeing the film and before or during the fire (AV/BBf in Table 3), 20 respondents indicated a new concern for their street (80 per cent increase on before the film), 19 did so for their neighbourhood (70 per cent increase)

and 16 did so for 'someone nearby who needs help' (57 per cent increase). During or after the fire, these new concerns seem to have been sustained.

Respondents commonly credited viewing the *Fire Stories* film for changes in both time periods (before or during/after the fire). Of the 101 reasons for changes to spheres of concern before the fire, 78 per cent were elements of the *Fire Stories* project: 46 (57 per cent) respondents cited the film, 19 (23 per cent) cited newspaper coverage and 14 (17 per cent) the information expo. Of the 114 reasons for changes to spheres of concern once the fires commenced, 61 (53 per cent) related to *Fire Stories* with 37 (46 per cent) respondents citing the film, 17 (21 per cent) citing newspaper coverage and 7 (9 per cent) the information expo. This exceeded the influence of the experience of the bushfires, which accounted for 36 per cent of the reasons given.

### Thinking and talking about *Fire Stories*

Sixty per cent of respondents reported thinking about the film 'for a long time afterward' and the same percentage 'leading up to and during the following bushfire season'. Another 40 per cent thought about the film 'especially during the 2013 bushfire threat'. The film prompted discussion, particularly about bushfire behaviour and preparation. People most often talked about the 'potential severity of Blue Mountains bushfire' (61 of 73 respondents or 83 per cent) followed by 'people and history in the film' (79 per cent) and 'how to prepare for bushfire' (67 per cent). Discussion most often occurred with families and friends (90 per cent) followed by community members (59 per cent), neighbours (45 per cent) and work colleagues (42 per cent). Respondents reported taking the conversation into groups and schools and some discussed the film with visitors to the mountains.

### Effects of film elements

Of 76 respondents who replied to the question, 85 per cent rated the film as either very effective or effective (50 and 35 per cent, respectively) in promoting community preparedness and resilience. As shown in Figure 2, the element with the most frequent 'high impact' rating (71 per cent) was the graphic map of the movement of the fire. This element was instrumental in depicting the speed and extent of the fire complementing the archival footage and people talking. There were also rated by a majority of respondents as having a 'high impact'.

## Discussion

The evaluation of the *Fire Stories* project highlights the value of risk education that takes an event-based approach. The film provided viewers with the vicarious experience of a major fire event, using visual technology to convey the speed, unpredictability and destructiveness of fire in familiar locations to personalise the experience. It assisted respondents to come to terms

with, and to overcome impediments to, being prepared for fire events and helped stimulate readiness and mitigation actions. *Fire Stories* prompted a substantial increase in bushfire safety activity in the lead-up to the 2013 bushfires. The effect was sustained over the 20 months to the date of the survey. The film also produced a shift in focus of concern when preparing for bushfire to include greater concern for community including others in their street, neighbourhood and vulnerable people.

The behaviour of the catastrophic 1957 fire-affected respondents powerfully. The motivational effect of the film on fire preparedness and response was comparable to that of an actual fire of similar magnitude. Indeed, it was comparable to the experience of the 2013 bushfires for three of the five behaviour change categories: information and communication, bushfire safety planning and planning for relocation or evacuation. It was also followed by considerable new and additional activity related to protection of property.

These findings concur with a US study of homeowners in a wildland-urban interface, which found that higher subjective bushfire knowledge increased risk perception, in turn leading to more risk reduction actions (Martin *et al.* 2009). From a literature review that triangulated bushfire, risk and crisis, Steelman and McCaffrey (2014) identify the characteristics of effective communication. *Fire Stories* represents each of these, being interactive processes that allow for dialogue and risk clarification, taking local context into account, 'reliable and honest' sources and 'credibility of the messenger' (p. 688). Of nine best-risk communication practices identified by Sellnow and colleagues (2009), several relate to *Fire Stories*: involving the public in a dialogue about risk, presenting risk messages with honesty, remaining open and accessible to the public, designing messages to be culturally sensitive and collaborating and coordinating credible information sources. Elements of the film project that contributed to its impact were agency collaboration, quality documentary film techniques, local and personal stories and settings and confronting content in a supportive community setting.

