

Increasing the resilience of the Deaf Community in NSW to natural hazards

Milestone 1 - Synthesis Literature Review Final Results Report

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Synthesis Literature Review Final Results Report - Milestone 1

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List of Acronyms

ABS	Australian Bureau of Statistics
Auslan	Australian Sign Language
CapTel	Captioned Telephones
CART	Communication Access Real-time Translation
CBO	Community-based Organisation
EMQ	Emergency Management Queensland
IP-relay	Internet Protocol Relay
NGO	Non-government Organisation
NSW RFS	New South Wales Rural Fire Service
NSW SES	NSW State Emergency Services
NSW	New South Wales
QLD	Queensland
TAS	Tasmania
TDDs	Telecommunication Devices for the Deaf (TDDs)
TTYs	Teletypewriters
VCO	Voice Carry Over system
VIC	Victoria
VRS	Video Relay Service

Key terms and concepts

Auslan: Australian Sign Language

Combat Agency: The agency identified in Displan as the agency primarily responsible for controlling the response to a particular emergency. (Source: SERM Act).

Australian Government Disaster Response Plan (COMDISPLAN):The COMDISPLAN outlines the coordination arrangements for the provision of Australian Government physical assistance to states or territories or offshore territories in the event of a disaster (Australian Government Attorney's-General Department, 2011).

Community: In *Communicating with people with a disability - National Guide for Emergency Managers (Attorney General's Department, 2013)*, four types of *communities* are identified: (i) geographic communities (bounded by space or location), (ii) communities of interest (shared interests/characteristics/attributes), (iii) virtual communities (connected online), and (iv) communities of circumstance (shared issue or disaster experience). In this project, we align ourselves most closely with 'communities of interest' i.e. groups of people who interact with each other based on shared interests, attributes, social networks, modes of expression and identity.

deaf: Someone who is deaf (denoted by a small 'd') is physically deaf but does not use Auslan or identify with the Deaf Community(Schembri, 2010).

Deaf: Someone who is Deaf (with a capital 'D') belongs to the Deaf Community and uses Auslan as their main language. They consider themselves to be 'normal' and not 'impaired' by their inability to hear - their identity is drawn from their shared culture and language and not from their inability to hear. Deaf people rely mainly on their vision (Auslan and text) to communicate and cannot usually hear speech even when amplified by a hearing aid (Schembri, 2010).

Deaf Community: The Deaf community is a network of people who share a language, a culture, and a history of common experiences – similar to an ethnic community. The Deaf community is well organized with national, state and local networks of sporting, recreation, social, special interest and advocacy groups(Schembri, 2010).

Disaster: A disaster is a complex, place-oriented product of a hazardous event and the historical outcomes of socio-political and economic forces (distinct from environmental forces) that have shaped societal structures and society's capacity to respond effectively to the hazard (Wisner et al., 2004). Disasters occur when a significant number of vulnerable people experience a hazard (or series of hazards) that cause severe damage to livelihoods and

overwhelm the system, making recovery improbable without external aid (Wisner et al., 2004).

The State Disaster Plan (Displan): The NSW Displan details emergency preparedness, response and recovery arrangements for New South Wales to ensure the coordinated response to emergencies by all agencies having responsibilities and functions in emergencies (Ministry of Police and Emergency Services, 2011b).

Emergency: An event, actual or imminent, which endangers or threatens to endanger life, property or the environment, and which requires a significant and coordinated response (Emergency Management Australia, 2004).

Emergency management: A range of measures to manage risks to communities and the environment (Emergency Management Australia, 2004).

Emergency services organisation: Government agencies in New South Wales that are charged (under the New South Wales State Disaster Plan) with the responsibility for managing or controlling an accredited rescue unit. These agencies include: the NSW Police, NSW Fire Brigades, Rural Fire Service, Ambulance Service, State Emergency Service, and Volunteer Rescue Association (State Emergency and Rescue Management Act 1989 No 165).

Hazard: A threat to humans and their welfare with the potential to cause loss (Smith, 1995).

Hard-of-hearing: Those who define themselves as being hard-of-hearing or hearing-impaired see themselves as 'hearing' people with a hearing impairment or medical problem. This group of people usually prefer to use speech, listening (with the help of hearing aids) and lipreading to communicate over Auslan and do not identify with the Deaf Community (Macready, 2009, Schembri, 2010).

Mitigation: In the context of disaster management, mitigation refers to structural and non-structural measures undertaken to limit the adverse impact of natural hazards (IFRC, 2012).

Preparedness: The process of ensuring that an individual, population or organisation (1) has complied with preventive measures, (2) is in a state of readiness to contain the effects of a forecasted disastrous event to minimize loss of life, injury, and damage to property, (3) can provide rescue, relief, rehabilitation, and other services in the aftermath of the disaster, and (4) has the capability and resources to continue to sustain its essential functions without being overwhelmed by the demand placed on them (BusinessDictionary.com, 2012).

Recovery: Decisions and actions taken after a disaster with a view to restoring or improving the pre-disaster living conditions of the affected community or population, while facilitating necessary adjustments to reduce disaster risk to future events (IFRC, 2012).

Resilience: The capacity of a system to absorb disturbance and reorganise throughout volatile periods of change whilst retaining function, structure and identity (Folke, 2006, Walker and Meyers, 2004).

Risk: The calculated likelihood of an event or change taking place and negatively impacting an exposure unit (individual, household or population) resulting from a decision or course of action (Smith, 2000).

Vulnerability: The degree to which an exposure unit [human groups, ecosystems and communities] is susceptible to harm due to exposure to a perturbation or stress, and the ability (or lack thereof) of the exposure unit to cope, recover, or fundamentally adapt (Kasperson and Kasperson, 2001).

Executive Summary

During the January 2011 floods and Cyclone Yasi (February 2011) the Queensland Premier Anna Bligh and Emergency Management Queensland (EMQ) used Australian Sign Language (AusLan) interpreters to communicate with the Deaf community during live television broadcasts for the first time. This initiative was commendable until the power failed in affected communities, causing TV broadcasts, Internet and telephone services to fail. Deaf Community members were left with little means to receive emergency response information, leaving them more vulnerable to ongoing events than the wider population. In NSW there is currently no state emergency strategy to effectively assess the needs of the Deaf community in a disaster setting and provide them with the assistance they need prior, during, or after a hazardous event.

In October 2011, the NSW State Government provided financial support for a 2-year project entitled *Increasing the resilience of the Deaf Community in NSW to natural hazards and disasters* to redress this oversight under the NDMP grants system. Specifically, the project aims to:

1. Increase the resilience of the Deaf Community to future natural hazards and disasters via improved access to and provision of emergency management information; and
2. Increase the effective resources of NSW emergency service organisations enabling them to deliver their core business (to the Deaf Community) and to improve the deaf awareness for staff and professional officers within those organisations.

Successful emergency management requires strong linkages and partnerships between emergency management organisations and the communities they serve. Consequently, this project is a collaborative initiative involving five partner institutions: the Australia-Pacific Tsunami Research Centre Natural Hazards Research Laboratory (APTRC-NHRL) based at the University of NSW; the Deaf Society of NSW; Fire and Rescue NSW; the Rural Fire Services NSW; and the State Emergency Services (SES) NSW.

The purpose of this synthesis literature review report is to: (i) ascertain what is currently known about the Deaf Community in NSW, the needs of its members, and their capacity to effectively respond to natural hazards, (ii) identify the types of hazards that the NSW population is exposed to, (iii) outline the approach emergency managers in Australia and NSW take in assisting those with disabilities and the challenges these agencies face in supporting this minority group in an emergency setting, and (iv) identify actions that may help strengthen collaborative and effective action on emergency preparedness and response that specifically addresses the needs of the Deaf Community. In producing preliminary answers to these questions, it also fulfills the requirements of Milestone 1 of the project (see Appendix 1 for the project plan and milestones).

Hazards in New South Wales

New South Wales (NSW) residents are exposed to several types of natural hazards. These include bush fires, wind storms, hail storms, lightening, flash flooding, riverine flooding, coastal erosion and inundation, drought, and heatwaves (DECCW, 2010e, Emergency Management Australia, 2006). Bushfires are one of the most destructive forces of nature. However, severe storms are the most common natural hazard in Australia and are responsible for inflicting the most damage in terms of insurance costs in Australia and NSW (Emergency Management Australia, 2006, Insurance Council of Australia, 2012). Climate change projections for NSW indicate that the severity and frequency of bushfires, heatwaves, and coastal erosion and inundation (due to increases in sea-levels rise) some of these hazards are likely to increase (DECCW, 2010e).

The Deaf Community in NSW and their vulnerability to hazards

The Deaf Community - the focus population of this project - is a group of people who share a language (Australian Sign Language or Auslan), a culture, beliefs and practices that derive from a history of common experiences that are transmitted across generations – similar to an ethnic community. They do not define themselves in terms of their hearing impairment. Instead, having a shared language is the main determinant of inclusion. The exact numbers of Auslan users in Australia and NSW is difficult to ascertain. According to Australian Census data (ABS,2012a), there are an estimated 8,406 Auslan speakers in Australia and 1,484 NSW, representing less than 0.1% of the population at both geographical levels. However, Hyde and Power (1991) suggest that the true number is closer to three times higher than official figures suggest.

Having special needs, like a hearing impairment, can exacerbate vulnerability to the impacts of natural hazards or disasters (Dow and Cutter, 2002, Hans and Mohanty, 2006, Parr, 1987, Phillips et al., 2005, Van Willigen et al., 2002, Wisner, 1993). For example, people that are deaf may not receive warnings broadcast to the general population if the main communication mediums used are auditory (Phillips et al., 2005, Wood and Weisman, 2003, Wisner, 1993). However, labelling deaf people as inherently vulnerable presupposes ‘victimhood’ and disempowers those individuals or groups by downplaying the substantial role human agency and their personal coping skills play in influencing their response capabilities. A more inclusionary approach to emergency and disaster management is needed, one that capitalises on the strengths of the Deaf Community, fulfils their identified needs, and facilitates close cooperation and common understanding between the Deaf Community and the emergency management services.

Emergency management approaches in Australia and implications for inclusionary support

There are three main emergency management approaches when dealing with the needs of sub-sets of the community that have ‘disabilities’ or impairments (Wisner, 2003):

- a. **Do nothing**—prevalent in situations where there are few resources and many needs, the disabled are simply not given priority
- b. **Provide special services** and arrangements for people with impairments or disabilities
- c. **Participatory and inclusive approaches** that actively involve disabled people and their organisations in the process of assessing their vulnerability to harm and capability for self-protection in the face of hazards.

Australia currently subscribes to ‘Approach B’ that is highly top-down and views disability as a medical condition. There is therefore a disconnect between how the emergency services define the Deaf Community members and how Deaf Community members see themselves and their abilities – Deaf Community members do not define themselves in terms of their hearing impairment but the hearing world does. This misalignment of definitions consequently affects the framing of emergency response approaches and response plans with regard to disabled or impaired community members. This project aims to facilitate a shift to a more inclusive approach (Approach C) by actively involving the Deaf Community in the planning of more supportive emergency management practices and procedures and increasing the involvement of deaf and hard-of-hearing support organisations. We are mindful, however, that such ambitions will be nonetheless shaped by existing emergency management policies and structures necessitating a grounded understanding of the workings of the emergency service organisations within these existing legal parameters and the capacities of these organisations to consider and apply more inclusionary framings and procedures.

Challenges in supporting the Deaf Community in emergency situations

There is limited information on the experiences of deaf and hard-of-hearing people in responding to disaster situations here in Australia. However, international accounts detail numerous challenges that prevent the Deaf Community from getting the support they need to best prepare, respond, and recover from emergency and disaster events. The main challenge for the Deaf Community is getting access to information needed to facilitate effective responses during and after the event. Many are unable to receive local emergency notification messages prior to evacuation or whilst in shelters.

