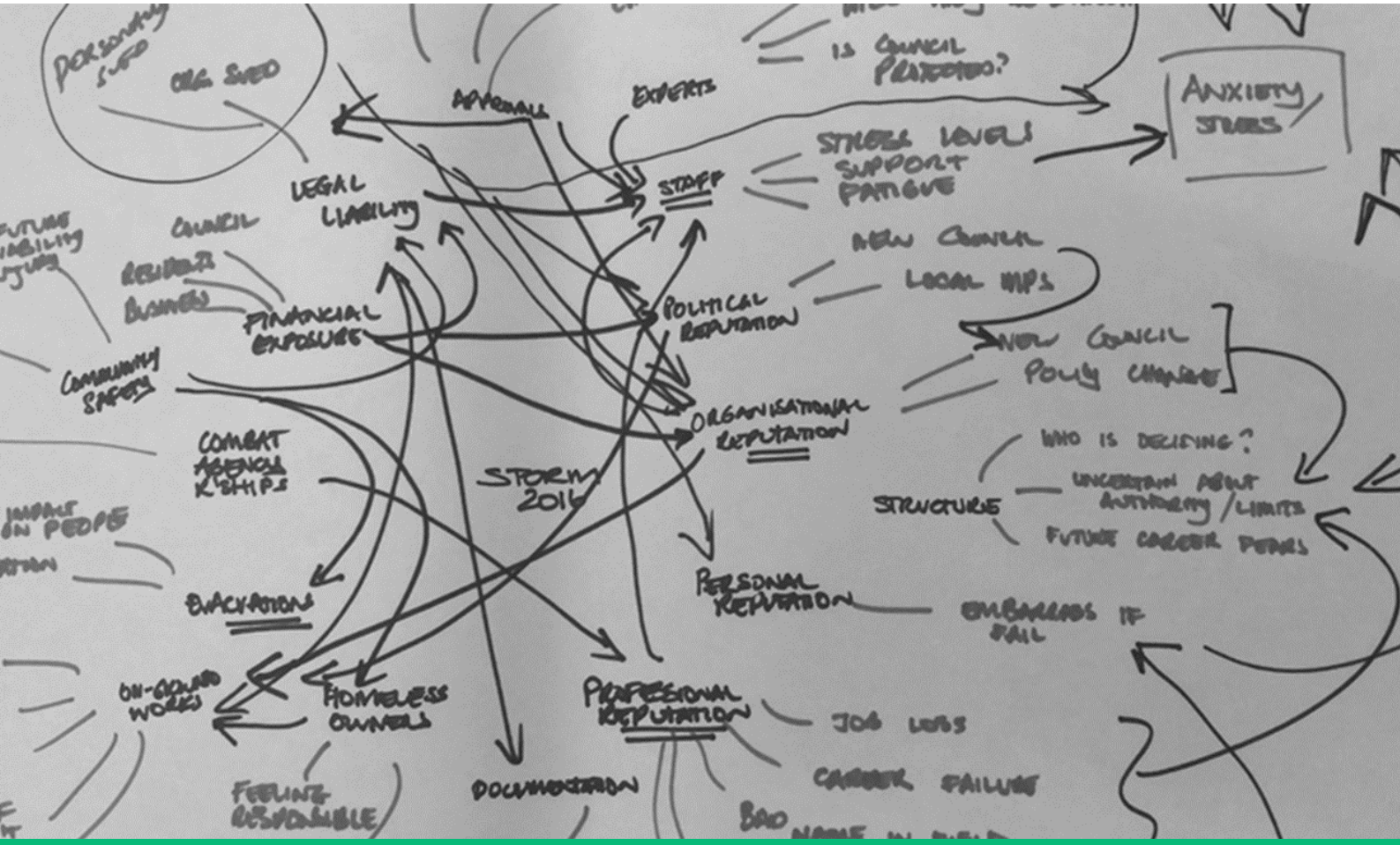

A collaboration between Resilient Sydney and the Sydney Environment Institute

Insights into Community Urban Resilience Experiences.

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Kristin Gabriel has an extensive professional background in community engagement projects for local government initiatives addressing a wide range of environmental and social issues.

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Executive Summary

This report presents the findings of Resilient Sydney – Insights into Community Urban Resilience Experiences, a research project that examined community resilience to shock events in Greater Metropolitan Sydney. This study used the System Effects methodology, as well as focus groups, to identify the impacts, barriers and enablers experienced by residents and emergency and non-emergency service providers in relation to 2013 Blue Mountains bushfires, the 2016 East Coast Low in the Northern Beaches, the 2016/17 heatwave in Penrith, and the 2014 Martin Place Siege.

In summary the project aimed to:

- Consider resident and service provider experiences of shock events in the Greater Sydney Metropolitan Area, with a particular focus on how these experiences can inform initiatives that minimise household, neighbourhood and community disruption, trauma, and suffering.
- Identify and rectify the reality that the lived experiences of residents and service providers to shock events is largely absent from resilience research, policy and practice, both in Australia and internationally.
- Present a case for how the System Effects approach can provide innovative and actionable insights into the community impact of disaster events, and how those impacts are experienced.
- Make recommendations for policy, program, and resourcing interventions to efficiently and effectively limit the impacts of future shock events and reduce human suffering.

The term 'resident' in this study refers to residents of Greater Metropolitan Sydney who experienced direct impacts as a result of one of the events identified above. Residents were typically from the local government area in which the shock event occurred, with the exception of the Martin Place Siege. The terms 'service provider' in this study refers to representatives of a wide range of organisations that constitute the resilience workforce, outlined below:

Emergency services

- Professional emergency services (e.g. fire and rescue; paramedics)
- Volunteer emergency services (e.g. NGOs)
- Non-government community services (e.g. charity organisations)

- Local government emergency service (e.g. response management)

Non-emergency services

- Government community services (e.g. Centrelink; public library services)
- Local government non-emergency service (e.g. planners)
- Commercial management (e.g. building manager; business manager)

We examined individual experiences of these events as well as overall trends and the relationships between various determinants of resilience at the community-level. Our results suggest that there are distinct trends in resident and service provider experiences, primarily a wide range of emotional impacts, in addition to highly varied barriers and consistent social enablers. The findings of this report clearly demonstrate that the impacts of disasters are complex and extend well beyond the initial period of the particular shock event.

The focus groups for the 2016/17 heatwave were held in Emu Plains and were attended by a demographically diverse group of residents from the Penrith region, with a range of housing tenure represented, including private home ownership, private rental and public housing. The Blue Mountains focus groups were held in Springwood and were attended by local residents, typically long term and either homeowners or living with home-owning relatives. The resident group for the 2014 Martin Place siege was drawn from the wider Muslim community in Sydney and was held in Bass Hill in Western Sydney. Participants were all older women. In order to bridge the language barrier between focus group facilitators and participants, there were two translators present who were central to the running of the event.

Residents articulated experiences of suffering, anxiety, long term trauma, stress, grief, social isolation, and loneliness, in addition to various physical and financial changes that are both short term and permanent. Residents also reported direct and indirect productivity and financial losses, individual and professional conflicts, and a loss of public trust and confidence in government and the wider society which can lead to social withdrawal.

Resident analysis reinforced the importance of social aspects of resilience, particularly social cohesion at the neighbourhood level, in response to both physical and social shock events. The 2016/17 heatwave impacted Penrith residents in primarily

individualistic ways, and generally resulted in increased social isolation. Similarly, the experience of Muslim residents from the wider Sydney community during and in the aftermath of the Martin Place siege suggests that the impacts of the siege were primarily social and resulted in both social and physical isolation of the Muslim community. In contrast, the Blue Mountains resident experience of the 2013 bushfire engaged with and, in most cases, strengthened pre-existing social networks comprised of family, friends, neighbours, and community. Overall, pre-existing and positive social relationships at the household, family, neighbourhood, and local community level were central to the coping capacity of residents across all events examined. At the most general level, measures to increase social cohesion, the findings suggest, will increase individual and social resilience to a wide range of shock events.

The focus group for Blue Mountains service providers was attended by representatives from the NSW Rural Fire Service, a community charity organisation, and a community resource network. The Martin Place service provider group was comprised of predominantly non-emergency service responders, including building operations managers, and public servants. Participants played a supporting role for emergency response staff and organisations and acted as a link (both for information and directing actions) between the public and the emergency response organisations during the event. The focus group for the Northern Beaches east coast low was held in Collaroy and attended by emergency service workers as well as council staff involved in the emergency management and coordination of the response. The Penrith Service provider group was held in Penrith and was made up of representatives from non-emergency community services such as aged care, legal advisory and advocacy services, and local libraries in Western Sydney. The data presented here on Penrith service providers was our second attempt at collecting information from that stakeholder group. We conducted an initial workshop with a range of service providers in an interagency committee in Western Sydney and its networks, which ultimately failed due to the members of that group refusing to participate in the System Effects participatory mapping process and discussion. During that workshop numerous attempts were made by the project team and workshop facilitate to reengage the group in the process, but each of those attempts were ultimately futile. Our reflection on this experience is twofold. First, it is clear that members of the failed service provider workshop were largely unwilling or unable to engage with heat as a community-significant shock event. Second, there exists a significant gap between the

community experience of heat - and the resilience that community members demonstrate in responding to it - and how the failed group viewed the community's level of resilience. This failed group is a particularly stark example of the gap in experience that often exists between service providers and community members, and of the value of conducting research that engages *directly* with members of impacted communities.

The analysis of the service provider experience highlighted the importance of diverse inter-agency and intra-agency networks in a shock event, and in particular that of communication and professional and personal support. For Blue Mountains emergency and community service providers, the 2013 bushfires acted as a catalyst for the development of a grassroots inter-agency network that strengthened professional communications and resource management, addressed fragmentation, and continues to act as a social support system helping individuals manage stress and isolation.

In Penrith, both intra-agency relationships and those between state and community service organisations were seen to be critical in positively managing the increased workload associated with heatwaves.

In Martin Place, the lack of clear communication between emergency service providers and non-emergency service providers inhibited responses and exacerbated the emotional impacts of the event.

