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DISASTER RESILIENT AUSTRALIA

GET READY

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

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COVER

Image: Rebecca Hosking

Cover image titled 'Helmet of Leadership Values' by Rebecca Hosking was the winning entry in the 2015 Resilient Australia National Photography Award.

ABOUT THE JOURNAL

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

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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. All academic papers are peer reviewed. Please note that the Australian Journal of Emergency Management is indexed by several indexing organisations throughout the world, please visit our website for details.

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DISASTER RESILIENT AUSTRALIA
GET READY

Foreword

John Bates, Director, Australian Institute for Disaster Resilience

Welcome to the January edition of the *Australian Journal of Emergency Management*. This is the first edition to go to press after the launch on 17 November 2015 of the Australian Institute for Disaster Resilience. The Institute is a partnership between the Australasian Fire and Emergency Service Authorities Council, the Australian Red Cross and the Bushfire and Natural Hazards Cooperative Research Centre; working closely with the Commonwealth Government to deliver professional development products and services on behalf of Emergency Management Australia.

This is a unique point in time for Australia to advance its approach to disaster resilience and to collectively respond to the many ongoing and emerging issues in this sector. The partnership brings together a wide range of emergency management expertise from operational, humanitarian and research backgrounds. It will share and build on the extensive knowledge and experience in emergency management from Australia and internationally to deliver improved practices and outcomes.

Disasters are an inevitable part of life in Australia. It is not possible to prevent or avoid them completely but it is possible for us to better mitigate against, prepare for, respond to and recover from them. We can reduce the impact they have on individuals, communities, the natural environment and the economy by working together to pool our expertise and knowledge. To do this, we need to be better prepared to learn from each event and from other sectors and to have the courage to implement new ways of approaching the challenges and disasters that will inevitably confront us.

Improving national resilience through education and training will require our energy to be directed to mitigation, our preparations, our response efforts and the way we recover from disasters. The Institute will lead that charge and will build on the experience of the former Australian Emergency Management Institute to deliver education and training, publications, events, and other products and services that meet the goal of improving resilience across Australia.

To be truly resilient as a sector and, importantly, in our communities, now is the time to think differently. We need to identify further ways to develop our capability and enhance our competency to be able to deal with the unpredictable and unimagined. Understanding how we think in dealing with disasters and emergencies is a key part of better equipping the nation's resilience. This notion has been a driving principle behind the establishment of the Australian Institute for Disaster Resilience.

I am looking forward to engaging with many of you in coming months as the Institute establishes itself as your partner in building national resilience across all hazards, all agencies, and all communities.

This edition of the journal provides an opportunity for you to learn more about some of the initiatives already in place to improve our disaster resilience. I hope the information will help you as you make your significant local contributions to our national resilience capabilities.

Dr John Bates
Director, Australian Institute for Disaster Resilience

Extending into community-led preparedness and planning just enough (but not too much?)

By Dr Blythe McLennan, Bushfire and Natural Hazards CRC and RMIT University

Dr Blythe McLennan

How can a well-organised, capable, and respected community group help improve local community bushfire safety and build resilience in a high risk area? That is the question the research team for the Bushfire and Natural Hazards CRC Out of Uniform project[1] explored in a case study of a community-led bushfire preparedness project called Be Ready Warrandyte. Along the way, the case study raised questions about the appetite of the emergency management sector for supporting community-led preparedness and planning.

Be Ready Warrandyte (Be Ready)[2] was a project of the Warrandyte Community Association, undertaken between May 2012 and June 2015. Its primary goal was to have more Warrandyte households with effective bushfire plans. It rolled out a range of locally-tailored and, from an emergency management perspective, quite innovative communication and education activities and products. It did this with direct support from the Country Fire Authority (CFA), local government staff and local CFA brigade captains. Its philosophy was to inform and engage local residents, businesses and community groups, but not to advise people what to do.

Be Ready was of great interest to myself and my colleagues Dr Josh Whittaker and Professor John Handmer because it is an illustrative example of extending volunteerism in disaster preparedness. This form of volunteerism occurs when volunteers associated with an existing community group or non-government organisation that does not have regular emergency or disaster management functions (e.g. the Warrandyte Community Association), extend their activities into the areas of disaster management or community resilience in response to a perceived need. Be Ready was also interesting to us because it involved a high degree of collaboration between non-traditional emergency volunteers who are not affiliated with emergency management organisations, traditional emergency management volunteers, and paid emergency services staff.

Overall, the Be Ready case study[3] shows how a community-led project with strong leadership and governance, authorised by the community and supported by emergency management organisations, was able to achieve many outcomes. Be Ready adapted government communications, connected further into the community, devised and tested more innovative approaches, lead discussion on topics that needed independence from perceptions of government bias or agenda, and brought local contexts, priorities, goals and knowledge into emergency management dialogues and planning. These are all good results.

Image: Jock McNeish, Strategic Images.

A cartoon developed to help promote the Be Ready Warrandyte cause.

1 Out of Uniform project. At: www.bnhcrc.com.au/research/resilient-people-infrastructure-and-institutions/248.

2 Be Ready Warrandyte. At: http://warrandyte.org.au/fire/.

3 Be Ready case study. At: www.bnhcrc.com.au/publications/biblio/bnh-2103.

Image: Be Ready Warrandyte.

A Be Ready Warrandyte scenario planning workshop, where a facilitator stepped through a hypothetical fire scenario, allowing community members to test household plans and actions and gain feedback from emergency management organisations.

Reflecting on the case study, however, I am particularly struck by the difficult balance participants in community-led projects have to strike between working with the established emergency management system, while also seeking to challenge or influence it at the same time. Notably, this point applies to all participants, whether they are supporting the project as volunteers or paid staff, as representatives of a local community, an emergency management organisation, or any combination of the above. It may be a particularly thorny issue for traditional emergency management volunteers who arguably have the most difficult line to walk between representing the goals, priorities and concerns of their organisation, and their local community at the same time. Of course this is much easier to do when these goals, priorities and concerns are closely aligned, but given the particular and diverse settings, histories and conditions of different communities this is not always going to be the case.

In the case of Be Ready, a fairly moderate stance was adopted and the group worked in a way that was, for the most part, well-aligned with state and local government policy and well-supported by emergency management organisation representatives. Overall, there was strong consensus between the community volunteers and emergency management organisation representatives, and few significant points of difference. One notable difference that did exist was the issue of how to deal with the mounting interest of residents to learn about and install private fire bunkers. This issue is approached cautiously in Victorian state policy, but the Be Ready program engaged with it more actively and partly in a way that was not supported by emergency management representatives involved.

Importantly, there were both positive and negative consequences from adopting this more moderate stance. For Be Ready participants, the positives clearly outweighed the negatives. On the positive side, for example, it facilitated emergency management organisation support and trust in the project and the volunteers leading it, which in turn enabled them to support it in valuable ways. It also enabled more open, 'gloves off' discussion about contentious issues like private fire bunkers, as well as local road management. On the negative side, however, it restricted what the project was able to tackle and how. It also left the Be Ready project open to criticism of being little more than a mouthpiece for government policy; although such criticism was not widespread.

This raises an important question for the future of community-led preparedness and planning. While there is growing support for community-led approaches among emergency management organisations, how far can this support extend when faced with major differences in government and agency policy on one hand and local community priorities and values on the other? How far is 'just enough' to enable community-led projects to foster greater shared responsibility and build resilience to disasters, without being 'too much' for what is in many respects a risk averse sector? Of course there are important community safety and legal issues involved in this, but there is also an issue of the appetite of the emergency management sector to share responsibility with communities in practice. More importantly, how will differences in perspective, values, goals, and priorities in community safety and local emergency planning be negotiated between those who have statutory responsibility and risk management expertise, and those who have local knowledge and who personally live with the consequences, whatever they may be?

The Be Ready Warrandyte case study and more research from the Out Of Uniform project is at www.bnhcrc.com.au.

CALL FOR PAPERS AND PEER REVIEWERS

The *Australian Journal of Emergency Management* is a refereed journal publishing original papers (academic and practitioner) in 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 in this journal. Authors should refer to and comply with the AJEM *Editorial Guidelines* and the *Contributor Guidelines* available on the AJEM website. Papers will be evaluated on the basis of originality, content, clarity, and relevance to the theme.

Practitioners, professionals and academics with particular experience, knowledge and skills in this area are invited to nominate as a referee of papers.

All correspondence can be directed to ajem@aidr.org.au.

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Research articles: present an original thesis and report results that are based on an empirical method of evaluation. Subject to double blind peer review. Word limit guide (total with references): 3000 words.

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Bushfire support services and the need for evaluation: the 2013 Blue Mountains experience

Dr Jane Rich and Angela Booth, University of Newcastle, Dr Allison Rowlands, NSW Ministry for Police and Emergency Services, and Professor Prasuna Redd, University of Newcastle, show how collaboration between community services can meet community needs. ®

ABSTRACT

In 2013, the Blue Mountains region of NSW experienced devastating bushfires. In response, the Step By Step Blue Mountains Bushfire Support Service was established by the Ministry of Police and Emergency Services and a local Blue Mountains service, Gateway Family Support. The service was to support bushfire-affected community members through a strengths-based and solution-focused approach. This approach has been used in other support services but limited evidence exists on the effectiveness of its use in disaster recovery. The integration of research in the early stages of disaster recovery service design may prove a valuable way to support the work of governments and service delivery organisations and is an important aspect of disaster preparedness and community wellbeing.

This paper highlights the vulnerability of the Blue Mountains region to bushfire and examines the 2013 response by the Ministry for Police and Emergency Services Disaster Welfare Service (DWS) in association with Gateway Family Services. The DWS and Gateway Family Services collaborated to implement the service. This paper concludes that support services should be flexible in their response to dealing with those recovering from traumatic experiences such as bushfires. It demonstrates that evaluation of existing disaster support programs could better inform future disaster responses and services to assist communities to better cope and rebuild their lives.

Introduction

More than 97 per cent of Australia experienced above average temperatures between the months of September 2012 and June 2013 (Jones *et al.* 2013) and in 2013 Australia experienced its hottest summer on record (Australian Bureau of Statistics 2014). It is predicted that Australian temperatures will increase and Australia will have more hot days and fewer cold days (Australian Government Bureau of Meteorology & CSIRO 2014). An increase in the number of extreme fire-weather days is expected in some parts of Australia, including longer fire seasons and a decrease in rainfall in some areas that may cause an increase in drought frequency and severity. Alexander and colleagues (2006) report that the shift towards drier summers is wide spread. It is forecast that climate change may have dramatic and devastating impacts on the environment and on human health (Capon & Hanna 2009, Haines 2008, Kiem & Austin 2012, Kjellstrom & Weaver 2009, McMichael, Woodruff & Hales 2006, Patz *et al.* 2008, Wiseman & Edwards 2009).

With this recent history and future predictions it is important that governments and communities are prepared for this change in conditions. Effective emergency response plans and the preparedness of local health services and community welfare programs are essential for responding to these adverse events and are vital for increasing resilience of communities. The projections of climate change for Australia includes extended droughts, hotter summers and increased bushfires (Clarke, Smith & Pitman 2011, McMichael, Woodruff & Hales 2006) placing preparedness and support as key components to community resilience.

While Australian regional communities are generally aware of the increased risk to the destructive effects of bushfires, the Spring of 2013 saw bushfires in the Blue Mountains region destroy the homes of over 200 families (Donegan 2014).

Environmental disasters can result in loss of lives and substantial economic, health and social hardship (Clemens *et al.* 2013, Webber & Jones 2013) The need for communities to be prepared at a local level is pertinent in reducing the cost, time to recover and the effect of disaster on communities.

The Blue Mountains as a risk area

The Blue Mountains local government area is 55–95 kilometres west of Sydney. In 2000, the Blue Mountains was added to the World Heritage list and in 2007 it was included on the National Heritage list.

The Blue Mountains covers over one million hectares of a mostly forested landscape that includes 100 species of eucalypt and more than 400 species of animals (Department Of The Environment 2014).

The typical climate in the Blue Mountains is warm with an average summer-autumn rainfall peak in November to June and a drier early Spring. The bushfire season generally runs from September to February and prevailing weather conditions associated with the bushfire season in the Blue Mountains normally westerly or north westerly winds, which, if associated with drought, can lead to severe weather and fire behaviour (Blue Mountains Bush Fire Management Committee 2010).

The urban, industrial and agricultural development within and surrounding the Blue Mountains, highlights the tension between development and conservation imperatives. Like many protected areas, the Blue Mountains faces threats to its immediate and long-term integrity. These include climate change, urban development, human disturbance (including tourism) and pest species (plant and animal) (Blue Mountains World Heritage Institute 2015).

The Blue Mountains City Council services 26 townships spanning 143 000 hectares with the population in 2012 at 78 414 (Blue Mountains City Council 2014).

Table 1: Age distribution in the Blue Mountains (Australian Bureau of Statistics 2014)

Age in Years	Population %
0–14	19.0
15–24	11.9
25–34	9.5
35–44	13.5
45–54	14.9
55–64	14.9
65–74	9.6
75–84	4.6
85+	2.1

Table 1 illustrates the population age ranges and shows that those between 35 and 64 years are a large proportion of the population. A significantly higher number of people reside in the lower Blue Mountains, which mainly consists of young families. The upper Blue Mountains has a higher proportion of older residents as well as tourist accommodation. The Blue Mountains is a major tourist attraction with tourist activity usually concentrated in the upper Blue Mountains. Peak season is in June-July, October, and January-February (Blue Mountains City Council 2014).

Chen (2005) identified that proximity of dwellings to bushland can predict bushfire risk level. The report showed that the Blue Mountains area is in the highest risk of bushfire in New South Wales and shows that 73 per cent of all addresses in the Blue Mountains are categorised as high bushfire risk. Given the population demographics and number of transient groups, the area is at an increased risk of exposure to bushfire.

Models and theories for disaster recovery

A range of theories, models and approaches have been used in disaster recovery responses. Commonly, case management, psycho-social, community capacity building and community-development models are used (Cronstedt 2002). A shift from treatment-type approaches to community-based and strength-based approaches is increasing. Evidence shows that in the early phase following a disaster, safety, support, information and resources are the most crucial requirement and that flexible, well organised and supportive assistance allows for the natural recovery process to occur (Slawinski 2006).

The Step Blue Mountains Bushfire Support Service adopted a strengths-based and solution-focused approach. This approach is used by its parent organisation, Gateway Family Support, in all aspects of its service delivery. The strengths-based and solution-focused approach views individuals, families and communities as capable participants in their recovery and focuses on the client's strengths, capabilities, visions, and hopes. This approach allows the recovery process and timeframes to be in the control of the client while the role of the professional is to facilitate and help clients tap into their own strengths to move ahead and seek solutions (Ligon 2002).

This strengths-focused approach uses a different language. Word such as 'empowerment', 'resilience' and 'membership' are key concepts. This way of thinking does not place the person as the victim in their situation but does not ignore the trauma that has occurred. It simply places the control back in with the client and allows them control over their individual recovery.

The solution-focused and strengths-based approach is well-established in social work and case management and are being used with different client groups (Saleebey 1996, Cox, Bachkirova & Clutterbuck 2010). This approach has only been used twice in Australia through Step By Step and the Warrumbungle Bushfire Support Coordination Service in 2013 (Coombe *et al.* 2015). The results from the Warrumbungle Bushfire Support Coordination evaluation demonstrated that former service users and stakeholders regarded this approach as useful and an effective model for assisting people through a disaster event. This evaluation

Image: Dr Allison Rowlands

The Blue Mountains of NSW experienced its worse bushfires in over 30 years in October 2013. Over 118 000 hectares were burnt with the loss of two lives and 248 homes.

suggested that timely and rigorous evaluation of such services be conducted to inform future implementations (Coombe *et al.* 2015).

Step By Step intervention

Many people affected by the October 2013 Blue Mountains bushfire were severely affected, which took communities by surprise. The three fires started in Lithgow, Springwood and Mount Victoria and burned in the region for several days before their severity was realised. By 25 October the fires had burned over 65 000 hectares (NSW Rural Fire Service 2013).

The fires were fought by local fire services and communities for 10 days. Many people evacuated and experienced isolation, separation from people they love, fear and trauma, and dislocation from their communities and services (Curran 2013).

The Disaster Recovery Centre was opened at the Springwood Presbyterian Church and Gateway Family Services was contracted by DWS to establish and manage a personalised bushfire recovery support service for bushfire-affected households in the Blue Mountains for a specific timeframe. The recovery service was jointly funded by the NSW and Commonwealth governments under the Natural Disaster Relief and Recovery Arrangements. The Step By Step service was designed to assist affected individuals, families and the community by providing an outreach service that offered users a single point of contact to help them navigate and access the range of services they may require.

The Step by Step Blue Mountains Bushfire Support Service commenced operating from the Springwood Disaster Recovery Centre on 7 November 2013.

The recruitment process for the Step By Step team commenced in the second week in November. The team was initially based at the Disaster Recovery Centre with a mobile outreach service. Communication and referral services were established with other providers and a psycho-social recovery model was integrated into a *Bushfire Support Services Manual*, produced earlier by the DWS. The team consisted of workers from Gateway Family Services and a seconded worker from a local youth centre (Crestani 2014).

Using a strengths-based and solution-focused approach the Step By Step support workers assisted householders in their bushfire recovery. This included supporting people in making decisions regarding housing, livelihoods, relationships and day-to-day living. Rather than imposing solutions on individuals and families, the workers facilitated an informed, supported decision-making process. There were no other comparable services in the area and the Step By Step service filled a gap during the recovery phase of the fires.

The Step by Step Blue Mountains Bushfire Support Service was operational from November 2013 to August 2014 and while the DWS administered the joint Commonwealth/NSW Government funding for the majority of the service during its time, the last three months of operation were funded by the Uniting Church to extend the service delivery.

The need for evaluation

Disasters can have long-lasting effects on individuals and communities. The ability to recover depends on support from a range of services and can take many years. Emergency response plans and programs are designed to support individuals and communities through this recovery, however limited evidence exists as to how such service or programs help or hinder the recovery process (Dufty 2013). Although past evaluations have indicated that successful interventions employ social connectedness and community development, there is no consensus over which interventions result in positive outcomes (Grealey *et al.* 2010). Further, the role of government assistance in post-disaster intervention is not well understood, which indicates the necessity of governments to be 'evidence-informed' in implementing post-disaster community services (Grealey *et al.* 2010).

There has been a gradual shift from services using treatment-based approaches to respond to a disaster to an increase in community development and capacity-building approaches (Slawinski 2006). Many services adopt the solution-focused approach even though there is limited evidence on its effectiveness in disaster recovery and, generally, reports that have been created are descriptive or kept in-house. In Australia, there have been few evaluations of government-initiated interventions following a natural disaster made publicly available. One Australian post-natural disaster service evaluation was conducted in relation to the Victorian Bushfires Case Management Service (VBCMS) following the 2009 Victorian bushfires. Although the evaluation identified an overwhelmingly positive community response to the VBCMS, it also noted that 'the quality of the evidence available to guide governments and policy makers in responding to disasters is limited' (Grealey *et al.* 2009).

Given the potentially devastating impacts of disasters and the likelihood of future disasters, there is a need to evaluate and increase the evidence for the different models being used in order to improve government services that are implemented following a disaster. Dufty (2013) highlights the inconsistencies in current disaster program evaluation and recommends that a consistent, comprehensive, and timely approach to Australian post-event emergency management will improve learnings for future events and overall disaster resilience. Additionally having research integrated into disaster phases proves useful in collecting data and information on support services from establishment through to closure, thus capturing more complete data about the service and allowing for in-depth evaluation.

Conclusion

The Step By Step Blue Mountains Bushfire Support Service was a collaborative intervention effort between DWS and Gateway Family Services. This collaboration highlights the importance of joint efforts and that when government works with service delivery agencies, they can roll out effective support services for communities.

The next stage in this collaboration is to involve research into the process to evaluate the services, seeking feedback from those who used the service so that future programs will meet the expected needs. The DWS is leading the way in terms of incorporating research into disaster service evaluation, initially with the Warrumbungle Bushfire Support Coordination Service in 2013 (Coombe *et al.* 2015) and with an evaluation of Step by Step Blue Mountains Bushfire Support Service with the University of Newcastle Centre for Rural and Remote Mental Health. This integration of research supports the development of appropriate policies guiding the work of governments and service delivery organisations. Research and evaluation are essential to understanding bushfire preparedness and community wellbeing.

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A collaborative resource allocation strategy for hurricane preparedness for private, public and government sectors

Jessica Donaldson, Dr Enrique Campos-Náñez, Dr Thomas Mazzuchi and Dr Shahram Sarkani at The George Washington University show how using a mathematical model can assist planners prepare and respond to emergency events. ®

ABSTRACT

The number of natural hazards across the globe has increased over the last decade impacting communities, business operations and disaster recovery efforts (Leaning and Debarati 2013). Fast and effective recovery efforts minimise the consequences of natural hazard events. Relief efforts suffer from constrained budgets, high cost of resources and lack of an effective means to allocate those resources. Current resource allocation systems leverage state warehoused goods and appropriates products as needed, both during and after a disaster event. In some cases, services are outsourced to the private sector. In most cases, these processes do not include coordination across multiple sectors, which results in higher overall costs for goods and services. To improve the efficiency of relief efforts, collaboration between sectors is vital for effective planning and preparation. Research for this paper demonstrated potential improved outcomes that can be achieved in balancing the responsibility for resource distribution among sectors via a user-friendly mathematical model. The *Balanced Resource Allocation Model* (BRAM) assists planners to collaborate and balance resources among local public, private and government sectors during the 'pre-phase' of disaster recovery efforts.