Emergency management organisations experience multiple challenges in effectively supporting deaf people and those with disabilities prepare and respond to events:

- a. Prior to the event: disabled people are not included in preparedness planning and their specific needs are not well-known; preparedness information is often not presented in accessible formats; and there are few training opportunities for first responders in how to best support disabled people;
- b. During the event: locating vulnerable populations is difficult; communication methods used to inform the public of unfolding events and response instructions are highly auditory and therefore inaccessible to deaf people; emergency call centres may not have the appropriate technology to communicate effectively with deaf people; whilst facilities and services in evacuation shelters often do not have the right facilities and services required to communicate and support deaf people;
- c. Post-event: trauma counselling for deaf individuals is limited and lessons learnt are not always incorporated into future planning or response practices.

Practices to help improve emergency support for deaf people

A review of the literature points to the following recommendations to improve the level of support emergency management organisations provide to deaf and hard-of-hearing individuals and increase the preparedness and resilience of this sub-section of the NSW population:

1. There is a need for emergency services to have access to reliable information on the location and needs of the Deaf Community and hard-of-hearing.
2. Increasing inclusion in emergency planning and management by including deaf and hard-of-hearing representative bodies, community-based organisations, disability experts, and deaf and hard-of-hearing people in all stages of the emergency management and disaster planning process. This also requires the development of strong relationships between emergency management organisations and deaf and hard-of-hearing representative and support bodies and people's ownership of their own preparedness.
3. Deaf and hard-of-hearing people should be supported to enhance their knowledge of both the types of risk that they may face and how best to respond in the event of an emergency or disaster whilst emergency service staff require training on the specific needs of people who are deaf.
4. Communication methods need to match the needs of the end-users. Furthermore, making information on the needs of deaf and hard-of-hearing people will encourage wider community awareness of their needs.
5. Appropriate services and facilities that suit the requirement of deaf people need to be made available in evacuation shelters. If this is not possible in all locations, then both shelter staff and deaf people need to be made aware of centres that can specifically cater for deaf and hard-of-hearing people.

1 Introduction

New South Wales (NSW) (Figure 1) is affected by a range of natural hazards that take human life, cause injuries, and destroy private property and infrastructure. Risk management seeks to simultaneously increase the resilience and reduce the vulnerability of individuals and communities to the negative effects of natural hazards and their associated disasters. To achieve this, communities work together with local government authorities, and emergency service organisations but having the information needed to respond effectively before, during, and after an emergency or disaster event is crucial in determining a positive outcome.

During the January 2011 floods and Cyclone Yasi (February 2011) Queensland Premier Anna Bligh and Emergency Management Queensland (EMQ) used Australian Sign Language (Auslan) interpreters to communicate with the Deaf community during live television conferences for the first time. This initiative was commendable until the power failed in relevant communities, causing TV broadcasts, Internet and telephone services to fail. This left the Deaf Community members with fewer means to receive emergency response information, leaving them vulnerable to ongoing events. In NSW there is currently no state emergency strategy to effectively assess the needs of the Deaf community in a disaster setting and provide them with the assistance they need prior, during, or after a hazardous event. To redress this oversight, this project aims to:

1. Increase the resilience of the Deaf Community to future natural hazards and disasters via improved access to and provision of emergency management information; and
2. Increase the effective resources of NSW emergency service organisations enabling them to deliver their core business (to the Deaf Community) and to improve the deaf awareness for staff and professional officers within those organisations.

The objectives used to fulfil each aim are to:

1. Undertake consultation workshops and to conduct face-to-face interviews with representative members (and stakeholders) of the Deaf Community to determine:
 - a. Current awareness of the Deaf Community to natural hazard and disaster risk in NSW;
 - b. Identify the current sources of information used by the Deaf Community to help prepare for emergencies and to respond appropriately in hazard/disaster situations;
 - c. Investigate the preferred forms of 'communication' that will meet the needs of the Deaf Community during live emergency situations in the future; and
 - d. Analyse existing capabilities of the NSW emergency service organisations (specifically, the NSW SES, the NSW RFS and FRNSW) to deliver risk information and warning messages to deaf people across NSW.
2. Use the results generated from Objective 1 to devise a range of information communication sources/materials and strategies to meet the needs of deaf people in NSW;



Figure 1. Location of New South Wales and its regions

3. Trial and test various communication and information sources for selected (high probability) hazard scenarios in NSW (determined by the NSW SES) with deaf people in NSW; and
4. Assist the NSW State Emergency Services, the NSW Rural Fire Services and Fire and Rescue NSW devise and implement a communication strategy to specifically cater for the needs of deaf people in NSW.

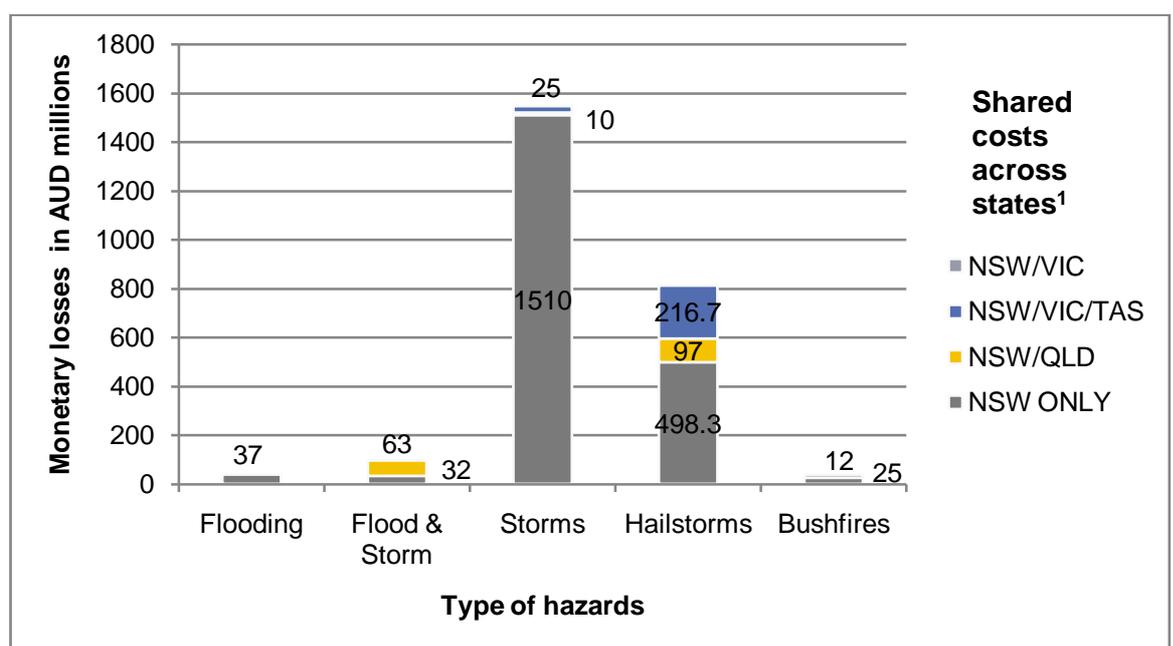
Vulnerability and resilience are place- and system-specific prompting three fundamental questions that form the basis of any investigation into vulnerability levels and ways to reduce them: *who* is vulnerable, *what* are they vulnerable to, and *why*? The purpose of this report is to provide preliminary answers to these foundational research questions and to give an overview of the relevant background material thereby generating a sound structure for the work. In doing so, it also fulfills the requirements of Milestone 1 of the project (see Appendix 1). This review has been prepared at the outset of the project and will be enhanced for the final project report due in December 2013.

The remainder of the report is divided up into five sections. Section 2 presents the types of natural hazards in NSW that pose a risk to the state population (what are people exposed to). Section 3 gives an overview of the Deaf Community in Australia and NSW (who – the focal population). Section 4 examines linkages between vulnerability and ‘disability’. Section 5 identifies the emergency management approach that is used in Australia and outlines the specific policies and disaster response plans that inform emergency response practices and procedures in NSW. Section 6 explores some of the reasons why the Deaf Community are particularly vulnerable to natural hazard risks. This includes a review of current risk and emergency management approaches to assisting deaf people and those with disabilities (both generally and in NSW specifically), the challenges emergency response agencies face in providing appropriate support, and the identification of actions that may improve both emergency management strategies in supporting the Deaf Community and increase their resilience.

2 Natural hazards in New South Wales

New South Wales (NSW) (Figure 1) is prone to many types of natural hazards. These include bush fires, wind storms, hail storms, lightning, flash flooding, riverine flooding, coastal erosion and inundation, drought, and heatwaves (DECCW, 2010e, Emergency Management Australia, 2006). Bushfires are one of the most destructive forces of nature and South-eastern Australia has the greatest wildfire hazard in the world (Emergency Management Australia, 2006). However, severe storms are the most common natural hazard in Australia and are responsible for inflicting the most damage in terms of insurance costs (Emergency Management Australia, 2006, Insurance Council of Australia, 2012). The same is true in NSW.

Figure 2 shows that the monetary losses sustained from storms in NSW over the last decade far outweigh losses sustained from any other type of hazard. Flash and riverine flooding also present as significant and widespread risks to populations and property across all regions of NSW (DECCW, 2010e). Heatwaves and instances of coastal inundation and erosion are concentrated in particular NSW regions. Heatwaves, for example, are most prevalent in central and western parts of NSW (DECCW, 2010e). They are also experienced (with less frequency) in eastern parts of both the Riverina Murray and Western regions, whilst the eastern seaboard is largely spared due to the cooling influences of sea breezes (DECCW, 2010e). The geographical patterns of natural hazards events experienced across the state are presented in Figure 3.



Source: data sourced from Insurance Council of Australia (2012).

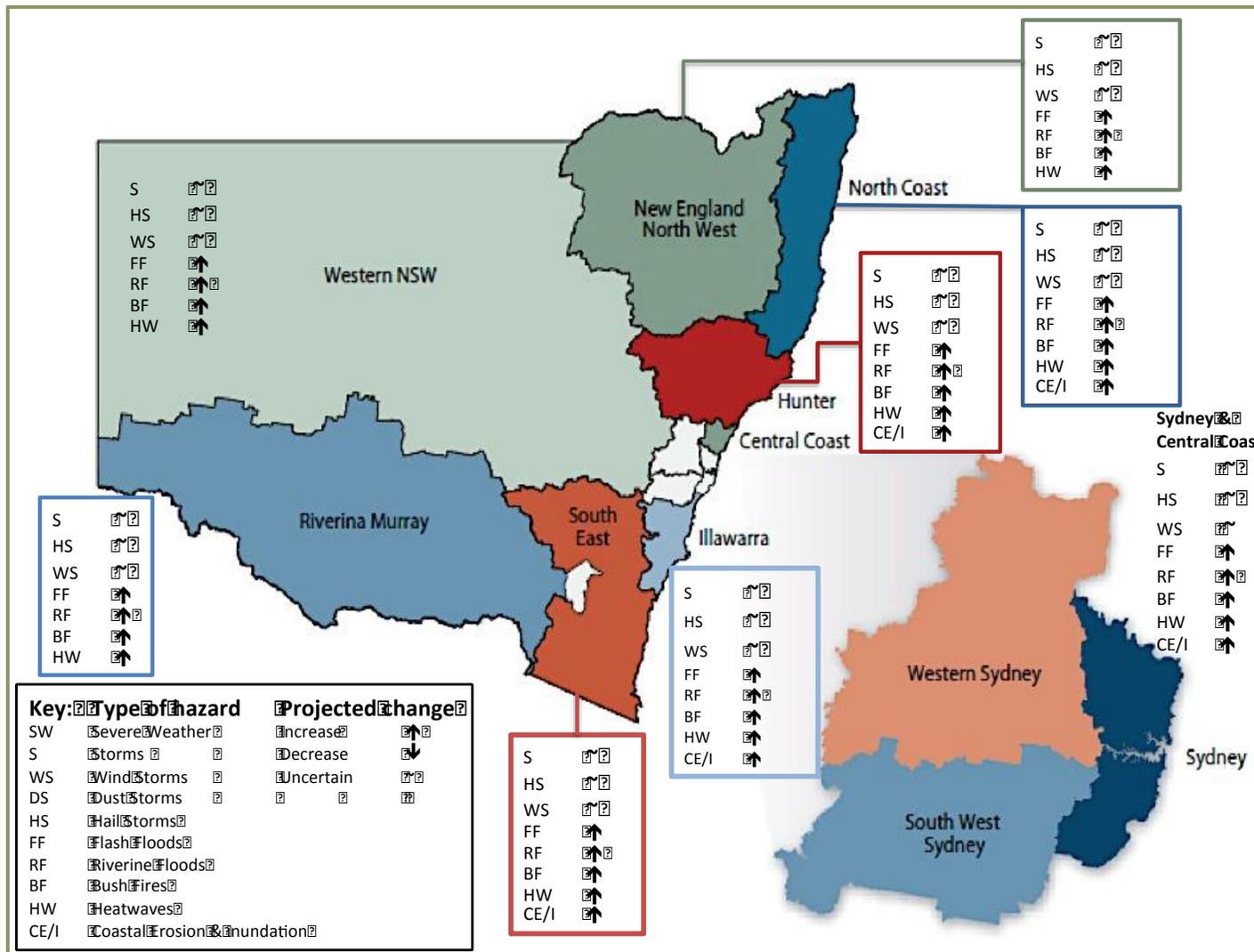
Figure 2. Estimated disaster losses incurred in NSW 2002-2011²