For service providers in the Northern Beaches, the experience of the 2014 East Coast Low (shortly after local council amalgamation) was characterised by an organisational context in which disrupted professional networks impacted professional clarity and capacity. The findings suggest that professional networks are critical to both the professional and personal experience of shock events, with diverse, well-established and positive professional relationships underpinning measures of service provider resilience.

Overall, this research found that improving resident and service provider experiences of shock events requires greater attention to the emotional and social aspects of resilience. We have developed distinct recommendations as a result of our findings, presented below, which range in scope from those that address overarching thematic findings, to those aimed at a specific shock event or group type. Many

recommendations are made with reference to the NSW State Emergency Management Plan (EMPLAN) and the supporting NSW Recovery Plan, as well as sub-plans relating directly to the shock types examined in this study, specifically the NSW Heatwave Plan, NSW Storm Plan, NSW Counter Terrorism Plan, NSW Sydney Evacuation Plan, and the NSW Bushfire Plan. Outlined below are ten recommendations that translate the evidence-base established in this project into pragmatic, effective public policy strategies. Our findings reinforce two consistent themes emerging from an overview of Australian and international urban resilience studies. First, the impacts of a shock event depend on where, when, and to whom it occurs, and that contextual variability is embedded into the lived experience of shocks. Second, that this variability is rarely captured in resilience policy, often as a result of qualitative methodologies that rely heavily or exclusively on expert or professional perspectives, or else on quantitative assessment tools based on technical data sets. Our findings support calls for community engagement that acknowledges the lived experiences of a wide range of stakeholders, and identify System Effects as a tool capable of accounting for the variability of such accounts in a way that is meaningful for policy makers.

Recommendations:

Core

Recommendation 1: Expand the focus on, and response to, the individual emotional and social well-being aspects of resilience in disaster policy, planning, support, and recovery.

Recommendation 2: Provide a funding platform for both council and grassroots neighbourhood-level social initiatives in order to establish, maintain or improve community cohesion. Develop recovery plans for social cohesion.

Recommendation 3: Utilise social network development and engagement strategies to improve the efficacy and quality of disaster preparation communication between the government and non-government organisations and vulnerable populations. Provide greater diversity in applied community services communication and support regarding risks both before and after shock events.

Recommendation 4: Encourage more diverse service provider stakeholder engagement by government agencies to identify and educate on the impacts of shock events and ways of mitigating them.

Recommendation 5: Develop and mandate broad, experience-based post-event reflective mechanisms for service workers in emergency response strategies, recovery strategies, and in longitudinal recovery strategies.

Specific

Recommendation 6: Reduce the burden of cumulative financial vulnerability around utility cost assistance in heatwaves.

Recommendation 7: Provide and advertise non-commercial public spaces during heatwaves.

Recommendation 8: Distribute caregiver information on managing heatwaves in heat prone areas.

Recommendation 9: Designate community hubs, or a central information collection and distribution point, for local communities prior to, during, and after of bushfires.

Recommendation 10: Develop specific industry guidance on crisis reporting around security events and engage the media industry in advance. Expand media training for both emergency service and community leaders.

While there are limits to broad generalisations of these results as a result of participant numbers and diversity, this study offers a significant contribution to the important need to translate factors of individual- and community-level resilience into evidence-based policy guidance.

In particular, the project demonstrates the effectiveness and potential of the System Effects methodology for capturing the lived experience of disaster events, their variation and complexity. The use of the methodology, and the results generated, provide innovative and impactful insights into how disasters affect communities and how policymakers can most effectively and efficiently intervene to promote resilient communities.

There remains significant scope to further use the methodology to understand the community impact of disaster events, and to support the work of the Office of Emergency Management and Resilient Sydney more broadly. We see a number of particularly generative opportunities for future research, particularly related to tracking the impact of disasters over time, assessing the systemic financial cost and impact of disaster events, developing models to predict future impact, and evaluating the performance of existing resilience policies and programs.

Overall, the results presented here demonstrate that the System Effects methodology is fit for purpose to support the development of policies and programs to support community resilience. The study is significant in revealing the limitations of research that does not prioritise community voices or that is based on a linear model of cause and effect. As such, the recommendations of this report are structured around improving overall community wellbeing via strategies that engage with the dominant community vulnerabilities identified in our findings, including emotional wellbeing, social cohesion, and financial wellbeing. The systemic impacts of such factors of community wellbeing in this study reinforce existing literature that recommends greater inclusion and systems thinking as a means of building community resilience to shock events. The avenues for future research recommended are a further opportunity to engage with and respond to the *systemic* and *complex* community experiences of a range of disaster events.

1. Introduction

Australia is one of the developed countries most vulnerable to shifting natural hazards, with changing seasonal precipitation and temperature patterns exacerbated by an increasing frequency and intensity of extreme weather events (IPCC, 2014). As such, there is a need for policy and planning bodies to prepare for and minimize the damage of these events, particularly in densely populated metropolitan areas. Realising this goal requires decisive action in urban areas, where economic disparity, socio-cultural diversity, and population density make them "the example par excellence of complex systems" (Batty, 2008, p. 769). This complexity arises from the constantly evolving environmental, material and intangible interactions between individuals, communities, companies and institutions that characterise urban functionality (Deppisch & Schaerffer, 2011). Rather than an exception, uncertainty, change and crisis are intrinsic to the dynamism and appeal of complex systems (Keck & Sakdapolrak, 2013). From a planning perspective, urban environments must be understood and approached as spaces of contradiction and nuance - reliant on, yet also threatened by, complexity.

The challenge of creating effective resilience policy lies not only in managing and mitigating increasingly unpredictable extreme weather events, but also in the complex, dynamic, and multiscalar responses of urban systems themselves in response to these events. Future resilience approaches must be founded upon a closer understanding of how urban residents already experience shock events. How do urban residents experience the impact of shock events? What is the systemic, or cumulative, impact of these events in their everyday lives? How do urban residents articulate these systemic impacts, and identify factors that make the experience easier or more difficult?

These questions have informed the research design of Resilient Sydney – Insights into Community Urban Resilience Experiences, which will take steps towards bridging the gap between the policy need for an evidence-based policy rationale, and the pre-existing, place- and event-dependent factors of community vulnerability and adaptive capacity to disasters and shock events in Sydney.

2. Urban Resilience – State of the Research

The research approach we have developed and used to identify community capability and vulnerability in relation to shock events was identified and developed through a

preliminary scoping review, followed by an extensive review of the academic literature related to urban resilience. This process allowed us to thematically map existing literature, and to identify and respond to gaps in contemporary urban resilience research.

Despite an extensive field of resilience frameworks, it remains unclear which factors make a community resilient, and – importantly - how these factors relate to each other across scale, time and space (Coaffee and Lee, 2016). This is related to the notion that the unpredictability of shock events and the magnitude of their impact is exacerbated by our own ignorance of "what is connected to what" (Batty, 2016, p. 170). Addressing this ignorance requires a framework that can both clarify and represent c*omplex multiscalar interactions* while still accounting for the local and living experience of place. This is evidence that novel resilience methodologies need to be developed that are capable, in the absence of holistic certainty, of examining and extracting utility from the lived experiences of resilience and the factors that enable it.

Three consistent themes emerge from an overview of Australian and international urban resilience studies. First, the impacts of a shock event depend on where, when, and to whom it occurs, and contextual variability is embedded into the lived experience of shocks. Second, this variability is rarely captured in resilience policy, often as a result of qualitative methodologies that rely heavily or exclusively on expert or professional perspectives, or else on quantitative assessment tools based on technical data sets. Third, that the social impacts and disruptions arising from climate change will be experienced in in distinct ways in urban areas, and that these social impacts and disruptions are problematically underacknowledged in urban policy and planning initiatives. These themes suggest a growing need for multi-stakeholder, e*xperiential* accounts of shock events, as well as a tool capable of accounting for the variability of such accounts in a way that is meaningful for policy makers.

The following section will explore the literature gaps highlighted by the scoping process and use these themes to guide and extend a preliminary literature assessment.

2.1. Resilience studies often fail to reflect the lived experience of communities

This insight is not entirely new, and has been noted sporadically by different studies for over two decades. Buckle et al. (2000) for example, in assessing personal and community resilience in and around Melbourne found that the local residential perception of, and priorities relating to, shock events differed significantly from those of emergency management agencies. More recently Boronyak-Vasco and Jacobs (2016) have emphasised the problem of overreliance on service provider testimony to inform community perspectives, particularly at the exclusion of other sources of input. Australian studies highlight the individual- and community-level knowledge and need differentials resulting from the strength of residential and professional community networks, as well as levels of prior experience with specific shock events (Boronyak-Vasco and Jacobs, 2016; Chhetri et al., 2012; Rawluck et al., 2017). There are widespread calls in the literature for increased public consultation and engagement in policy strategy (Berry, 2013; Head & Alford, 2008, Keck & Sakdapolrak, 2013, McPhearson et al., 2016). While engaging with the experience and views of disaster relief service providers is a central part of the current Australian urban resilience landscape (Rogers et al., 2016, Mulligan et al., 2016), there continues to be a strong tendency in the literature and in city-based resilience initiatives to focus on the collaboration and knowledge of urban professionals and academics, overlooking the citizen experiences of the services and vulnerabilities resilience initiatives are intended to target. The uniformity of stakeholder consultation is salient in Chhetri et al.'s (2012) report, which highlights that resident feedback tends to be absent in post-event policy creation despite an explicit focus on community vulnerabilities. This is problematic because, as Ackerman et al. (2016, p. 77) highlight in their work on 'skunkwork', or the production of informal social networks in response to localised shocks, governing bodies "cannot simply read or think one's way into rhetorical, ecological perception and responsibility." This reinforces Strand's (2014) vision of the urban as a system created and dictated by citizen social networks, in which any working definition of a resilient city must be grounded in an acknowledgement that the form and function of urban space before, during and after shock events is determined by the experiences of those who live there. Such holistic scope tends not to be captured in academic and policy accounts of community experiences of shock events, and it is for this reason that

Meerow and Newell (2016) call for an urban resilience that attends to the nuances of resident experience in terms of place, scale and time.