Introduction

Impact-to-Life (ITL) is defined as the aggregate consequence of the lack of availability of resources on the lives of people experiencing a disaster. Minimising the ITL for recovery efforts is based on the immediate availability of resources such as water, food, shelter, transportation, medical care, sandbags and bleach. Distributing resources in a timely manner significantly reduces the threat to life and property damage.

This research introduces a method for balancing assistance among local public, private and government sectors. This can bridge the gap in identification of limited and abundant resources, thereby allowing other stakeholders a way to pre-plan the efficient distribution of needed supplies. This study used a dataset from *Hurricane Floyd* for 10 counties in the State of North Carolina as a scenario for inputs into the BRAM.

Enhancements in satellite imaging technology and refinements in meteorological simulation models provide experts with better tracking capability and allows them to predict the impact path of a hurricane. Nonetheless, despite forewarnings, significant challenges exist in the determination of the optimal allocation of resources both before and after a disaster in order to mitigate its impact (Maon 2009). Resource availability is either abundant or lacking and communication among public, private and government sectors can be hampered.

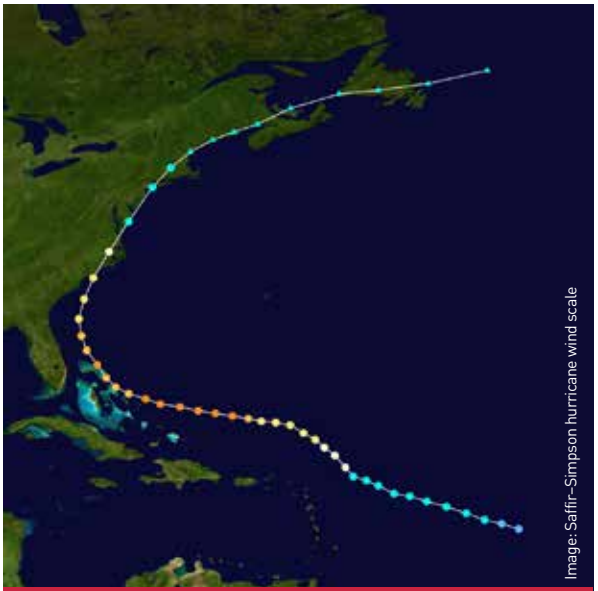
For example, in North Carolina during and after *Hurricane Floyd* in 1999, resources were not readily available for public distribution. This was attributed to the use of outdated map data for flood zone areas prior to *Hurricane Floyd's* impact (NOAA 2009). Seventy-five per cent of North Carolina's Flood Insurance Rate Maps were as old as five years (NOAA 2009). The use of these maps misled vendors to pick up supplies at wrong locations and resulted in significant delays in resource allocation. As a consequence the Federal Emergency Management Agency (FEMA) rigorously tailored the *National Preparedness System* documentation for multiple states, as well as for the District of Columbia and U.S. dependencies (Homeland Security 2011).

National preparedness systems

Good emergency preparation minimises ITL. In addition, adequate contingency planning is necessary to execute efficient resource allocation efforts. FEMA's *National Preparedness System* outlines: '...an organised process for everyone in the whole community to move forward with their preparedness activities and achieve the National Preparedness Goal.' (Homeland Security 2011). FEMA's preparedness system provides a greater focus on procedures and guidelines in written form (FEMA 2008). This study focuses on developing

Long Beach, North Carolina 1999. The devastating storm surge that accompanied *Hurricane Floyd* damaged or destroyed hundreds of houses along the ocean front and flattened sand dunes.

Hurricane Floyd off the coast of the U.S. in September 1999.



The track of *Hurricane Floyd* as it travels up the U.S. coast and intensifies.

contingency planning via mathematical models that provide solutions to resource allocation problems that can be used in real-time. For example, in the Hurricane Katrina After Action Report, survey respondents identified challenges in both location and facilitation of personnel procedures and a lack of effective coordination (Hoffman 2006).

Communication among internal or external sectors can be problematic because of the 'complexity and criticality' of organisations (Maiers, Reynolds & Haselkorn 2005). In addition, 'education, preparedness and training issues' still remain once the collaborative organisations are identified (Casey 2004). Emergency response budgets have decreased in certain areas. One example is the reduction in funding for the Centers for Disease Control and Prevention (CDC). Specifically, the Biodefense and Emergency Preparedness budget for 2014 lists USD $1.33 billion, which is a $48 million decrease from 2012 budget (Roos 2013). Furthermore, in some areas, food and other goods experienced price increases (Barbic 2015).

There are several disaster simulation applications similar to the BRAM; however the approach proposed here differs in several ways. The FEMA and the U.S. National Preparedness Directorate provide an inventory tool that is the Incident Resource Inventory System (IRIS). The IRIS is operated by the Preparedness-Technology, Analysis and Coordination Center. IRIS is an open source information resource allocation system and can share information with multiple agencies. The tool provides a variety of information to assist communities with resource availabilities. Some information includes disaster mission requirements, the availability of resources, and the associated delivery time. Unlike IRIS, BRAM uses an optimisation technique to balance resources among sectors using an optimisation technique commonly used in supply chain management.

Another disaster recovery system is the National Emergency Management Information System (NEMIS). The NEMIS system is used to connect communities with assistance after a disaster (FEMA 1998). Moline's decision framework for disaster recovery centre resource allocation and identified post-disaster improvements (Moline 2014) was also evaluated. Moline's approach is a data-driven technique for different types of resources using statistical analysis. The BRAM uses a mathematical optimisation approach. Other models studied were the Post-Disaster Needs Assessment (PDNA) and the Disaster Recovery Framework (DRF). The PDNA and DRF differ from the BRAM in that they identify processes and procedures for guiding multi-sector planning partnership (GFDRR 2014) while the BRAM focuses on the distribution of resources.

Communities engaged in disaster planning or recovery encounter different types of challenges. This requires collaboration of efforts for various hazards such as damage to levees (Galloway & Bronowicz 2006) and severely flooded counties, and for the distribution of resources to locations where they are needed most.

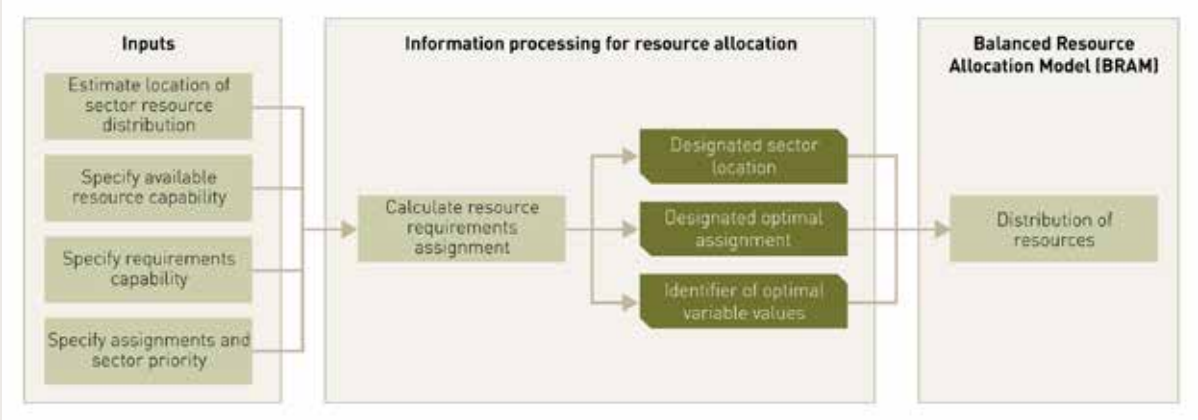


Figure 1: Resource distribution application approach.

In 2011, FEMA added new functions to the *National Disaster Recovery Framework* emphasising, 'Long-term environmental and cultural resource recovery needs after large-scale and catastrophic incidents' (Homeland Security 2011). This enhancement was introduced to solve cross-sector partnership problems by providing various levels of an organisation to share information and responsibility as necessary. Nevertheless, this new implementation is 'context-based' and lacks application mechanisms such as optimisation of resource allocation. In addition, the new implementation does not cover the contingency planning ('pre-phase') of multi-sector collaboration, or the lack of coverage, which is an important challenge in disaster planning. This paper provides a research model to solve this challenge.

Methods

This method provides an approach for solving resource allocation distributions while minimising ITL. Built into the approach is a way to systematically calculate resource allocation distributions. This study leveraged Baker's presidential disaster analysis declarations map data, covering the 33-year period from January 1965 to December of 1998 where flooding represented 45 per cent of the disaster declarations, followed by numerous severe storms estimated at 15 per cent (Homeland Security 2011). From Baker's analysis and data collected from *Hurricane Floyd*, several lessons were learned including the importance of digitising flood maps, identification of residential evacuation routes, and the creation of contingency planning mechanisms to identify resources. Lessons from *Hurricane Floyd* included the importance of updating flood maps and transformation of map data into a digital format allowing for easier identification of available evacuation routes for residences. This research shows that improved map preparation helps in the development of contingency planning mechanisms that assist to identify warehouse locations and potential cross-organisational collaboration. In this study, three organisations within various sectors were examined. These were the American Red Cross, Walmart, and the State of North Carolina Department of Public Safety Emergency Management. The study examined how resources are balanced among local public (American Red Cross), local private (Walmart), and local government (Department of Public Safety Emergency Management). Leveraging the application of the BRAM, it was hypothesised that the selected sectors and locations would significantly contribute to solving resource allocation challenges. The algorithms used in the input are flow-modeling techniques. This model focuses only on the 'pre-phase' of contingency planning and ignores the delivery time of resource distributions.

Figure 1 shows the use of the BRAM and the stepped approach to processing information.

The first stage in applying the BRAM consists of a user organisation identifying the inputs. This provides the assumptions for the BRAM calculations. The 'Estimate location of sector resource distribution' step involves authorities identifying locations of designated distribution sites. The 'Specify available resource capacity' step identifies the inventory of resources at each organisation. The 'Specify requirements capacity' step identifies and manages requests from potential causalities. The 'Specify assignments and sector priority' step identifies organisational priorities in chronological order of availability.

The 'Information processing distribution' stage begins after the requirements and resource specifications are defined and collected in the 'Input' stage. The determination of resource assignments, designated sector location(s), designated optimal assignment(s), and identified optimal variable values are processed in the 'Calculate requirement resource assignments' module. The 'Designated sector location' step is processed after resource requirements calculations are completed and a distribution location is determined. The 'Designated optimal assignment' step is processed after resource requirements computations are completed and assignment combinations are created. The 'Identified optimal variable values' step is processed after resource requirements calculations are

completed and priority variable values are chosen from the dataset. The 'Distribution of resources' step creates flows for resource distribution.

The scenario data used for this study was collected from *Hurricane Floyd* recovery efforts specifically, the resource quantities that were distributed to North Carolina communities. There were two scenarios in this research. Scenario one uses the BRAM, while scenario two is data from the actual distribution of resources. The evaluated counties are Beaufort, Brunswick, Camden, Carteret, Dare, Duplin, Hyde, Jones, Pender and Tyrrell. The evaluated resource types are blanket, bleach, comfort kit, cot, generator, packaged meal, plastic, sandbag, wash kit and water. The collaborating sectors are the local public sector (American Red Cross), local private sector (Walmart) and local government sector (State of North Carolina-Department of Public Safety Emergency Management).

Results

The BRAM data, using American Red Cross as the local public sector, Walmart as the local private sector and the North Carolina Department of Public Safety Emergency Management as the local government sector in charge of distribution of the above commodities to the affected locations was applied to the *Hurricane Floyd* scenario with results summarised in Table 1. The cost structure is based on item costs and the model optimising the distribution costs.

Table 1: Potential costs savings with balanced resource allocation.

Sector	Predicted Cost (BRAM) (USD)	Actual Cost (USD)	Potential Savings (USD)
Public Sector	$32 275	$461 353	$429 078
Private Sector	$94 849	$562 369	$467 520
Government Sector	$247 124	$357 429	$110 305
Total Cost	$374 248	$1 381 151	$1 006 903

The total cost computed was USD $374 248 using all three sectors. Specifically, local public sector total is USD $32 275, local private sector total is USD $94 849 and local government sector total is USD $247 124. If each organisation handled resource distributions independently the total cost would be USD $461 353 for local public sector, USD $562 369 for local private sector and USD $357 429 for local government sector. The BRAM approach provided a potential 91 per cent, 83 per cent and 31 per cent in savings for local public, private and government sectors respectively. This indicates that, based on the choices of resources and locations, balancing among organisation one, two and three will be the most cost-effective option in minimising ITL. Had this model been available, the local government organisation would have conserved resources by collaborating with local private organisations to supply the majority of blankets to Beaufort County. In addition, the local government organisation may have conserved resources by coordinating with the local public organisation to supply some of the sandbags to Dare County. In some instances, partnership in support of regional and national disaster relief efforts evolves into multiple frameworks. Teamwork efforts are then distributed accordingly in order to operate successfully (Haimes *et al.* 2008). Moreover, corporate and nongovernment organisation partnerships demonstrate economic techniques by collaboration (Damlamian 2006). Partnerships among sectors would improve efficiency.

Discussion and conclusions

This research is based on the *Hurricane Floyd* dataset and annual reports from FEMA (Homeland Security 2011), State of North Carolina Department of Public Safety Emergency Management (Latham 2013), American Red Cross (American Red Cross 1999), Walmart (Harvey 1999), the Census Bureau (NC Home Town Locator 2014) and the National Oceanic and Atmospheric Administration (NOAA 2009). This assumes that all sectors could outsource to other vendors to fulfil required needs. Additionally, this study presumes that people at designated resource locations (i.e. depots) will distribute the goods to local communities accordingly. The collection of data includes the amount of resources requested and distributed, resource type, and associated costs during *Hurricane Floyd*.

These allocation assumptions would be stressed if there was a need to support several emergencies within a short time period. This study offers a collaboration technique that emphasises depleting resources during hurricane recoveries within communities. Moreover, it saves money and resources. The model showed that the State of North Carolina could have saved some of its resources during the hurricane recovery efforts. Although this research focused on the 'pre-phase' of *Hurricane Floyd,* the formulation can be used to suit other disaster types as well as other phases of an event. It is recommended that future investigations alter the formula and introduce applicable data for other kinds of catastrophes such as earthquakes, tornados, typhoons, snowstorms, mudslides, floods and fires. In addition, the model is transferable to suit other government agencies, public and private organisations and events in other countries.

In order to minimise ITL and improve contingency plans for future emergency efforts, it is important to become familiar with the various resource locations. Collaboration between local public, private and government sectors is an essential part of preparing for recovery efforts. While implementing an integrated contingency plan adopted by various sectors can be cumbersome, each phase of a relief effort is critical. In this case the complexity could be limited

if the appropriate team is formed and a frequent and consistent dialogue between all sectors is arranged. FEMA's *National Preparedness System*, part four, is most relevant to this research area. Further upgrades and enhancements will improve current attributes and contribute to achieving the U.S. National Preparedness Goal[1].

The BRAM introduces a methodology for modeling the necessary resources that need distribution during and after an emergency event. *Hurricane Floyd* is only one scenario that demonstrates the model's utility. The model can be adapted to suit severe hurricanes and cyclones (category 1-5) by changing the input data. One of the model's limitations is the delivery time. This study focuses on contingency planning 'pre-phase' of hurricane response and did not evaluate delivery time that is usually identified in the 'during phase.' Although the model can be used to analyse all phases, phase-dependent alterations are required for each specific phase. This research indicates that appropriate contingency planning and knowledge of available resources will minimise the ITL.

Acknowledgement

The authors are obligated to the reviewers of this paper for their insightfulness.

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The influence of organisational culture on learning lessons: implementing a lessons management life cycle

Lisa Marie Jackson, Emergency Management Victoria, takes a life-cycle approach to capturing, analysing and sharing lessons in the emergency management sector. ®

ABSTRACT

This paper provides an overview of research into the management of lessons in the emergency management sector to identify what success looks like when implementing lessons management. This research included a literature review, an evaluation of Australian and international emergency services organisations lessons management implementation and case study focus groups of Country Fire Authority members in Victoria. A Lessons Management Life Cycle was developed that is currently being implemented by Emergency Management Victoria. The success of a lessons management life cycle relies on a strong lessons organisational culture. Organisations that display key characteristics of a strong lessons culture support lessons management and continuous improvement programs.

Introduction

There is currently a lot of work being completed around knowledge and lessons management in the Australian emergency management sector. Since the release of the *National Strategy for Disaster Resilience* in 2011 (Attorney-General's Department 2011), emergency services organisations have focused on a multi-agency approach to knowledge sharing. This multi-agency focus is working towards bridging a gap, where a lessons management process is yet to be proven to work for a sustainable period in emergency management and government contexts. (Boin *et al.* 2005, Gilpin & Murphy 2008). In addition, there are few pre-requisites required to enter into the emergency management sector. This has resulted in a dependence on an individual's previous knowledge rather than sector-wide understanding.

The influence of an organisation's culture on how it records, analyses and builds knowledge and manages its lessons can explain why organisations often struggle with implementing effective lessons management. There is a need for a holistic approach to ensure lessons can be captured and shared across emergency services organisations, government departments, businesses, industry, and the community. There is a sector-wide appetite to learn, improve performance, and support innovation in this area but siloes will remain if emergency services organisations continue to develop individual processes.

The research

This paper presents a model for lessons management for the emergency management sector based on research conducted in 2014. The research investigated lessons management methodologies and their application in emergency services organisations. The outcomes of this research were to provide the Country Fire Authority Victoria with recommendations on how to incorporate a lessons management life cycle to support behaviour change, future service delivery planning, and improve organisational performance. The research included:

- identifying existing literature and research on lessons management methodologies and implementation
- analysis of existing Australian and international emergency services lessons management methodologies and life cycles
- investigating the organisational lessons management needs and requirements through focus group discussions with Country Fire Authority (CFA) members as a case study.

Literature review

There is limited literature relating to lessons management implementation for the emergency management sector. The scope of this literature review included general lessons management literature and supporting organisational theories. The literature review focused on the most applicable and common elements of lessons management success. The purpose of the literature review was to identify key aspects of lessons management that are important for implementation, particularly for emergency services organisations.

Existing literature was selected based on criteria of success, relevance and significance. David Garvin's work in learning organisations was chosen because of its popularity and recognition within the emergency management sector, in particular, through its adoption by the United States Wildland Fire Lessons Learned Centre, one of the most widely known and used lessons management centres in emergency management. Many leading authors adopt, or are influenced by, Garvin's definitions and the learning organisation process of knowledge transfer (Huber 1991, Garvin 1993, Nasiatka & Christenson 2005).

Nick Milton's work in lessons learned and knowledge management supports Garvin's work and was chosen because it is highly influential in the emergency management context. Milton's 'learning loop' of identification, action and institutionalisation (Milton 2010) fits Garvin's definition of a learning organisation (Garvin, Edmonmson & Gino 2008). Milton has conducted extensive research and work in the lessons management field. His ability to translate complex concepts into digestible terms was desirable to build understanding and applicability for all CFA members.

The literature review provided an overview of what needs consideration and also the process to be undertaken including defining lessons management, cultural requirements, collection of lessons, analysis of lessons, and actioning lessons. The literature review identified some gaps particularly in areas that appear to be sticking points for lessons management implementation. These gaps are:

- a lack of lessons management literature focused on emergency management implementation
- lessons management cannot be accomplished in isolation of culture and change management
- lessons management is underestimated in its capacity to support the capturing and sharing of knowledge
- a lack of detail available on what monitoring and review is required as a component of the lessons management process.

Evaluation of emergency services organisations

The literature review was supported by the analysis of emergency services organisations that have, or are in the process of, implementing lessons management. Emergency services organisations that were evaluated include:

- US Wildland Lessons Learned Centre
- North Atlantic Treaty Organisation Joint Analysis and Lessons Learned Centre
- US Centre for Army Lessons Learned
- Emergency Management Australia, Australasian Fire and Emergency Service Authorities Council
- New South Wales Fire and Rescue
- New South Wales State Emergency Service
- Department of Environment and Primary Industries (now Department of Environment, Land, Water and Planning).

The evaluation of these emergency services organisations identified and supported a realistic process to be developed and implemented within a supportive organisational culture and governance. The lack of available literature has resulted in emergency services organisations adapting a range of literature, theories and learnings to build their own models. Organisations may also be trying to fix larger organisational issues by implementing lessons management. Therefore, inconsistencies exist in lessons management nationally and internationally.

Case study focus groups

The outcomes of the literature review and emergency services organisation evaluation established the characteristics of successful lessons management. These outcomes influenced the case study research and focus group discussions and were evaluated against the needs and requirements of the CFA members. The CFA is a statutory authority made up of approximately 60 000 volunteers and 2000 staff distributed across Victoria. The sampling undertaken to establish the focus groups was purposeful to ensure a cross section representation of the organisation and to allow the findings to represent the organisation as a whole. The three focus groups represented different sections of the organisation being corporate (CFA headquarters), metropolitan and rural.

The approach to forming the focus groups was consistent with Rabiee (2004) where three focus groups of six to eight participants each allows for meaningful discussion of simple research questions. Each focus group meeting lasted 1–2 hours. Questions addressed a range of topics including definitions, prior knowledge, processes, implementation and roles. The collected data was analysed using an inductive approach, based on Rabiee's (2004) key stages of the analysis continuum and Wilkinson's (2000) coding and clustering process. The data was interpreted using the seven criteria outlined in Rabiee (2004), which allowed the interpretation of relationships between quotes, ideas and links in the data. The focus group results were combined with the literature review and emergency services organisation evaluation to establish links between all the data and to identify themes. The validity and integrity of the findings were assessed through triangulation of multiple data sources and peer review. The most consistent themes were selected and built into the Lessons Management Life Cycle (see Figure 1).