Climate change projections for NSW indicate that the severity and frequency of some of these hazards are likely to increase (DECCW, 2010e). The risk of bushfires is expected to increase the most. Projected increases in the number and intensity of days of high temperature, low humidity and higher evaporation levels will increase the frequency and intensity of fires, with the occurrence of days of very high to extreme fire-risk possibly rising by 10–50% in all regions (DECCW, 2010e). Heatwaves are also expected to increase in frequency and severity due to projected mean maximum temperature increases of 1-3°C by 2050 (DECCW, 2010e).

¹The full name of each Australian state listed here is as follows: NSW (New South Wales), VIC (Victoria), TAS (Tasmania), QLD (Queensland).

² Estimated original costs used here are based on reported submissions over AUD10 million provided by general insurers. Consequently, the figures are only an approximation of the insured losses.

Sea levels along the NSW coast are projected to rise as much as 40 cm above 1990 mean sea levels by 2050 whilst a 1% increase in storm surge is deemed possible (DECCW, 2010e). A projected rise in sea level of up to 40 cm is likely to result in a recession of sandy parts of the coastline of up to 20–40 metres by 2050 (DECCW, 2010e). It is unclear what impacts climate change may have on future storm (including thunderstorms, hailstorms, lightening or flood event frequencies and patterns (DECCW, 2010e). However, flood risk is expected to increase due to the rising developmental pressures in low-lying coastal areas (DECCW, 2010e).



Sources: DECCW (2010f, 2010b, 2010c, 2010a, 2010d, 2010g)

Figure 3. Natural hazards patterns in NSW by region and climate change projections

3 The Deaf Community: culture versus ability

3.1 Introduction

One of the most important tasks for the emergency manager is to understand who the stakeholders are, the numbers of each stakeholder group, and what is important to them (Boughton, 1998, Ferrier and Planner, 1999, Phillips et al., 2005). This knowledge not only allows appropriate emergency preparedness activities and response planning to take place prior to the event, it also helps emergency services to identify and provide suitable and adequate facilities and resources during and after the event (Wisner, 2003). Opening up dialogue between emergency response agencies and minority community groups also facilitates a mutual understanding that can lead to the design of more inclusive plans and greater community engagement and ownership in all phases of disaster management and planning (Wisner, 2003). But defining the Deaf Community and identifying its members is not clear-cut and is dependant, in part, upon which culture a person grew up in or identifies most closely with, 'the hearing world' or the 'the deaf world'.

3.2 The Deaf Community

The Deaf Community is a group of people who share a language (Australian Sign Language or Auslan), a culture, beliefs and practices that derive from a history of common experiences that are transmitted across generations – similar to an ethnic community (Padden and Humphries, 1988, Schembri, 2010). They are also a linguistic minority, with Auslan being used as the dominant language and communication medium (in conjunction with the written word) that binds the community together (Johnston, 1998, McQuigg, 2003). However, not all deaf people are members of the Deaf Community.

Australian Bureau of Statistics (ABS) figures on the size of the deaf population in Australia are patchy. However, estimates suggest that 1,485,900 people in Australia have partial hearing loss and a further 43,000 are totally deaf (Table 1). In NSW, 414,400 experience partial hearing loss whilst 12,900 are totally deaf (Table 1). But only those that speak Auslan are considered part of the Deaf Community (ABS, 2012c, Johnston, 1998). Statistics on Auslan speakers are also unreliable (based on the ambiguity of the questions used to collect the data) but 2006 Australian Census data indicates that 5,538 use Auslan in Australia (ABS, 2012a). Hyde and Power (1991) suggest that this number is closer to three times this amount (15,400). The same ambiguities arise in the available data for NSW. ABS 2006 Census data estimate the Auslan speaking population to be 1,484 people (ABS, 2012b) whilst Hyde and Power (1991) purport the number to be 4,130. This problem of identifying the number of Auslan users is not isolated to Australia. Similar experiences have been reported in the US and Canada due to the mismatch between how governments and deaf individuals identify themselves; not being able

to hear is not in itself a determinant of group identify for sign language users (Padden and Humphries, 1988).

Table 1. Estimated numbers of those with hearing loss in NSW by region ('000)

Geographic regions	Partial loss of hearing	Total hearing loss	All people with hearing loss
Sydney	242.9	6.8	249.7
Hunter	68.9	2.7*	71.6
Illawarra	-	-	37.7
Richmond-Tweed	21.1	0.5**	21.6
Mid-North Coast	-	-	25.2
Northern	16.9*	0.9**	17.9*
North Western	-	-	4.7*
Central West	18.8*	0.9**	19.7*
South Eastern	13.4*	0.2**	13.6*
Murrumbidgee	18.2*	0.8**	19*
Murray	7.6*	0.1**	7.7*
Far West	6.6*	-	6.6*
Off-shore areas & migratory	-	-	-
All of NSW	414.4	12.9	495.0
<i>All of Australia</i>	<i>1485.9</i>	<i>43.0</i>	<i>1529.0</i>

Source: data from ABS Survey of Disability, Ageing and Carers (SDAC) 2009

* estimate has a relative standard error between 25% and 50% and should be used with caution

** estimate has a relative standard error greater than 50% and should therefore be only as a rough guide

The distinction between the ‘culturally deaf’ and ‘audiologically deaf’ populations is reinforced in the written word (Padden and Humphries, 1988). Deaf Community members that subscribe to this culturally-based identity refer to themselves as being ‘Deaf’ (spelt with a capital ‘D’). For this community, one’s hearing ability is not a determinant of inclusion. Nor do they see themselves as disabled or physically deficient in any way (McQuigg, 2003). Deafness is both about being hearing impaired and culture. This culturally-loaded viewpoint is in stark contrast to the one taken by ‘deaf’ and ‘hard-of-hearing’ people who define themselves in terms of their lack of hearing ability and biological disability. A ‘deaf’ person (spelt with a small ‘d’) is someone who is physically deaf but does not use Auslan or identify with the Deaf Community (Padden and Humphries, 1988). This means that on the one hand, someone can be ‘deaf’ but not ‘Deaf’ but you cannot be ‘Deaf’ unless you are ‘deaf’ (Schembri, 2010). Someone that is ‘hard-of-hearing’ sees themselves as a ‘hearing’ person with a hearing impairment. This group of people usually prefer to use speech, listening (with the help of hearing aids) and lip-reading to communicate over Auslan and have no ties with the Deaf Community (Macready, 2009, Schembri, 2010).

The degrees of hearing loss may differ between ‘deaf’ and hard-of-hearing’ people (see Box 1) but their cultural orientation is similar. The choice to orientate oneself to either the ‘hearing’

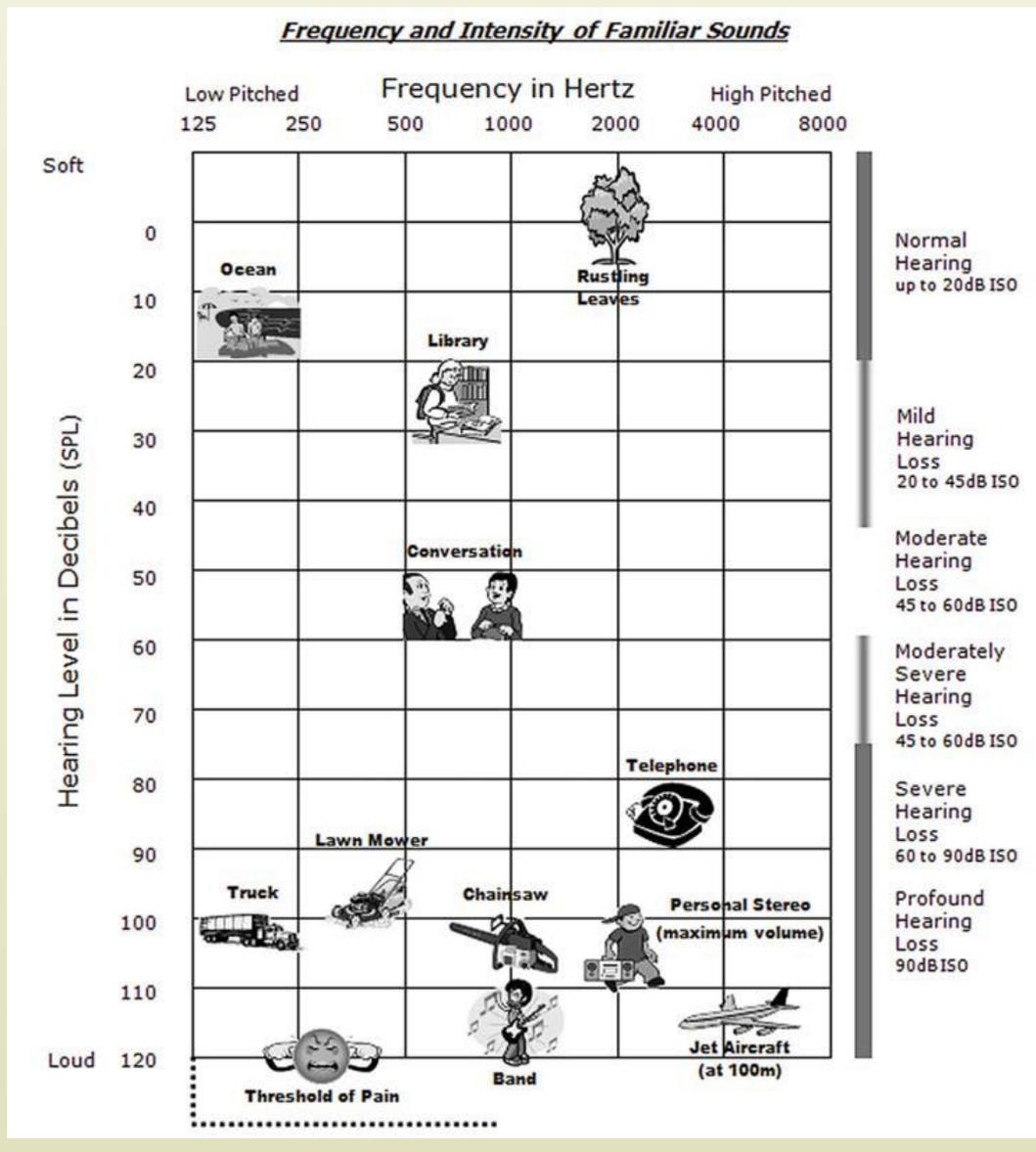
or 'Deaf' culture is often influenced by the age at which a person loses their hearing(Johnston, 1998). The vast majority of people who lose their hearing later in life see themselves as 'hearing' individuals who now lack the ability to hear ('deaf') whilst those with early onset profound deafness more readily adopt the Deaf culture, its language, and a positive identity based on difference instead an inability to hear(Johnston, 1998).