Related, Zaidi and Pelling (2015) argue that urban governance institutions must recognise that management regimes are capable of co-producing both vulnerability and resilience in the city, highlighting the need for experiential resident feedback. Assessing resilience perspectives at multiple scales - from the governance authority to the community, to the household, to the individual - is critical in uncovering hidden dimensions of vulnerability (Hendricks, 2010; Friend & Moench, 2013). Meerow et al.'s (2016, p. 46) review of urban resilience literature highlights the influence that politics of place have on resilience policy, resulting in an increasing need to critically examine "who defines the agenda, whose resilience is being prioritized, and who benefits or loses as a result." From a policy perspective, the choices enacted in resilience planning are dependent on "the rather political question of which elements, or functions, of a city system are deemed to become resilient" (Spaans & Waterhout, 2016, p. 115). Put simply, there is increasing acknowledgement that urban resilience is intimately tied to pre-existing areas of urban disadvantage, with many positioning systemic social, political and economic inequities as critical barriers to the ability of communities to adapt to, and cope, with shock events (Deppisch & Schaerffer, 2011; Vale, 2014; Cretney, 2014).

2.2. Resilience studies often fail to account for complexity

It is difficult to identify why some communities are better able to cope with shock events than others, due to the variety of factors that impact the way in which a household, neighbourhood, and community will be able to respond. These factors include issues around the economic, social, political, and physical status of individuals and the communities in which they live. While each of these factors is important, it is the way they relate to and impact each other that is increasingly important to resilience research. The complexity of these relationships means that it is not possible to identify the role of one factor without understanding its role in the system of factors that shape coping capacity at the household, neighbourhood, and community scale. This is important because the way in which factors are identified and studied in urban communities influences both the findings of such studies and the policy implications drawn from them (Chelleri, 2012). El-Zein & Tonmoy's (2015) commentary on the comparative nature of resilience planning reinforces that while policy-makers may be

required to compare vulnerabilities, many factors of experiential resilience cannot be measured or reduced to a single variable. The challenge of representing variation in community resilience analysis is compounded by the dynamism of factors underpinning resilience, in that individuals and communities are simultaneously resilient to some shocks and some impacts while being vulnerable to others (Buckle, 2000). Analysis must engage with not only the causes and negative impacts of shock events, but also to the unexpected coping capacities of different agents, particularly in groups considered to be vulnerable (Fletcher & Sarkar, 2013; Friend and Moench, 2013). In a review paper of the Rockefeller Foundation's Asian Cities Climate Change Resilience Network (ACCCRN) program, Friend and Moench (2013) highlight that resilience is experienced by urban residents as the comparative difference in day-to-day life before and after a shock event. This reinforces Pelling and Manuel-Navarrete's (2011) observation regarding the innate subjectivity of resilience, in that particular factors can support the resilience of one household while undermining it for another, and in the multiple and even competing ways in which such factors can be perceived and evaluated. As such, Carpenter et al. (2009) suggest that resilience initiatives need to account for the 'noncomputable' elements of shock events, such as conflicting viewpoints, experiences and fragmentary knowledge.

Accommodating such factors in planning requires adaptive and evolving social contracts between governance institutions and the communities they govern, and in particular more participatory and experiential community input in and engagement with decision-making. Embedding multiple experiential perspectives in resilience policy through resident participation can avoid what Soden et al. (2015, p. 233) identify as a "conceptual overloading of resilience." The point is to move from the *concept* of complex policy-making to the *experience* of it in designing responses. In a field increasingly calling for progress indicators to reflect and refine real-life success (Hassler & Kohler, 2014), we propose an approach and a method that prioritises the success of existing programs from the perspective of those who have experienced their impact, both positive and problematic.

2.3. Urban policy often fails to incorporate the social disruptions arising from climate change

It is well established that the physical impacts of climate change will affect urban social systems in complex ways, through demographic and population shifts,

exacerbated or changing social vulnerabilities, and complex and uncertain adaptation pathways at the individual and community level (see Adger, 2010; Diling et al., 2015). The rate and scale of such climate-related social impacts is likely to be increasingly problematic in policy and planning contexts where the governance response is insufficient to successfully guide community adaptation (Barnett et al, 2015). Such insufficiencies may arise due to the inability of existing policy, legal and regulatory frameworks to successfully engage with uncertainty, including issues around climate change projections (Lorenz et al., 2017), climate change scepticism as an environmental and political value (Whitmarsh, 2011), and the social implications of urban climate change governance (Bulkeley, 2013). Shifting the policy emphasis away from future climatic conditions and instead to current experiences of vulnerability in urban contexts may help guide successful adaptation measures at the policy level. Janković and Schultz (2017, p.27) emphasise that climate change policy should focus on social issues of exposure and vulnerability rather than on explicit atmospheric change because "in reality, recent increases in damages and losses due to extreme weather events are due to societal factors". There is a need for greater recognition of the interconnectivity between these physical and social impacts in urban environments by all government agencies and partners in order to avoid maladaptive and/or inequitable planning and policy (Hughes, 2015; Lorenz et al., 2017; Meerow and Newell, 2016).

2.4. Summary

The major thematic findings of our search suggest:

- that there are numerous factors that support successful communities, and that these factors interact with and impact each other in constantly changing ways;
- that urban resilience planning must be flexible enough to respond to existing and emerging sources of community vulnerability resulting from these changing relationships;
- that there is a need for new resilience research and policy methods that can identify these sources of community vulnerability, specifically by:
    - capturing and reflecting a wide range of lived shock event experiences, including local and supralocal perspectives over a range of locations and time periods;
    - accommodating the uncertainty around both shock events and community responses in ways that are useful for policy makers; and

- incorporating the lived experience of a wide range of residents and service providers living and/or working in urban communities.

3. Resilient Sydney – Insights into Community Urban Resilience Experiences

In response to the literature review, this research project was designed to capture the lived resident and service provider experience of shock events in order to identify and understand existing factors of community adaptive capacity and community vulnerability to urban shock events. This study was based in Metropolitan Sydney, Australia's largest city, whose inhabitants represent over 20 per cent of the national population. Sydney is also one of '100 Resilient Cities' (100RC) included in the Rockefeller Foundation's initiative to foster physical, social, and economic urban resilience on a global scale. The 100RC framework is based on place-specific precedence and the probability of acute shocks and chronic stressors. Resilient Sydney's 2016 Preliminary Resilience Assessment (PRA) identifies extreme weather as Sydney's prime threat, based on the predominance of natural hazard shock events such as heatwaves, floods and bushfires. Such events, along with other key shocks related to economic stability, public health, and security, impact a wide spectrum of urban functionality. This is evident in the diversity of urban resilience foci, ranging from public transport and road infrastructure (Jaroszweski et al., 2014), to resident morbidity and health (Bambrick et al., 2011), and the tourist economy (Amelung & Nicholls, 2014).

Increasing Sydney's capacity to effectively prepare for and respond to such events in the future requires inclusive and nuanced engagement with the ways in which these types of shock events are currently experienced, which has implications for policy. Four shock events were chosen in the Greater Sydney Metropolitan area as the focus of this study. Resilient Sydney's PRA informed the identification of shock event types selected (Table 1), and the choice of events, outlined below, to serve as the basis of the study.

Table 1: Event types

Sydney LGA	Event	Shock Type	PRA Threat Rank
Penrith	Heatwave	Weather	#1
Blue Mountains	Bushfire	Weather	#1
Collaroy	Storm surge	Weather	#1
Sydney CBD	Sydney siege	Security	#8

3.1. Events

2016-17 Penrith heatwave

NSW experienced its hottest summer on record between Dec 2016 and Feb 2017, with record-breaking temperatures 2.58 degrees above average, leading the Climate Council to dub it the 'Angry Summer'. The impacts of this were particularly felt in Western Sydney, where the mean temperature was 2.8°C above average. This period was characterised by heatwaves, with an unprecedented streak of 26 days of plus 30°C weather, in which 11 days exceeded 35°C. Penrith Lakes recorded their highest summer temperature of February 11 at 46.9°C. These temperatures lead to energy surges and resulting blackouts, with the Australian Energy Market Operator issuing blackout warnings and the NSW energy minister issuing a statement calling on residents to curb power use. The heat exacerbated ozone and other pollution levels in Sydney, with NSW Health issuing a warning that residents with respiratory problems – particularly children with asthma – to stay indoors during the hot daylight hours.

2013 Blue Mountains bushfires

The Bureau of Meteorology reported that September 2013 was the warmest on record to date for NSW, with temperatures 6 degrees above average in the last week of the month. The hot weather, combined with windy conditions, triggered widespread bushfires across the state from October 13; however it wasn't until October 16 and 17 that the worst fires were triggered in the Blue Mountains. Three separate fires originated in Lithgow, Springwood and Mount Victoria. These bushfires destroyed 248 properties, damaged another 133, and burnt over 65,000 hectares of mostly national parkland. Smoke impacts affected much of the state, with the Blue Mountains fires particularly impacting the Sydney Metropolitan area. The State government declared the bushfire areas a natural disaster zone, with the Blue Mountains Council stating that the bushfires were the worst disaster in Blue Mountains history.

2016 Northern Beaches East Coast Low

From the 3-6 June 2016, an East Coast Low of unprecedented magnitude, duration and location compared to recorded events in the past impacted the east coast of Australia. The East Coast Low brought gale force winds, heavy rain, and intense storm surges, leading to flooding and widespread coastal erosion. While beach erosion associated with the storm event was widespread along the NSW coastline, the impacts were most apparent at Collaroy-Narrabeen Beach, located in Sydney's north between Narrabeen Head and Long Reef Headland, and identified as an erosion hotspot.

While advanced warning systems meant that the East Coast Low storm was well documented and residents received advanced notice, the flooding of Narrabeen Lagoon triggered resident evacuations while severe beach erosion of up to 50 meters caused much commercial and residential property damage along the coast.