Findings

The research investigated lessons management methodologies and their application by emergency services organisations. Three key areas were scope, culture, and process. These three areas are represented in the Lessons Management Life Cycle in Figure 1. The scope of lessons management is

displayed in the life cycle by the use of a magnifying glass around the process. Cultural characteristics are identified in the life cycle as people pushing cogs. The components that make up the lessons management process are displayed on the cogs.

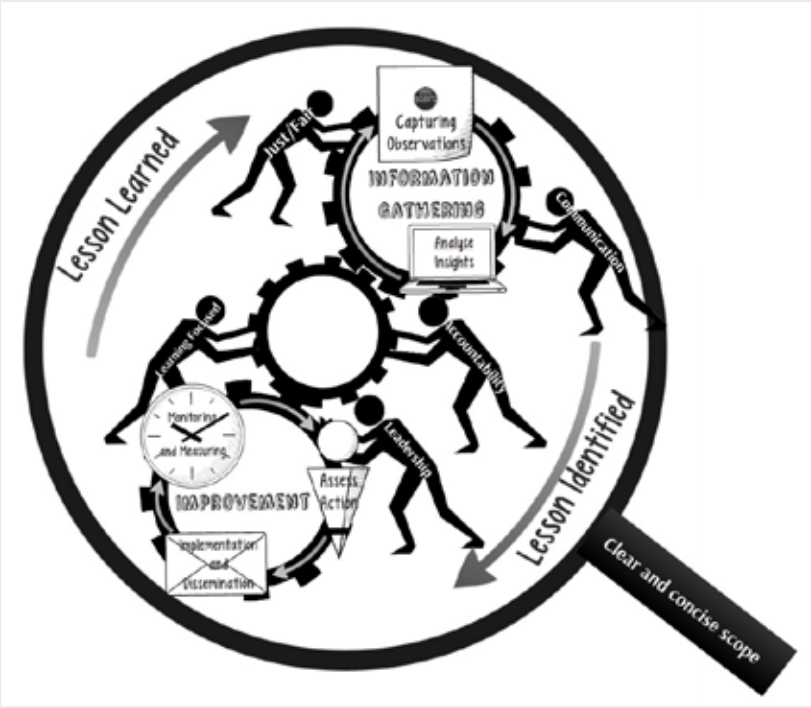


Figure 1: Lessons Management Life Cycle (Jackson 2014).

Clear and concise scope

The literature, emergency services organisation evaluations and focus group discussions identified the need for a comprehensive understanding of the role of lessons management within an organisation and awareness of the definitions, objectives and the scope. Consistent with the existing literature, this helps establish clarity of roles, responsibilities and accountability (Attorney-General's Department 2013, Elliot 2009, Newman 2007). Due to the lack of definitions relating to lessons management in emergency services organisations, definitions from key lessons management literature were used to inform research findings and the resulting recommendations for implementing the life cycle.

Clear definitions of terms are critical to successful lessons management. A definition of lessons management applicable to CFA was developed using literature review data and tested during this research. Focus group members provided descriptive words and statements representing their understanding of the term. Focus group discussions indicated that the researcher's definition captured the participant definitions and was a good representation of lessons management for the CFA. As a result, the definition of lessons management was confirmed as 'the management of a continuous learning cycle where capturing, analysing and implementing lessons, occurs without barriers and results in measurable behaviour modification' (Jackson 2014).

In addition to definitions, the research highlighted that successful lessons management requires connections to be identified between all areas within organisations and clear responsibilities in organisational structures identified. Lessons management requires a team and a 'home' within organisation structures. One focus group participant said,

> *'it needs a team and it needs a home, there's a lot of people doing a lot of stuff on goodwill with organisational value and stuff like that, but it doesn't live anywhere. So if you are going to do this then do it and this is your job'.*

Establishing these structures and connections early will assist the implementation of lessons management by encouraging engagement, ownership and accountability.

Culture

The literature review identified that organisational culture is the foundation of an organisation. The literature, the evaluation of the emergency services organisations, and the focus group discussions highlighted a number of cultural characteristics within an organisation required for successful lessons management. These included 'just/fair', 'leadership', 'accountability', 'communication' and being 'learning-focused'. Without all of these characteristics working together within the process outlined in the Lessons Management Life Cycle, lessons management will not be successful. The life cycle includes these cultural characteristics that support lessons management as the words on the people pushing the process cogs. These are not in any particular order but are all required for lessons management to be a success.

'Just/fair' was a significant cultural characteristic identified in the literature, in the emergency services organisations evaluation, and was discussed in the focus groups (Attorney-General's Department 2013, Bennett 2000, Bos *et al.* 2008, Elliott 2009, Garvin 1993, Milton 2014). The focus groups discussed the need for a no-blame or just/fair culture. One focus group participant said,

> *'I think we are scared to put stuff out there and I think potentially, staff or volunteers, are worried they are going to upset someone so I think that's why we don't put it out there'.*

Consistent with the literature (Attorney-General's Department 2013, Elliott 2009, Safety Institute of Australia 2014), the term 'just/fair' has been adopted to describe this cultural characteristic rather than 'no-blame'. This was due to organisations trying to implement no-blame based on face value. 'Just/fair' describes the balance between no-blame and accountability in that the organisation accepts the fact that people may make mistakes but those who participate in reckless behaviour are held accountable. This characteristic requires training, education and endorsement from senior leadership to support the adoption of a 'just/fair' culture.

The focus group discussions and the literature highlighted that leadership within lessons management requires accountability, ownership and appropriate behaviour modeling by senior management. People in leadership need to promote, enforce and prioritise lessons management throughout their organisation as a business-as-usual function (Attorney-General's Department 2013, Milton 2009).

The lack of accountability was an issue experienced by a number of focus group participants. Accountability must include actions to be allocated to individuals or teams and for these actions to be prioritised (Garvin 2008, Milton 2009). The focus group discussions highlighted the importance of all members being aware they have a role to play in lessons management, even if it is primarily submitting observations to ensure the organisation maximises learning opportunities. The literature identified that leadership and accountability are complimentary characteristics and if one is not successfully occurring the other will be absent. These two critical components are both represented in the life cycle to ensure they are included in implementation.

Communication was identified as a key theme throughout the focus group discussions and within the literature. One of the main issues experienced by the participants was the lack of communication once they had contributed to lessons management activities, particularly in relation to what had happened with their information and if any changes had occurred. The 'black hole effect' was discussed frequently by focus group participants,

> *'...closing the loop is such a simple concept. We never ever close the loop. It leads to a lack of interest. There's nothing worse than putting a lot of time into something and it going into a big black hole and never getting anything out, its demoralising'.*

There is a need for transparency and communication throughout the process. By specifying exactly what people should expect throughout a lessons management life cycle, particularly in regard to their contributions, people will be informed, can better understand, and have balanced expectations.

A learning-focused organisation requires active involvement in continuous improvement. Garvin (2008) identified a supportive environment, clear processes and leadership support as essential for a learning organisation. Part of this focus on learning is the importance of improvement. The purpose of lessons management is to improve the knowledge base of the organisation and ensure the organisation makes evidence-based decisions, minimises mistakes, and promotes positive behaviours and initiatives (Glassey 2015).

Lessons management life cycle process

The Lessons Management Life Cycle in Figure 1 is a process of capturing observations, analysing insights, identifying lessons, assessing action, implementating and disseminating, monitoring and measuring, and lessons learned. The most important aspect of the cycle is that it is continuous and includes two sub-cycles:

- The information gathering cycle includes capturing observations and analysing insights.
- The improvement cycle begins when a lesson is identified. The lesson is then assessed for required action, which may include allocating actions or determining that no action will be taken due to limited reward. Once this step is completed, implementation of the action occurs (or communication occurs that the lesson identified will not be actioned). Dissemination of the action or product resulting from the lesson identified and communicating these will then occur. Finally, monitoring and measuring continues until improvement or behaviour change occurs and the lesson identified can be successfully classified as a lesson learned.

The first stage of the life cycle involves the capturing of observations. Although this stage heavily involves the use of tools and techniques, the most important aspect for CFA members was a clear, consistent, understandable and accessible process to ensure members know what is expected and what will occur once the information is submitted (Garvin 1993, Garvin 2008, Milton 2010). The focus groups reported that the level of involvement in learning processes is slowly decreasing due to lack of motivation. This is due to it appearing as though the information is not being used or, if it is resulting in change, this is not being communicated to them

The second stage of the life cycle involves analysing the captured observations and identifying insights. Analysis can involve root cause, theming, and identifying trends. This stage is especially important because it identifies that not every observation will become an insight and every insight may not become a lesson identified. Therefore, the information gathering cycle will continue until a lesson is identified, also providing a filter for low-risk observations. Communication is important to ensure the members contributing the data are aware of what has happened with it. By managing expectations, members understand that some observations may remain as a single observation for a significant amount of time and may never become an insight or lesson identified (Attorney-General's Department 2013, Newman 2007).

Once a lesson is identified, the next step is to establish what action will occur. There are two options at this point. The organisation accepts the risk of the identified lesson because there is not enough reward for implementing change, or an action is allocated to an individual or team. Accountability and leadership are important at this stage to guarantee that when actions are identified they are allocated, prioritised and implemented within a reasonable timeframe. The literature highlights the need for establishing responsibilities for actions and the process for escalating actions that are not progressing (Milton 2009, Milton 2010, Attorney-General's Department 2013).

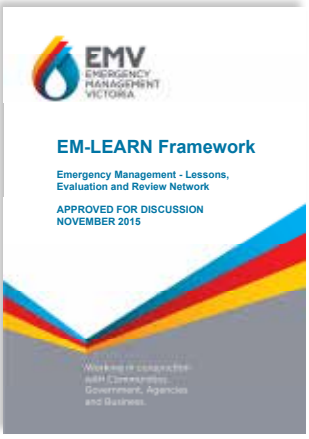
Implementing identified actions and disseminating the outcomes is the next component of the life cycle. This ultimately requires communication to ensure that members are informed of the outcomes of their contributions and can access any learning products. The literature identified that a clear and holistic process is required at this point to allow the organisation to implement the outcomes (Attorney-General's Department 2013, Newman 2007).

Monitoring and measuring was the least detailed area within the literature and during the focus groups. This is a significant gap because it is here that a lesson identified can become a lesson learned (a term often used incorrectly and interchangeably with lesson identified). Although this area appears neglected within the research, the small amount of literature specifies that monitoring and measuring activities need to be built in from the outset to ensure it is a key component of lessons management. It also states monitoring and measuring should include regular reporting and communication on compliance, activity and output. In particular, reporting against success criteria identified in an implementation report and results being shared widely to ensure communication and engagement. In addition to regular reporting, the literature and focus group discussions identified exercising, training and operational activity as also providing valuable information about behaviour change as a result of implementation (Attorney-General's Department 2013, Milton 2010).

Application

The research identified components and characteristics that ensure findings are transferrable to other emergency services organisations. The identified barriers and issues experienced by CFA members in this study, the findings and the life cycle itself are applicable for all emergency services organisations. The cohort of CFA members in this research is broadly representative of many volunteer-based emergency services organisations across Australia. Findings from this case study could be extended to other non-volunteer emergency services organisations, government departments and emergency management partner organisations. Further research may find application for non-emergency services organisation contexts (e.g. military domains). Commonwealth documents, including the Attorney-General's Department Handbook (2013) have a direct influence on the research and findings, ensuring that the life cycle and recommendations are consistent with these documents and applicable to other Australian emergency services organisations.

The research identified a lack of successful models for lessons management within emergency management internationally that are sustainable and proven over time to address social and institutional memory loss. There is currently an opportunity to progress the way emergency services organisations learn from events, improve practices and change behaviour improving safety and capturing knowledge. Emergency Management Victoria is using the research described in this paper to develop lessons management within the Victorian emergency management sector. The project deliverables include a lessons management framework, process and IT system that support the implementation of a successful lessons management life cycle.



In November 2015, Victoria's first lessons management framework was approved for discussion. The Emergency Management – Lessons, Evaluation and Review Network (EM-LEARN) Framework establishes a model for lessons management, based on the research in this paper and extensive stakeholder engagement. The framework includes a life cycle that provides cultural characteristics and a lessons-management process for implementation. The framework was developed through stakeholder engagement over 12 months, including over 70 meetings with 25 agencies to identify good practise, understand the sector's requirements and share the lessons management research. The framework supports the Monitoring and Assurance Framework for Emergency Management developed by the Inspector General – Emergency Management by detailing a culture and common process for continuous improvement.

How lessons management is being implemented for operational activities as an initial test of concept is outlined within the framework. The framework will also be applied to non-operational activity in the future, including project management. The operational lessons management process was piloted during the development of the *Emergency Management Operational Review 2014-15* (now on the website at www.emv.vic.gov.au/our-work/review/emergency-management-operational-review/).

This report is a summary of the operational activities undertaken by emergency management personnel over 2014–15 supports the continuous improvement of the sector by sharing lessons. This provides a broader

focus of year-round, multi-hazard, all-phases, and multi-agency. Part 1 is an overview of the weather and emergency management activities carried out during the 2014–15 financial year and a set of 11 case studies that demonstrate the variety of emergencies managed by emergency management personnel. Part 2 provides insights based on observations from emergency management personnel regarding the management of Class 1 emergencies.

An implementation plan accompanies the framework focused on five areas for action, being governance, communication, process, training and technology.

- A governance structure will be established to support the cultural characteristics and life cycle to ensure the lessons management process is transparent and functional.
- Communication will occur throughout implementation of the framework and throughout the lessons management process to ensure all members can access required information and expectations are managed.
- The process of capturing, analysing and implementing lessons will be implemented through a clear governance structure and communication plan.
- Training and education will be used to build confidence and engagement in the process. To support the development of clear expectations and roles and responsibilities, members will be trained on the tools, techniques and concepts.

Due to the complexity of the multi-agency emergency management environment in Victoria, there is a need to establish a lesson-sharing platform to support learning and the lessons management life cycle. This technology is the last component of a comprehensive change process to facilitate learning and improvement across the sector.

The long-term vision of the project is for lessons management to support processes and activities in all hazards, all phases, all agencies and all levels. Throughout implementation of the project, the life cycle will be evaluated and adjusted to meet the needs and requirements of the sector. This will ensure lesson capture and that analysis and implementation is sustainable and contributes to continuous improvement in the sector therefore supporting the vision of 'safer and more resilient communities'.

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Centralised coordination of spontaneous emergency volunteers: the EV CREW model

Dr Blythe McLennan, Julie Molloy, Dr Joshua Whittaker and Professor John Handmer, RMIT, Bushfire and Natural Hazards CRC and Volunteering Queensland present a best-practice model for coordinating spontaneous volunteering. ®

ABSTRACT

This paper presents a case study of Emergency Volunteering - Community Response to Extreme Weather (EV CREW). EV CREW is a best-practice model for centrally coordinating spontaneous volunteers who respond during emergencies. The model was developed by Volunteering Queensland, a not-for-profit organisation and the peak volunteering body in Queensland. The case study outlines the EV CREW model, with particular attention on intended outcomes for community resilience and emergency management. It presents spontaneous volunteering as an empowering and legitimate component of recovery and resilience and, when coordinated appropriately, it adds value to recovery, is rewarding for volunteers, and reduces associated risks for volunteers, recipient organisations and communities. It also emphasises that central coordination does not replace traditional emergency management volunteering nor informal helping behaviour and emergent volunteerism. Instead, models like EV CREW extend existing emergency management arrangements to increase the variety of ways available for people to contribute to emergency management and disaster recovery.

Introduction

Spontaneous volunteers are:

> *'those who seek to contribute on impulse—people who offer assistance following a disaster and who are not previously affiliated with recognised volunteer agencies and may or may not have relevant training, skills or experience'*
> (Cottrell 2010, p. 3, Australian Red Cross 2010).

Spontaneous volunteers may be associated with a formal organisation or they may be involved in informal and emergent volunteerism where people work together towards shared goals (Drabek & McEntire 2003) but in less formal ways that 'typically lack formal elements of organisation' (Whittaker, McLennan & Handmer 2015). They tend to be motivated by an immediate desire to help (Cottrell 2010), and to engage in shorter, fixed-term activities. They may or may not be involved in volunteering in an ongoing way outside the immediate emergency context or with organisations (Barraket *et al.* 2013).

Notably, until recently, government authorities have tended to overlook spontaneous volunteering when planning, and to regard them as an unpredictable and uncontrollable nuisance and risk rather than as a legitimate part of response and recovery (Helsloot & Ruitenberg 2004, Scanlon, Helsloot & Groenendaal 2014). Yet research shows that spontaneous volunteers contribute significantly to a range of important activities in the immediate aftermath of a disaster, including search and rescue, first aid, and the assessment of community needs (Whittaker, McLennan & Handmer 2015). As the International Federation of Red Cross and Red Crescent Societies have emphasised, 'the success of relief efforts by those spontaneously offering their help depends on the capacity of agencies and authorities to integrate them quickly and effectively into a coordinated strategy' (IFRC 2001, p. 146).

Spontaneous volunteers also significantly challenge more traditional models of volunteer management. These models were designed for a traditional style of volunteering that involves 'a lifelong and demanding commitment' to an organisation, and is underpinned by 'traditional' altruistic values and devotion to community service (Hustinx & Lammertyn 2003, p. 168). This is the style of volunteering that emergency services organisations have typically sought to develop in the past.

While people have always converged on disaster sites to help response and recovery activities (and also inadvertently complicate recovery operations) (Whittaker, McLennan & Handmer 2015, Fritz & Matthewson 1957, Kendra & Wachtendorf 2003), spontaneous volunteers are, in many respects, a non-traditional form of emergency volunteering. Compared

to traditional volunteering styles, non-traditional forms of volunteering are, in general terms, more diverse, individualised, technology-enabled, autonomous, short-term, and less-formally structured (McLennan, Whittaker & Handmer 2015, Hustinx & Lammertyn 2003). Non-traditional forms of volunteering are on the rise, largely driven by changes in the nature of paid work, lifestyles and values in the 21st Century, as well as the revolution in new technology, among other things.

EV CREW is a best-practice example of a non-traditional management model developed for a non-traditional form of volunteering in a disaster context. This paper outlines the EV CREW model with a particular focus on intended outcomes for community resilience and emergency management. This case study is timely. Interest is increasing within Australian emergency management in spontaneous volunteering and a *Spontaneous Volunteer Strategy* was recently endorsed by the Australia-New Zealand Emergency Management Committee (ANZEMC 2015). Significantly, the EV CREW model operationalises many of the proposed objectives, principles and actions outlined in the *Spontaneous Volunteer Strategy.*

The case study presented here is small in size and based on three main sources of:

- personal knowledge and reflections of the second author who has coordinated EV CREW since 2010
- volunteering Queensland reports
- key informant interviews with three stakeholders involved in the development and operation of EV CREW.

The EV CREW model is explained as well as the intentions and experiences of those who developed it. The case study does not evaluate the strengths and weaknesses of the model, but documents it to share some of the learning and experiences of those closely involved with it. Additional interviews are planned that will examine outcomes of EV CREW from the perspectives of its external stakeholders.

Emergency Volunteering CREW

EV CREW was developed during a time of transition for Volunteering Queensland in late 2007 and early 2008. At this time, the organisation shifted away from a focus on supporting more traditional community-sector volunteering towards a wider view of generating better ways for people to tap into diverse and non-traditional forms of volunteering.

As a part of this shift, Volunteering Queensland engaged with the emergency management sector in Queensland, particularly through the State Community Recovery Committee (now the Human and Social Recovery Group) to explore how it could add value in that area. At this time a change of CEO brought in experience in disaster recovery from Australian Red Cross. He recognised a loss of social capital following *Cyclone Larry* in 2006 when large numbers of offers of assistance from the public were turned away by established emergency services organisations. This experience and collaboration with the State Community Recovery Committee created a new direction for Volunteering Queensland. It took on a formal role within the Queensland disaster management arrangements[1] as the lead organisation for managing offers of assistance from the public. The development of EV CREW was a significant part in realising this role.

The model

EV CREW is adapted from the business model of a recruitment agency. It involves Volunteering Queensland registering offers to volunteer from the public and live-matching registered people to specific requests for volunteers from organisations that support communities during and after disaster. Within this simple model, Volunteering Queensland has active roles as facilitator and broker as well as coordinator (see Figure 1).

Core EV CREW services are provided directly to potential and referred volunteers on one side, and recipient organisations on the other. Volunteering Queensland also provides a range of supportive services. The core services are provided by paid Volunteering Queensland staff and by a large pool of support volunteers who are trained to operate and support EV CREW. Almost 800 support volunteers have been trained to date.

For volunteers

Volunteering Queensland engages and educates people who are registered for, or interested in, volunteering both during and outside of volunteer campaign times (i.e. when volunteers are being actively matched to opportunities). Registrations of interest in emergency volunteering are taken over the phone, online through the Emergency Volunteering portal (www.emergencyvolunteering.com.au), and via the ReadyQld smartphone application (www.emergencyvolunteering.com.au/home/disaster-ready/menu/emergency-smartphone-app). Volunteering Queensland accepts both individual and group registrations and the service takes registrations at any time. Once registered, people are supported to participate in emergency volunteering with information on emergency management processes, specific volunteering opportunities and conditions, and volunteer rights and responsibilities.