Whilst "Deaf culture' plays a dominant role in the identity of Deaf Community members, they are not one homogeneous group. Within this community there are smaller groups organised by class, age, ethnicity, race, and profession, all of which influence their identities, belief systems, perceptions of risk, and indeed their response capabilities when faced with emergency situations (see Adger, 2006, Padden and Humphries, 1988). Their hearing abilities also differ markedly, crossing the spectrum from mild hearing loss through to profoundly deafness (Padden and Humphries, 1988). Yet despite these differences, the Deaf Community are a cohesive, supportive, and well-organized group of people with national, state and local networks of sporting, recreation, social, special interest and advocacy groups(Macready, 2009, Schembri, 2010). Deaf people spend a large part of their leisure time socialising with other Deaf Community members, with approximately 80 to 90% of Deaf people marrying or forming long-term stable relationships with other Deaf community members (Johnston, 1998).

Members of Australia's dominant 'hearing' culture, however, have not yet come to terms with the 'otherness' of Deaf people and their culture (Macready, 2009), creating a divide between the two cultures where puzzlement, and often exclusion on both sides has become the unintended norm(Macready, 2009). The dominant 'hearing culture' relates to the deaf in terms of their 'disability' or inability to hear and any attempts to include them in social initiatives is done so from a presupposition that this defining difference (the inability to hear) should be eliminated (though technology or inclusion into mainstream 'hearing' systems) where possible (Macready, 2009). Through this 'equalling' process, the Deaf are given the chance to become inferior copies of 'the hearing' (Macready, 2009). But this 'hearing' positionality, causes dominant social group members to be oblivious to the Deaf Community's unique way of seeing and operating in a shared physical world and their attachment to this unique cultural viewpoint (Macready, 2009). This inability of the dominant 'hearing culture' to appreciate the viewpoints of the minority Deaf population and the different way they interact in the world, however, influences the dominant culture's perceptions of the 'disabled' and their vulnerability to hazardous events, and the subsequent 'hearing' population's treatment of the 'disabled' in emergency management.

Box 1: Levels of hearing loss and their measurement

Audiograms are used by the medical profession to measure a person's degree of hearing loss. The severity of hearing loss is ranked according to the intensity (the volume of a sound - soft to loud) and the pitch (low to high) of sounds heard by the individual. Decibels (dB) measure the sound's intensity whilst frequency (hertz) is a measure of pitch. The five levels of hearing loss are: mild, moderate, moderately severe, severe or profound. The ranking of these five hearing loss categories along with the corresponding frequency and intensity of familiar sounds is shown below.



Source: © Deaf Society of New South Wales 2010.

4 Challenging linkages between vulnerability and disability

Having special needs, like a disability, can exacerbate vulnerability to the impacts of natural hazards or disasters (Dow and Cutter, 2002, Hans and Mohanty, 2006, Parr, 1987, Phillips et al., 2005, Van Willigen et al., 2002, Wisner, 1993). The deaf are one such group. People that are deaf, for example, may not receive warnings broadcast to the wider population if the main communication mediums used are auditory (Phillips et al., 2005, Wood and Weisman, 2003, Wisner, 1993). However, conventional approaches in emergency management rarely go beyond acknowledging that people with disabilities need to be 'helped' by emergency response professionals and support services when a disaster occurs (Parr, 1987, Waterstone and Stein, 2006, Wisner, 1993, Wisner, 2003).

Two recent Australian examples of this are found in the Victorian Bushfire Royal Commission Final Report on the 2009 Black Saturday bushfires and the 2011 Interim Report from the Queensland Floods Commission. Both reports acknowledge the need to provide special assistance for 'vulnerable groups', which includes those with disabilities, but they fail to proffer any concrete plans on how best to serve this sub-set of the community in future disasters (see Holmes, 2011, Teague et al., 2010). Furthermore, conventional disaster planning and responses can compound existing social inequalities and vulnerabilities experienced by the disabled (Fjord and Manderson, 2009). These oversights have prompted calls for the needs of the Deaf Community to be better represented in the formulation and implementation of disaster preparedness and response plans (Hans and Mohanty, 2006, Kent, 2011, National Council on Disability, 2005, NOAA, 2011, St. Louis County Public Health and Human Services, 2011, Stephens, 2011, United Nations Secretariat for the Convention on the Rights of Persons with Disabilities, 2006). Yet for real change to occur, assumptions emergency management agencies have about 'disability' and the vulnerability of disabled people need to be examined (Fjord and Manderson, 2009, Wisner, 2003).

Disasters lay bare the very essence of society (Oliver-Smith, 1996), with each disaster prompting questions about which social and environmental conditions create and perpetuate social practices of discrimination and exclusion (Fjord and Manderson, 2009, Wisner et al., 2004). Vulnerability, therefore, cannot be seen solely as a condition created by personal traits of an individual or community sub-group. Vulnerability is a contextualised condition of the coupled human-environment within which we live, necessitating a holistic approach that considers both the social characteristics of individuals as well as the social and physical environments that either facilitate or constrain an individual's or a group's access to the resources they need to prepare and effectively respond to a hazardous event (Larsen et al., 2011). Nor can disaster preparedness plans effectively reduce vulnerability by making lists of 'vulnerable people' and treating them as being 'exceptional' from the wider community (Fjord

and Manderson, 2009, Wisner et al., 2004). This type of labelling that presupposes 'victimhood' also disempowers those individuals or groups by downplaying the substantial role human agency plays in influencing their response capabilities (Coleridge, 1993, Fordham, 1999, McLaughlin and Dietz, 2008, National Organization On Disability, 2002, Wisner, 2003). Fjord and Manderson (2009) argue that the 'disabled' are not inherently victims or categorically vulnerable; instead this subset of the community bring valuable cultural expertise on how to identify and resolve social and environmental barriers. The disabled are well trained to creatively overcome adversity including access or communication barriers, as it is something that they must negotiate every day (Fjord and Manderson, 2009, Parr, 1987).

Fjord and Manderson (2009) and Wisner (2003) consequently challenge the tendency of the dominant 'able' culture to routinely view the needs of those with disabilities as 'special' and tend to these needs by including them as 'additions' to standard emergency preparedness and disaster response plans. Instead, an alternative approach is proffered that places the needs and the experiences of the disabled at the centre of wider social inclusionary plans to create social environments that meet the everyday needs of all society members (Fjord and Manderson, 2009). This requires a fundamental shift from a focus on the 'abled' and seeing the disabled as a special interest group to making those that are currently marginalised the focus of future developmental and disaster management plans. Adopting a broader definition and inclusionary approach ensures that no one is left behind and results in a more supportive social net for all (National Council on Disability, 2005).

This inclusionary approach is supported from a rights perspective. Article 9 of the United Nations' *Convention on the Rights of Persons with Disabilities* (UNCRPD) stipulates that signatories (which includes Australia) shall "take appropriate measures to ensure to persons with disabilities access, on an equal basis with others...to information and communications... [including] ...emergency services" (Hans and Mohanty, 2006, Parr, 1987). Under Article 11 of the UNCRPD, signatories shall "take...all necessary measures to ensure the protection and safety of persons with disabilities in situations of risk" (United Nations Secretariat for the Convention on the Rights of Persons with Disabilities, 2006).

Calls for more inclusionary approaches may be sound in principle, but for theory to be transformed into action, these changes need to be supported by structural and procedural mechanisms that shape current emergency responses, namely laws, policies, and subsequent institutional procedures that dictate emergency response practices at the local, state, and federal level. Important policy questions to be asked include (Wisner, 2003):

- a. How are 'disability' (and 'ability') and 'normality' defined in Australian emergency management policy?
- b. What implications do these definitions have for policy and emergency responses designed to support the needs of people with different kinds of impairments?
- c. Are all disabilities treated in the same way or are responses tailored to the specific needs of individuals?

Enquiry into these issues fall under aim (2) and Objective (1d) of the project and as such will be explored in some depth throughout the project (see Appendix 1). However, the next section provides foundations for this more in-depth work by giving an overview of current emergency management approaches taken in Australia and the policies that guide emergency responses in NSW.

5 Emergency policy and planning in Australia and NSW

There are three main emergency management approaches when dealing with the needs of sub-sets of the community that have ‘disabilities’ or impairments (Wisner, 2003):

Approach A. **Do nothing** - in situations where there are few resources and many needs, the disabled are simply not given priority;

Approach B. **Provide special services** and arrangements for people with impairments or disabilities; and

Approach C. **Participatory and inclusive approach** that actively involves disabled people and their organisations in the process of assessing their vulnerability to harm and capability for self-protection in the face of hazards.

Australia subscribes to ‘Approach B’ which is highly top-down and views disability as a medical condition (Wisner, 2003). This project aims to facilitate a shift to a more inclusive approach (Approach C) by actively involving the Deaf Community in the planning of more supportive emergency management practices and procedures and increasing the involvement of deaf and hard-of-hearing support organisations. But such moves are still shaped by existing emergency management policies and procedures.

Australia’s approach to emergency management is comprehensive. It encompasses all hazards and sees the management of risk, hazards, emergencies, and disasters as a holistic process that requires planning, action and monitoring throughout the four integrated stages of the disaster cycle (Emergency Management Australia, 2004):

1. *Mitigation*: mitigation activities seek to reduce the impact of hazards themselves along with the populations susceptibility of populations at risk of hazard impacts;
2. *Preparedness*: preparedness activities establish plans, and provide education and information that are designed to help prepare individuals and populations cope effectively with emergencies and disasters that may eventuate;
3. *Response*: response actions activate preparedness arrangements and plans to help the population deal with the immediate effects of the emergency or disaster; and
4. *Recovery*: recovery strategies assist emergency- or disaster-affected communities rebuild physical infrastructure and restore emotional, social, economic, and physical wellbeing.

The four stages of the disaster cycle along with the types of actions that are taken at each stage of the disaster cycle are shown in Figure 4.