A key feature of *Fire Stories* may be that it is not a generic emergency management message. It sidesteps the 'official rationality of bushfire management' (Eriksen & Gill 2010, p. 815) and the 'strategy' of institutions and structures of power (de Certeau 1984, p. 110). Elements of the film that evoked the 'now I get it' response include, the archival footage of the 1957 fires burning familiar and inhabited locations and augmented by spatial mapping of the path of the fire to depict the speed and ferocity of the event. This visual depiction of the spatial mapping and movement of the fire appeared to be effective in informing people about fire behaviour and may have helped to overcome the 'limited understanding of fire behaviour, ...despite the high level of risk recognition' as observed by Beilin and Reid (2014, p. 42) in rural and peri-urban landscapes in Australia. 'People's responses are complex and constructed based upon an analysis of local conditions, prior experience and newly organised or reorganised social memory' (Beilin & Reid 2014, p. 42). An 'intuitive understanding' of risk in their landscape and home places can physically be made 'real' by seeing



## Q38 Please rate the impact on you of the following elements of *Fire Stories*

Answered: 74 Skipped: 17

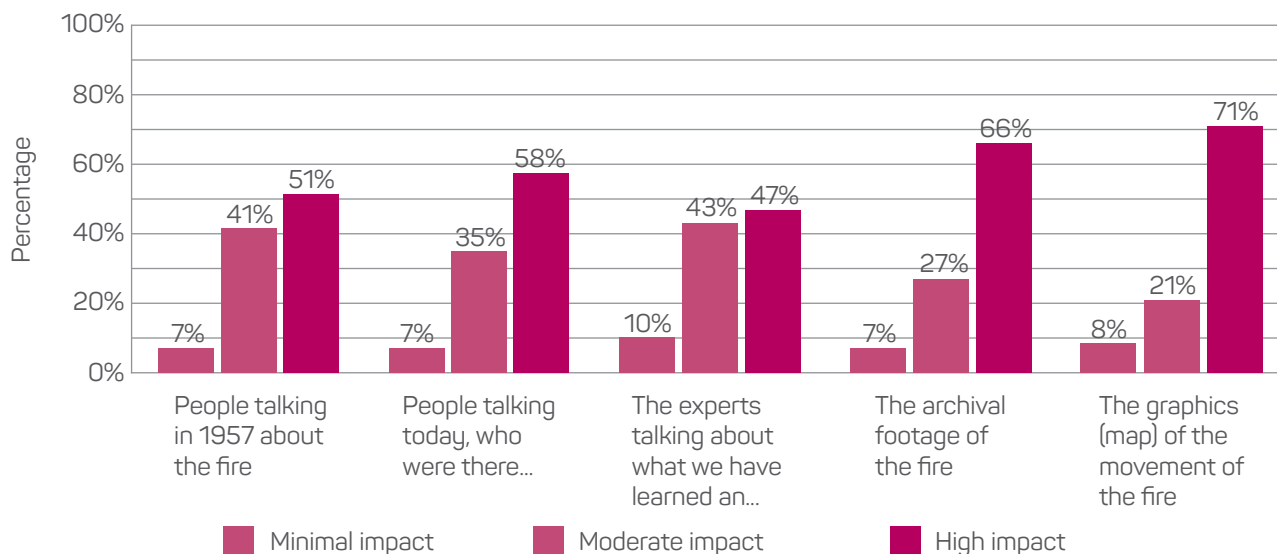


Figure 2: Cinema survey respondents – ‘Elements That Had Most Impact on You’.

this map, ‘bringing together the rational and the intuitive’ (Beilin & Reid 2014, p. 47).

A second effective element of the film was personalising the experience using local eyewitness accounts. Showing how people who have lived through devastating fire and who have witnessed the scale of destruction can recover and using these people to talk about protecting property and living safely in a bushfire-prone area was powerful.

The film was part of a larger collaboration and community engagement campaign. Thus, the film (or ‘the *Fire Stories* project’) incorporates the social fabric of people’s lives as highlighted in studies (e.g. de Certeau 1984, Eriksen & Gill 2010) as being important for the development of attitudes and actions relating to unpredictable and unruly ecological events, such as bushfires. Respondents acknowledged the effectiveness of the local newspaper coverage of the film project and the bushfire information expo.