Volunteer matching and referral is an active and labour-intensive process undertaken by staff and large numbers of trained volunteers assisting Volunteering Queensland. The matching and referral process is initiated by a request from a registered organisation. EV CREW operators first identify potential volunteers registered in its database who are appropriately skilled, located and available for a specific role. Volunteers are contacted via phone and email to let them know about the volunteering opportunity, secure their interest, and refer them to the recipient organisation. Once

1 Queensland disaster management arrangements. At: www.disaster.qld.gov.au/About_Disaster_Management/DM_arrangments.html.

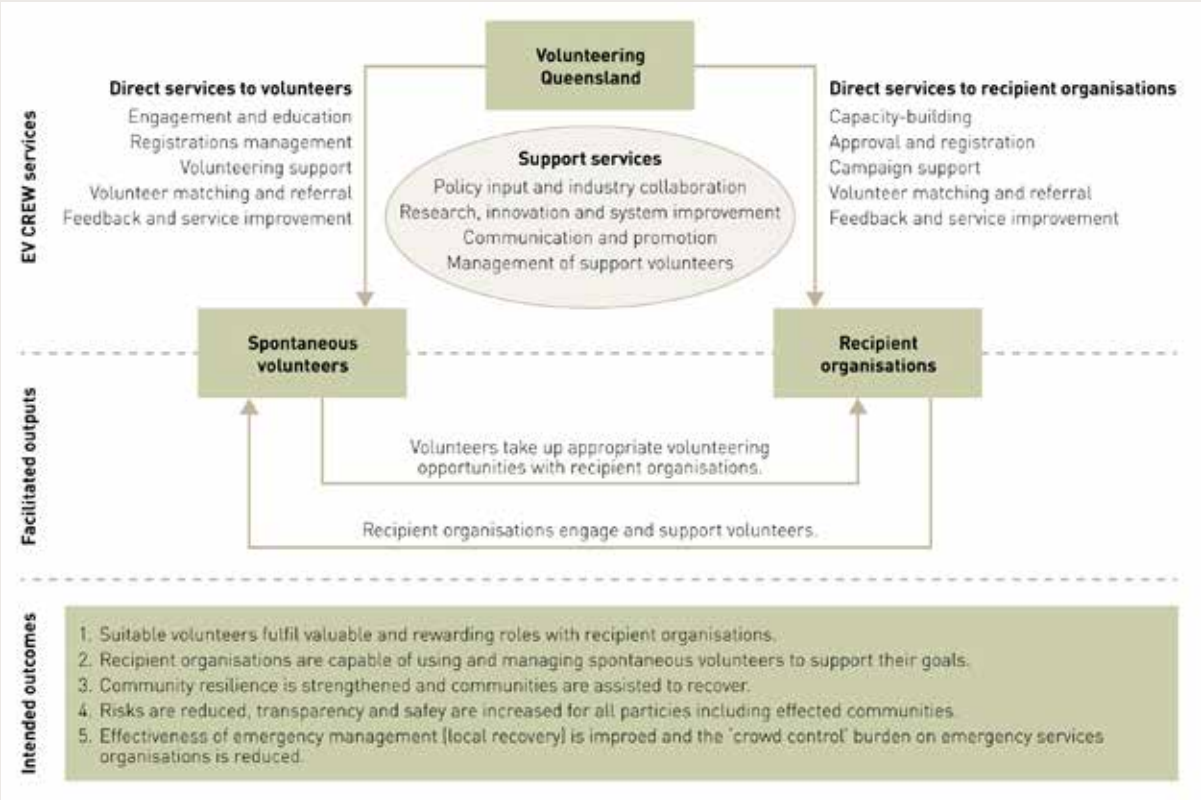

Figure 1: The Emergency Volunteering CREW model.

volunteers have concluded their volunteering role, they are asked for formal feedback about their experiences. This informs improvements to the system and the support offered to recipient organisations.

For recipient organisations

Volunteering Queensland provides important capacity-building support, for example through one-on-one, over-the-phone advice and assistance with all aspects of managing spontaneous volunteers, as well as with developing and undertaking volunteering opportunities. It approves and registers organisations to receive volunteers, provides support during their volunteering campaigns, and actively seeks out, recruits and refers volunteers to them. Registered organisations must satisfy Volunteering Queensland that they have appropriate volunteer support in place, for example, induction and insurance, as well as having well-designed and rewarding volunteering opportunities available that are sensitive to local needs and conditions.

Important exclusions to EV CREW's core services are volunteer insurance, workplace health and safety, and volunteer induction, which are provided to volunteers by the recipient organisation. Also monitoring and compliance of recipient organisations, is beyond the capacity of a small non-profit organisation.

Outputs of EV CREW

There are two main outputs of the EV CREW model, shown in Figure 1. Volunteers take up appropriate volunteering opportunities with recipient organisations and recipient organisations engage and support spontaneous volunteers to assist communities during and after an emergency event or disaster.

To this end, EV CREW has been activated for the following major events in Queensland:

- 2008 – The Gap storms, North Brisbane
- 2010 – Coal ship grounding on Douglas Shoal, off Rockhampton
- 2010–11 – Queensland floods, Brisbane
- 2011 – *Tropical Cyclone Yasi*
- 2013 – *Tropical Cyclone Oswald* and associated flooding and landslides
- 2014 – ex-*Tropical Cyclone Ita*
- 2014 – super storm cell, Brisbane
- 2015 – flooding in the Tablelands Region
- 2015 – *Tropical Cyclone Marcia*
- 2015 – floods, south east Queensland
- 2015 – explosion, Ravenshoe Café, Ravenshoe.

Of these, the 2010-2011 Queensland floods, in particular the floods in Brisbane, was a standout event for EV CREW in terms of scale as well as the testing and refinement of the model and processes used. Overall, EV CREW managed approximately 120 000 registrations in response to this event. Of these, 86 000 were unique registrations from Queensland. It is worth noting that people's enthusiasm to offer help led many to register multiple times, with registrations received from all states and territories of Australia as well as almost every country in the world. A conservative estimate of volunteers referred to organisations to assist with post-flood clean up, primarily the Brisbane City Council, is around 23 000. These referred EV CREW volunteers formed a part of the massive volunteer post-flood clean-up effort that came to be known in the media as the 'Brisbane Mud Army'. Notably, the Mud Army also consisted of significant numbers of people informally helping family, friends and neighbours, as well as people who answered a call from the Brisbane Mayor to turn up to four coordination centres on two dedicated weekends to assist with the clean-up (Rafter 2013). Brisbane City Council estimates that over 50 000 people volunteered on the first of these weekends alone (Rafter 2013).

As at 30 June 2015, there were almost 82 000 individuals and groups registered with EV CREW as potential volunteers. This is a live database and the numbers change daily. All of these people are contacted to update their registration at least twice a year to ensure their interest in volunteering is current.

Also at this time, there were 72 organisations registered to receive volunteers (Table 1). They have provided over 128 discrete volunteering opportunities and received more than 32 000 volunteers through EV CREW (bearing in mind that a large majority were referred for Brisbane flood clean-up in 2011). Over half of the registered organisations are not-for-profit organisations, such as Australian Red Cross, Habitat for Humanity and Conservation Volunteers Australia. Smaller community groups registered with EV CREW include sporting clubs, community and relief centres, and neighbourhood houses.

A resident walks through flood waters in the suburbs of Brisbane in 2011.

Table 1: EV CREW volunteer opportunities and estimated referrals by type of recipient organisation, as at 30 June 2015.

Group	Number registered	Volunteer opportunities offered	Volunteers referred
Community groups*	15	13	146
Emergency management agencies	2	4	23
State government	4	2	115
Local government (Brisbane City Council)	9	30	28 212** (25 000)
Non-profit organisations	41	78	3967
Schools	1	1	80
TOTAL	**72**	**128**	**32 543**

(Source: Volunteering Queensland)
*This category includes a number of small, family-run businesses that received volunteers in 2011 only.
**This figure includes estimated numbers of volunteers referred to Brisbane City Council and other organisations in response to the 2010-2011 Queensland floods.

Outcomes of EV CREW

More broadly, there are five intended outcomes of the EV CREW model reported by internal stakeholders and Volunteering Queensland (see Figure 1).

- Spontaneous volunteers undertake valuable and rewarding roles. By connecting people with approved and registered organisations, EV CREW volunteers are confident that their efforts are contributing to recovery in a direct way than might be possible through well-meaning but less informed and coordinated opportunities.
- More disaster recovery organisations (including not-for-profit organisations and community groups working in relief and recovery) develop capacity and experience in using and managing these types of volunteers effectively and safely. Through EV CREW, disaster recovery organisations benefit from Volunteering Queensland's expertise in volunteer management and engagement and its experience with coordinating spontaneous volunteers. This is provided through one-on-one provision of advice as well as through the provision of certified training in volunteer management. This is in addition to access to the pool of registered volunteers and the matching and referral services. Volunteering Queensland also builds capacity to manage volunteers through developing and trialling innovative tools and systems that are shared with other organisations.

The clean-up at Bundaberg with help from the 'Mud Army' following *Cyclone Oswald*.

- Community resilience is strengthened as matching volunteers is undertaken so volunteers are as local as possible to foster local social connectivity and cohesion. Stakeholders reported that the EV CREW model can assist the psychosocial recovery of both volunteers and those who receive their assistance by offering an important avenue for people to express their willingness to help and support each other. This is supported by research by Barraket and colleagues (2013). Resilience is also strengthened by educating people about disaster risk, community resilience and emergency management. EV CREW engages with registered volunteers about these issues with tailored communications provided through its emergency volunteering website (www.emergencyvolunteering.com.au).
- All parties involved, including communities affected by disaster, have reduced risk and greater transparency. Much spontaneous volunteering undertaken without association with a formal organisation occurs without incident. However, some level of basic coordination by a local government, not-for-profit or community organisation can significantly reduce risks to volunteers, communities and recipient organisations, as well as to the emergency effort. For example, EV CREW stakeholders cited numerous cases where Mud Army volunteers who were not centrally coordinated had inadvertently created harm or distress to other people, themselves or other volunteers, or caused damage to people's property. Examples include throwing out possessions that were valued and salvageable, inadvertent property damage due to lack of relevant knowledge, and unsafe asbestos removal. EV CREW reduces such risks by linking volunteers to recipient organisations that provide volunteer induction, health and safety briefings, and on-site coordination of activities. These organisations also have knowledge of local conditions and needs.
- Improvements in the effectiveness of the emergency management effort, particularly in local-level recovery, are delivered as well as a reduction in the 'crowd control' burden on emergency services organisations. EV CREW supports disaster recovery organisations to make use of the skills and resources that exist locally. This helps increase the surge capacity in times of need so they can focus their resources on the emergency response. This is particularly the case for larger and highly-publicised events (Whittaker, McLennan & Handmer 2015). There is also potential for EV CREW to bridge the gap between when people offer to assist (in the days immediately following an event) and when help is most needed (in the weeks, months or years afterwards) (Cottrell 2010). It does this through ongoing engagement activities with registered volunteers. A survey of people who registered with EV CREW following the 2010-11 Queensland floods found that the majority were volunteering for the first time (Barraket *et al.* 2013, p.18). Some of these first-time volunteers may go on to become regular volunteers.

Challenges and risks

Challenges and risks faced by Volunteering Queensland in delivering EV CREW services, as reported by stakeholders, were in four areas:

- engaging with volunteers
- engaging with recipient organisations
- integrating with the formal emergency management system
- managing internal organisational risks related to funding and liability.

Volunteering Queensland's capacity to engage with volunteers has increased considerably since it adopted a cloud-based client relationship management software system in 2011. This system has greatly improved Volunteering Queensland's capacity to manage and monitor its registrations, communicate with large numbers of potential volunteers, and manage volunteer matching.

A significant challenge was people's lack of knowledge about emergencies and emergency management processes. In response, Volunteering Queensland developed a number of communication tools to help

educate people.[2] Another challenge was managing the passionate but sometimes inappropriate offers of assistance, and the psychosocial needs of traumatised callers. Call scripts have been developed to support staff and volunteers to manage this but more work is needed in this area.

Managing the expectations of recipient organisations of their roles and those of Volunteering Queensland is a challenge, as is dealing with the varied volunteer management capacity and experience of organisations. A final important challenge is encouraging organisations that are more used to traditional volunteer management to rethink the role of volunteers in their organisation, and the potential contribution of spontaneous volunteers.

Challenges were faced in integrating EV CREW, and the central coordination of spontaneous volunteers more broadly, with the existing emergency management system. While collaboration with the State Human and Social Recovery Group as well as the Local Government Association of Queensland has advanced this integration, challenges remain. These relate to the culture change required within the established emergency management system to support more non-traditional volunteering (e.g. from a command-and-control culture to a more cooperative, resilience-based one), and better delineation of roles and working relationships.

Risks identified with the EV CREW model stem from the actions of recipient organisations that are unfamiliar with spontaneous volunteering. They included the risk of poorly-managed or ill-conceived volunteering opportunities turning people away from volunteering, small community-based organisations becoming over-burdened or overwhelmed during an emergency event, and volunteering opportunities running counter to either formal emergency management processes or local community needs. Notably all of these risks are reduced through the services offered by Volunteering Queensland. Volunteering Queensland itself lacks funding for EV CREW services and there is a lack of clarity around its liability as the coordinating organisation.

Discussion

Experience with implementing the EV CREW model raises important questions—as well as provides some answers—about the appropriate place for spontaneous volunteers within Australian emergency management, and about the role of not-for-profit organisations in this area (Fitzpatrick, Molloy & Haigh 2014). Non-traditional forms of volunteering present challenges for existing emergency management processes (e.g. Sauer *et al.* 2014, Fernandez, Barbera & van Dorp 2006). However, when system changes are made that integrate them appropriately, they have potential to improve the effectiveness of emergency response and recovery and strengthen community resilience. EV CREW is an important Australian model for doing this and it has been used in multiple situations. Appropriate coordination of this form of volunteering can lead to more rewarding volunteer experiences and reduce a range of risks for those involved. Importantly, the EV CREW model acknowledges that spontaneous volunteering is a legitimate component of disaster recovery and resilience activities. A similar view is seen in sociological research on citizen responses to disasters, which shows that spontaneous and emergent volunteering is inevitable, normal, and brings benefits to disaster recovery such as increased surge capacity, awareness of local needs, innovation, adaptability, and speed (Fernandez, Barbera & van Dorp 2006).

The role Volunteering Queensland has filled in developing and managing EV CREW suggests that not-for-profit organisations, particularly volunteering peak bodies, have a significant part to play in Australian emergency management. Indeed, their role is already expanding. With strong support from Volunteering Queensland, other volunteering peak bodies are in various stages of adapting the EV CREW model for use in other Australian jurisdictions, most notably in the ACT, Tasmania and Victoria. This shows an expanding role for these organisations as brokering agents between the more formal, structured response to emergencies by established emergency management organisations, and the more informal, emergent response by the public (Fitzpatrick, Molloy & Haigh 2014). This case study shows how not-for-profit organisations value-add to the emergency management process by bringing new perspectives, expertise and experiences.

This EV CREW case study shows that central coordination of spontaneous volunteers does not replace traditional emergency management volunteering or less formal helping behaviour and emergent volunteerism. Instead, EV CREW was designed to increase the variety of ways available to people to contribute, particularly during response and recovery, *in addition to* those that already exist. To this end, there are two strong messages relayed

2 See for example the Disaster Ready Communities program, www.emergencyvolunteering.com.au/component/tags/tag/67-disaster-ready-communities.

by Volunteering Queensland to people when they are considering registration with EV CREW. These are:

- Before volunteering with new organisations, people should first look after themselves, their families, friends and neighbours, and pursue opportunities to help that are available through their existing local affiliations and networks.
- There are existing emergency services organisations that provide expert training and a clear role for volunteers in response and recovery. However, they should not be contacted during those times when they are very busy managing the event.

The EV CREW model is one way to extend and adapt existing emergency management arrangements to become more inclusive and integrated with the less formal components of a community's recovery processes (Scanlon *et al.* 2014). It reflects elements of the shift taking place in risk management away from top-down, command-and-control approaches towards more people-oriented approaches 'where the public is a central element and resource in disaster risk management' (Scolobig *et al.* 2015, p. 205). In broad terms, this shift is reasonably well-supported in Australia with widespread support for building community resilience and sharing responsibility (COAG 2011, Duckworth 2015, McLennan & Handmer 2013). While the recent *Spontaneous Volunteer Strategy* represents an important step towards advancing these ideas in volunteer management at a national policy level, EV CREW presents an important best-practice model for how these ideas can be operationalised on-the-ground.

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Building adaptive capacities for disaster resilience: what role for government?

Susan Hunt, Australian National University and Bushfire and Natural Hazards CRC, is developing a disaster resilience policy implementation framework that can be applied in a multi-level governance system.

ABSTRACT

Natural disasters have always occurred regularly in Australia and governments have developed public policy responses for dealing with loss and damage resulting from disasters. In early 2011, Australian governments at all levels adopted the *National Strategy for Disaster Resilience* (NSDR) (Commonwealth of Australia 2011). The NSDR offered a new paradigm that called on all sectors of the community to adopt resilience-based behaviours in the face of the inevitability of natural disasters. Instead of being overly dependent on government and emergency services organisations, people were encouraged to become more self-reliant and share responsibility by gaining awareness, knowledge and taking action to reduce their risks. While there is a general consensus on the types of high-level policies needed for resilience, there is less information about how to translate disaster resilience policy into action. Addressing this gap depends in large part, on appropriate implementation of government policy to foster disaster resilience, including in a multi-level system of government, like in Australia. This paper, citing a lack of guidance for resilience policy implementation, proposes a resilience policy implementation framework that could be applied by practitioners. The theoretical basis for the framework consists of four networked adaptive capacities for resilience. Other elements include actions that support the development of these capacities and federal policy mechanism. The framework is tested and refined using four case studies corresponding with the four adaptive capacities and using data collected from five resilience initiatives operating within each tier of government and in the business and not-for-profit sectors.

Introduction

A central premise of this framework is that while Australia's disaster resilience policy choices may be sound, policy goals cannot be achieved without effective implementation. A review of disaster resilience policy implementation is needed to evaluate what has been done so far and to inform future approaches. This would determine whether implementation is consistent with achieving disaster resilience outcomes and goals, and the extent to which resilience is driving developments in the emergency management system. This research contributes to the academic literature on disaster resilience and policy implementation and provides information about operationalising resilience policy that can be applied in policy and program developments.

Background

In early 2011, all levels of Australian governments adopted the NSDR (Commonwealth of Australia 2011), which emphasises prevention, preparedness and mitigation over the historical focus on relief and recovery. The NSDR consists of broadly-based principles designed to be followed by state and territory governments with subsequent flow-on to local government and other sections of the community.

The NSDR is largely instrumental and, not uncommonly, was implemented in a policy environment of incomplete evidence. One of the reasons for this is that the rise of resilience in public policy, including in disaster management policy, had overtaken available research, particularly in the field of policy implementation. This remains the case. Four years, and several changes of government later, the resilience paradigm is showing no signs of waning and with the Australian Government currently reviewing the NSDR (Law Crime and Community Safety Council 2014a) it is important to turn attention to disaster resilience policy development and its implementation. If emergency management policy in Australia intends to retain resilience as its fundamental guiding principle, there needs to be more certainty about how resilience can be enabled at all levels.

Mainstream commentary tends to emphasise the limitations of resilience research and the effect

this has on policy efficacy, particularly the capacity of policymakers to analyse and evaluate resilience policies and programs. This is not entirely accurate. The evidence base has grown substantially over the past decade, primarily in the areas of definition, concepts, models and the development of instruments for measuring resilience. However, gaps are most evident in resilience policy implementation studies (Cork 2010), with the possible exception of ecological resilience policy implementation (Walker & Salt 2012, Alliance 2010, Salt & Walker 2006). Building resilience requires long-term commitment to action underpinned by attitudinal and behavioural change at all levels of government and in the community. Better and more detailed information and guidance is needed, not only on how to develop disaster resilience policy, but also on how to construct and design the apparatus of disaster resilience policy implementation (i.e. the laws and regulations, sub-policies, programs, institutions and governance). At the very least there needs to be greater knowledge and awareness about how to avoid undermining resilience, including as an unintended consequence of poorly designed and ill-conceived implementation practice.

Information from the Australian Government Review of Federalism, indicates a political preference for smaller government and the rolling back of the centralism that has defined government roles and responsibilities over several decades (Australian Government 2005). Putting debate on reform of the Australian federation aside, the expansion in power and influence of the Federal Government may be inconsistent with subsidiarity[1], a fundamental principle of cooperative federalism (Fenna & Hollander 2013). Subsidiarity goes hand-in-hand with principles in the NSDR of sharing responsibility across all levels of government and the community. Learning more about how resilience policy implementation occurs within and between the tiers of government and the community, including the downstream and upstream impacts of federalism, will help understand how implementation is influencing policies aimed at strengthening Australia's resilience to disaster events.

The structure of a disaster resilience implementation framework

Several bodies of evidence have been identified to determine the structure of a disaster resilience implementation framework. These are:

- theoretical concepts and characteristics of disaster resilience
- theoretical and empirical evidence from policy implementation studies
- qualitative and quantitative information from evaluation of Australian national strategic policies
- qualitative evidence obtained from the analysis of data collected from case studies conducted as part of this research.