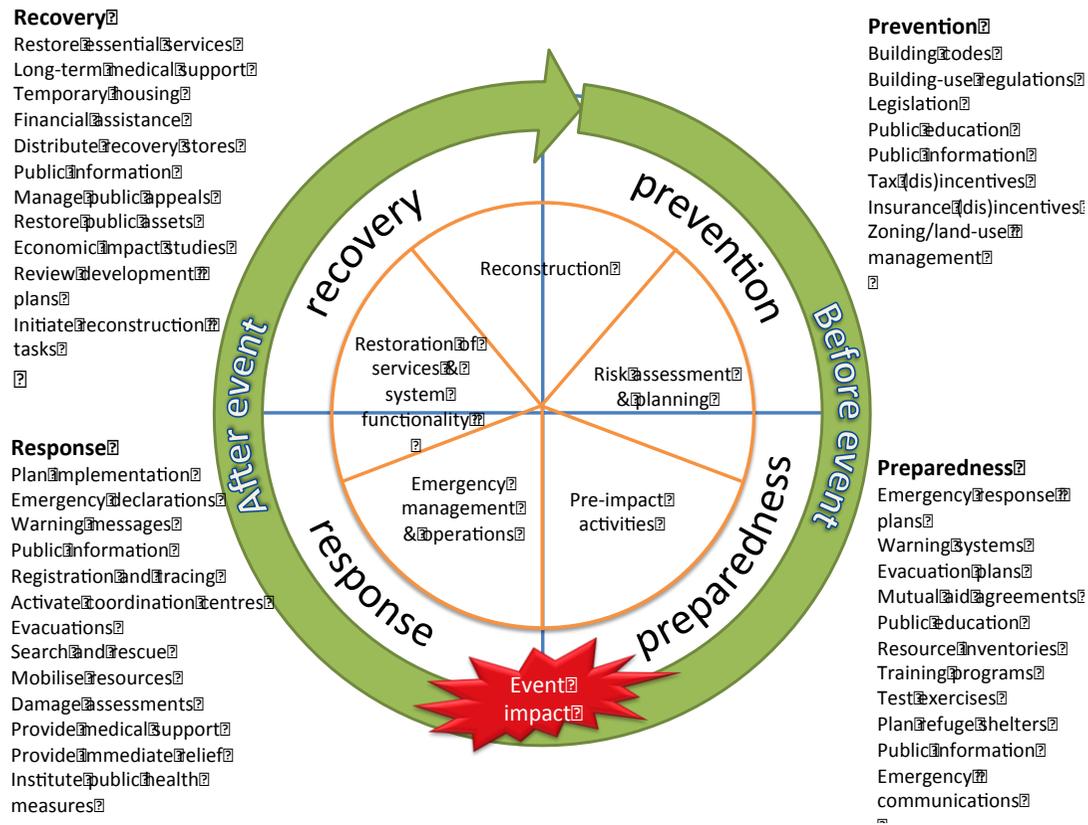


Figure 4. Disaster cycle and actions taken by emergency managers at each disaster cycle stage

Australia's emergency management approach is also highly integrated, requiring the involvement of a large number of governmental institutions and support organisations operating at the national, state/territory, and local level for it to be feasible (Emergency Management Australia, 2004). The private sector and communities are integral components of this approach. To facilitate the effective management of multiple agencies and groups, Australia has a clear legislative and public policy framework for emergency management that sets out the main responsibilities of all actors involved in responding to the different types of hazards that affect Australia's population. Table 2 details the legislative and public policy framework for emergency management in NSW. It also includes the various natural disaster response plans used in NSW and identifies the main coordinating agency responsible for executing each plan.

Australia's emergency management system reflects the country's constitutional arrangements, whereby the States and Territories have the constitutional responsibility for protecting the lives and property of their citizens (Emergency Management Australia, 2009). But response and recovery arrangements are graduated from the bottom up. Initial responsibility for managing emergencies, therefore, lies with individuals and households who are directly involved (NSW State Emergency Management Committee, 2003). When it becomes clear that they cannot cope on their own, responsibility for response, containment and restoration falls to the lowest level of government. As the scale and complexity of an emergency increases, and capacities or access to resources are exceeded, responsibility passes up through the District, State, and the Federal level where required (Emergency Management Australia, 2009, NSW State Emergency Management Committee, 2003).

States and territories also have the option to request assistance from other states or territories (Emergency Management Australia, 2009). However, as shown in Table 2, the laws, policies, and subsequent emergency response plans used to direct emergency management in NSW are linked directly to two Commonwealth directives: the Australian Emergency Management Arrangements and Disaster Response Plan (COMDISPLAN). These two directives provide the foundations upon which the state and territory government policies and plans are based.

In addition to the involvement of government agencies at all levels, emergency management arrangements in Australia are also highly integrated, whereby the success of these arrangements rely on the cooperation and engagement of non-government organisations, volunteers, community members, and the private sector (Emergency Management Australia, 2009). Disaster and emergency management in Australia is, therefore, a collaborative effort between emergency service organisations and community members (Figure 5).



Source: © NSW Rural Fire Service

Figure 5. NSW Rural Fire Service members removing bushfire hazards for elderly residents

This approach to disaster management is reinforced in the *National Strategy For Disaster Resilience* that was adopted by the Council of Australian Governments (COAG) on 7 December 2009 (Council of Australian Governments, 2011). In the past, standard emergency management planning emphasised the documentation of roles, responsibilities and procedures (Council of Australian Governments, 2011). The introduction of this strategy is an acknowledgement that action-based resilience strategies are needed in conjunction with existing emergency planning arrangements to: (i) identify differential risk patterns within and across communities, (ii) strengthen local capacity by placing greater emphasis on community engagement, and (iii) gain a better understanding of the diversity, needs, strengths and vulnerabilities within communities (Council of Australian Governments, 2011). This strategy is a whole-of-nation resilience-based approach to disaster management requiring the cooperation of all community stakeholders that share a united focus and sense of responsibility in improving disaster resilience (Council of Australian Governments, 2011).

Table 2. Legislative and policy frameworks and plans used to coordinate emergency management in New South Wales

Government level	Response plans & committees	Details and roles
Federal	Australian Emergency Management Arrangements	Overview of federal, state, territory, and local governments' collective response for emergency management that includes recovery.
	Disaster Response Plan (COMDISPLAN)	Describes the coordination arrangements for Commonwealth physical assistance to states and territories in the event of disaster.
State	State Emergency & Rescue Management Act 1989 No 165	Provides the legislative basis for the organisation and coordination of emergency management in New South Wales under the NSW Minister for Emergency Services. This includes planning, preparedness, operational coordination, and community participation in recovery. Specifically, the Act provides for: <ul style="list-style-type: none"> • Preparation of a State Disaster Plan (Displan) and subordinate plans to ensure a co-ordinated response for necessary operations • Establishment of Emergency Management Committees at state, district and local Government levels that decide on how to utilise resources during all stages of the disaster/emergency cycle (planning & preparedness, response, recovery, reconstruction, & mitigation) • Arrangements for controlling emergency operations • Procedures for <i>State of Emergency</i> declarations (for 30 days maximum) by the NSW Premier, which gives the Premier control over all response agencies and resources
	State Emergency Management Committee (SEMC)	Responsible for emergency management and planning at the state level. Main responsibilities include: <ul style="list-style-type: none"> • Formulate and monitor multi-scaled risk reduction and response plans for all agencies • Provide advice to departments and agencies on mitigation policies and practices • Establish and oversee all coordination and communication systems and networks between emergency services at all levels • Formulate and monitor emergency management training policies and material for all response agencies • Develop and implement Public Awareness Programs • Maintain basic level of Civil Defence preparedness
	State Disaster Plan (Displan)	Displan is activated in the event of any emergency and coordinates the response by all agencies charged with responsibilities and functions under the Displan. It: <ul style="list-style-type: none"> • Identifies the combat agency primarily responsible for responding to different types of emergencies • If no combat agency has been assigned to a hazard event (e.g. earthquake), the Emergency Operations Controller at either the local, district, or state level will take control (all Controllers are from the police and each sits on their respective Emergency Management Committees). Controllers also assist combat agencies in coordinating support when requested by the Head of a combat agency • Outlines the co-ordination of the activities of other agencies charged with supporting the combat agencies • Specifies the tasks of all agencies in the event of an emergency • Specifies the responsibilities of the Minister and the state, district, and local Emergency Operations Controller. The main directives under the Displan are: <ul style="list-style-type: none"> • Responsibility for preparation, response (including response coordination), and recovery rests at the local level with agencies charged with that role. If local agencies and resources are overwhelmed, those at the District, State, and Commonwealth (in that order) augment them if the need arises; • Combat agency controllers must keep Emergency Operations Controllers at the local, district, and state level informed of developments throughout emergency operations
	NSW Flood Sub-Plan	Details the preparation, warning, response, recovery and mitigation arrangements for flooding in NSW and the responsibilities of agencies and organisations in implementing the arrangements. Combat agency: NSW State Emergency Service.
	Hawkesbury/Nepean Flood Emergency Sub-Plan	Outlines preparedness measures, the conduct of flood operations, and the establishment of coordination for recovery measures to deal with a Level 2 flood (when water level of the Hawkesbury-Nepean River is expected to exceed 15.0 metres on the Windsor Bridge gauge) in the Hawkesbury-Nepean Valley. Combat agency: NSW State Emergency Service.
	NSW Storm Sub-Plan	Specifies the damage mitigation, warning, preparedness, response and initial recovery arrangements for severe storm activity in NSW and the responsibilities of agencies and organisations in implementing the plan. Combat agency: NSW State Emergency Service.
	NSW Bush Fire Sub-Plan	Outlines arrangements and responsibilities for preparedness, prevention, mitigation, response to and recovery from bush fire events by combat, participating and support agencies in NSW. Combat agencies: NSW Fire & Rescue for urban fires, and (ii) NSW Rural Fire Services for all fires outside urban areas.
	NSW Heatwave Sub-Plan	Details the arrangements for the control and coordination of, the preparation for, response to and immediate recovery from heatwave events within NSW to reduce the risk or counter the effects on the community. Combat agency: State Emergency Operations Controller.
NSW Tsunami Emergency Sub-Plan	Specifies arrangements for the emergency management of tsunamis in NSW. The plan only covers pre-event preparedness, immediate response to tsunamis, and the initiation of recovery coordination arrangements following the impact of a tsunami. Combat agency: NSW State Emergency Service.	
District	District Emergency Management Committee (DEMC)	Responsible for developing district level plans for the disaster cycle (preparedness/planning, response, recovery, mitigation). Main activities include emergency risk management, multi-agency training, and supporting combat agency public education programs.
	District Disaster Plans	The District level Displan details the planning and operational arrangements to enable district level emergency response actors to effectively and efficiently prevent, prepare for, respond to and recover from emergencies. It also provides policy direction for the preparation of Local Displans, Local and District Supporting Plans and Local and District Sub Plans.
Local	Local Emergency Management Committee (LEMC)	Responsible for developing local level plans for the disaster cycle. Main activities include emergency risk management, multi-agency training, and supporting combat agency public education programs.
	Local Disaster Plan	The Local level Displan describes the planning and operational arrangements to enable local level emergency response actors to effectively and efficiently prevent, prepare for, respond to and recover from emergencies.

Sources: Emergency Management Australia (2009), Ministry of Police and Emergency Services (2011a, 2011c), NSW State Emergency Management Committee (2003)

6 Challenges in assisting the deaf population

Australia's integrated approach to emergency management relies heavily on high levels of cooperation and coordination between government, emergency service organisations, community support organisations, the private sector, community members, and individuals to effectively function (Emergency Management Australia, 2009). However, for this system to work, there also needs to be a common understanding of the needs of different groups within society as well as the challenges emergency service organisations face in helping these groups with the resources they have. A shared understanding between emergency service organisations and community sub-groups enables mutually beneficial solutions to be found. There is limited information on the experiences of deaf and hard-of-hearing people in responding to disaster situations here in Australia but lessons can be learnt from those experiences recorded from around the world. Drawing upon these reported experiences, the following sections present a review of (i) the obstacles deaf people face in responding effectively to emergencies and disasters and (ii) those challenges emergency management organisations have in supporting deaf people prepare, respond, and recover from emergencies and disasters. Following this review are some suggested practices to help improve disaster preparedness and response levels amongst the deaf and hard-of-hearing populace.

6.1 Challenges for deaf people in responding to risk and disasters

The main challenges the Deaf community face when having to respond to emergency situations or disasters are related to communication (Ferrier and Planner, 1999, Wisner, 2003, Sullivan and Häkkinen, 2006, Wisner, 1993). Specifically:

- a. Many are unable to receive local emergency notification messages prior to evacuation or whilst in shelters;
- b. They may also have difficulties obtaining information on how to access the resources they need for recovery.

Deaf people and the hard-of-hearing are one subset of the wider population that has no systematic, institutionalized, or reliable means of receiving timely and accurate information about natural disasters and how to respond as they unfold (Kent, 2011). Without effective communication systems, people that are deaf or hard-of-hearing have few opportunities to learn what steps must be taken to increase their preparedness and resilience to natural hazards, they often have no way of receiving timely warnings when an emergency situation arises, and they have limited access to critical resources needed in the aftermath of an emergency (DHHCAN, 2004). Consequently, information for preparedness in the Deaf Community tends to focus on specialized emergency communication strategies (DHHCAN, 2004).