2014 Martin Place Siege

The Martin Place siege (also referred to as the Sydney Siege; Lindt Cafe Siege) occurred on 15 and 16 December 2014, and involved a gunman named Man Haron Monis taking 18 people hostage during a 16-hour stand-off with police at the Lindt Cafe in Martin Place, Sydney. Monis communicated with police via Tori Johnson, the manager of the café, and stated that the act was motivated by allegiance to the Islamic State. Monis led police to believe that he had other collaborators stationed around the city, and that all, including Monis himself, had access to bombs. As a result, large scale building evacuations took place in the city blocks within and surrounding Martin Place. The siege ended after police stormed the café. Two hostages, Tori Johnson and Katrina Dawson, as well as Monis himself, were killed in the process, and three hostages and a police officer were injured. Immediately following the event, a coronial investigation was launched regarding the law enforcement and public safety practices used during the event, and ways in which they could be improved. The siege received a high level of media coverage, and the Islamic affiliation of Monis prompted significant and contentious public discourse centred on the relationship between multiculturalism, Islam, and Australian values and identity (Colic-Peisker, Mikola & Dekker, 2016). Thousands of floral tributes were placed in Martin Place in commemoration and mourning, which were later removed by the City of Sydney council. A permanent memorial was established in Martin Place in 2017.

Policy context of these events:

- The State Recovery report for the 2016 East Coast Low identifies 41 local government areas that were included in a natural disaster declaration for the event, of which Northern Beaches was one.
- NSW activated a heatwave action plan in Dec 2016, with NSW Health Department publicising a list of precautions for the public to take.
- NSW Premier declared state of emergency for 2013 October, with the Rural Fire Service identifying 69 bushfires (23 uncontained) on 19 October, with those occurring in the Blue Mountains recognised as the worst.

- During the Martin Place Siege, several sites around the CBD were evacuated, and there was media communication from the Australian Prime Minister, NSW Premier and NSW Police Commissioner.

3.2. Recruitment

The first section of this study involved recruiting Sydney participants with personal experience of one of the events identified above. Participants were invited to attend one three-hour focus group held within the LGA of the target event, held between August 2017 and December 2017. We identified two participant group types to target for recruitment – local residents, and professional/voluntary service providers attending the area at the time of the event. The term 'resident' in this study refers to residents of Greater Metropolitan Sydney who experienced direct impacts as a result of one of the events identified above. Residents were typically from the local government area in which the shock event occurred, with the exception of the Martin Place Siege. The terms 'service provider' in this study refers to representatives of a wide range of organisations that constitute the resilience workforce, outlined below:

Emergency services

- Professional emergency services (e.g. fire and rescue; paramedics)
- Volunteer emergency services (e.g. with Red Cross)
- Non-government community services (e.g. charity organisations)
- Local government emergency service (e.g. response management)

Non-emergency services

- Government community services (e.g. Centrelink; public library services)
- Local government non-emergency service (e.g. planner)
- Commercial management (e.g. building manager; business manager)

Both groups were identified as having distinct lived experiences, and as groups with a high level of policy relevance. An important aspect of this research was to broaden the definition of 'impacted' in these types of shock events, and the experiences of these two groups were central to achieving a more comprehensive understanding of stakeholder impacts. All recruitment was conducted by the office of Resilient Sydney and achieved through a combination of residential letterbox leafletting and targeted advertising via social media (in relevant Facebook groups) and through posters and leaflets in community organisations such as government buildings, public libraries and other local

service facilities. Residents self-identified as impacted by the target event and were screened by Resilient Sydney staff in a brief phone call prior to event registration and confirmation. Residents were provided with a $50 grocery voucher for their time. Service provider recruitment was achieved by accessing existing networks run or contributed to by Resilient Sydney, local emergency management committees, local emergency management officers, and community groups.

Table 2: Participation overview

Sydney LGA	Groups	Participants
Penrith	Resident	16[1]
	Service Provider	3[2]
Blue Mountains	Resident	10
	Service Provider	3
Collaroy	Resident	N/A[3]
	Service Provider	11
Sydney CBD	Resident[4]	10
	Service Provider	12
Total	7	65

The success of recruitment and corresponding focus group attendance varied according to location and event chosen and was a primary challenge of the methodology. For example, recruitment was conducted for a resident group for the Northern Beaches East Coast Low, however the relatively small residential areas directly impacted by the event, the low participation incentive in a relatively high-income neighbourhood, and the high media saturation around the event prior to this study meant that recruitment was not successful.

Reflections from this project with respect to future use of this method are outlined below. Whilst detailed analysis of recruitment barriers is outside the scope of this report, a number of challenges have been identified.

[1] One participant's data was omitted from analysis due to relevance of content.
[2] This group was run twice. Please see section 5.1 for details.
[3] Despite recruitment attempts, we were unable to attract participants for this group.
[4] The only focus group not to take place in the LGA in which the shock event occurred. Due to the low residential population in the City of Sydney LGA and an interest in the impact of the siege on the Muslim community, Muslim residents from Greater Metropolitan Sydney were recruited, and the focus group took place in Bass Hill.

Event and place specific issues

- Northern Beaches: a relatively limited geographic area of impact meant a small number of properties were impacted by the coastal storm surge, constraining the potential cohort of resident participants;

- Blue Mountains: a history of intensive engagement exploring the impacts of the Blue Mountains bushfires may have resulted in a sense of consultation 'fatigue' for the local community; and

- Martin Place Siege: the coronial investigation may have caused sensitivity around participation for some stakeholder groups.

General recruitment issues

- Distributing flyers and social media posts through pre-existing networks:
    - A targeted recruitment approach was necessary in order to reach people who were impacted by the events. The project team contacted community groups, professional organisations and social media groups with connections to impacted people with requests to distribute invitations throughout their networks. Invitations included electronic flyers and pre-prepared social media posts;
    - Social media was effective in the Blue Mountains. This may have been because the group had been established in response to the bushfires, and were therefore responsive to our request; and
    - For other events this methodology was less successful, possibly because the ability to send reminders, or follow up, was transferred to organisations who were busy with their own activities. In some cases these organisations were resourced by volunteers.

- Letterbox drops, flyers and door-knocking:
    - The project team engaged in extensive letter-boxing, door knocking and hand delivery of flyers in impacted areas;
    - These methodologies had the highest rate of conversion to participation in Penrith, possibly because the geographic area of impact was broad; and

  - This methodology had the lowest conversion rates for the other events.

- No methodology was effective in reaching local businesses. Possible barriers include the fact that most were small businesses owned and operated by people who are generally time-poor. This is consistent with other experiences engaging with small businesses who have had difficulty finding the time to attend focus groups.

- Whilst time-consuming, recruitment of service personnel was generally effective.

- There is a possibility of 'avoidance' by community members fearful of re-experiencing trauma or distress from focusing on their experience of shock events during research activities. Further exploration of barriers to recruitment is recommended for similar projects to ensure they are not impacted by low or self-selecting participation numbers.

3.3. System Effects Methodology

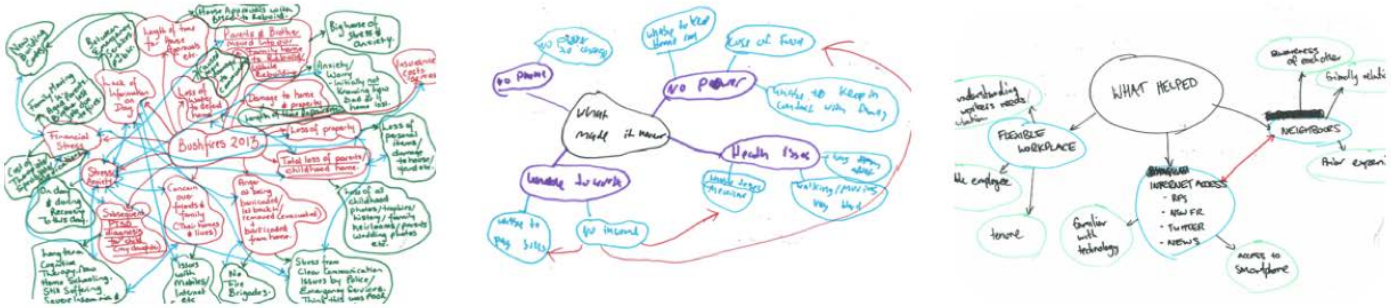
This study employed System Effects, a mixed method framework that aims to capture the lived experience of complex phenomena (Craven, 2017) and enables a high level of individual participant detail to be reflected within aggregated findings. The System Effects method is comprised of two distinct steps: first, engaging participants in a mental mapping exercise to capture their individual experiences; second, aggregating those experiences to identify dominant patterns of impact and response across diverse participants, group type, and event type.

Focus Group Mapping

We conducted the first stage of the System Effects process in focus groups. Each focus group produced two sets of distinct yet related research data: participant maps; and small group discussion. Focus groups began with a brief project introduction and 'getting to know you' exercise, followed by the main participatory mapping exercise. The mapping exercise lasted approximately an hour and resulted in three distinct maps: an impact map detailing all the ways in which the participant was impacted; a barrier map detailing all the factors that made the participant's experience of the event harder; and

an enabler map detailing all the factors that made the participant's experience of the event easier.

The mapping process comprised four distinct steps. First, participants began by writing the theme of the map in the middle of the page e.g. the name of the shock event, what made it harder, and what made it easier. Second, participants wrote down their direct experiences of that theme, for example the impacts they experienced directly as a result of that event. Impacts were defined as any aspect of daily life that changed or was influenced as a result of the event, regardless of size or type. Enablers and barriers were anything that was significant to the participant in their capacity to cope with their experience of the event. Third, participants were asked to add a second layer of factors that stemmed from or were a result of the initial layer of direct experiences. This allowed for a temporal dimension to be included with in the process, enabling a distinction between immediate, direct experiences, and those that became apparent longer term. Finally, participants were invited to draw links between the components of their maps to visually depict the relationships between factors and over time, and the ways in which they contributed to or influenced each other. These linkages could be uni- or bi-directional, according to the nature of the relationship. The mapping process was individual, however participants could ask questions or ask for assistance from researchers, as required. After a short break, participants were divided into small groups of 3 to 7 and paired with a University or Resilient Sydney table facilitator, who guided a group discussion that allowed individuals to discuss, extend, and add detail to what they had written on their maps, and to interact with and respond to the experiences of others.