Disaster resilience research state-of-play

The resilience evidence base has developed roughly in this order: definitions and conceptual models, resilience indicators and measurement tools, and methodology. The earliest mention of resilience in the context of emergencies and disasters appears in 1854 when it was used to describe the recovery of a Japanese city after an earthquake (Alexander 2006). This, by all accounts, was an anomaly as the use of resilience in relation to disasters did not appear again until early in the 21st Century. Up until then the focus was on the general concept of resilience and the development of various discipline-specific definitions. The uptake into the social sciences through anthropology in the 1950s and its emergence in the 1970s and 1980s in ecological systems literature (Holling 1973), and human and developmental psychology (Rutter & Garmezy 1983) were significant developments. The latter, particularly in terms of the general humanising of resilience and its application to individuals and the idea that resilience can deliver positive changes arising from adaptation, over and above the restoration of function to a pre-disturbance state. Major advances in social resilience research were made by Adger who linked natural ecology with human ecology (2000). Later, Norris and her colleagues (2008) expanded the concept of individual resilience to collective resilience i.e. community resilience and contextualised it to disasters

The popularity of resilience has often been viewed as an impediment to its scientific rigour. McAslan (2010) responded to this by concluding that even though definitions and descriptions of resilience were numerous and varied, they demonstrated sufficient commonality and shared characteristics to allow it to be recognised as a useful concept. Around the same time, the uptake of resilience into public policy has been a significant development. For example, the *United Nations International Strategy for Risk Reduction* focuses on integrating approaches for disaster risk reduction and developmental goals to achieve resilience via the *Sendai Framework for Disaster Risk Reduction 2015–2030* and its predecessor, the *Hyogo Framework for Action 2005–2015: Building Resilience of National and Communities to Disasters*. In all likelihood this will stimulate further research, particularly in areas relating to measurement tools.

Theoretical concepts and characteristics

The work of Norris and co-authors (2008) provides the theoretical model of choice for this research because it links individual resilience to collective and community resilience. Resilience is described by Norris as 'a process linking a set of adaptive capacities to a positive trajectory of functioning and adaptation after a disturbance' (Norris *et al.* 2008). This definition is disaster-appropriate because it explicitly refers to a shock or disturbance that is connected to, or

1 The principle that says action should be taken at the lowest effective level of governance. Jordan A 1999, *The multi-level politics of European environmental governance: a review article. Public Administration [HW Wilson - SSA], 77, pp. 662.*

triggers a dynamic process leading to an improvement in functioning.

Four adaptive capacities of economic development, social capital, community competence and information and communication each have inherent qualities or attributes being robustness (strength), redundancy (substitutable), and rapidity (timeliness). The validity of this theory was strengthened by the Index of Perceived Community Resilience (IPCR) (Kulig *et al.* 2013) that expanded Norris's model. The IPCR was tested in two fire-affected communities in Canada using interviews, community profiles and a household survey. The IPCR proposed additional characteristics of leadership and empowerment, community engagement, and non-adverse geography that align with Norris's social capital and community competence capacities (Kulig *et al.* 2013).

Issues in disaster resilience policy implementation research

To understand the challenges of policy implementation research it is helpful to know that it slid into academic obscurity following a flush of interest and activity between 1980–90 (Hupe 2014). However, it did not disappear but became subsumed within other fields so that many studies can more recently be found in discipline-specific and professional journals rather than solely in the mainstream public policy and administration research literature. Some of the most relevant can be found in the ecological resilience literature, although these tend to be limited to a geographical location.

Some of the discussion on policy implementation issues dating back several decades remains relevant for disaster resilience today, including the debate about top-down verses bottom-up approaches and the emergence of the view that a combination of these two approaches is a legitimate option (Sabatier 1986), particularly for implementing disaster resilience policy (Buckle, March & Smale 2001).

The study of policy implementation is also difficult due to its complexity, not the least of which relates to the problem of 'too many variables' (Goggin 1986). This, combined with the diffuse nature of the evidence in the academic literature and the additional layer imposed by the implementation of resilience in a multi-level governance system, presents methodological challenges for this work.

Effective implementation arrangements need to be legal and require capabilities at two levels. They must be functional (can get the job done) and ideologically sound (principles governing activities must be consistent with the goal of building the four networked adaptive capacities for disaster resilience).

Policy implementation and its context: the role of government

Policy implementation can be multi-layered depending on the policy objectives, stakeholders and target audiences. Many policies will be issues and interest-based, initiated by and within varying sectors, and will be worked through the system in a combination of horizontal and vertical pathways. Disaster resilience policy is no exception, and if all levels of government and the community are to assume their share of responsibility for resilience, more detailed guidance on how to implement disaster resilience policy is needed that can be used by stakeholders. Therefore, multiple layers have been built into the disaster resilience policy implementation framework.

Evidence about implementing policy that enables the four adaptive capacities and their complementary sub-scales (community engagement, leadership and empowerment, and non-adverse geography) informs normative outcomes at the broadest level of the disaster resilience policy implementation framework. It should be noted that these elements overlap as do their associated policy implementation mechanisms and actions. This does not limit the usefulness of the implementation framework but rather, provides a comprehensive menu and awareness of the mutual dependencies of the system.

Social capital is enabled by implementing policies that build informal relationships, networks and stakeholder trust, by providing information to people relevant to their own roles and values, and by giving people the skills to deal with conflict (Productivity Commission 2003). Ecological resilience is also linked to social capital and is reflected in the non-adverse geography sub-scale (Kulig *et al.* 2013). This highlights the importance of the physical environment in community wellbeing and provides evidence supporting the inclusion of environmental and natural resource management policy implementation within this resilience implementation framework.

A role for government in fostering community competence lies in engaging with communities to ensure that people can participate in policy development and implementation, including by facilitating local level leadership.

Normative policy outcomes of equity and diversity of economic assets (Norris *et al.* 2008) within communities can be influenced via government policies on taxation, social welfare and other redistributive strategies, employment, small business, regional development, foreign investment, competition, superannuation, and energy to name a few.

In relation to information and communication, communities tend to look to government for reliable and accurate information about issues of public importance. Government needs to formulate and lead effective communications activities during and in the aftermath of disasters (Conkey H 2004). Government is well-placed to marshal the professional skills and substantial financial resources needed for conducting national public awareness and information campaigns. Evidence supporting the effectiveness of this approach can be found in national strategies relating to public health and road safety (Delaney *et al.* 2004). Conversely,

a role for government in ensuring a responsible media (another key element of information and communication adaptive capacity) is less clear.

The context for policy implementation is critical for shaping its outcomes (Coffey 2014). Analysis of the policy context informs decisions about allocation of responsibility, the role of levels of government, and the mechanisms available to government for implementing policy.

The notion of multi-level governance, the overarching theoretical model for the Australian government system, provides the context for the proposed framework. This translates into national, sub-national and local implementation platforms. The *Australian Constitution*[2], at the highest level, provides the legal framework for the system.

Discussion about federalism in Australia is well-developed in the public administration and public policy literature and is central to the consideration of the role of government in the development of the disaster resilience policy implementation framework. The federalism literature provides the following reference points for developing a disaster resilience framework:

- The *Australian Constitution*
- federal financial arrangements
- intergovernmental agreements and institutions (or lack thereof)
- political economy of Australian states and territories
- roles of regional and local government
- principles and practice of subsidiarity
- power sharing arrangements (Jordan1999, Fenna & Hollander 2013, Galligan 2002).

However, pathways to achieving outcomes that lie outside of government become increasingly less evident as the goal of implementation moves away from government and onto communities and householders. Therefore it becomes critical to identify implementation mechanisms that are obscure or non-existent and support community engagement, participation and partnerships for resilience.

The structure of the framework takes account of implementation plus the level at which implementation should occur within the federal system and its sub-systems. For example, does a policy need to be whole-of-government i.e. initiated and overseen at the federal level through a body such as the Council of Australian Governments and have corresponding implementation machinery within each state and territory government, then also be reconstituted at the local government level down to individuals? The answer is, 'it depends'. It depends on the nature of the policy: what it is seeking to achieve or change and the capability to achieve that change at each level of the system. These issues are fundamental to subsidiarity and the debate about centralism verses devolution. Therefore, in terms of a principle for successful policy implementation, subsidiarity is key and 'a potentially powerful concept around which a debate about the optimal assignment of tasks across different administrative levels could be constructed' (Jordan 1999).

Policy implementation can also be described as a system that gives rise to policy implementation mechanisms including sub-policies, laws, programs, institutions and governance arrangements. These offer relatively tangible units for analysis and provides structure that helps manage complexity. The implementation mechanisms operate at each level within Australia's federal system, i.e. at national, sub-national (state and territory government), and local government levels. These have been incorporated into the framework because they help identify an appropriate role for government and can point to the types of resilience-building activities that are appropriate.

Figure 1 provides a structural concept for the disaster resilience implementation framework. The four networked adaptive capacities of economic development, community competence, social capital and information and communication form the implementation pillars. These intersect with the three implementation platforms of the national (Australian Government), sub-national (state and territory), and local (local government, business and civil society). Each of the platforms contain implementation units consisting of sub-policies, laws and regulations, governance, institutions and programs. Implementation mechanisms operate within the implementation units. For example, federal policy implementation arrangements include political mechanisms, federal financial arrangements such as intergovernmental agreements, federal legal frameworks (such as The *Australian Constitution*), whole-of-government and national policy implementation arrangements, both formal and informal, and intergovernmental institutions e.g. Council of Australian Governments.

Methodology

Overview

Qualitative research methods were used to test and develop the disaster resilience implementation framework, which also serves as the analytical framework for the research. The first step was to identify the theoretical characteristics of resilience. The model of 'networked adaptive capacities' was chosen. Next, evidence for enabling the disaster resilience adaptive capacities of economic development, social capital, community competence and information and communication was explored. These are broad concepts that lack specificity and present methodological difficulties in terms of isolating elements for a policy implementation framework. With a shortage of resilience policy implementation information and absence of reviews and evaluation findings on the NSDR, evidence from evaluation and

2 The *Australian Constitution*. At: www.aph.gov.au/About_Parliament/Senate/Powers_practice_n_procedures/Constitution.

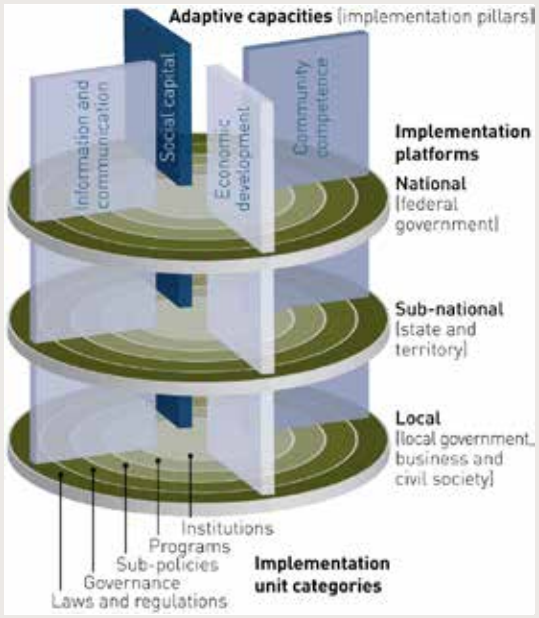

Figure 1: A structural concept for the disaster resilience implementation framework.

reviews of other Australian national strategies provided a valuable source of information.

In addition to Norris and co-authors (2008) and Kulig and colleagues (2013), the terms of the analysis were adapted from the following sources: The Productivity Commission (2003) and Australian Bureau of Statistics (2004) on social capital, Handmer and Dovers (2013) on information and communication as a 'universal' policy instrument and the role of community participation, Richardson (2014) in relation to security as an outcome for economic development, Hussey and co-authors (2013) regarding intra governmental and administrative policy mechanisms, links between stakeholder engagement and leadership and empowerment (Porteous 2013), and Fenna and Hollander (2013), Jordan (2013) and Mcallister, Dowrick & Hassan (2003) on principles of cooperative federalism. In developing the methodology, guidance was obtained from *Statutory frameworks, institutions and policy processes for climate adaptation: Final Report* (Hussey *et al.* 2013). Table 1 lists the desired policy implementation actions and outcomes for each of the four adaptive capacities.

Case studies

ANU human research ethics approval has been obtained for the empirical component of this research. This consists of four case studies corresponding to each of the four adaptive capacities. Data is being collected from a sample of programs or initiatives with explicit disaster resilience and natural hazard risk reduction or mitigation objectives. These have been chosen from each of the three levels of government, from business and the not-for-profit sector.

Data collection involves initial document study, followed by structured interviews. Questions have been designed to draw out detailed information about the way each of the resilience initiatives are being implemented in relation to the actions or outcomes in Table 1. The interview responses will be analysed in terms of the actions or outcomes in Table 1 as well as the policy implementation information obtained from the document study. Particular regard will be given to whether or not, and how, approaches to implementation are a function of federalism. Consistent with the key principle of subsidiarity, the notion of centralism verses devolution and the direction of implementation (vertical, horizontal or multi-directional) will also be considered in the analysis.

Conclusion

While it appears as if much has been achieved by the NSDR in terms of embedding disaster resilience policy at the highest level, research about how policy implementation enables resilience needs to be incorporated into approaches for building resilience. Similar to areas of social policy research, this poses considerable challenges in terms of managing and synthesising information about implementation issues that contribute to policy outcomes. However, these are challenges that must be tackled as Australian political leaders and policy makers review the NSDR and the federal arrangements that give it effect. This paper outlines a concept, broad architecture and methodology for a framework to guide effective ways of implementing disaster resilience policy. The disaster resilience policy implementation framework provides clarity for achieving the four resilience adaptive capacities of community competence, social capital, economic development and information and communication. Early findings suggest useful lessons

Table 1: Disaster resilience policy implementation – networked adaptive capacities.

Adaptive capacity	Social capital	Community competence	Economic development	Information and communication
Actions and outcomes	Networks Non-adverse geography or place-based Community engagement Leadership (internally focused)	Political partnerships Stakeholder engagement Leadership (externally focused) and empowerment Community participation	Security Economic diversity Equity of resource distribution Sustainability Shared (equitable) risk allocation	Narratives Responsible media and access to trusted information Skills and infrastructure Information flow between sectors

are available from evaluations of various strategic policies. Next, case studies involving each level of government, the business and not-for-profit sectors will assist in refining the framework, as well as delivering specific information about implementation of the NSDR.

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Susan Hunt worked in the Australian Public Service for 18 years prior to commencing PhD studies in 2014. During that time she developed national mental health and national disaster management policies and programs. This followed her earlier career as a general and mental health nurse where she worked in clinical settings and in community health and health education in the Hunter region of NSW.

Mine disasters: the need for planning partnerships between mine operators and local community emergency planning committees

David Parsons, senior emergency management planner and Masters student at Charles Sturt University, presents recommendations for cooperative working for planners. ®

ABSTRACT

In contemporary Australia mine disasters involving miners trapped underground are not common. However, experience from recent mine disasters in Australia and overseas show that when underground entrapments do occur they create a range of issues for the mine and local community to manage. The emergency response will therefore include participation of multiple emergency services with specialist support potentially coming from across the globe. Significant issues management and logistical challenges will arise. As a result the participation of local, state and national governments will be required.

For the majority of mines the range and scale of issues are beyond the scope of their internal emergency plan. As a result emergency management arrangements within the jurisdiction in which the mine operates will need to be activated to enable effective coordination. Joint pre-planning between the mine operator and the local community's emergency planning committee will contribute to ensuring the conduct of an effective emergency operation. This article recommends actions mine operators should take to build a strong partnership with their Local Emergency Management Committee.

Introduction

The effective response to a mine disaster will involve not only the mining company but the local community where the mine operates and may well attract national and international attention. The global nature of the mining industry will result in offers of assistance from mining companies around the world. Effective response operations will require the application of both the mine's emergency response arrangements and those of the jurisdiction in which the mine is located. Achieving joint planning and preparation between a mine and the local community is essential.

On 25 April 2006 a mine collapse in Beaconsfield, Tasmania killed one miner and trapped two others approximately 900 metres underground. This event attracted dozens of media crews to the town and involved emergency services from multiple Australian states and territories (Melick 2006). On 19 November 2010 the Pike River coal mine explosion occurred in New Zealand, killing 29 miners whose bodies have never been recovered. This disaster drew dozens of media crews to Greymouth and resulted in an extended emergency response operation. The management of the disaster involved national and international resources (Royal Commission on the Pike River Coal Mine Tragedy 2012). Most recently, on 9 February 2014, the Hazelwood open cut coal mine fire occurred in Victoria. The fire caused significant disruption to the community and public health issues. The Hazelwood coal mine fire involved an extended emergency operation using large numbers of emergency services personnel from multiple Australian states and territories (Hazelwood Mine Fire Inquiry 2014). The official reports from both the Pike River mine disaster and the Hazelwood mine fire recommend improving the ability of mine operators to work effectively with emergency management agencies (Hazelwood Mine Fire Inquiry 2014, Royal Commission on the Pike River Coal Mine Tragedy 2012).

The combination of complex issues, intense public interest and multiplicity of agencies involved requires formal coordination arrangements. Each Australian state and territory has legislation to enable this to occur. The legislation also creates Local Emergency Planning Committees at local government level. These committees are responsible for planning for emergency events in their area.

This paper details research into mine disaster events and provides recommendations for future cooperative planning.

Method

A literature review was conducted to examine the issues that arise in a mine disaster. The review collated information from a range of government reports, mine disaster books, journal articles and briefings. The mine disasters that were reviewed in detail included Beaconsfield and Hazelwood in Australia, Pike River in New Zealand, Westray in Canada and Copiapó in Chile. This article focuses substantially on the medical and psychological conditions of the miners, the intensive media pressures, and the impacts on family and community members.

There is a considerable amount of literature relating to the cause of mine disasters and strategies to mitigate the risk. However, there is substantially less written about the issues in managing the mine disaster response and operation. The issues identified as a result of this review were categorised into key themes requiring management in a mine disaster response. Each theme is comprised of categories employing terminology familiar to the emergency management community.

Leadership – command and control

Mine disasters involve two key characteristics that meet the criteria for activation of emergency management arrangements in most Australian jurisdictions. These characteristics are that mine disasters endanger, or threaten to endanger, the safety or health of people and that they require a significant and coordinated response.

Inquiries into the Pike River and Hazelwood mine disasters found that interaction and cooperation between emergency services organisations and the mining companies involved was not optimal. Inquiries from both events found that inter-agency problems were due to the lack of a common incident management operating system (Hazelwood Mine Fire Inquiry 2014, Royal Commission on the Pike River Coal Mine Tragedy 2012). The lack of this common process meant that sharing of information and critical decision-making was disjointed and dysfunctional. In response to this, the New Zealand, Victorian and New South Wales governments initiated requirements for mining companies to apply the Incident Control System in their emergency response processes (Hazelwood Mine Fire Inquiry 2014, New Zealand Police 2015, Trade and Investment NSW 2015). In New Zealand this system is known as the Co-ordinated Incident Management System (CIMS) (New Zealand Government 2014) while the Australian Fire Authorities Council call it the Australian Inter-service Incident Management System (AIIMS).

Recommendation 1: Mine operators should work with their Local Emergency Planning Committee to gain an understanding of:

- local emergency response arrangements such as location of the community Emergency Operations Centre and requirements of the local police officer who would coordinate the response
- agencies that could be involved in the multi-agency response and their roles. Agencies could include emergency services organisations, disaster medical staff, local government and community social services.

Working with the media

A mine disaster involving miners trapped underground for an extended period will attract a large media contingent to the mine site and within the local community. In Chile a 2000-strong media contingent camped at the mine site (Franklin 2010). At Beaconsfield and Greymouth each had greater than 60 media crews in attendance to cover the emergency response (Franklin 2010, Goc & Bainbridge 2006, Macfie 2014, Wright 2012). In Beaconsfield the media crews obtained campervans for accommodation and parked these along the street adjacent to the mine. The community arranged meals, shelter and hygiene facilities to support the media for the two weeks of the rescue operation. In Greymouth the media crews arrived quickly to the town and booked out most of the accommodation available at hotels. This caused a shortage of accommodation for family members and friends who arrived later.

As the majority of the activity during a mine rescue occurs deep below the ground there is limited opportunity for the media to photograph and film the action. Reporters want to supply stories for news each day. In Beaconsfield and in Greymouth this resulted in reporters seeking out stories from the community. This hunt for news included shouting drinks in hotels, calling at the homes of miners and rescuers, and offering thousands of dollars to people for talking to them and providing information for stories (Wright 2012).

The Beaconsfield mine disaster had a very effective media operation. The police officer given the responsibility for managing the media had previously managed the media at the Port Arthur mass shooting in Tasmanian in 1996. The media strategy included establishing a media briefing centre and regular media briefings by the police, Mayor and mine manager.

Recommendation 2: Mine operators should work with their Local Emergency Planning Committee to gain an understanding of:

- the agency to establish and coordinate a multi-agency media information centre
- the agencies in a combined multi-agency media information centre
- the location for large media briefings
- how to manage media crews seeking information within the community.

Medical and psychological care

Once miners are located and access is gained to them, consideration needs to be given to the physical and psychological injuries they may have sustained. Initial access may only be a hole drilled through to the miners that becomes a lifeline until release. Physical issues may include injuries and the effects of having had little to eat or drink for a prolonged period. Professional health advice will be required to avoid health risks from a sudden surge of too much food and to maintain an appropriate diet during a delayed release from entrapment (Franklin 2010, Wright 2012). Miners may also have experienced isolation from sound and light stimulation. As a result they may have experienced audio and visual hallucinations created by the brain in response to the isolation. The lack of natural light may result in a disruption to the miner's circadian rhythm and the resultant loss of the ability to judge time periods.[1] In the Chile mine disaster, specialists were used from NASA and the United States Navy to provide advice on managing the psychological impacts of entrapment and isolation (Franklin 2010).

Once miners are located they are typically provided contact with their family initially by notes and later by audio-visual connection. This contact with the family is closely monitored by mental health professionals who are tasked with the management of the psychological condition of the miners (Franklin 2010, Kowalski-Trakofler & Vaught 2012, Wright 2012).