Sound risk communication is inclusionary, decision-relevant, two-way, and interactive and fosters trust, awareness, understanding, and motivation to act (Atman et al., 1994, Council, 1989, Kaspersen et al., 2003, Ng and Hamby, 1997).McGinley et al. (2006)andMalizia et al. (2008)therefore recommend the use of public emergency messaging systems that support:

- a. Multiple recipients thereby making it inclusionary;
- b. Multiple channels which extends the warning's reach and provides the means of confirmation reinforcement but for the latter to work, the message must be consistent across all channels;
- c. Multiple hazards to increase efficiency and limit confusion particularly in the event of the onset of multiple hazards in the same timeframe;
- d. Multiple stakeholders (and stakeholder groups) with different needs and in different geographical location;
- e. Multiple senders of information (from the various emergency management agencies responsible for different aspects of response and recovery) but one central dissemination system to avoid confusion; and
- f. Multiple platforms for disseminating the information that link directly existing communications systems (voice, fax, email, SMS, TV, and centralised emergency websites) and databases of messages and message recipients to avoid duplication and confusion.

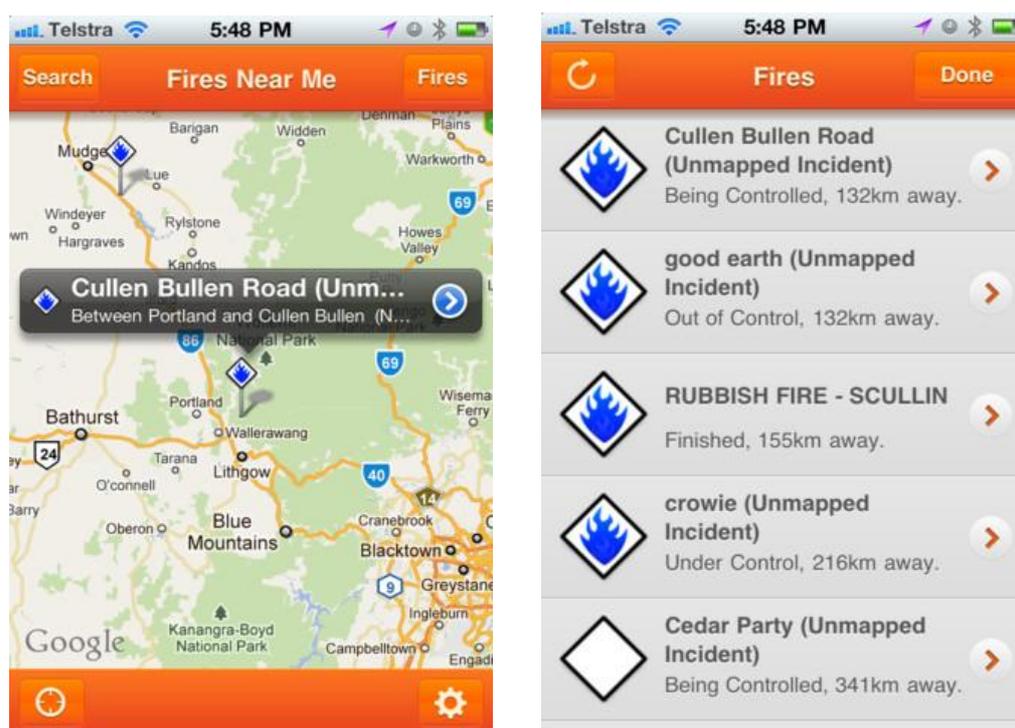
Another basic consideration is the language used in emergency warnings and the form signage (and the symbols and pictograms used on signage) takes. It is vital that the chosen language and signs are understood across cultures and languages, including those that are specific to sub-cultures that exist within populations(Malizia et al., 2008).

It is also imperative that communication methods match the preferences of the receiving population. Research undertaken by Kent (2011) and the National Council on Disability(2005)in the USA suggests that the best communication mediums to use in communicating emergency warnings and evacuations plans to the deaf and hard-of-hearing include:

- a. Television broadcasts with clear captioning
- b. Email or text alert to mobile phones
- c. Video sign mail through video relay operators and
- d. Call-in number for updates.
- e. A national reverse 000 phone-based public warning system that can quickly target a precise geographic area and saturate it with thousands of calls per hour. This service would however need to be able to make TTY calls.

New communication technologies such as Internet services, mobile phone services (particularly smartphones), and email are increasing popular communication mediums amongst deaf and hard-of-hearing people and prove particularly useful in communicating with rural or scattered communities (Malizia et al., 2008, Nick et al., 2009, Sullivan and Häkkinen, 2006). The NSW Rural Fire Services, for example, have introduced a smartphone and tablet application called *Fires Near Me* (Figure 6) that allows users to source information on and track fire incidents near them and across NSW (NSW Rural Fire Service, 2012).

Figure 6. Screenshots of the *Fires Near Me* smartphone application



Source: © NSW Rural Fire Service (2011)

There are, however, some challenges with using new communication technologies in emergency management. Emergency e-mail and wireless network alerts are helpful to the deaf and hard-of-hearing community, but information dissemination can be patchy and therefore unreliable when used in isolation (Hans and Mohanty, 2006). This is particularly the case when some parts of the telecommunications networks (such as cellular phone towers and transmitters) and supporting power infrastructure are destroyed and the network subsequently fails due to the onset of the hazardous event (Hans and Mohanty, 2006). Additional information needed on shelter locations, access to medical care and food, the safety of drinking water cannot get through. Furthermore, some information is truncated when sent to various devices (National Council on Disability, 2005).

Social networking sites like Twitter present emergency services with another option. Stevens (2011) reflects that the use of Twitter is particularly useful when critical information from emergency response personnel is missing or not easily obtained. Furthermore, it allows for up-to-date information to be broadcast quickly when conditions such as new road blockages

from flash flooding or bushfires arise(Stephens, 2011).The effectiveness of Twitter’s usage in helping deaf people quickly respond to events as they unfold is captured by the experiences of a Deaf Community member who used Twitterin 2011 to escape the worst impacts of multiple natural hazards (an earthquake, tornados, Hurricane Irene, and flooding from Tropical Storm Lee) that occurred in Central Pennsylvania in the USA:

Twitter gave me up to the minute road closures from tweets by others trying to get back to their homes. Road after road was flooding as tweet after tweet appeared telling us which roads not to take. Because of these tweets, my husband was able to get off of work just in time to come through the secondary roads before they, too, were closed. At first, no one thought it was anything to be in a hurry about...then the flash floods started(Edmiston, 2011).

In Australia, the Australian Communication Exchange (ACE) have developed *Silent Tweets*, a free smartphone application (available from mid-January 2012) that uses Twitter to provide deaf and hearing impaired Australians with up-to-date emergency warning notifications or disaster announcements to users within a certain geographical area for the duration of the risk or disaster(Australian Communication Exchange, 2011). This system, however, has a wider application than usage in a disaster setting. It is designed to provide the Deaf with equivalent access to the range of audio announcements that the hearing community receive (Australian Communication Exchange, 2011). Public broadcasts will cover traffic congestion, weather warnings, and alerts in public places like trains stations and sporting events (Australian Communication Exchange, 2011).

Nonetheless,Kent (2011)asserts that social networking tools should not replace other forms of communication. These include visual alarms in homes and workplaces that convey the type of threat and the appropriate action (Sullivan and Häkkinen, 2006). Nor can the deaf community rely solely on their existing family and friend networks to relay these messages because it is not guaranteed that their ‘hearing’ friends and family have received the messages either(Kent, 2011). Instead, Kent (2011) recommends the use of multiple methods of communication to ensure that deaf and hard-of-hearing people get reliable access to the information they need to effectively respond.

6.2 Challenges for the emergency services

Emergency management organisations experience multiple challenges in supporting deaf people and those with disabilities prepare before an onset natural hazard, respond during an event, and recover from emergencies and disasters. The problems emergency managers and support organisations have in supporting deaf and hard-of-hearing during the pre-event mitigation and preparedness stages of the emergency or disaster cycle are related to planning, limited access to knowledgeand training (see Box 2). The challenges emergency services have when trying to assist deaf individuals during emergencies and disasters include

locating the location of vulnerable populations, communication problems, and supplying appropriate facilities and services in evacuation shelters (see Box 3).

In the aftermath of an emergency or disaster, the provisioning of trauma counselling for deaf individuals is a concern. Post-event trauma counseling is rarely available for the deaf due to a lack of counselors with sign language capabilities and the absence of sign language interpreters (National Council on Disability, 2005). Following 9/11, a deaf person in New York City who was unable to get accessible trauma counseling was asked to assist in counseling another deaf person seeking the same services because of that person's ability to both speak intelligibly and sign. This can cause further trauma for the deaf member. Trauma counselors also sometimes fail to appreciate the experience of trying to remain independent when routine services and supports are no longer available (National Council on Disability, 2005).

But one of the most recurrent issues that emergency management organisations have in the post-disaster phase is the challenge of incorporating lessons learnt from previous disaster experiences into future mitigation, preparedness, response, and recover strategies (National Council on Disability, 2005). Information and lessons learned pertaining to accessibility to information, appropriate facilities (shelters, first aid stations, portable toilets, temporary housing), as well as shelter identification, access, management, training, and services are not shared across organisations and states (National Council on Disability, 2005). This problem is not isolated to practices relating to assisting deaf and disabled individuals or communities; it is a widespread challenge in disaster management where lessons are often 'observed' by government and emergency response agencies but not necessarily incorporated into future practices (see Birkland, 2006, Thomalla et al., 2009, Zou and Thomalla, 2008).

Box 2: Problems with assisting deaf and disabled people prepare for disasters

Good intentions but no action:

- Conventional emergency management approaches rarely go beyond acknowledging that people with disabilities need to be ‘helped’ by emergency response and support services when a disaster occurs (Sullivan and Häkkinen, 2006, Wisner, 2003).
- Non-government support organisations (NGOs) express strong intentions to include disabled people in their disaster response policies, plans, and actions. However, these policies and statement of intent often fail to materialize into practice or are not well known. The disabled are often included under the broader banner of ‘vulnerable groups’ earmarked to receive relief, aids, and equipment, who are usually referred onto other ‘specialist organisations’ for assistance (Kett et al., 2005).

Exclusion from planning and support mechanisms

- People with disabilities and support/representative organisations are often left out of preparedness and planning activities (DHHCAN, 2004, Kett et al., 2005, National Council on Disability, 2005). These include analyzing and documenting the possibility of an emergency or disaster and the potential impacts, and community consultations that help inform the design of emergency preparedness and response strategies (National Council of Disability, 2005). Cumbersome bureaucracy and a shortage of funds are cited as reasons for this (Fjord and Manderson, 2009, Kett et al., 2005).
- The strengths and skills of community-based organisations (CBOs) serving people with disabilities are not well integrated into the emergency service plans (National Council on Disability, 2005). Nick et al. (2009) argue that CBOs are underutilized resources in the disaster context: they best understand the needs of the groups they work with and are trusted. Accordingly, CBOs are well-placed to: (i) help inform emergency services of the needs of the groups they work with prior to and after the onset of an event; and (ii) to help mobilize community and local resources in crisis situations (Nick et al., 2009).

Limited access to knowledge

- Deaf and hard-of-hearing community members often lack of knowledge about where and how to access disaster preparedness information and training both prior to and during a disaster event, a problem that they share with ‘hearing’ people (Calgaro, 2010, Kent, 2011, National Council on Disability, 2005, Waterstone and Stein, 2006). This includes a lack of knowledge and coordination of existing disability-related resources (National Council on Disability, 2005).
- Emergency preparedness information is not always available in accessible formats. These include large print, disks, audio files/MP3, visual explanations of procedures accompanied by simple text, and accessible media, including web sites or captioned and audio-described films and videos (National Council on Disability, 2005).