Impact Map | Barrier Map | Enabler Map

Figure 1: Examples of Participant Maps

Data Analysis

The second stage of research involved digitising, coding, and aggregating participant data. Participant data was de-identified, and the content of each map was digitised in a coded word document that classified the content by event, focus group type, and participant, resulting in three documents per participant involved in the study. A list of observed themes was developed by the researcher during the digitisation process. These themes were refined over time and became the coding schema, or nodes, used in a qualitative data analysis program called NVIVO to classify all participant data. This categorisation of participant data allowed researchers to understand the personal participant experience of each event and was of interest in its own right. The next steps of the System Effects method involve the aggregation of these experiences with respect to the linkages between shock event factors experienced by individual participants, enabling researchers to identify dominant patterns of impacts, barriers, and enablers within and across the community experience. The NVIVO node categories were used to create the horizontal and vertical axes in an adjacency matrix, and the linkages identified in the original maps were translated into this matrix, according to the coded cause (vertical axis) and effect (horizontal axis) communicated via the linkage direction. An individual adjacency matrix was created for each participant map. These individual matrices were then aggregated by shock event + group type e.g. Bushfire residents. These aggregates were analysed using a network analysis and visualisation program called Gephi, which enabled visual network to be produced which identified the dominant relationship patterns within each data set. The resulting maps communicating information in two ways. First, the depth of red of the node, which is a visualisation of its weighted degree, or the relative importance of its combined cause and effect. Second, the thickness of the arrow/s connecting the node to other nodes in the network, which signifies the strength of that relationship. Where there is a loop arrow pointing from a factor to itself it indicates that participants identified links between that factor and itself, for example issues around finances led to exacerbated or different issues around finances.

An example of an aggregated community map is presented below:

A

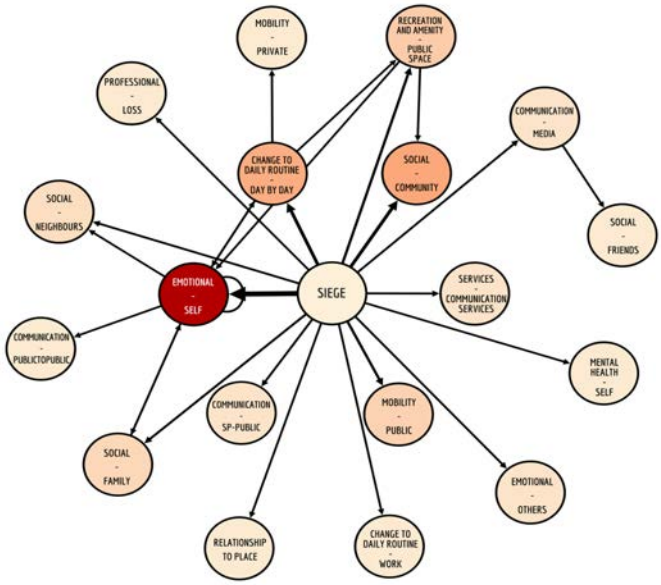


Figure 2: Example of a Gephi network map, in which individual participant maps are aggregated to provide an understanding of community-level factors of impact

While we have not done so as part of this study, the data collected through this methodology could be used to assess the 'systemic cost' of disaster events. The orthodox approach to costing the financial impact of disaster events often focuses on a limited number of easily quantifiable factors e.g. infrastructure loss and damage, injury, productivity loss from days of work. The system maps generated through the System Effects process present opportunities to assess the broader 'systemic cost' of particular disasters and how they are experienced by community members. Doing so would complement existing approaches to quantifying the economic and financial impact of disasters.

These results are presented in the following sections, starting with an overview of the resident experiences in the Penrith heatwave, Blue Mountain Bushfire, and Martin Place siege, before going on to report on the service provider experiences of each of those, plus the Northern Beaches East Coast Low. For each case, and for both residents and service providers, we discuss the self-reported impacts of the event, as well as the barriers to and enablers of resilience in the face of shock events. A glossary providing clarification and examples of all codes discussed in the following sections is provided below. A full list of codes used in this research is provided in Appendix 1 and 2.

3.4. Coding Glossary

Code	Description and use	Example
Community	Actions or interactions related to the local community	"community support" "handling residents"
Community services	Actions or interactions with government or non-government community services	"attended recovery center day 2" "community wonderful (Salvation Army/Anglican/Baptist churches)"
Day to day change	Routine day to day activities or behaviours that changed as a result of the event.	"always listening for the weather report" "moving out for 3 days"
Expense	Expenses arising directly as a result of managing or recovering from the event	"cost of therapists/specialists/medications" "significant clean-up costs" "power bill"
Emotional – others	Feelings that the participant identified other people experiencing as a result of the event	"stressed parents"
Emotional - self	Feelings personally experienced by the participant as a result of the event	"gratitude (agencies/bank for help)" "feeling vulnerable and weak"
EMS (Emergency Management Services)	Actions or interactions of emergency service staff or organisations, including police, fire, ambulance services.	"contact with police on scene" "call ambo - son passed out due to heart"
Family	Actions and interactions of family of the participant in relation to the event	"we stayed with sister in law for a few days" "uncooperative husband" "children took over managing lots of things"
Friends	Actions and interactions of friends of the participant in relation to the event	"help from friends" "stayed at friend's house for 7 weeks"
Housing characteristics	Characteristics of residential buildings that impact the experience of heat for residents. This includes the presence and efficacy of air-conditioning units, as well as the design and materials used in constructions.	"housing commission doesn't provide air conditioning"

Material loss	Damage or destruction of physical objects as a result of the event	"lost my home" "loss of family history e.g. photos and letters"
Material Objects	Role of physical objects and belongings in the experience of the event	"overheated computer equipment" "handheld battery powered fan" "modern medical equipment - everything folds compactly"
Media	Role of televised or print media in the participant's experience of the event	"inaccurate media coverage of fire location and threats – dramatization" "Repetitive constant TV coverage"
Mental health - self	Specific reference to mental health issues such as depression and post-traumatic stress disorder experienced by the participant as a result of the event	"Depressed"
Mental health – others	Specific reference to mental health issues such as depression and post-traumatic stress disorder of others identified by participant as a result of the event	"PTSD diagnosis given to my child"
Neighbours	Interactions and actions of neighbours in response to the event	"checked neighbours aware and taking action" "Neighbours picked up kids"
Place characteristics - physical	Physical characteristics of the participant's home or neighbourhood that influenced their experience of the event.	"living on 5 acres of bushland" "Penrith is 5 degrees hotter than city"
Physical health - self	Physical impacts – range from minor (sweating, fatigue) to major (inflammation, pain)	"feeling sick from heat and sweating more"
Physical event	Direct, physical experiences of the event	"trapped in burning house" "Flooding in multiple areas" "it was still 39 degrees at 10pm" "CBD in lock down"
Recreation and amenity – commercial	Spending time in a commercial area e. shopping center, club	"forced to "escape" to shopping center if heat too intense"
Utilities	Relating to power, blackouts, water	"loss of water to defend home"

4. Resident Results

Table 3: Resident Overview

	Impacts	Barriers	Enablers
Blue Mountains	Emotional – self Material loss Family; Community; Objects	Physical event Utilities; EMS Place characteristics	Family; community Community services
Penrith	Emotional – self Day to day change; physical health	Emotional – self; expense Utilities, Housing characteristics Emotional – others; Physical health self	Material objects; Family Recreation and amenity – commercial
Martin Place	Emotional – self Day to day change; Community	Media Day to day change; Family	Community Media Friends; Neighbours

4.1. 2016/17 Heatwave

The focus groups for the 2016/17 heatwave were held in Emu Plains, and were attended by a demographically diverse group of residents from the Penrith region. Participant groups featured ages ranging from 18-24 to 65+, had a roughly even mix of male and female. Average annual income ranged from under $20,799 to $91,000 - $155,999, with a range of housing tenure represented, including private home ownership, private rental and public housing.