Recommendation 3: Mine operators should work with their Local Emergency Planning Committee to gain an understanding of:

- the agencies that can provide the specialist medical advice required
- the agencies that can provide the specialist psychological advice required
- where specialist advice is located and how long it would take to arrive.

Family support

Family members of miners may not only be from the local community, but also communities elsewhere. Miners' families will come to a mine seeking to be close to their loved one who is trapped. In Pike River this resulted in 400 family members arriving in Greymouth. These family members had to be accommodated, supported and kept informed. In New Zealand, Air New Zealand staff trained in supporting families following an aircraft disaster, were successfully used to provide support to the families of miners. Family members will need a location to gather each day while they wait for information. This facility needs privacy, refreshments and be large enough for the number of relatives and support workers who may be expected. Families from overseas could result in embassies being involved in providing support to their residents. At the Pike River disaster buses were arranged to transport family members up to the mine site. Managing the needs of families is a significant task ranging from accommodation, catering, counselling, transportation, access, briefings, security and memorial planning (Ewen 2014, McEntyre 2011, Maunder 2012, Kowalski-Trakofler & Vaught 2012, Wright 2012).

Recommendation 4: Mine operators should work with their Local Emergency Planning Committee to gain an understanding of:

- the surge accommodation available locally for the families of miners
- the location for a family meeting and briefing centre
- the agency to manage family privacy and security
- the agency to provide counselling support for family members
- the agency to provide counselling services for the local community and special group such as schools.

Logistics support

For rural and regional communities affected by a mining disaster the logistic services required to support a large or long-running emergency response will be significant. The closest town to a mine site will be affected by the convergence of personnel and equipment. Personnel will include families, media and emergency services. The rescue operation will also involve additional equipment being brought to the rescue site. The national and possibly global response may result in the use of aircraft to transport equipment to the scene quickly. Equipment and personnel will require transport. Many rural towns have mobile telephone systems but no capacity to cope with the surge of hundreds of people with mobile telephones and wireless data needs. Other services that may be required to support various parts of the emergency operation will include security, transportation, catering and temporary accommodation (West Virginia Office of Miners Health 2008, Wright 2012, Royal Commission on the Pike River Coal Mine Tragedy 2012, Wright 2012).

Recommendation 5: Mine operators should work with their Local Emergency Planning Committee to gain an understanding of:

- the agencies that can assist with logistical tasks to support the rescue operation and family support e.g. catering, accommodation, transport
- the agencies that can provide transport vehicles
- the arrangements for increasing mobile telephone cell capacity
- the size of aircraft that can use local airstrips.

1 How isolation warps minds. At: www.bbc.com/future/story/20140514-how-extreme-isolation-warps-minds.

Community recovery

A mine disaster resulting in death may result in a memorial being created to remember the miners. In the Pike River mine disaster multiple memorial services were conducted and a number of memorials were built. The memorial services were attended by thousands of people including the Prime Minister (Ewen 2014, Maunder 2012, Wright 2012).

Recommendation 6: Mine operators should work with their Local Emergency Planning Committee to gain an understanding of:

- the agencies planning for memorial services that may involve the participation of thousands of people
- the agencies involved in building a memorial.

Conclusion

Although a mine operator will provide the initial response to a mine disaster, other agencies such as emergency services organisations, health specialists, psychosocial support agencies and local government may join the operation. Mine disasters can involve all levels of government due to the international nature of the industry, both in terms of the country of origin of the workforce, company ownership and the possible requirement for the global sourcing of expertise and equipment.

Effective emergency management depends significantly on the relationships that exist between those involved (Ewen 2014, Kowalski-Trakofler & Vaugh 2010, New Zealand Police 2015, Nova Scotia Government 1997).

Recommendation 7: Mine operators can take a number of actions to establish critical relationships with their Local Emergency Planning Committee including:

- arrange a tour of the mine for members of the Local Emergency Planning Committee
- review the mine's incident plan with the Local Emergency Planning Committee
- explain the mine's incident response capability and capacity to the Local Emergency Planning Committee
- explain the mine's incident management structure to the Local Emergency Planning Committee
- introduce the mine's Incident Controller to the Local Emergency Planning Committee
- conduct a discussion exercise involving a long duration underground rescue with the Local Emergency Planning Committee.

The development of a strong partnership and mutual understanding between the mine operator and the Local Emergency Planning Committee is essential for an effective response operation. The partnership and understanding ensures each group is aware of the capabilities and responsibilities of others, and develop the relationships required for effective cooperation.

The recommendations proposed in this article are designed to assist the process.

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2015 Resilience Roundtable: co-working as a way of enhancing collaboration in post-disaster environments

Joshua Hallwright and Kate Brady, Australian Red Cross, detail the movement to co-working in disaster response and recovery.

ABSTRACT

In 2009 the Council of Australian Governments (COAG) agreed to adopt a whole-of-nation resilience-based approach to disaster management. COAG later released the *National Strategy for Disaster Resilience* in 2011. The strategy acknowledges that 'non-government and community organisations are at the forefront of strengthening disaster resilience in Australia' (COAG 2011). Since 2012, Australian Red Cross has been hosting annual Resilience Roundtable events as a way to explore the themes identified in the strategy. The 2015 Resilience Roundtable was held in September with the theme of co-working as a way to practically enhance collaboration in disaster recovery. A full report of the 2015 Resilience Roundtable is available on the Australian Red Cross website (www.redcross.org.au).

Background

The *National Strategy for Disaster Resilience* (NSDR) acknowledges that disaster resilience relies on society as a whole and not solely on government, emergency services organisations and local authorities. It recognises that a national, coordinated and cooperative effort is required to enhance Australia's capacity to withstand and recover from emergencies and disasters.

In 2012, the inaugural Resilience Roundtable explored the concept of social capital and its application in emergency management policy and practice. The 2014 Resilience Roundtable looked at the role that not-for-profit and non-traditional stakeholders (e.g. Landcare, BlazeAid, FireFoxes, Country Women's Association, Scouts, etc) could play in emergency management. In 2015, co-working as a mechanism to practically enhance collaboration was explored.

Co-working

Co-working occurs when personnel from two or more organisations share the same office or work space with the intention of sharing resources, information, and building an understanding of each other's overarching goals. Other terms for this in the existing literature are used almost interchangeably, being co-working, co-habitation and co-location.

There has been limited research into co-working arrangements in recovery settings. However, there is growing support for co-working in 'grey' literature, including from Emergency Management Victoria and the Canadian military. There is also an increase in case studies using co-working in response and recovery settings as a tool to enhance coordination, cooperation and collaboration.

In the private sector, outside of the emergency management sector, there is a growing body of literature highlighting the benefits of co-working. While relatively new, there is research being undertaken to explore the benefits, challenges and practicalities of co-working, especially in software development and creative and start-up industries. The 2015 Resilience Roundtable report contains more information regarding existing literature and case studies.

In Australia there are three themes fuelling exploration of co-working. The first is the emphasis on coordination and cooperation in the NSDR. The second is the growth in organisations co-working during disaster recovery. The third is the growth of co-working in the private sector, with dozens of businesses and initiatives springing up to foster greater collaboration and cooperation among individual, independent workers.

Over the last decade, Australia has experienced greater use of co-working, such as in disaster response arrangements, and, increasingly, in disaster recovery and longer-term arrangements (Emergency Management Victoria 2015, Fire Services Commissioner Victoria 2013).

The confluence of the three themes is expressed through examples such as the new Victorian State Control Centre (SCC), managed by Emergency Management Victoria. The SCC is a dedicated space providing multi-agency access during a response to

Over the last decade Australia has experienced greater use of co-working arrangements, particularly at evacuation and recovery centres.

emergencies. It does this by bringing in personnel from dozens of organisations to the same physical space. This improves coordination and creates cooperation during the immediate response to an emergency. By being physically located in the same space – within metres of each other – agency representatives can quickly exchange critical information, can make decisions and execute multi-agency response plans in multi-agency teams (Emergency Management Victoria 2015). This practice has existed in the response phase for some time as well as in the early recovery phase (e.g. in recovery centres), however it is now appearing in longer-term recovery settings.

In the private sector, co-working occurs when a group of independent workers carry out their various tasks in a shared workspace. Co-working offers collaborative workspaces where freelancers and small business operators use shared facilities and can connect with each other in exchange for paying a membership fee. The Australian co-working industry is growing rapidly. In 2011, there were only a handful of co-working spaces. However, as of February 2015 there were over 140 co-working spaces, work hubs and incubators across Australia (McLaren & Krauskopf 2015). Examples include Inspire9 in Melbourne, The Hub in Adelaide, Sydney and Melbourne, and SpaceCubed in Perth.

Internationally, these themes are being expressed similarly but are more advanced (Bacigalupo 2012). In the private sector, the international co-working industry has experienced double-digit growth since it first appeared in the early 2000s. The number of co-working spaces globally is estimated at 9000 with the prediction of 1 million co-workers by 2018 (Sykes 2014). This demand for co-working spaces has been driven by a contingent workforce with a need to connect with each other.

The emphasis on coordination and collaboration has been institutionalised in the United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA). The office is part of the United Nations Secretariat and is responsible for bringing together humanitarian organisations to ensure a coherent response to emergencies. UN OCHA plays a key coordination role in crisis situations, including assessing situations and needs, agreeing on common priorities, developing common strategies to address significant issues, clarifying consistent public messaging, and monitoring progress. UN OCHA is the custodian of the global cluster system, which is a way of structuring coordination based on similar principles to those of co-working, i.e. bringing people from different sectors and organisations into one room to enable sharing of information, to promote innovation to solve problems, and to support effective multi-sector action.

The international response to *Typhoon Haiyan* in the Philippines provides many examples of deliberate co-working. Co-working was central to the humanitarian response and was highly valued by stakeholders. This continued into the longer-term recovery phase. In Roxas City in the province of Capiz in the Philippines, dozens of humanitarian organisations were co-located in the Mayor's office in the City Hall along with international military forces that were there to provide extra support. The Canadian military identified that co-working arrangements during the response was critical to the high functioning civil-military coordination and has since recommended co-working and co-location for any future situations where coordination and collaboration on that scale is required. The After Action Review of the United Nations civil-military coordination showed that the benefits of co-working included the efficient, fast and transparent sharing of information, increased coordination effectiveness, and maximised communication with stakeholders (Consultative Group on Humanitarian Civil-Military Coordination 2014).

Another example of co-working in international recovery is the arrangements by New Zealand Red Cross to co-locate with the Stronger Christchurch Infrastructure Rebuild Team. Since 2014, the two organisations have deliberately co-worked. While the outputs of their work are different, strong leadership and careful deliberation over a shared vision has meant that each organisation's work has been enhanced by the partnership.

Recovery from disaster takes time. The length of time differs for every community. While recovery continues long after response and relief operations cease, it is important that recovery activities begin at the time of impact of the emergency and that all response and relief operations incorporate recovery considerations. The complexity of recovery, the large number of organisations involved and the long-term nature of recovery all suggest that collaboration and cooperation is central to efficient and effective recovery support. In other words, these suggest that co-working arrangements are highly suitable to disaster recovery contexts in Australia.

The 2015 Resilience Roundtable

Hosted in Sydney in 2015 with the support of IAG, the 2015 Resilience Roundtable focused on co-working in the recovery phase of the disaster

cycle. The presentations at the Roundtable included perspectives from representatives of local government, New Zealand government, community members from Kinglake in Victoria, Australian and New Zealand Red Cross, the private sector and academia. A list of speakers and summaries of presentations are available in the 2015 Resilience Roundtable report.

The presentations provided five perspectives on co-working and its ability to improve collaboration and cooperation. Despite the differences in perspectives some commonalities emerged. These were:

- intentional co-working and deliberative planning was critical to success, as was a focus on establishing trust quickly
- success and utility of co-working in recovery hinged on it being people-centred
- the physical space where co-working occurs can dramatically alter its success and utility for the community.

Roundtable participants addressed particular aspects of co-working in disaster recovery, including its applicability to complex situations, advantages, risks, enablers and barriers. Participants identified the similar characteristics where co-working can be an effective collaboration tool including:

- complex environments involving 'wicked' problems
- environments where different, flexible ways of thinking are required
- situations where it is desirable to share expertise
- situations where the rapid sharing of information, formal and informal, is desirable.

Participants noted that the biggest advantage of co-working is that it encourages strategic coordination of recovery programing, leading to better outcomes for disaster-affected communities. Additionally, a myriad of operational advantages to co-working in recovery were identified. Participants identified that co-working can create shared purpose, assist to build trust quickly across organisations, strengthen the coordination of services, improve cost efficiencies, streamline communication with communities, facilitate information sharing and knowledge transfer, strengthen community engagement and capacity building, and assist to break down silos across organisations.

During the Roundtable discussions, some risks of co-working in disaster recovery were considered. These were categorised (see Table 1) by which stakeholder in co-working bears the risk, i.e. the affected community, leaders, the host organisation, and the guest organisation(s).[1]

Table 1: Types of risks identified and which stakeholder bears that risk.

Stakeholder	Type of risk
Community	Displacing community meeting spaces
	Confidentiality, privacy and security of personal information
	Access can seem intimidating to community
Leaders of co-working organisations	Distracting from independent organisational goals
	Challenges to established processes and norms
	Overly complicated way of working when not needed
	Harmony constrains innovation
	Group think
	Over-bonding among co-working staff
	Intellectual property
	Difficulties in exiting thus staying longer than the community needs or wants
	How to measure success?
Host	Losing organisational or professional identity
	Brand risk
	Reputational risk
	Resource inequity and capacity
Guest	Losing independence
	Being pulled away from core role
Host and guest	Contagious stress
	Lending legitimacy to less credible organisations

Through the input of participants with a range of experience and perspectives, a summary of considerations for the parties involved in co-working in recovery settings was identified (see Table 2).

Roundtable participants strongly agreed that good leadership is central to effective co-working. A champion, or champions, can facilitate co-working arrangements and provide strategic support. Supportive and engaged leaders can promote the shared vision and purpose, protect the independence of the organisations involved, provide clarity around the expectations of the arrangements, and ensure there is strong involvement of community leaders.

Barriers to effective co-working in disaster recovery were identified in discussions. Participants indicated that leaders who are not supportive of co-working can be significant barriers to collaboration. Different organisational cultures and organisational resistance to change can also reduce the efficacy of co-working arrangements. Participants highlighted that leaders have a responsibility to keep well-trained,

1 'Community' refers to the geographic-affected community. 'Leaders' refer to leaders within co-working organisations. 'Host' refers to the organisation that is the predominate user of the co-working space. 'Guest' refers to the organisation(s) that are the minority users of the co-working space (usually the organisation(s) with the fewer number of staff).

Table 2: Considerations for stakeholders involved in co-working.

Stakeholder	Considerations
Community	Provide clarity of the co-working location (ensuring to respect existing community spaces). Plan to exit co-working arrangements at the beginning of co-working. Ensure co-working organisations link with community leaders. Ensure clarity of community expectations. Highlight to the community the importance of confidentiality, privacy and security of personal information issues.
Leaders	Should think strategically about the implications of co-working. Know when to leave the co-working location. Plan for people to return to their own organisation after co-working. Think of ways to acknowledge co-working efforts. Have an awareness that staff may 'come back' with new and different ideas. Recognise that key performance indicators for staff may be difficult to determine. Provide clarity about 'boring stuff' e.g. who to call when sick, who pays for what. Ensure the right person for the right role and identify when it's not working as it should. Have the trust of senior-decision makers to work on behalf of the organisation (and others should do the same). Establish internal trust within organisations. Identify system structures for co-working to work.
Host	Respect location and space of co-working (e.g. respect existing community uses of space). Plan to exit co-working arrangements at the beginning of co-working. Recognise co-workers as a new community. Provide clarity about budgets and costs. Be deliberate about the way co-working occurs. Establish and manage continual feedback loop – what's working, what's not – between host and guest. Manage practicalities e.g. photocopiers, network access, site access.
Guest	Respect host location and space of co-working. Plan to exit co-working arrangements at the beginning of co-working. Plan for how one 'comes home' back to one's own organisation. Put forward ideas for how to be acknowledged for working collaboratively. Think about 'coming home' with possibly new and different ideas. Contribute to continual feedback loop – what's working, what's not – between host and guest. Establish tools to minimise risk of group think.

competent staff during co-working arrangements. The high turnover of staff during the recovery phase is another barrier.

Other barriers to efficient co-working included:

- a lack of planning co-working arrangements before they are required, i.e. before an event
- a lack of trust across the emergency management sector and among different organisations
- a lack of appropriately trained staff
- restrictive workplace health and safety policies, e.g. difficulties in re-arranging office spaces
- co-working not being formally recognised in emergency management, thus making it more difficult to use a different way of working.

Participants indicated that the availability of funding and resources was a possible limitation of co-working. Different organisational systems, procedures and policies make working together difficult especially if there are no existing agreements in place. Participants noted this was especially true for simple systems, such as printing networks and security procedures.

Despite the identified barriers, participants of the 2015 Resilience Roundtable agreed with and reaffirmed the idea that co-working is a very practical expression of improving coordination, cooperation and collaboration in the sector. Importantly, they listed some follow-up steps they regarded as key to embedding co-working in recovery initiatives.

Four recommendations to further co-working were identified at the conclusion of the Roundtable:

1. Develop operational principles and guidance for the Australia-New Zealand Emergency Management Committee Recovery Sub-Committee's consideration.
2. Achieve strategic level endorsement of co-working as an effective method of collaboration and cooperation in the Australian emergency management sector.
3. Document the evidence base for co-working in recovery, including case studies of existing co-working arrangements, for the development of future business cases for co-working in disaster recovery settings.
4. Include co-working arrangements in disaster management simulation exercises.

Danielle O'Hara, Australian Red Cross, and Daniel Long, Blue Mountains City Council at the 2015 Resilience Roundtable event.

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Rebuild by Design: building resilience with winning strategies

By journalist, Rosemarie Lentini.

Image: Helen Lochhead

Helen Lochhead, Deputy Government Architect, NSW Architect's Office

For Australian architect Helen Lochhead, building resilience to disasters involves 'building back better'.

As Deputy Government Architect in the NSW Architect's Office and, before that, Executive Director of Place Development at Sydney Harbour Foreshore Authority, Ms Lochhead has spearheaded design-based resilience strategies for renewing urban environments.

She believes designers can not only help governments and communities plan for, and rebuild after, major disasters, but also initiate better solutions that build long-term urban resilience.

'It's not just about what you do, but how you get it done and the mechanisms to enable that. Oftentimes, there is a frustrating focus when disaster strikes on simply rebuilding what existed before. That isn't viable. We should be focusing on how we can get more systemic change by bringing together governance, policy and the visionary and technical know-how of designers as well,' she said.

Ms Lochhead believes such coalitions are possible, pointing to her research on the Rebuild by Design competition in the United States.

As a 2014 Lincoln/Loeb Fellow at the Graduate School of Design at Harvard University and the Lincoln Institute of Land Policy, Ms Lochhead gained privileged access and insight into the Rebuild by Design process.

What is Rebuild by Design?

Rebuild by Design was a regional design competition launched by the U.S. Government in response to *Hurricane Sandy*, one of America's most devastating natural disasters.

Hurricane Sandy battered the U.S. northeast coast in October 2012, leaving 186 dead, 650 000 homes damaged or destroyed, and an estimated $US65 billion recovery bill. It also exposed the inherent vulnerability of coastal cities to extreme weather events. In New York, for example, scientists predict a sea level rise of up to 45 centimetres by 2050. [1]

For the U.S. Federal Government, *Hurricane Sandy* was an opportunity to promote resilient rebuilding through innovative ideas.

In December 2012, President Barack Obama created the Presidential Hurricane Sandy Rebuilding Task Force. The task force was led by the Secretary of Housing and Urban Development, Shaun Donovan, and made recommendations for the sustainable investment of approximately $US50 billion in federal recovery funds.[2]

The task force aimed to align funding with local needs, coordinate the efforts of multiple tiers of government, and build community resilience to future storms.

One of the task force's recommendations was the creation of Rebuild by Design.

Multidisciplinary teams from around the world competed for federal funding to stormproof the Sandy-affected regions of New York and New Jersey.[3]

Rebuild by Design senior project manager Alexis Taylor said the competition, which launched in June 2013, harnessed the cutting-edge ideas of experts such as designers, architects, engineers, emergency

1 Miller KG, Kopp RE, Horton BP, Browning A & Kemp C 2013, *'A geological perspective on sea-level rise and its impacts along the US mid-Atlantic coast'. Earth's Future. At: onlinelibrary.wiley.com/wol1/doi/10.1002/2013EF000135/full.*

2 *Hurricane Sandy Rebuilding Strategy. At: portal.hud.gov/hudportal/documents/huddoc?id=HSRebuildingStrategy.pdf.*

3 The U.S. Department of Housing and Urban Development ultimately set aside $US930 million in Community Development Block Grants funding to go towards implementation of six winning projects plus one additional finalist proposal.

Image: Rosemarie Lentini

Rebuild by Design senior project manager Alexis Taylor and communications manager Joshua Bisker.

managers, sociologists and geologists, for innovative, sustainable solutions.

'The problems that came out of *Hurricane Sandy* were so complex that we couldn't posit that we have just one single problem that you address through your design. The complexity of the problem demanded an interdisciplinary, design-based, community-driven approach.

'It was many, many decades of planning decisions that led to a lot of underlying vulnerability in New York and New Jersey. Hoboken was 90 per cent under water during and after the storm. It used to be an island. There had been rivers and patterns for natural water movement. But because we created a different environment it was filled in like a bathtub during Sandy. The water had nowhere to go because of the way the city had been built,' Ms Taylor said.