Training of emergency respondents and staff is inadequate

- There are few training opportunities for first responders (police, SES, fire services) on the specific needs of people with disabilities and activity limitations. Instead, first responders rely on street experience and react to situations as they arise (National Council on Disability, 2005).
- Shelter staff are not trained how to assist deaf and disabled people (National Council on Disability, 2005). Furthermore, legal regulations may disallow disability specialists to provide help in a disaster shelters if they cannot provide the required documentation on the spot (Waterstone and Stein, 2006).

Box 3: Problems with assisting deaf and disabled people during disasters

Difficulty in locating vulnerable populations

- It can be difficult to clearly identify and locate vulnerable populations during an emergency (Nick et al., 2009).

Communication issues

- A lack of captioning on major broadcast systems, as well as on internet news sites, creates anxiety when deaf people can see pictures of events as they unfold but cannot ascertain what's happening and where its happening. Furthermore, scrolling messages sometimes blocked captions, making it difficult for deaf people to read captioned information (National Council on Disability, 2005).
- When electricity is cut, deaf people are unable to use telecommunication equipment dependent on electricity causing them to miss out on audio announcements broadcast in public spaces and workplaces (National Council on Disability, 2005).
- Triple 0 centers may be lacking the latest telecommunications technologies and therefore might not be prepared to handle voice carry over (VCO), IP-relay (Internet protocol), VRS (video relay service), and CapTel (captioned telephones) calls deaf and hard of hearing people (National Council on Disability, 2005).
- The timing of warnings and ensuring that the Deaf Community has access to warnings outside the home and workplace is also difficult to manage (Kent, 2011).
- Written updates (including the text of oral announcements) on the disaster event as it unfolds and subsequent response instructions can also be missing from public areas or shelters (National Council on Disability, 2005). This leaves the deaf and hard-of-hearing (as well as members of the 'hearing population' that are out of hearing range) without any way to get written updates (National Council on Disability, 2005). These types of updates are particularly important when other communications systems like the Internet, and phone services go down.

Inappropriate shelter facilities and services

- Not all shelters are equipped with the facilities needed to serve those with disabilities (National Council on Disability, 2005, Waterstone and Stein, 2006). After Hurricane Katrina and Rita, the US National Organization on Disability reported that less than 30 percent of shelters had access to sign language interpreters; 80 percent lacked TTYs; 60 percent did not have televisions with open caption capabilities; and only 56 percent had areas where oral announcements were posted (Waterstone and Stein, 2006).
- Suitable communication mediums are often missing in evacuation points and shelters. These include auxiliary aids and services such as sign language interpreters, CART (communication access real-time translation) readers, people to assist with completing paperwork, and people to take notes (National Council on Disability, 2005). After Hurricane Katrina in 2005, deaf people were isolated in an area designated as "Deaf Area" and were left without signing translators and public address announcements never reached them (Sullivan and Häkkinen, 2006).
- Family units are sometimes split up, causing deaf people to be separated from their main support systems who often act as interpreters for them (National Council on Disability, 2005, Waterstone and Stein, 2006).
- Where shelters have lacked the technology or skilled staff to enable clear communication between deaf people and emergency response staff, there have been instances where Deaf Community members have been turned away (National Council on Disability, 2005, Nick et al., 2009).

6.3 Improving emergency management support for deaf and hard-of-hearing people

Reviews of past disaster and emergency experiences have culminated in a list of recommendations that may help to (i) improve the level of support emergency management organisations provide to deaf and hard-of-hearing individuals and (ii) increase the preparedness and resilience of this sub-section of the NSW population. Opening up dialogue between emergency response agencies and minority community groups facilitates a mutual understanding that can lead to the design of more inclusive plans and greater community engagement and ownership in all phases of disaster management and planning. The recommendations presented here address the main challenges identified in the previous two sections. These include: understanding and locating the Deaf Community and hard-of-hearing population in NSW; promoting greater inclusion in emergency planning and management; augmenting education and training; increasing the quality of evacuation facilities and services; and improving knowledge and tailoring communication methods to match the end-users. These are dealt with in more detail.

1 Understanding and locating the Deaf Community and hard-of-hearing populations

- To enable the inclusion of the deaf and hard-of-hearing populations in emergency planning and appropriate resource distribution, the emergency and disaster management services need to know how large the Deaf community is in given locations and what their needs are (see Parr, 1987).
- The diversity of the Deaf community and hard-of-hearing population in NSW, needs to be considered i.e. different ages, gender, ethnicity, class, and needs (Kett et al., 2005). They are not one homogeneous group.

2 Increasing inclusion in emergency planning and management

- A holistic approach to emergency and disaster planning and management is needed to ensure integration and continuity. This requires deaf and hard-of-hearing representative bodies, community-based organisations (CBOs), emergency management, and government agencies to work together to (a) conduct comprehensive needs assessment that documents community vulnerabilities; (b) develop and implement education and training opportunities, that involve representatives from all stakeholder groups including representatives from the Deaf Community and hard-of-hearing population, deaf and hard-of-hearing support organisations, CBOs, emergency services (including volunteers that work in the shelters), government, public safety, and local public health; (c) foster cooperative working relationships on multiple levels, not just in emergency preparedness; and (4) develop continuity-of-operations plans that prepare staff in advance for the challenges of disaster preparedness and recovery (Nick et al., 2009).
- People with disabilities must be included in preparedness planning for all emergencies, and all plans must take people with disabilities into account (DHHCAN, 2004, National

Organization On Disability, 2002, Parr, 1987, Waterstone and Stein, 2006). The Deaf Community has much expertise and knowledge that is needed to create and execute effective and inclusive emergency and disaster preparedness plans (DHHCAN, 2004, Waterstone and Stein, 2006, Wisner, 2003). Drawing upon the life experiences and localized knowledge of deaf people will provide a totally new perspective on risk reduction and disaster management (Wisner, 2003). Furthermore, this involvement will help to increase understanding of their needs in a wide variety of areas (DHHCAN, 2004). If people are not incorporated fully into a planning process - whether this be due to emergency response protocol (institutional obstacles), resistance or lack of motivation from Deaf community members (human and social obstacles), or the inability to access resources needed for participation because of unawareness or physical, sensory, or cognitive disabilities - then the best evacuation scenarios will not aid them (Sullivan and Häkkinen, 2006). Nor will there be self-ownership of the responsibility to act amongst individuals. To maintain the dignity and independence that lies at the heart of the disability movement, people with disabilities must also take responsibility and ownership of their own safety, to the degree allowed by their disability (National Council on Disability, 2005). However, to enable greater participation additional funding may be needed to support this (Hans and Mohanty, 2006).

- To facilitate greater inclusions, emergency managers need to strengthen their relationships with CBOs and deaf and hard-of-hearing support organisations by recruiting, encouraging, and providing funding and incentives to these organisations to encourage and enable greater participation and assistance in disaster preparedness and relief (National Council on Disability, 2005).
- In terms of larger policy issues for planning, preparedness, response, relief and recovery, it is recommended that deaf and hard-of-hearing individuals be active participants in advocating for better services, monitoring current services and practices, and give advice and support wherever possible to emergency managers at the local, state and federal levels (National Organization On Disability, 2002). This could be achieved through a network of deaf and hard-of-hearing support organisations that can liaise between their respective communities and the emergency services.
- Include disability-related experts in emergency planning processes. Doing this would mean that good disability-specific practices from previous disasters would not need to be relearned, strengthening the nature, sensitivity, and quality of the response (National Council on Disability, 2005). Taking this one step further, the National Organization On Disability (2002) advocate for the training of people with disabilities in emergency and disaster planning and response. Developing greater expertise within the Deaf Community not only increases the pool of experts more generally but it would create trusted experts who understand both the Deaf culture – their characteristics, ways of seeing and responding to the world – and the processes that shape and determine the effectiveness of disaster response mechanisms. Mistrust in government and emergency response institutions linked to government presents as an influential determinant of non-action or resistance to seeking help amongst minority populations that have had negative

experiences with dominant culture authorities (Donner and Rodríguez, 2008, Drabek, 1999, Meredith et al., 2007).

- National and state Disability Access Advisory Groups should be established if they do not exist already. These groups should be made up of qualified people with disabilities and others with disability-specific disaster experience who meet regularly with senior emergency planning and response officials (from the SES, fire services, police, armed services) to discuss issues and challenges (National Council on Disability, 2005).

3 Augmenting education and training

- Deaf and hard-of-hearing people need to be supported to better understand both (i) the types of risk that they may face and (ii) how best to respond in the event of an emergency or disaster (Parr, 1987, Sullivan and Häkkinen, 2006). Phillips et al. (2005) go one step further to stress that preparedness, outreach, and educational efforts must target those at highest risk repeatedly and thoroughly. This must be done through credible authorities and established and trusted social networks to encourage greater community participation in the design and implementation of preparedness strategies (Phillips et al., 2005).
- First responders (police, SES, fire services) as well as staff working in the emergency shelters and facilities need to be trained on specific needs of people with disabilities and activity limitations (Kett et al., 2005, National Council on Disability, 2005, Parr, 1987).
- Emergency response staff including those working as volunteers in shelters need to be trained how to use special telecommunication devices for the deaf (TDDs) (National Council on Disability, 2005). Whilst these devices may be available for staff to use, limited training is provided to support staff on how to use them (National Council on Disability, 2005). The development and implementation of standardized training should begin with soliciting feedback from deaf people who use the equipment (Rowland et al., 2007). The training could be made available in modules that are easily inserted into existing training program schedules (Rowland et al., 2007).

4 Improving knowledge and tailoring communication methods to match the end-users

- Emergency response agencies should integrate information on and for people with disabilities into general preparedness materials to not only mainstream the availability of special need information but also to encourage wider community awareness on the requirements of special needs groups. This information should also inform readers on how to get access to more customized materials (National Council on Disability, 2005).
- There is a need for effective warning systems that includes *special needs weather radios*. In the USA for example, the National Oceanic and Atmospheric Administration's (NOAA) radio station (NOAA radio) currently use strobe light or vibrates to alert the individual of an emergency alert (NOAA, 2011).
- Strong enforcement mechanisms are needed to ensure that video programming distributors, including broadcasters, cable operators, and satellite television services,

comply with their obligation to make emergency information accessible to people with hearing and vision disabilities, that it acts immediately on violations.

5 Increasing the quality of evacuation facilities and services

- Deaf and hard-of-hearing people should be able to use the same services as the other residents of the community in which they live. Although they may need additional services, the emergency management system must work to build provisions for these services into its plans so that people with disabilities are not excluded from services available to the rest of the community (National Council on Disability, 2005).
- If a shelter cannot accommodate deaf or hard-of-hearing people, prompt transfer to a better-equipped facility needs to be offered. For example, if one shelter is well equipped to assist people who are deaf and another shelter is equipped to assist people with mobility disabilities, an agreement for cross-referring should be established quickly (National Council on Disability, 2005). Choices on which facilities will cater for deaf people and the dissemination of this information could be included in emergency plans for the deaf and hard-of-hearing so that there is prior awareness about this.

7 Summary

In this synthesis report, we have: identified the hazards the NSW population are exposed to, introduced the Deaf Community, and reviewed emergency management practices in Australia and the approach emergency management organisations take when dealing with the needs of those with disabilities. We have also identified the challenges that deaf people, on the one hand, face in preparing and responding to hazardous events as well as those that emergency service organisations have in effectively supporting deaf people prior, during, and after an emergency or disaster event.

Important and encouraging observations can be drawn from this review. First, there is little information on how deaf people and those that are hard-of-hearing prepare and respond to hazards in Australia. ***We know very little about how deaf and hard-of-hearing Australians perceive risk, the information sources they use to inform themselves of possible risks, and the subsequent actions (if any) they take to prepare themselves prior to the onset of hazardous events. We also have limited information on the actions they take during an event; the sources and type of information they rely on for directives, the networks (personal or community-based) they turn to for assistance when their individual coping capacities are overwhelmed, the resources they need to help them respond effectively, and the challenges they may face in accessing these resources.*** Finally we do not know what types of assistance and resources they need in the recovery phase once the emergency phase has passed. This project is well-positioned to make a substantial contribution to disaster preparedness in NSW by addressing these substantial knowledge gaps and providing the foundational knowledge needed to design robust preparedness strategies for this sub-set of the NSW population.