4.1.1. Impacts

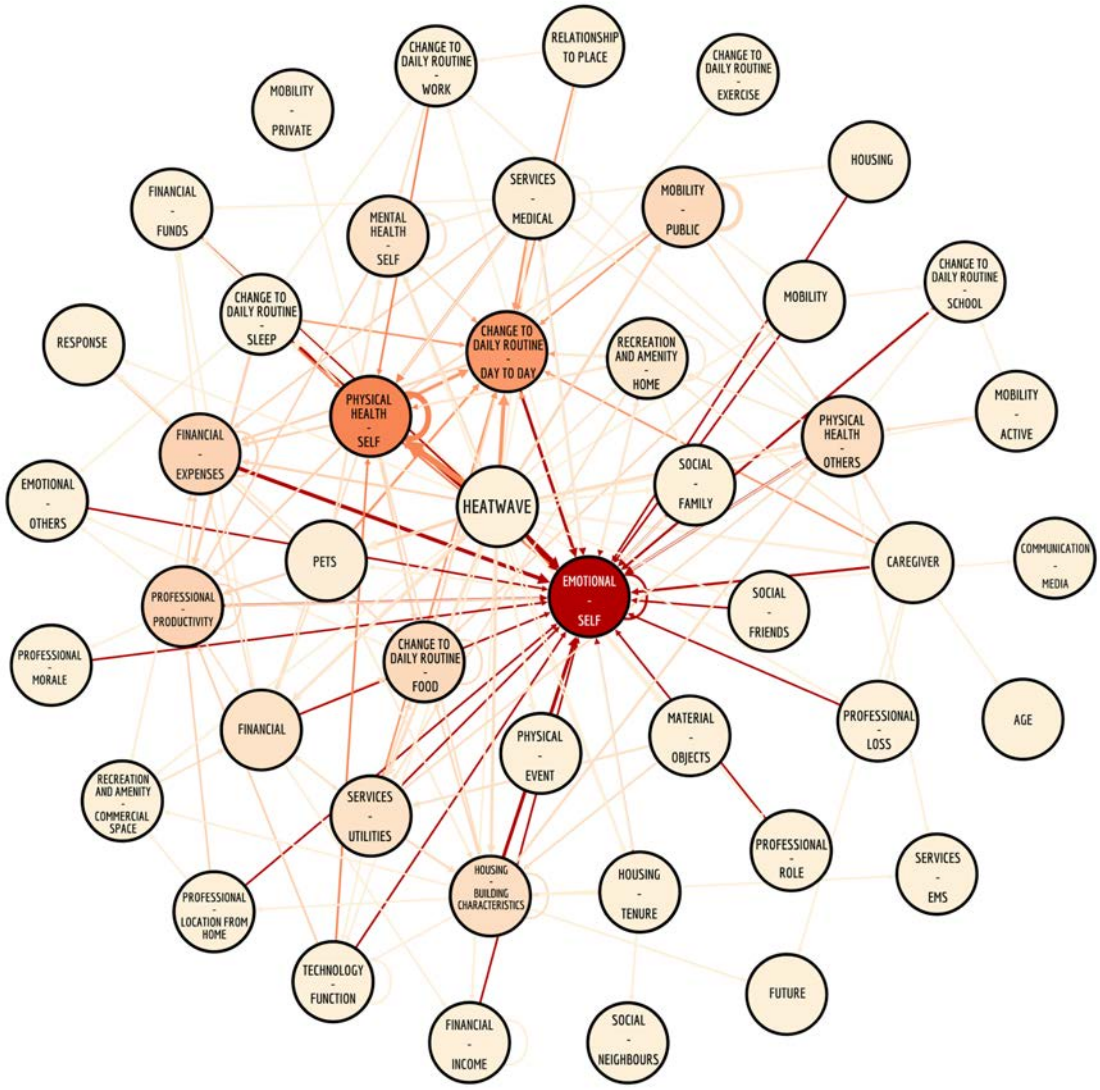


Figure 1: Penrith Resident Impact Map

Most Prominent Factors:

- Emotional – self: increase in feelings of anxiety, stress, and frustration due to the heatwave.
- Day to day change: changes in day to day routines, ranging from decreased energy for housework and cooking, to making decisions around when to travel to and from work. Such changes were most significant for participants with caring responsibilities, as fear of excessive heat or blackout often meant missing work to care at home or making arrangements to ensure the wellbeing of heat-sensitive patients. These actions often led to financial expenses.

- Physical health – self: physical states ranging from discomfort (sweating, fatigue) to illness (inflammation, nausea). Many people noted bodily fatigue, lethargy, and exhaustion in their individual maps

The Penrith resident impacts maps reveal that the experience of heat is characterised first and foremost by personal emotion. In individual maps terms such as anxiety, stress, and frustration were used, with participants describing changes in mood, decreased feelings of personal capability, and an increased rate of conflict in professional and personal interactions, as well as between tenants and their landlords. Emotion is not experienced alone, but rather is embedded within each experience, shaping the participant's cumulative experience as a result. Extending on the mapped impacts in small groups emphasized the variety of ways in which emotional heightened the experience of the heatwave.

I stayed alone and baked, which was not healthy for me because I was becoming more socially isolated, even though it was a bit of an issue for me. P_R1_SG2

Yeah, mine was emotional. Everything led back to how I feel about myself and my own self-worth, that I just couldn't do anything. P_R1_SG1

Here we see direct emotional impact affecting sociability, isolation, and feelings of self-worth. The centrality of emotion in Figure 1 was emphasised in small group discussions, where personal emotional response tended to characterise each experience of heat, regardless of whether the impact of heat is practical, physical, social, or financial. The other prominent impacts on the Penrith resident map were physical health – self, and change to day to day routine, however we still see that there is an embedded emotional aspect to these experiences, which became apparent through small group discussions.

Personal physical health was an important part of the participant experience of heat, and included physical states ranging from discomfort (sweating, fatigue) to illness (inflammation, nausea). Many people noted bodily fatigue, lethargy, and exhaustion in their individual maps, which were touched upon in small group discussions.

> *I've felt that personally, in my own health, that I was knocked around a lot, that it was very draining on me, the heat.* P_R1_SG1

> *I think for me, it was mainly stress and anxiety because of all the other issues. One was health. It impacts my health and the kids and that obviously leads to a really stressful situation and then money because your bills are so high and you're missing work and if you're working casually, you don't get paid.* P_R2_SG3

This is a good example of the complexity of the resident experience, where one aspect of heat – in this case physical health – impacts and is impacted by other things within the participant's life – emotion, work, expenses – to characterise their particular experience of heat. One participant suffering from heat-triggered eczema touches on both the emotional and social aspects of the direct physical impacts of heat:

> *What made it worse is probably the sweating, no matter what…because my skin was that flared, infected and stuff, like I got looked at. So you try and wear something to cover up but still try and keep cool and it's just like – and then even if you did, because of just sweating, you start to get the sweat marks and the blood marks and everything else – people still looked at you funny…my depression and anxiety just skyrocketed in that period. Stress.* P_R1_SG2

Another prominent impact in Figure 1 is change to the day to day routine of participants. This refers to any activity in the participant's life that changed as a direct result of the heatwave and could be a one-off action such as moving into a motel or friend's home, or behavioural such as changed social patterns, avoiding particular places such as their homes, doing less housework, or not attending work. Both were common flow on effects and again small group discussions highlighted the interrelation of these changes and emotional flow-on impacts.

> *I think it really affects your mental health because – during the day, I got obsessive about going on to the BOM website, the Bureau of Meteorology. What is it now? What is it now? What's the heat now? Constantly…And you get obsessive. It's weird. You're not yourself.* P_R1_SG1

> *When it's that hot, you just don't feel like doing anything. Your house gets untidy. It's not dirty, but it gets untidy because you really don't feel like doing anything.* P_R2_SG3

The below excerpts are from participants whose caring responsibilities had a significant impact on their day to day life during the heatwave, one staying with a family member in order to care for a disabled partner, another needing to take time off work to care for relatives, and a third with long-term caring responsibilities. The financial and emotional (guilt, stress, anxiety) cumulative impacts of these direct impacts can be seen in the following excerpts:

> *Yeah, and you feel guilty because you've taken all this stuff and you've taken over somebody else's house and sort of caused them a lot of inconvenience…then I felt all the guilt and the stress just because of a couple of hot days.* P_R1_SG1

> *I work in Sydney CBD. I had to make decisions very early in the day whether I'm going to go to work or not. It caused stress at work – people were thinking I was taking time off because I'm taking advantage of the situation, caused some issues and all that there. So that was a bit of a shitfight there…* P_R1_SG1

> *[Talking about heat-related public transport delays]…so I was sometimes not getting home till an hour after my routine and routines are things that I believe in. When you've got someone with dementia living in your house, routine's absolutely imperative. If we don't have dinner by 6 o'clock, then everything else goes out the window because medications have to be had and they can't be had on an empty stomach. All of these things that make up your daily routine when you have someone that relies on you.* P_R2_SG2

These examples again show the emotional endpoint of particular catalysts changing participant routines and emphasises the emotional characterization of the resident experience of heat conveyed in Figure 1. The relationship between seemingly disparate types of impacts touched here – emotional, practical routine, caregiving responsibilities, utilities, and transport – is a good example of not only the complexity of resident impacts but also the ways in which their functional interdependencies characterise individual, context-dependent experiences.

4.1.2. Barriers

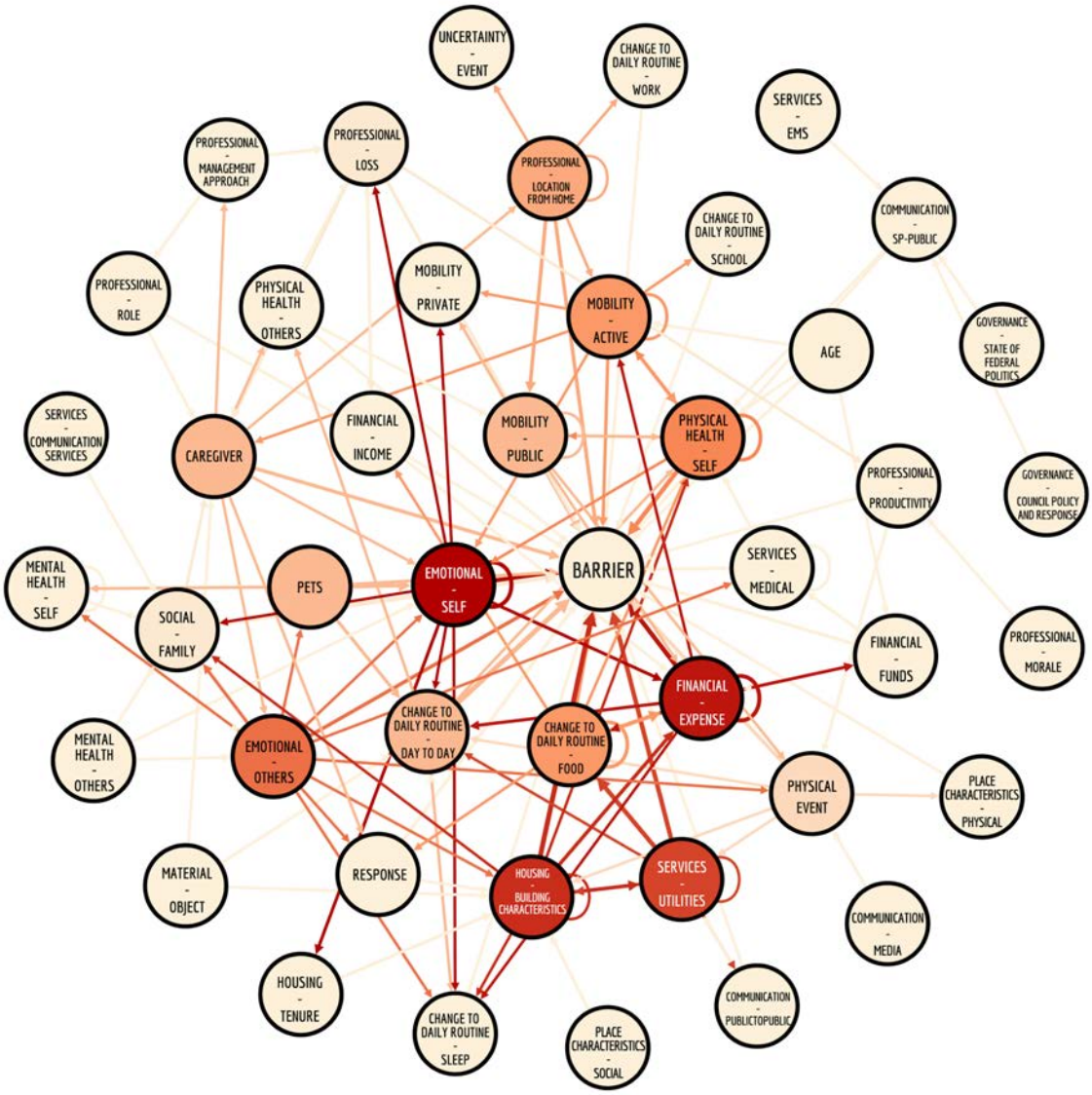


Figure 2: Penrith Resident Barrier Map

Most Prominent Factors:

- Emotional – self: feeling distressed about the experience of heat e.g. having to go home to a hot house, experiencing an increased rate or irritability and frustration in professional and personal interactions. In addition, cumulative stress from increased expenses, moving out, wellbeing of others etc.
- Expense: experiencing heat-related costs e.g. from higher electricity bill, having to stay in motel, as a problematic financial burden
- Utilities: the loss of electricity during blackouts during the heatwave was of primary concern for residents relying on air-conditioning for comfort and/or health, for those

relying on electricity to power health-care equipment (breathing apparatus, monitors etc.). The loss of electricity prompted some participants to either stay with relatives or a friend whose electricity was functioning, or to stay in a motel for the duration of the blackout or heatwave. The loss of function fridges and freezers in combination with lack of air-conditioning also led to food spoilage, in many cases replacement of food exacerbated the financial stress of the heatwave

- Housing characteristics: lack of air-conditioning in combination with building controls, strata policy, and public housing interactions as barriers, several participants having to physically move out to a family members or friend's home or a hotel during heatwave in order to cope (this relies on either financial or social resources)
- Physical health – self: physical discomfort or illness related to heat, including fatigue, heat stroke, heat rash, dizziness, asthma, and eczema
- Mobility (public and active): heat-related train delays, extended waiting time at train stations and bus stops with no shade, lack of household access to a car resulting in increased vulnerability for children and families walking to school. Issues of mobility interacted with household financial status (ability to own a private car) and physical health (long travel time in hot busses, especially for health carers and those with children)

The role of personal emotion characterises the direct impacts in participants' lives and can exacerbate their barriers to coping, particularly in cases of cumulative impacts, as below.

> *[caregiver] I'm trying to be what I can be, as good a son as I can, but also know that I need to get to work, I need to make life simple and easier for myself*. P_R1_SG1

> *And it's exponential because if you only get maybe three or four hours sleep – and it's not good sleep – you know, you don't get a good constant sleep – when you miss that first sleep, it's like, "I can cope today." You miss the second sleep and it's like, "I'm not coping too well." The third sleep, it's like, "Please keep away from me. I'm not going to kill you, but it's going to be a close call." And every day after that just gets worse and worse*. P_R2_SG2

Here we see that direct impacts – having to miss work to care for a relative, or decreased sleep – have cumulative emotional impacts that make the experience harder. In these cases

the emotion arises from the participants' challenged self-perception as a "good son", and social tolerance over time.

Another critical aspect of the experience of heat for Penrith residents involves both resulting expenses, as well as their pre-existing financial capabilities.

> *I just can't afford to have air-conditioning going.* P_R2_SG3

> *Yeah, mine was financial too because housing expected me to pay for the air-conditioning and I can't afford it because I'm on the carer's payment because I care for my son. They expected me to also get people to come in and set it up.* P_R2_SG1

> *You know, if I ran my conditioner, it would cost me probably something like about five, six, seven hundred dollars a quarter. I live on a disability pension. I'm very good at budgeting. Not to that degree, though.* P_R2_SG2

> *And then the electricity bill from running all the extra power, I ended up – my normal bill is around about three to four hundred dollars, but I had an extra $500 to pay in top of the February bill… and, you know, they only give you two to four weeks to pay everything so when you're just pensions and carers, finding that extra cash was really hard.* P_R1_SG1

We can see here that the cost of, for example running an air-conditioner more frequently than usual, adds to monthly expenses and acts as a barrier to coping. However, we also see here that this extra expense is exacerbated by the pre-existing financial constraint of living off a disability pension or a carers allowance, and the likelihood that the original conditions of personal disability or being in a caregiver position underlie greater requirements for air-conditioning in the first place. Additional expenses also demonstrate the complexity of resident experiences. For example, many participants included food spoilage as a result of energy blackouts during the heatwave. The relationship between utilities, food, emotion, and additional expenses is also emphasised for participants living on a budget, relevant as many included food spoilage as an unexpected expense

> *…what if your fridge goes? That's it. What do you do? You can't eat.* P_R1_SG1

We see in these examples a double barrier – not only financial pressure, but also pre-existing vulnerabilities that make that financial pressure both more likely and harder to accommodate for particular residents. Figure 2 highlights a two-way relationship between access to utilities (electricity and water) and the role of the physical building design and arrangement of resident housing. The majority of individual resident maps mention the presence, function and/or effectiveness of home air-conditioning, a factor which directly impacts and is impacted by suburban electricity supply. The importance of the relationship between utilities, air-conditioning units, and the design and cooling capacity of particular buildings is outlined below, and again include emotional dimensions.

> *So that's another thing that causes stress and then I think also having to stay in a hotel one night because there was no electricity. Bub was only, I think, four or five months at that time and really fragile and the kids were just really sick.* P_R2_SG3

> *It was like I was living in an oven for eight hours until the sun went down.* P_R1_SG2

> *The heat affected my son. He's got a severe heart disease, so the heat is not good for him. He suffers from ADHD/ODD, so you try and keep a kid that's like that cool. We can't because we don't have air-conditioning. When we lost our power, we had nothing.* P_R2_SG1

The physical capacity of residential homes to withstand high temperatures and maintain comfort was discussed in small groups, where the impact of various building regulations were explored.

> *So what I have been saving for is to have awnings or something to drop down. I've got natural bamboo drops, just cheap ones, but now I want to put permanent ones in because I'll be there for life, but I've got to get permission. So I've got the paperwork. What I've got to do is get a licensed installer to come out, give me a quote on how much it would cost, but the main thing is how he's going to assemble it and if he's going to do any damage to the home or something like that.* P_R2_SG2

> *In those strata units, I mean,* [Name] *can't even change the plants in her front garden, even though she owns the unit, she can't change the plants that are in the front garden*

> *without strata approval and they only meet once a year. Unless they call the meeting, but if they call the meeting, they have to pay for the mediators to come out.* P_R1_SG1

We see here formal and informal regulation are a distinct barrier to resident approaches to improving the capacity of their properties to withstand heat through additional shade structures and plants. Many participants highlighted issues of tenure on their barrier maps, particularly that their landlords were unwilling to improve the capacity of their homes to withstand heat.

> *I don't have any air-conditioning. I rent, so it makes it hard. I've asked the landlord twice over eight years, can I please have it. I'll pay extra rent, I don't care. No. No.* P_R1_SG1

> *In our complex, everything's old in there. No one likes to maintain things under strata. We lost power in our complex.* P_R2_SG1

These barriers of tenure and building regulations were barriers particularly faced by those in public housing. We see here the relationship between utilities, tenure and the capacity of a building to withstand heat.

> *P1: I bought the awnings. That makes a lot of difference at the front.*
> *P2: Well, I can't afford those. Housing won't let me. I'm in what they call emergency accommodation. I've been there nearly five years.* P_R2_SG1

> *And the thing is in housing and social housing, emphasis was not made a big issue for insulation. It's kind of like, "Hey, you've got a house. Suck it up. Be thankful."* P_R1_SG2

In small group discussions with residents, the relationship between the lack of social cohesion and community networks within these complexes and exacerbated risks arising from, for example, lack of physical air-conditioning, were more clearly identified.

> *I found* [community housing complex in Penrith] *is – with older residents, elderly residents, they will give them a phone call once or twice a week because we have had residents that have passed and when your rent just gets taken out automatically and you don't really know your neighbours – we haven't seen Old Joe for a few weeks. What's*

that funny smell? And that's happened. Yeah. It's kind of like, "There's a bit of a smell coming from Joe's place. Let's go check on Joe." Well, Joe had moved on within the last month. So there's not a lot of social interaction at times. P_R1_SG2

P1: *And I live in housing commission too, but it's a nice area where I am. The neighbours don't talk to each other. We just keep to ourselves, which I prefer. It's a nice little complex.*
M1: *Just the lack of air-conditioning.*
P1: *Yeah, no air-conditioning. No one's got it.* P_R2_SG1

I don't know my neighbours on a personal basis, apart from a couple of them. P_R2_SG2

There is a clear relationship between the factors of stress, social isolation and loneliness outlined above, and the maintenance of interpersonal connections and social networks. This relationship is clearly affected by the impacts of heat in professional and social settings.

P1: *Yeah, I think basically the overall thing was just stress. Like stress with the parents, stress with the staff because we did get a lot of parents – because we've had to call them up, which means they've got to leave work - - -*
M1: *And they're annoyed.*
P1: *Yeah. So it's basically overall it just comes back to the overall stress environment.* P_R2_SG3

…everyone was feeling it. People's patience was starting to run thin and the way I – we couldn't blame each other because we were all in the same situation, but when everyone's sleeping a lot less than they used to…Very short-tempered, yeah…And you're drained. You're walking around feeling lethargic. P_R1_SG1

Physical health – self

I'm asthmatic and diabetic. I have arthritis and I have a body temperature problem where my body temperature goes up and I pass out. So when I get overheated, it's really hard and I don't have air-conditioning. P_R2_SG3

I suffer with eczema and asthma, so over that heat period, the sweat and everything affected my skin and I ended up with a lot of infections and my eczema flaring up and stuff due to sweating and stuff like that. P_R1_SG2

Much, much harder because you've not only got to take care of yourself and I've learned that I come first. However, when you're a carer or you've got children or a wife that's not well and what have you, you do tend to put them first. P_R2_SG2

Mobility – active and public

Issues of mobility, particularly active and public transport were important in shaping resident barrier maps, and arose frequently in small group discussions, sometimes in relation to other barriers, sometime alone. The recurring theme of non-private mobility as a barrier to day to day function in heatwave conditions was one of the most discussed factors in small groups and tended to focus on physical discomfort.