From 148 teams that applied, 10 were selected to develop proof-of-concept plans.

Supported by grants from The Rockefeller Foundation, a private philanthropic organisation based in New York, the teams examined critical infrastructure, ecology and water on a regional scale over several months.

They also considered governance, funding and social issues, a process involving meetings with 535 community organisations and 181 government bodies, visits to more than 40 neighbourhoods and more than 60 outreach events.

In June 2014, a jury comprising design, ecology, planning, sociology and emergency experts selected six winning design projects, plus one additional finalist project that also received funding.[4]

While the long-term effectiveness remains to be seen, Ms Taylor said Rebuild by Design's legacy is the creation of a framework for community coalitions in disaster recovery.

'The complexity of disasters requires that everyone be participating in their solution. It can't be something that only government hands down to us because it has to do with our own awareness and culture of resilience.

'That was one of the innovations of Rebuild by Design. It was a U.S. Federal Government-sponsored project, but the process which allowed all this community outreach was funded through philanthropy.

'Some unexpected partnerships came together in the immediate response after Sandy, and continuing that goodwill and transition from emergency management to long-term integrated planning has been a big part of what we are navigating as well. What is the ongoing role of some of these groups and can they be institutionalised?' Ms Taylor said.

Can Rebuild by Design work in Australia?

The Rebuild by Design competition was a bold model that connected the world's most talented designers and researchers to build community resilience. During the process, Ms Lochhead consulted with members of the design team, jury and competition stakeholders to independently assess the projects as a new approach to resiliency planning.

Ms Lochhead believes that, while the scale of Rebuild by Design probably wouldn't be replicated in Australia, its principles – grassroots advocacy and engagement, multidisciplinary coalitions and design-led innovations – can help deliver sustainable solutions in many disaster-prone locations Australia-wide.

'For me, Rebuild by Design is a difficult process to replicate because of the size of the investment. Not many cities would have the resources to invest in a Rebuild by Design project like New York City, which is a global hub. But what you can take away from this and replicate are the key principles and adapting the concept to fit local conditions.

'Policy can be introduced and design projects can be developed, but unless you've got the enabling authorities or agencies with capacity to deliver, they just become paper projects. That means looking at the political landscape first and seeing where you might pilot a project or initiative and then seeing how you might scale up to implement it more systemically,' Ms Lochhead said.

4 View the winning strategies at: www.rebuildbydesign.org/winners-and-finalists.

The Big U, now known as 'The Dryline', was one Build by Design competition winner.

After more than 20 years in urban design, including her involvement with Rebuild by Design, Ms Lochhead believes a key to building urban resilience is integrating design principles into disaster planning. This will enable communities and places to not only survive, but also adapt and grow, no matter what chronic stresses or acute shocks they experience.

'In Australia, we have robust and coordinated governance structures. We can respond to emergencies in a very coordinated and singular way, which is why Australian emergency services are so good at doing their work.

'Australia really has a lot of resilience. But the idea of building resilience is being able to build back better, to evolve and change, to develop strategies that are protective and enable safer and faster rebound.

'If we consciously integrate resilience strategies in our planning, design development and our governance frameworks, we will bounce back faster from disruptions like bushfires, flooding and heat waves in a way that they become hiccups rather than cataclysmic,' she said.

The six winning designs were:

The BIG U (The Dryline): a barrier around Manhattan's southern coastline to protect homes from storm surges and provide new recreational opportunities for residents.

Hunts Point Lifelines: a coalition of community leaders in the Bronx, New York, created a working model of resilience around a regional food hub.

Living Breakwaters: a project to reduce risk, revive ecologies and connect educators to the shoreline in Staten Island, New York City.

Resist, Delay, Store, Discharge: an urban water strategy to provide coastal defence, slow down run off, direct excess rainwater and support drainage in Hoboken, New Jersey.

New Meadowlands: a project to address risks, provide civic amenities and create opportunities for redevelopment in The Meadowlands, New Jersey.

Living with the Bay: a regional plan for Nassau's South Shore in New York that promotes the county's best features while building community resilience.

The Surf Emergency Response System evaluated and improved

Surf Life Saving Australia provides an update of the Surf Emergency Response system.

Surf Life Saving staff and volunteers man the response system.

Background

The Surf Emergency Response System (SERS) was established in 2008 by Surf Life Saving (SLS) as a single point of contact within each state for Police and other emergency services organisations to contact and activate lifesaving services. SERS was created in response to the complex and inconsistent system within SLS and used by emergency services organisations to contact SLS aquatic rescue services. The single access point phone number provided effective communication between emergency service agencies and SLS to arrange and coordinate aquatic rescue services along the Australian coastline.

Since its inception, SERS has received over 2000 call outs from Police or State Emergency Services and performed hundreds of rescues in New South Wales alone, the majority being at unpatrolled locations or outside patrol hours. In its first years of operation SERS was not audited or reviewed at a national level.

In 2011, an audit under the National Emergency Management Projects program was developed to conduct a full evaluation of the efficiency and effectiveness of the SERS and develop an improvement plan focussed on better inter-agency communication and efficiency. The project was scoped to a national scale to capitalise on the benefits particular to each jurisdiction.

Evaluating the response system

In each jurisdiction a full evaluation of the efficiency and effectiveness of the existing SERS was conducted, which included the communications and dispatch system. Based on those findings a review was completed and feedback from stakeholders added to the final determination. This provided a truly national snapshot of the status of the SERS. With this information, an improvement strategy was drafted in collaboration with SLS and its allied agencies. The strategy identified and documented the improvements needed and the action plan for improvement.

The project achieved some high-level outcomes that underpin the continued effective operation and delivery of the services. The review and audit of the system ensured maximum performance and communication between agencies to facilitate well-coordinated joint rescue operations. The review was also the first comprehensive national audit and gap analysis of the capabilities and capacities of SERS and other non-government organisations coastal aquatic rescue organisations. The process also reinforced the need for continued collaboration within non-government organisations coastal aquatic rescue agencies and between non-government organisations and government emergency management agencies.

Anticipated outcomes and benefits include:

- reduction in drowning deaths and injury along the Australian coastline
- best practice guidelines based on evaluating the learnings from the audit which allowed each jurisdiction to adopt or review existing procedures in order to improve services
- enhanced communication between SLS services, Police and state emergency services and other coastal aquatic rescue agencies
- improved interoperability.

Current state

To enable SLS to actively participate as an integral part of Australia's emergency management network, the SLS infrastructure, services and systems must undergo continuous improvement. The seven SLS state centres are continually reinforcing and improving SERS based on jurisdictional and operational need. SLS Australia is investigating the next generation infrastructure that supports the single point of contact to ensure it meets the changing needs of SLS state centre requirements.

SLS is an integral part of emergency management around Australia and the Surf Emergency Response System ensures SLS and emergency management agencies continue to work collaboratively and effectively to reduce coastal drowning deaths and injury.

SLS promotes Triple Zero (000) as the first point of contact for coastal and aquatic emergencies.

This project was funded under the National Emergency Management Projects in 2011.

Supporting post-disaster planning in flood-affected communities

Kirsty Kelly, Planning Institute of Australia, provides the background to the online, on-demand information system for planners.

In Australia, floods cause an average $377 million in damage each year. Rebuilding flood-affected communities in ways that enhance their resilience to future flood events is important to strengthen individuals, businesses and institutions and minimise the adverse effects of future disasters.

This project, administered by the Planning Institute of Australia (PIA) under the National Emergency Management Project program, provided online, on-demand access to information for local planners, particularly in rural and regional areas, that relate to flood affects and planning. Key components of the project were to develop and deliver web-based information and resources, seminars, video presentations from mentors, and easy access to other associated information. The program delivered four key elements:

- the online reference resource
- a professional development seminar program
- a networking and mentoring program
- outreach services.

The PIA content was developed and is hosted on the EMA Knowledge Hub website. It is a valuable resource for planners looking for the latest concepts and tools to build community resilience to natural disaster events through mitigating the hazards of flooding. Content includes presentations by leading industry professionals who deal with building and planning in the fields of flood plain management.

The online resource base is on the PIA website[1] and links to a range of key national and international post-disaster planning resources.

The professional development and networking component included five seminars on post-disaster planning in metropolitan and regional areas. The locations were South East Queensland (Gatton), North Queensland (Rockhampton), Central Queensland (Roma), Northern New South Wales (Dubbo) and Victoria (Mt Macedon). The seminars were specifically developed to provide up-to-date information and resources to regional planners in the identified and surrounding areas. Speakers who had experience in recent flooding events were drawn from businesses and agencies. They provided insight to the impacts on local and regional communities.

The mentoring service was developed as a series of video presentations by volunteer expert planners answering a range of pre-determined questions and providing up-to-date advice. This was an alternative approach to the traditional 'individual to individual' mentoring model. Mentors were identified based on skills, relevance, and recognition within their fields of expertise and experience in post-disaster planning. While this does not allow for a question-and-answer capacity, visitors to the site have access to a large number of experts who may offer alternative opinions. The mentor presentations[2] are also hosted on the EMA Knowledge Hub website. This co-siting allows access to both the content-based presentations and professional development interviews all from one location. The material on the website was provided in CD format to over 500 stakeholders including local governments and regional agencies as on-site training materials.

Finally, a volunteer outreach service was established by planners with experience in post-disaster planning. The outreach service extends the reach of the regional seminars and increases the accessibility of the information. The PIA reproduced the seminar content into online learning and knowledge-sharing packages to extend the face-to-face delivery of the seminars. The material, including audio and visual presentations, is available online and accessed regionally, nationally and internationally.

The 'Enhancing Disaster Resilience in the Built Environment: Roadmap' is a key implementation of the *National Strategy for Disaster Resilience*. This PIA project was a pilot implementation project that linked to the roadmap. It assisted in both filling a direct need post-flood, but also in road testing the tools and techniques for future program delivery.

This project was funded under the National Emergency Management Projects in 2011.

1 PIA Online Post-Flood Disaster Seminar Series. At: www.aemi.edu.au/pia/default.html.

2 Mentoring and Outreach Seminar CD and final report available at: www.aemi.edu.au/pia/default.html.

Australia hosts the first global training exercise for emergency response medical teams

By Michelle Foster, National Critical Care and Trauma Response Centre, Royal Darwin Hospital.

The top end of Australia was the focus for world-first training for international Emergency Medical Team Coordinators in October 2015. The chaos following a category five cyclone on an imaginary Pacific island called Namuna was recreated in Australia for this first global disaster relief training exercise.

Australia's National Critical Care and Trauma Response Centre (NCCTRC) based in Darwin in collaboration with the World Health Organization delivered the training. Darwin was selected for the first training program because of its proximity to the world's most disaster-prone regions. The NCCTRC has become an international leader in disaster response in recent years. The training is designed to create a group of highly-trained individuals to assist host governments in coordinating the arrival of international medical teams following a major disaster.

The need for coordination of foreign medical teams entering a disaster-affected nation has arisen from events like the Haiti earthquake, West African Ebola epidemic, and *Cyclone Pam* in Vanuatu.

In the aftermath of the 2010 Haitian earthquake, many doctors and nurses (and some people posing as such) turned up with good intentions but no capacity to be self-sufficient or operate appropriately under the conditions.

While there is no doubt that foreign medical teams are an important part of the global health workforce and have a specific role to play following a disaster, any medical team coming from another country to practice healthcare in an emergency needs to come as a member of a self-sufficient team. They need to respond with success rather impose a burden on the national system.

Lessons learned from recent international relief operations in the Philippines, Vanuatu, Nepal and West Africa have led to the need for flexible and effective medical team coordination mechanisms that may be adapted in-country for different types of emergency scenarios.

The NCCTRC's Nursing Director of Trauma and Disaster, Bronte Martin, is on secondment with the Word Health Organization in Geneva developing the global registration verification and mentorship program for emergency (foreign) medical teams.

Images: National Critical Care and Trauma Response Centre

The chaos following a category five cyclone on an imaginary Pacific island called Namuna was recreated in Australia for this first global disaster relief training exercise.

'The purpose of the course was to create a group of highly-trained individuals that assist host governments in coordinating the arrival of international medical teams following a major disaster.

'Importantly they need to facilitate the coordination between multiple agencies, organisations and governments during a disaster response.

'Additionally these teams are given the expertise to manage the transition to the host Government while maintaining the confidence of the wider humanitarian community,' she said.

The week-long training from 26–30 October provided the opportunity for the 35 candidates to be immersed in a real-time training exercise where they had to deal with a range of issues from disaster relief to public health emergencies.

'Many of the candidates already work in these kinds of roles for their own governments but the simulation sought to teach extra skills as well as train them in managing the UN system and work with international teams under intense pressure while supporting a devastated local health system,' she said.

The Emergency Medical Team Coordination Cell Training Course complements training already undertaken by Australian Medical Assistance Teams (AusMAT) and NCCTRC in preparing teams for disaster response.

Dr Nicholas Coatsworth, Executive Director, NCCTRC said the deployments of AusMATs to *Typhoon Haiyan* and *Cyclone Pam* positioned Australia well to be hosts of this important course.

Through the ongoing support of the Australian Government, the NCCTRC and AusMAT have led the way in developing, promoting and adhering to the highest standard of medical response to disasters,' he said.

The NCCTRC was established following the 2002 Bali bombings and is funded by the Australian Government under the Department of Health until June 2019. Under the AusMAT concept, the NCCTRC has trained more than 600 clinicians and logisticians to a national standard as medical disaster responders.

Image: Clive Hyde

NCCTRC trauma coordinator, Rhiannon Wake, provided a briefing to the course participants on medical capability in the top end of Australia.

The training delivered in collaboration with the World Health Organization included facing the media.

Participants of the first global training already work in similar roles for their own governments but learnt extra skills during the exercise.

About the exercise

Teams from seven countries responded to real scenarios created by actors in the simulation as they arrived on the imaginary Pacific island. The participants had to deal with a range of issues from disaster relief to public health.

The situations changed throughout the course of the 16-hour exercise, which was an imaginary cholera outbreak. Along the way they were interrogated, intimidated and discouraged.

Dr Ian Norton from the WHO's emergency risk management and humanitarian response team in Geneva said the program was designed around experiences with teams on the ground after a disaster struck, such as the Haiti earthquake.

Participant Dr Tarun Weeramanthri, Western Australia's chief health officer, who has been to a number of disaster zones, including the Ebola crisis in Sierra Leone and the Mumbai terrorist attacks said the simulation was fairly close to reality.

The WHO's course will be replicated in Europe, Africa and the Americas over 2016.

DISASTER & EMERGENCY MANAGEMENT

The Australian & New Zealand Disaster and Emergency Management Conference will be held at Jupiters Gold Coast on the 30 – 31 May 2016. An outstanding line up of Keynote Speakers has already been confirmed and we are currently sourcing concurrent stream speakers. You are invited to join us as we focus on natural disasters with the conference theme of **"EARTH; FIRE AND RAIN".**

The Conference will feature multi-agency presentations covering all phases of emergency and disaster management. There will be representation by fire, ambulance, emergency, rescue, volunteer, defence and health sectors. Presentations will facilitate discussion and provide a spotlight on developing leaders in the Disaster and Emergency Community.

Joint initiative of:

Australian & New Zealand Mental Health Association

Sustainability

bushfire&natural HAZARDSCRC

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CALL FOR ABSTRACTS CLOSING 8 FEBRUARY 2016

SEARCH & RESCUE CONFERENCE

CALL FOR ABSTRACTS

As the only trans-tasman multi-sector SAR event, the 2016 Australian and New Zealand Search and Rescue Conference will provide an opportunity to share new and upcoming concepts, techniques and information.

The Conference aims to provide a platform for leading practitioners to discuss challenges, experiences and development under the theme of 'Land, Sea and Air'.

Topics include Technology, Innovation, Crisis Management and Communication Strategies, Case Studies, Lost Person Behaviour (Mental Health), Training, and International/Regional Agreements and Exercises.

To be involved as a Conference Presenter, please submit your abstract by 8 February 2016 on the Conference website.

Covering 52.8 million square kilometres of Search and Rescue services, Australia is notorious for its prodigious Search and Rescue capabilities.

Join us on 1 June 2016 on the Gold Coast to hear how these services continue to be of the highest standard.

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2015 RESILIENT AUSTRALIA AWARDS

Disaster resilience can be defined in many ways, but ultimately it is about making communities safer, stronger and better prepared to manage natural disasters.

Key to a more resilient Australia is recognising that resilience is not just the domain of the emergency services, but also business, community organisations and individuals.

By celebrating innovation and best practice, the Resilient Australia Awards showcase work that is often unrecognised, inspiring others to think about how they can be more disaster resilient.

Since its inception in 2000, the Awards program has recognised excellence and innovation in emergency management and has received over 1100 entries, including 106 in 2015.

Emergency Management Australia Director General, Mark Crosweller, who was part of the judging panel for the 2015 national awards, said the awards served an important role in fostering resilience.

'The quality of entries is very impressive, as is the amount of work going on in the space of resilience more broadly.

'The thing I love about the Resilient Australia Awards, and resilience more generally in Australia, is how diverse the project scope is, how innovative people's thinking is in relation to what resilience means to them, and how they can work with their communities to put it into effect,' Mr Crosweller said.

The Resilient Australia Awards celebrate the many achievements of those who are actively working to make Australia more resilient to natural disasters. The Awards, which are sponsored by the Attorney-General's Department in conjunction with the states and territories, are coordinated by the Department's Emergency Management Policy Branch and a team of very enthusiastic state and territory convenors.

The Minister for Justice, the Hon Michael Keenan MP, announced the national award winners at a ceremony at Parliament House in November.

The 2015 National Australia Award winner was GIVIT, a Brisbane-based company that was established in 2009 to coordinate donated goods going to members of the community most in need. GIVIT's sophisticated online platform provides a simple, proven, coordinated response to quickly match donations and ensure offers of assistance get to where they are most needed.

Minister Keenan said that GIVIT could not be more deserving of this title.

'I'm proud to say Australians are renowned for being very generous at donating both goods and cash following an event that causes hardship to others. GIVIT's award for making a significant improvement to the handling of donated goods demonstrates how important this is to the recovery process.

Image: Attorney-General's Department

Sarah Henderson MP, Minister for Justice Hon Michael Keenan MP, and the Hon Theresa Gambaro MP, announce the 2015 National Resilient Australia Awards in the Mural Hall at Parliament House.

Image: Attorney-General's Department

Minister Keenan and the Hon Teresa Gambaro with the 2015 Resilient Australia Award winners, Juliette Wright and Sarah Tennant from GIVIT.

State	Winner	Project	Award category
Australian Capital Territory	St John Ambulance (ACT) Inc.	'Building Resilience in Retirees through First Aid Knowledge'	Community Award
	ACT Emergency Services Agency	'CBR Bushfire Ready'	Government Award
	Simon Butt	'Working Together'	Photography Award
New South Wales	Blue Mountains Resilience and Preparedness Working Group	'Resilience and preparedness in the Blue Mountains'	Community Award
	NSW Department of Primary Industries and North Coast Diary and Sugar Industries	'Flood Ready Agriculture'	Government Award
	Insurance Australia Group	'StormSafe: Doing a little could save the lot'	Business Award
Northern Territory	Northern Territory Fire Rescue Service	'Community Volunteer Engagement Trailer'	Government Award
	Gerard Lessels	'Working together to help others'	Photography Award
Queensland	GIVIT	'Disaster Recovery Service'	Community Award
	Livingstone Shire Council	'Cyclone Marcia Recovery'	Government Award
	Darrin Leonard	'Ravenshoe Café Explosion'	Photography Award
Tasmania	Tasmanian Visitor Information Network Inc.	'Emergency Preparedness Project'	Community Award
	Launceston City Council	'Pet Pal'	Government Award
	Lauren Clements	'Built to last'	Photography Award
Victoria	Life Saving Victoria	'Helping Older Adults Become Everyday Lifesavers – A Drowning Prevention Initiative for Over 60's'	Community Award
	Mansfield Shire Council	'Community Resilience Leadership Program'	Government Award
	Rebecca Hosking	'Helmet of Leadership Values'	Photography Award
Western Australia	Australia Red Cross	'The Pillowcase Project'	Community Award
	City of Mandurah	'"Beyond the Gate" – Aged Care Emergency Support Network'	Government Award
	Kyle Nowak	'WA South West Communities under Threat'	Photography Award

'I'd like to congratulate GIVIT on their ongoing commitment to their local community, Queensland, and the nation as a whole,' Mr Keenan said.

The Award was accepted by GIVIT's CEO, Juliette Wright, who is also the National Australia Day Council's 2015 Local Hero, and the General Manager Disaster Recovery, Sarah Tennant.

The Hon Teresa Gambaro, Federal Member for Brisbane, presented the award to GIVIT.

'The Queensland floods were absolutely devastating and I'm honoured to be here today to present to you this award because you and your team at GIVIT have done so much,' Ms Gambaro said at the presentation.

'Not only at the time of those floods — when there is a house fire, or a family in need — you match those donations and get it to the people who need it the most. You do it with no fuss at all. You just get in there and do it,' Ms Gambaro said.

Mark Crosweller, who often experienced the challenge of dealing with a deluge of donations in his early career in the NSW Rural Fire Service, said GIVIT was a worthy winner.

Sarah Henderson MP with the 2015 National Photography Award winner Rebecca Hosking (far right) and the subjects in her photograph Elliot Rankin and Captain Andrew Rankin.

'They understood how to define need, they understood how to assist the giver, and they understood how not to waste anything,' he said.

This year's entries covered all aspects of disaster management including risk assessment, mitigation, education and training, community awareness, response and recovery. State and territory winners were acknowledged at ceremonies in their jurisdictions throughout October and November.