Second, the Deaf Community are a linguistic and cultural minority and therefore need to be viewed and respected in this way. The current misalignment in how Deaf Community members define themselves (as a cultural group with a shared language) and the definition emergency managers use (deaf people are seen as having a medically diagnosed impairment requiring special provisions) affects the framing and subsequent approach emergency services take in designing and implementing emergency response strategies for the deaf. Addressing this misalignment will help facilitate a move from Australia's current emergency management 'special provisions' model for dealing with those that are disabled towards a more participatory and inclusive model. Such a model capitalizes on the strengths of the Deaf Community and actively involves them in the planning and execution of more supportive emergency management practices and procedures. It also encourages Deaf Community members and hard-of-hearing individuals to take greater responsibility and ownership of the management of their own safety, a point that marries well with Australia's current integrated emergency response protocols (the onus of responsibility for personal safety lies with the individual in the first instance) and core values of the disability movement (dignity and

independence lie at the movement's heart necessitating individual ownership of safety in the disaster context).

Third, Australia's integrated approach already offers a solid platform for increasing levels of community inclusion. The feasibility of this approach requires the involvement of and cooperation between governmental institutions and support organisations, community representative groups, community members and the private sector. This provides a platform for increasing the involvement of deaf and hard-of-hearing support organisations and deaf experts that supplies another layer of knowledge and support.

Fourth, the documented international experiences provide valuable insights into different types of strategies that may help increase emergency and disaster preparedness for the Deaf Community and the hard-of-hearing population. This information adds depth to the study by positively influencing our framing of the issues, the questions we need to ask, and the organisations we need to include in the process of designing and implementing effective disaster preparedness and response strategies that address the needs of the target community. Consequently, we are taking a four-pronged approach (detailed in Figure 8) to better support the deaf and hard-of-hearing community in preparing, responding, and recovering from an emergency or disaster.

This approach aligns closely with the project's objectives detailed below:

1. undertake consultation workshops and to conduct face-to-face interviews with representative members (and stakeholders) of the Deaf Community to:
 - a. determine present awareness of the Deaf Community to natural hazard and disaster risk in NSW;
 - b. identify the current sources of information used by the Deaf Community to help prepare for emergencies and to respond appropriately in hazard/disaster situations;
 - c. investigate the preferred forms of 'communication' that will meet the needs of the Deaf Community during live emergency situations in the future; and
 - d. analyse existing capabilities of the NSW emergency service organisations (specifically, the NSW SES, the NSW RFS and FRNSW) to deliver risk information and warning messages to deaf people across NSW.

(a) to (d) constitute the fundamental research questions of this project.

2. to use the results generated from Objective 1 to devise a range of information communication sources/materials and strategies to meet the needs of deaf people in NSW;

3. to trial and test various communication and information sources for selected (high probability) hazard scenarios in NSW (determined by the NSW SES) with deaf people in NSW; and
4. to assist the NSW SES, the NSW RFS and the FRNSW devise and implement a communication strategy to specifically cater for the needs of deaf people in NSW.



Figure 7. Our approach to strengthening disaster preparedness for deaf people

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Appendix 1



PROJECT WORK PLAN

TITLE: Increasing the resilience of the Deaf Community in NSW to natural hazards and disasters

PROJECT PARTNERS: The Deaf Society of NSW (DSNSW), the NSW State Emergency Service (NSW SES), the NSW Rural Fire Service (NSWRFS), the Fire Rescue NSW (FRNSW) and the ATRC-NHRL, UNSW

In order to successfully deliver this project, a detailed work plan is required. This plan takes account of the stated aims and objectives of the proposal and the available timeline and budget. The aims and objectives of the project are provided followed by 'step-by-step' work tasks, description of methods, reference to who completes the work, the milestones and the deliverables.

AIMS:

1 - increase the resilience of the Deaf Community to future natural hazards and disasters via improved access to and provision of emergency management information; and

2 – increase the effective resources of NSW emergency service organisations enabling them to deliver their core business (to the Deaf Community) and to improve the deaf awareness for staff and professional officers within those organisations.

The aims will be achieved via the successful delivery of the following objectives:

OBJECTIVES:

1 – to undertake consultation workshops and to conduct face-to-face interviews with representative members (and stakeholders) of the Deaf Community to determine:

- (a) present awareness of the Deaf Community to natural hazard and disaster risk in NSW;
- (b) to identify the current sources of information used by the Deaf Community to help prepare for emergencies and to respond appropriately in hazard/disaster situations;
- (c) to investigate the preferred forms of 'communication' that will meet the needs of the Deaf Community during live emergency situations in the future; and
- (d) to analyse existing capabilities of the NSW emergency service organisations (specifically, the NSW SES, the NSW RFS and FRNSW) to deliver risk information and warning messages to deaf people across NSW.

(a) to (d) constitute the fundamental research questions of this project.

2 – to use the results generated from Objective 1 to devise a range of information communication sources/materials and strategies to meet the needs of deaf people in NSW;

3 – to trial and test various communication and information sources for selected (high probability) hazard scenarios in NSW (determined by the NSW SES) with deaf people in NSW; and

4 – to assist the NSW SES, the NSW RFS and the FRNSW devise and implement a communication strategy to specifically cater for the needs of deaf people in NSW.

Step-by-step Tasks, Project Timeframe, Methods, Milestones and Deliverables:

In order to successfully deliver the project, it is divided into a sequence of steps with associated 'Tasks'. The tasks will be completed within specific timeframes. Appropriate methods and tools will be applied to the relevant steps/tasks and particular deliverables will be produced at specific milestones in the project. These are detailed in the text that follows and graphically illustrated in the accompanying Table.

1 – Establishment of an Advisory Committee (Co-Chaired by a representative of the NSW SES and the Deaf Society of NSW) to guide the project. The committee should be manageable in size and comprise appropriate representatives of all relevant stakeholder organisations. The Committee should be able to adequately meet on a regular basis (e.g., monthly) and guide the research to keep the project on track and ensure it meets its objectives;

2 – Appointment of a suitably qualified Research Fellow with experience in mixed methods, quantitative and qualitative social science and human geography research using questionnaire survey instruments, face-to-face interviews (in-depth, open and closed questions, semi-structured), leading workshops/forums and with appropriate statistical and other (e.g., qualitative coding software – Nvivo, Chi squared, t-test, parametric and non-parametric statistics etc) analytical techniques. A strong knowledge of social processes, human geography, hazard, risk and vulnerability sciences and the principles of emergency risk management are fundamental requirements. Knowledge of Auslan would be a distinct advantage (or capacity/willingness to learn). The ideal candidate will have a PhD in a relevant discipline field. The UNSW Enterprise Agreement conditions state that for such a position, appointment at Level A, step 6 is most appropriate. This salary scale (and its Year 2 incremental rise to step 7 (plus planned 6% pay rise for that step)) are reflected in the budget requested. Hereafter, this person will be referred to as the "Research Fellow (RF)";

3 – RF to undertake a detailed background literature review to examine existing literature and policy context and official protocols in relation to communicating risk management information to the Deaf Community. This should focus on both the domestic situation in Australia (with a particular focus on NSW and other State emergency service organisations) and internationally (e.g., US weather service etc). This will provide a benchmark of existing ‘best practice’;

4 – RF to develop appropriate social survey questionnaires (open and closed question for quantitative and qualitative analyses) for interviewing participants about existing hazard and risk awareness in NSW and sources of risk management information. Questionnaire development (and testing/trialling) to take account of latest best practice and knowledge of risk management social surveying (e.g., Bird, 2009). Project to consider use of on-line free questionnaire survey tools (e.g., Survey Monkey) and hosted on the NSW SES and DSNSW web sites to increase total number of surveys. The interviewing will take place in two forms: (1) community consultation forums (multiple persons participating). There will be eight such community forums (3 in the Sydney metro region) and 5 in the regions and rural areas. The exact locations of these community forums will be guided by the distribution of existing Deaf Society of NSW regional areas (together with their local networks) and the NSW SES regions. This will ensure efficiency and congruence between Deaf Society of NSW offices and NSW SES regions/units. From the forum participants, *circa* 200 people will be asked to participate in detailed one-on-one, face-to-face interviews with the RF to obtain more detailed qualitative knowledge relevant for supporting evidence based decision making and policy development and implementation. The results of the forum and face-to-face interviews will be added to the results of surveys completing using the on-line Survey Monkey questionnaire increasing the overall number of participants consulted;

5 – RF (together with Auslan interpreters) and a Deaf Society of NSW Deaf Facilitator to undertake community consultation forums and face-to-face interviews with deaf participants. Results to be collated, coded and analysed using quantitative (statistical) techniques for pattern identification and qualitative techniques (e.g., Nvivo) to provide rich, contextual information on hazard awareness, information needs, current information access protocols and preferred forms of communication;

6 – RF to prepare document/report detailing preferred communication types/styles and protocols (preferred by the Deaf Community) for receiving official warnings and other risk management information during emergencies;

7 – RF in partnership with emergency service organisations, to undertake analysis of existing capabilities of those organisations to communicate with members of the Deaf Community during crises and emergencies. This will include policy and protocol analysis, skills audits and alike to identify current practices and gaps in capacity;

8 – Develop and trial various emergency communication strategies for selected hazard/disaster scenarios.

Timeframe of project, work tasks, methods and management

Work tasks	Timeframe					Comments & Notes	Deliverables & Milestones
	0 – 6 months	6 – 12 months	12 – 18 months	18 – 24 months	24 months onwards		
Project Management						Management to occur throughout project supported by Research and Finance Managers at the ATRC-NHRL, UNSW. All project partners to be consulted on major project decisions	Project to be completed on time and to budget
Establishment of project Advisory Committee						All project partners have already committed to membership of this Advisory Committee. Should be Co-Chaired by NSW SES and Deaf Society of NSW	Project to be completed on time and to budget
Appointment of suitably qualified Research Fellow						As soon as possible after project funds awarded. (At UNSW Level A, step 6)	To lead the research and to develop products, reports, publications and materials
Synthesis of previous work (Standard literature review of available materials and previous work – to also take account of NSW SES, NSW RFS and FRNSW policies	Deliverable = “ Synthesis Report ” Milestone 1 = @ 6 months
Develop, test and implement questionnaire survey (plus analysis of results)						This achieves Objective 1a, b & 1c	Deliverable = “ Questionnaire survey and question bank ” Milestone 2 = @ 6-9 months Deliverable = “ Preliminary results Report ” Milestone 3 = @ 12 months
Undertake emergency service organisation capability assessment in relation to communication with Deaf Community						In reality, this task to be completed by about 15 months in to project and commences soon after RF appointed This achieves Objective 1d	Deliverable = “ Capability Report ” (confidential for benefit of sponsoring organisations) Milestone 4 = @ 15 months
Develop, trial and evaluate alternative communication materials and strategies						This achieves Objectives 2 & 3	Deliverable = “ Hazard scenarios & communication materials ” Milestone 5 = @ 18 months
Develop emergency service organisation communication protocols, materials and strategies (e.g., with NSW SES etc)						This achieves Objective 4	Deliverable = “ Strategies & Protocols ” Milestone 6 = @ 24 months
Project write-up							Deliverable = “ Final Report ” Milestone 7 = @ 24 months
Results dissemination and communication to the wider community (including all emergency service organisations in NSW and Australia), the Deaf Community, the wider community)						Project successfully completed	Deliverables = “ Knowledge notes, Communication Briefs, Newsletters, journal publications etc ” Milestone 8 = as appropriate