## Conclusions

*Fire Stories* addresses the challenges outlined by Eriksen and Gill (2010) for community outreach programs that meet the need for ‘local, socially contextualised and interactive initiatives’ that appeal to a diverse community (p. 824). This study reinforced the benefits of alternative community-based approaches that enhance the effectiveness of community bushfire safety endeavours. Films that present personal narratives of past experiences can allow social learning based on storytelling. The *Fire Stories* film project can be described variously as a means of communication, an education

activity and a mode of engagement. Knowledge is the end product and the film provides experiential learning that can be as effective as direct experience of a fire. This evaluation demonstrates the value and function of bushfire memory ‘as a tangible and travelling discourse’ (Garde-Hansen *et al.* 2016, p. 1). The film project helped to build understanding of bushfire and the implications of living in fire-prone areas.

## Acknowledgments

This evaluation was supported by a Blue Mountains Flexible Community Grant from the NSW Department of Premier and Cabinet. Glenn Meade of the NSW National Parks and Wildlife Service is acknowledged for the original idea to make the *Fire Stories* film, and recognition for the making of the film is due to John Merson and Peter Shadie of the Blue Mountains World Heritage Institute and to Laura Zusters (film director). We thank all those who took time to complete the survey.

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# Increasing hazard and risk awareness

ThinkHazard! was developed by the Global Facility for Disaster Reduction and Recovery and launched in May 2016. Users can search across the world for levels of flood, earthquake, drought, cyclone, tsunami and landslide hazards. A user can enter in a location and ThinkHazard! will highlight the hazards in that area and to what level the user should have an awareness of that hazard (when planning a development project for instance).

ThinkHazard! also provides recommendations and guidance on how to reduce the risk from each hazard

within the searched-for area, such as doing location assessments and identifying early warning systems. It provides links to additional resources such as country risk assessments, best practice guidance and additional websites. ThinkHazard! also highlights how each hazard may change in the future as a result of climate change.

Data for the website has been gathered from a range of sources including institutes, universities, UNDP, UNISDR and the World Bank.

Access ThinkHazard! at: <http://thinkhazard.org/>

The screenshot displays the ThinkHazard! website interface. At the top, there is a search bar with the text "Enter location (e.g. Indonesia or Bali)". Below the search bar, there are icons for various hazards: River flood, Earthquake, Water scarcity, Cyclone, Coastal flood, Tsunami, Volcano, and Landslide. The "Volcano" icon is highlighted in orange. Below the icons, the text "Victoria" is displayed, and the "Volcano" icon is highlighted in orange. The "Volcano" section is expanded, showing a hazard level of "Medium". The text below the hazard level states: "In the area you have selected (Victoria) volcanic hazard is classified as **medium** according to the information that is currently available. This means that the selected area is located at less than 50 km from a volcano for which a potentially damaging eruption has been recorded in the past 10,000 years and that future damaging eruptions are possible. Based on this information, **the impact of volcanic eruption should be considered in all phases of the project, in particular during project design, implementation and maintenance.** Further detailed information should be obtained to adequately account for the level of hazard." Below this text, there is a "Recommendations" section with two bullet points: "EARLY WARNING ACTION: Ensure the project can act on volcanic early warnings. This may involve having a plan in place to mobilize in the event of a warning being received. More information" and "IMPACT: Consider the effect that potentially lethal and destructive volcanic hazards near to the volcano – ballistic projectiles, lava flows, lahars and pyroclastic flows – could have on the planned project. Lahars can impact areas within valleys as far as 100 km from a volcano. Further information should be gained from local volcanic hazard maps, if available. More information". To the right of the text, there is a map of Victoria, Australia, showing the hazard distribution. The map is color-coded according to the hazard level: High (red), Medium (orange), Low (yellow), and Very low (light yellow). A legend below the map indicates the hazard levels: High (red), Medium (orange), Low (yellow), and Very low (light yellow). The map shows that the hazard level is "Medium" in the western and southern parts of Victoria, and "Low" in the eastern part. A "Zoom out to Australia" button is visible above the map. Below the map, there is a "Volcano hazard level" section with a legend: High (red), Medium (orange), Low (yellow), and Very low (light yellow).

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The Australian Institute for Disaster Resilience has a new \$1 million Australian Government scholarship fund to boost education development opportunities for emergency management volunteers.

The scholarships will be made available to Australian citizens or permanent residents who are volunteers in an emergency management agency for accredited emergency management or disaster resilience vocational or higher education studies.

Those who live in a regional or rural area, female volunteers, and Aboriginal or Torres Strait Islander volunteers, are highly encouraged to apply.

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