These entries were considered for the National Award by a panel of judges that comprised Andrew Coghlan, Australian Red Cross, Stuart Ellis, Australasian Fire Authorities Council, Troy Pickard, Australian Local Government Association, Dr Richard Thornton, Bushfire and Natural Hazards CRC, and Mark Crosweller, Director General Emergency Management Australia.

Due to the quality of the entries the judges also awarded four national 'Highly Commended' citations that were announced by Minister Keenan.

The National Photography Award was presented by Minister Keenan and Sarah Henderson, Federal Member for Corangamite, to Rebecca Hosking from Aireys Inlet in Victoria for her photograph entitled 'Helmet of Leadership Values'.

Rebecca's photograph depicts Andy Rankin of the Anglesea Country Fire Authority handing his captain's helmet to his son Elliot as part of Elliot's participation in the Anglesea Fire Education Initiative. Under the initiative, students learn about fire in their local landscape to become their community's fire educators. Both Andy and Elliot Rankin were able to travel to Canberra to be at the ceremony.

Ms Henderson congratulated Rebecca on her 'magnificent image'.

National Highly Commended

City of Mandurah 'Beyond the Gate' Aged Care Emergency Support Network (WA)

A project designed to improve the way aged care facilities deal with natural disasters.

Australian Red Cross 'The Pillowcase Project' (WA)

Helps to raise awareness of disaster preparation in primary school children.

Insurance Australia Group 'StormSafe: Doing a little could save the lot' (NSW)

A public-private partnership to build public awareness of storm risk and help individuals make better decisions on disaster preparation.

Mansfield Shire Council Community Resilience Leadership Program (Vic)

Brings together community members and leaders to build a better understanding of emergency management planning and responses.

'I just wanted to say very warm congratulations. The image that you have captured here is of Andy and Elliot in the car park of the Anglesea Primary School taking part in a very important fire safety program geared to local school students.

'Some of you might remember that back in 1983 the Ash Wednesday bushfires engulfed much of Anglesea and many places across the Great Ocean Road. The memories of that disaster remain very, very strong and are alive in the members of the Anglesea community,' Ms Henderson said.

The Photograph Award competition commenced in August when the People's Choice Photo Competition was conducted via an online public vote. The editorial team of the *Australian Journal of Emergency Management* selected the photo from the winners chosen by public vote in the states and territories. The team recognised that, as well as its aesthetic qualities — it's a great photo — the image embodies themes of succession planning and business continuity, change management, leadership, and youth in emergency management.

Further information

Resilient Australia Awards website: www.ag.gov.au/EmergencyManagement/About-us-emergency-management/Resilient-Australia-awards/Pages/default.aspx

Email: ResilientAustraliaAwards@ag.gov.au

Knowledge for life: how local knowledge is helping communities prepare

By Freya Jones, Communications Assistant, Bushfire and Natural Hazards CRC

There are many ways for a community to reduce its risk to the effects of hazards and disasters. Science and research play an important role, but for many remote and Indigenous communities, this cannot provide all of the solutions. Local knowledge can be pivotal to their risk reduction. To this end, the Bushfire and Natural Hazards CRC hosted a panel of speakers at the Australasian Natural Hazards Management conference in Perth as part of the 2015 International Day for Disaster Reduction.

This year's conference theme, Knowledge for Life, focussed on traditional, local and Indigenous knowledge and practices to complement current science and research into resilience for communities and individuals. The idea for the International Day for Disaster Reduction was conceived in 1989 by the United Nations to promote a global culture and awareness of disaster reduction, prevention, mitigation and preparedness. Since 2009 it has been held on 13 October each year.

The Bushfire and Natural Hazards CRC hosts the International Day for Disaster Reduction in Australia to ensure it remains on the national agenda. This year the day included a panel session at the 8th Australasian Natural Hazards Management conference that was held at the University of Western Australia, Perth from 13–14 October. The panel discussed assimilating local and traditional knowledge and practices as well as what partnerships are needed to help people in remote communities.

The panel comprised Professor Carmen Lawrence from the University of Western Australia, Erin Fuery, State Manager of Emergency Services in Western Australia and the Australian Red Cross, and Anne Garland, Research Associate of Applied Research in Environmental Sciences Non-profit in the United States.

Ms Fuery has worked with Indigenous and remote communities in Western Australia and presented some lessons learned by these communities following disaster. She explained that the Red Cross takes a 'place-based' approach when working with these communities.

Ms Fuery said, 'This involves partnering Red Cross emergency services work with our community services people who are already on the ground delivering programs to communities in regional locations.'

Ms Fuery noted the importance of understanding local knowledge and how it can limit the impact of disasters and help to improve recovery. She believes it is crucial for emergency services organisations to work with the local community in the aftermath of a disaster.

'In terms of finding solutions to some of these problems, it is about partnerships. It is about working with the community to find out what they need and

Image: Nathan Maddock, Bushfire and Natural Hazards CRC

Research at Ngukurr in the Northern Territory shows harnessing knowledge, especially in remote Indigenous communities, is essential for disaster risk reduction.

being a facilitator to find the people who can find the solutions for them.

'By partnering with community programs [we] help to ensure that emergency programs are relevant, culturally-appropriate and sustainable,' Ms Fuery said.

Professor Lawrence has been conducting research on community perceptions of risk when experiencing hazards. She explained that perceptions of risk play a big role in how we prepare for disasters. Part of her research involved a large-scale national survey about how communities understand risks. This survey was conducted through the Bushfire CRC between 2010 and 2013.

Professor Lawrence said, 'What we found were clear differences between communities and within those communities [there were] individuals who were better and less prepared. The communities who were best prepared and the individuals who were best prepared both had elevated perceptions of risk,' she said.

The results of the survey demonstrated that those who had first-hand experience with bushfires or had participated in community groups dealing with bushfires were more likely to take action.

'That participatory element was critical. Communities that did not have it did not prepare very well,' she said.

Professor Lawrence also said there were clear differences in approaches to risk reduction and hazard preparation between those who live in the urban fringes of our cities and towns and people in rural areas.

'People on the urban fringe have this view that someone else is going to do it, whereas people in the country tend to roll up their sleeves and do it together,' she said.

Image: David Bruce, Bushfire and Natural Hazards CRC

The 2015 International Day for Disaster Reduction panel (left to right) Professor Carmen Lawrence, Erin Fuery, Anne Garland and Michael Rumsewicz.

Having worked with people in the remote community of Barrow, located right on the northern tip of Alaska, Anne Garland noted that these issues are not confined to Australia.

Ms Garland said, 'In the Arctic, these people are facing hazards they have never had to face before.

'The city of Barrow has lost about 100 feet of their coastline in the last 30 years,' she said

The increasing threat of natural disasters places a heavy burden on these remote and often isolated communities, but Ms Garland believes they have a wealth of knowledge in dealing with disasters.

'They have a huge background of resilience and risk understanding,' she said of the Barrow community.

While the Australian environment is vastly different to Alaska, the issues faced are similar, and there is a lot we can learn from these types of communities, despite the geological differences.

The Bushfire and Natural Hazards CRC supports the International Day for Disaster Reduction to help researchers and those working in the field to continue to share their knowledge.

CRC Research Manager, Dr Michael Rumsewicz. said, 'Our idea behind the International Day for Disaster Reduction is to get people who work in this area to discuss what is happening out in the field; what policy changes are being considered, and what new thinking is being brought to this area.

'This is not a conversation that stops now. It has to continue. There is a lot of knowledge and research that needs to be passed around from different environments and we will hold this event annually in a different location around the country,' he said.

With 39 events for the 2015 International Day for Disaster Reduction taking place in 31 countries, it is clear that risk reduction is a global concern affecting the international community. Rather than confining these concerns to one annual event, the Bushfire and Natural Hazards CRC, through its national research agenda exploring the causes, consequences and mitigation of natural disasters, will ensure that the crucial conversations around disaster reduction, prevention, mitigation and preparedness continue to take place in an everyday context.

Watch highlights of the 2015 International Day for Disaster Reduction at **www.bnhcrc.com.au**

Notes from the Field

Australian Medical Assistance Team

When the Director of Disaster Preparedness and Response from the National Critical Care and Trauma Response Centre, Matt Harper, landed in Vanuatu in March this year, he was awestruck by the devastation caused by *Tropical Cyclone Pam*.

A highly-trained emergency manager and team leader for the Australian Medical Assistance Team (AusMAT) mission to Vanuatu, Matt Harper has been involved in many disaster responses in his former role at Emergency Management Australia.

The AusMAT arrived only three days after the cyclone and what Matt most noticed was how the chain of Pacific islands had been stripped bare.

'There was not a leaf on a tree. Things like chickens, which are an important part of the food supply, were missing, probably blown away during the cyclone,' said Matt.

Matt was also struck by the dedication of the Aussie medical team.

'They were incredible. I realise now why medicine is a calling rather than just a job,' he said.

The AusMAT deployment was coordinated by the National Critical Care and Trauma Response Centre at the request of the Australian Government. The National Critical Care and Trauma Response Centre (NCCTRC) was established following the 2002 Bali bombings and remains a key element of the Australian Government's disaster response.

The NCCTRC enhances Australia's capacity to provide clinical and academic leadership in disaster and trauma care. The NCCTRC has played a crucial role in response operations such as Typhoon Haiyan in the Philippines. It has established itself as the regional leader in providing trauma and disaster training.

Matt Harper comes from a non-clinical background. 'It was different for a non-clinical person to be leading a medical team but it worked very well. In a complex disaster like *Cyclone Pam*, the last thing we wanted was for clinicians to be spending their time on meetings and logistics. That would be a terrible waste of talent. You should use that talent where it's most needed,' he said.

The Category 5 cyclone destroyed much of Vanuatu and was the most intense to have occurred in the Pacific region since *Cyclone Zoe* in 2002. The NCCTRC had been monitoring the development of *Cyclone Pam* and had started preparing in the days before impact. This allowed a response to be mobilised as soon as the Australian Government issued the request. The first resources, a three-member Rapid Response Team and four-member Initial Treatment Team, were sent to Vanuatu within 48 hours of the cyclone hitting Port Vila. The teams worked alongside local medical professionals at Port Vila hospital or assessed the ability of communities to deliver health care.

Meanwhile, the main body of the AusMAT – made up of an additional 13 Territorians and seven Victorians – flew to Port Vila with 17 tonnes of medical and logistics equipment.

The teams set up three air conditioned temporary wards in the car park at Port Vila Central Hospital where AusMAT clinicians treated 1341 patients and helped with the delivery of 92 babies.

Despite the challenges of driving a multi-jurisdictional project, the AusMAT is now in a position to access the very best of clinical staff from around the nation for health emergencies. This was well-demonstrated in the deployment to Tacloban City in the wake of *Typhoon Haiyan*, when every state and territory had the opportunity to send clinical staff.

In total there more than 600 trained AusMAT professionals available across Australia. Professionals from the health discipline include nurses, medical, surgical, allied health, environmentalists, public health practitioners, and paramedic fire and rescue personnel.

The diversification of this capability commenced in late 2014 during the Ebola virus epidemic. The NCCTRC now has infectious disease epidemic response as a strategic objective for the coming years.

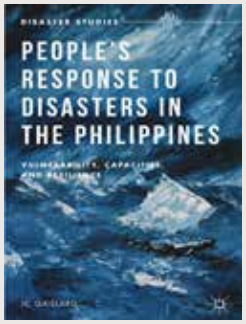
The AusMAT team deployed to Vanuatu in March 2015.

Review:

People's Response to Disasters in the Philippines

by J. C. Gaillard

Reviewed by Christine Healy



Published by Palgrave Macmillan New York, ISBN 1137484284

J.C. Gaillard is a widely published disaster researcher based in New Zealand. In this book he brings together a number of case studies on people's responses to disasters in the Philippines, through the lenses of vulnerability, capacities and resilience.

The Philippines is one of the world's most disaster-prone countries, located as it is on the typhoon belt and the Pacific volcanic rim. Flood, cyclone, landslide, volcanic eruption and earthquake are common. Between 1900 and 2013, 537 disasters have killed 60 000 people and directly and indirectly affected millions. But Gaillard challenges the orthodoxy that holds that it is nature's extremes and poor risk perception leading to inadequate behaviours that define the scope and damage of disaster. He argues that catastrophe not only lies in the triggering of natural hazards but rather is entangled in deeper socioeconomic and political factors. He also questions the focus of climate change as the main creator of future disasters, arguing that this focus distracts from the root causes of vulnerability to disaster.

The book is in three parts, the first dealing with vulnerability, which he defines as 'the susceptibility to suffer from a potentially hazardous event', referring to those conditions of a society that turns a natural hazard into a disaster. In answer to his question, 'Why did 1400 people die in late 2004?', he examines the disaster in which four successive tropical depressions and cyclones lashed eastern Luzon, bringing heavy damage and loss of life. He makes a detailed case that the three root causes of the disaster were not natural but were illegal deforestation of tropical mountain slopes, exacerbating landslides and floods; the migration of lowlanders to the mountains when they were deprived of access to land; and the oligarchical politics that allowed these things to happen.

Part two challenges the idea that those who suffer from disasters are helpless victims, making the case that communities bring inherent capacities to disaster. He found that when confronted with increasing and recurrent flooding the people of Pampanga made a wide range of adjustments in their daily life in order to cope. They were unable to rely on external aid and so reduced their food intake, cancelled celebrations, postponed the repayment of loans to family and friends and found other money-making activities. And here the role of women was signal—as it is in Australian drought-affected communities where women worked off-farm to support the farm's survival. Social networking was critical, based in an indigenous sense of community and including the sharing of labour.

Gaillard makes a plea for local capacities to be integrated with disaster recovery policy, requiring that the local knowledge, skills and resources are used by both local and outside stakeholders. He admits that this is difficult because local capacities rely on intangible resources like social networks, folklore and the memory of past events. To assist with making the intangible tangible, he introduces three techniques for capturing community knowledge: participatory mapping; disaster risk assessment; and P3DM (participatory three dimensional mapping), by which the community builds a three dimensional model of community vulnerabilities and assets. This critique of the techniques is immediately useful to Australian communities and policy makers.

To enhance community capacity Gaillard recommends the mainstreaming of marginalised groups and their capacities. Marginalised groups may be assumed to be vulnerable in disaster and yet their capacity often goes unrecognised. Take the case of the *baklâs*, of Irosin. Although nowadays often considered as gays, and sometimes transsexuals, the identity of *baklâs* in this context is more ambiguous and refers more to the performance of gender than to sexual orientation. In a society where tasks are clearly differentiated by gender, the *baklâs* are able to switch from male to female-orientated tasks and responsibilities and are acknowledged for their leadership in community activities.

Young people are also generally considered to be vulnerable in disaster and yet are knowledgeable about the local environment, dedicated to community activities, and keen to make a contribution after the event.

In part three Gaillard demonstrates how community participation in post-disaster recovery is essential to fostering long-term resilience. He uses the case of the Aeta people of Mt Pinatubo to illustrate how they have maintained the flexibility and durability of their traditional society in the face of the Mt Pinatubo volcanic eruption and the many subsequent lava flows and landslides.

This book is highly recommended to scholars and emergency management practitioners alike for its excellent exposition of the often used concepts of vulnerability, capacity and resilience in the context of well researched case studies.

EM Online:
BOM heatwave assessment service

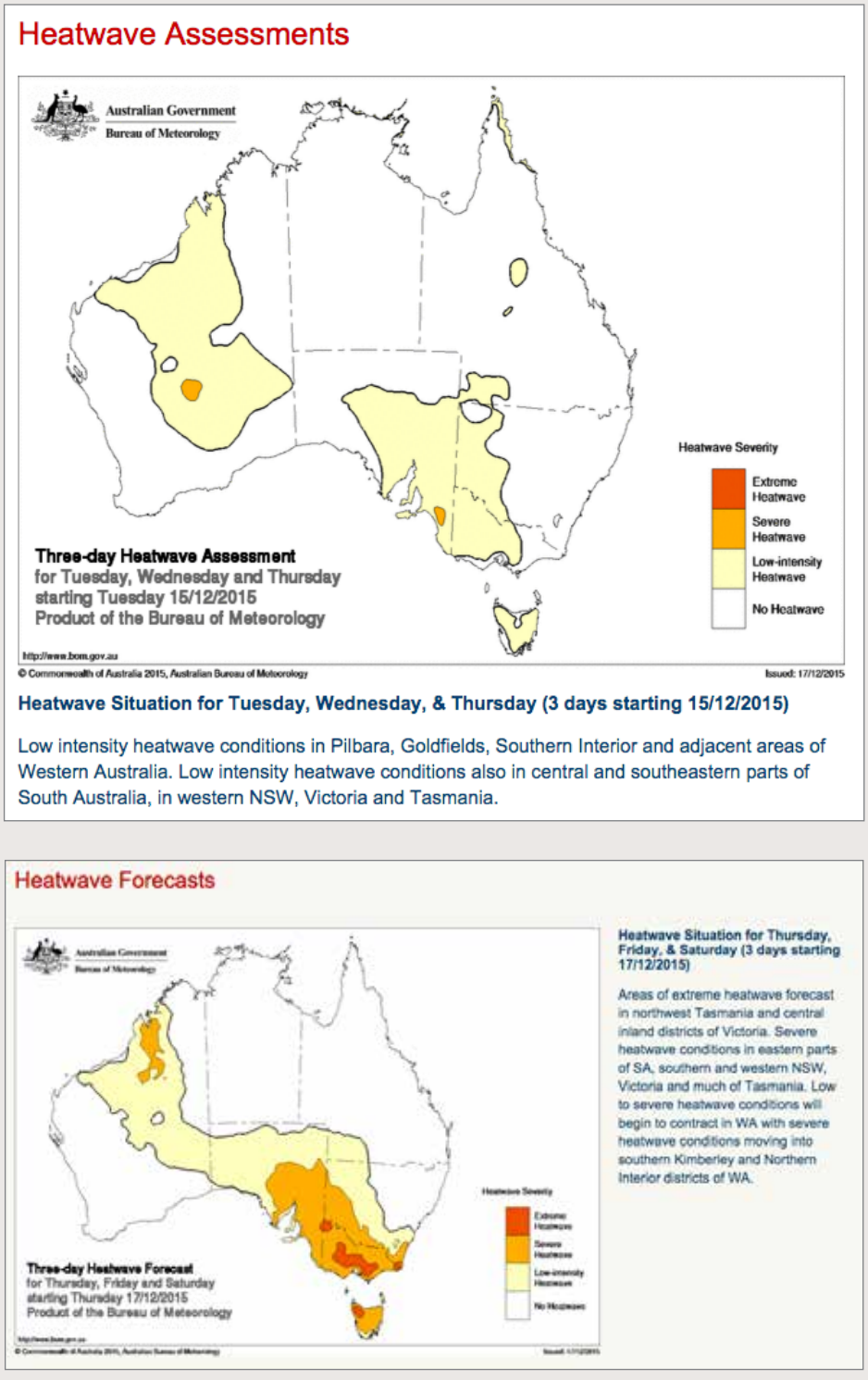
www.bom.gov.au/australia/heatwave/

Severe and extreme heatwaves claim more lives than any other natural hazard in Australia. For example, during the 2009 Victorian bushfires, 173 people perished as a direct result of the fires but 374 people lost their lives in the heatwave that occurred before the bushfires.

Advance notice of a heatwave helps everyone prepare for the conditions. The Bureau of Meteorology heatwave assessment service provides the advance notice of unusually hot conditions in areas of Australia. This gives communities, emergency services organisations and government bodies time to take actions to prepare for the conditions.

A heatwave is three or more days of high maximum and minimum temperatures that are unusual for a location. The heatwave service is a set of maps showing colour-coded areas of heat severity for the previous two three-day periods, and the next five three-day periods. Each map shows areas where heatwave conditions are and how they are contracting. They also show if the intensity is severe or extreme.

The heatwave service operates from the start of November to the end of March to cover the Australian summer.



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INNOVATION X CHANGE

The Pacific Humanitarian Challenge

Join us in rethinking humanitarian response

A Call to Action

Pacific countries are highly exposed to the impacts of climate change and extreme natural events. Through this $2 million Challenge we are calling on innovators, entrepreneurs, designers and scientists to rethink humanitarian response.

"What makes the Pacific uniquely challenging is its small population spread over such a large area"

Shadrack Welegtabit, Director of the Vanuatu National Disaster Management Office.

Take up the Challenge

The challenge seeks existing innovative solutions, and the opportunity to prototype new ways of doing business in the following three areas:

The Understanding and Interpretation of Needs
By improving the timeliness and needs assessment inputs, such as usefulness and accuracy of information, we will improve outcomes.

Humanitarian Logistics
By increasing our capacity to reach remote communities we will save lives and reduce the suffering caused by a disaster.

Building Financial Resilience
By increasing financial resilience, we help communities and businesses have access to the resources to fund recovery and reduce disaster risk.

Challenge Timeline

30 NOV 2015 *Challenge Opens*

7 FEB 2016 *Applications Close*

7 MAR 2016 *Innovators Announced*

29 - 30 MAR 2016 *Design Sprint*

11 APR 2016 *Final Submissions*

23-24 MAY 2016 *Final Innovators Announced*

Scaling the Impact

Through the implementation of these solutions and prototypes using the challenge funds, we will gain real-world assessment of their applicability to the region, and their technical, organisational and financial viability. If successfully piloted, it is DFAT's intention to support the continued development and scaling of the solution/prototype across the region post Challenge.

Australian Aid

Australian Government
Department of Foreign Affairs and Trade

www.pacifichumanitarianchallenge.org
#rethinkingresponse