My main experience with the heatwave was extreme heat doing school drop-off and pick up and it was just absolutely excruciating taking three children out in the hot sun and not being able to drive either and there's no other way, you have to do it. P_R2_SG3

See, I don't drive. I've got a licence but I don't have a car, so I'm getting public transport. Going to the bus stop was like, oh, God. Our uniform procedure is long black pants. We weren't allowed to wear shorts because it's above the knee. P_R2_SG3

…every time public transport let me down – and trust me, in a heatwave, that's one thing that gets let down very quickly. You know, tracks buckle or there's a bushfire on the side of the rail and nothing gets through. And that can be four hours ago and it's just the knock-on effect of everything being delayed. P_R2_SG2

And those that don't drive and get transport like me, you walk out the door and can't breathe. P_R2_SG1

…when there's a heatwave which I noticed working is the trains get delayed…. There was lots of issues with the trains. Trains were delayed, all that stuff. P_R1_SG1

For me, the biggest thing was having a non-air-conditioned bus…And the problem I had was I couldn't call a cab because I had a baby under 1. You need a special car seat for bub under 1 in the car and no one was willing to – like no one there had a car seat and when you called up the company they put you on hold and I had to pick up my daughter. So I had no choice. You don't think the bus is going to be hotter than the outside. P_R2_SG3

It kind of made an existing situation worse for us. So the biggest issue that we usually have is mobility. We don't have a car. I usually walk everywhere or use the public transportation and doing that in 35 degrees Celsius is not fun at all. P_R1_SG2

I'll catch a bus and I'll catch a train. But then you get to your destination and all of a sudden that sun's gone up. Hello. What are we going to do? Stinking hot outside. P_R2_SG1

4.1.3. Enablers

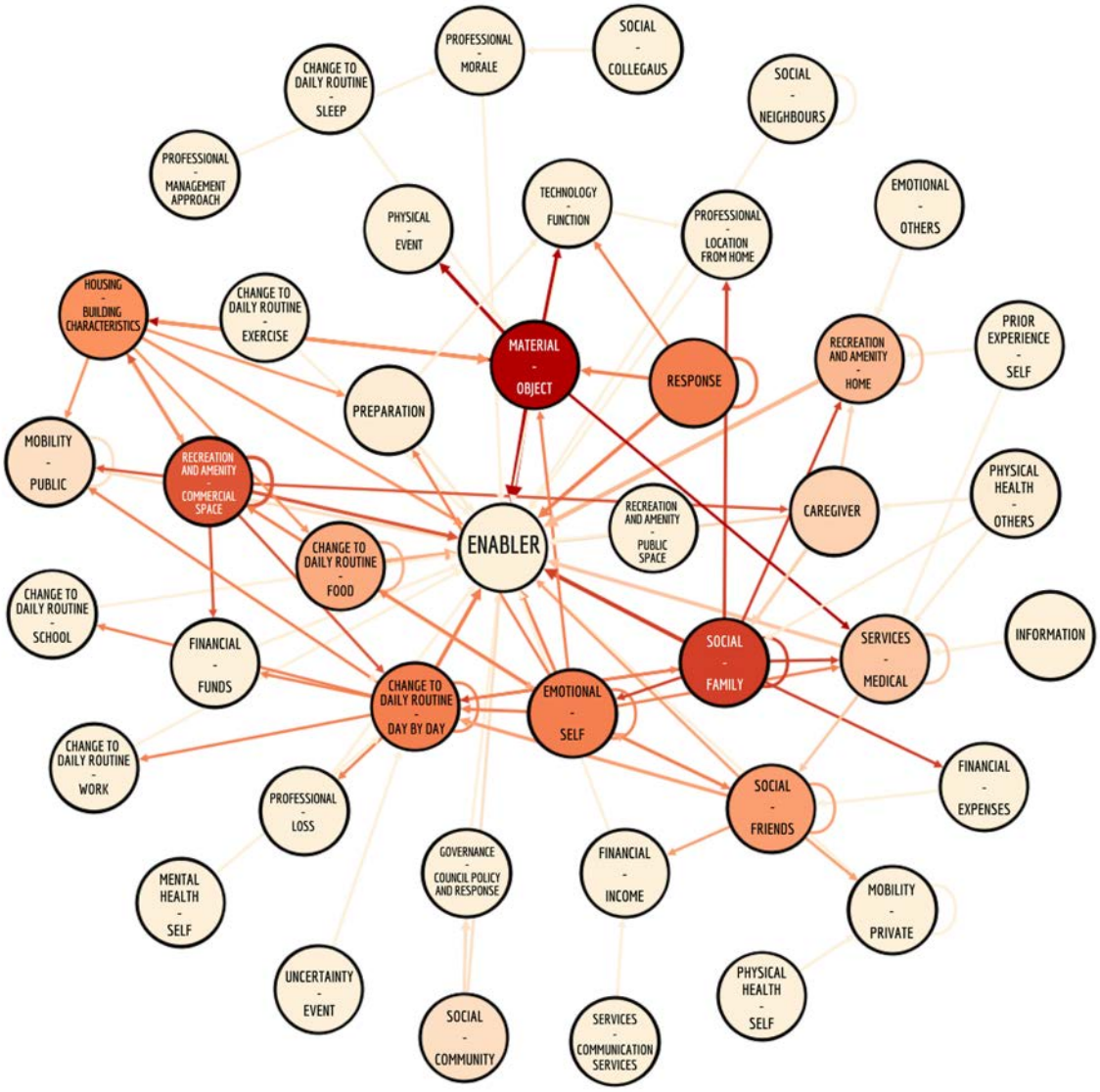


Figure 3: Penrith Resident Enabler Map

Most Prominent Factors:

- Material objects: low cost items used in the absence of air-conditioning e.g. personal fans, wet towels, and spray bottles
- Family: assistance from family in the form of social support and/or temporary accommodation in order to address the needs of family members with special care needs during the heatwave
- Recreation and amenity – commercial: spending time at the local shopping centre or clubs as a strategy to access free air-conditioning

Low cost material objects

Penrith resident experiences of heat were improved, by a significant degree, through the creative use of material objects. This primarily included items such as personal fans, wet towels, and spray bottles, objects which played a particularly significant role for participants without home air-conditioning. Material objects were present on individual maps, and in small groups they tended to be presented as low-cost strategies of overcoming the physical limitations of their homes.

> *So what I do is I get a wet hand towel and I run it under cold water and I put it around my neck and I leave it there until it needs to be done again. I get a spray bottle with ice water in it and just spray it on my face and I do that to the cat as well.* P_R1_SG1

> *I mean, you do what you know and you do what you – like, for me, putting wet cloths on the kids' heads, lots of water, ice-blocks and things. And normal temperature showers and just let the kids cool down, so I did all that, but you still don't have control over the heat.* P_R2_SG3

> *Sort of wet the towels as much as I can, cold water, put it over the fans and it doesn't do much… and another one, face washers in the freezer. They're good too.* P_R2_SG1

Several times during small group discussions, participants would make suggestions to other participants relating particular problems, for example cooling down children in a blackout. This suggests that there is a commonality in the experience of heat, as well as a pool of local experience and knowledge about overcoming it.

Family emerges as a primary enabling factor, and we can see here that family was important, particularly for residents requiring extra physical care, and their carers.

> *So after several hours of trying to keep him cool, undressing him, putting him in the shower, dressing him again – we ended up moving out…I had a sister who had a spare bedroom. I was able to pack him up, his wheelchair, his walker, everything else, his shower chairs, put them all in the car, take him to my sister's.* P_R1_SG1

> *We spoke to our neighbours and they were lucky to have a caravan, so we went and got a generator. They let us use the caravan, or let my mother use the caravan to sleep in and put a generator in there and put the air-con on and we used that.* P_R1_SG1

> *So that helped me a lot. My daughter and son, they were around all the time.* P_R2_SG2

Another prominent theme in both the individual maps and the small group discussions was the use of commercial spaces such as shopping centres and clubs as a common way of accessing public air-conditioning, to bide time, and even to get exercise.

> *One of my favourite tricks is going to the plaza.* P_R2_SG1

> *The only good thing about going – having Kmart open is you can go down there of a night time and walk around. I don't take any money, so I do tend to save a bit of money, even though I'm going to the shops. I still look at what's there. And I got some exercise. I couldn't get out to exercise or go for a walk, but when I was at Kmart or the shopping centre, I could do some exercise. Even if I'm leaning on a trolley, I still do an hour's walking or whatever and it's exercise.* P_R2_SG3

> *So yeah, the shopping centre, I would normally just hang out all day if I could, but with the kids you need to – so that again was expensive and stress and anxiety.* P_R2_SG3

> *A big way to escape was actually go down to the RSL or to the leagues club or something where they actually had air-conditioning. So somewhere to have a bit of a drink and somewhere to be cool.* P_R1_SG1

These commercial spaces were not as effective for participants with different needs, both emotional and physical.

> *And so you think, "How do you escape the heat? You go to the shopping centre where there are loads of people" whereas you absolutely hate crowds. So it's kind of like going from one form of hell to another.* P_R2_SG3

> *…we had no power, then I'd putting his equipment in the car and going somewhere else. He won't go to a shopping centre or anything like that because it's too awkward to get around [in a wheelchair].* P_R1_SG1

We can see in the small group discussion of one participant that these spaces served a dual purpose as a source of physical relief and emotional support.

> *…these clubs, they are hubs for the community… And one of the hottest days, I was at Panthers and everybody was there. It was packed and everybody said, "I'm here because of the heat." Everyone thought to. Just strangers – "I'm here because of the heat."* P_R1_SG1

> *In it together, that's right. So if you were trapped at home and not being able to get out, it sort of builds and builds and builds on you. As least we could talk to people and, like you said, you go to the pub and there's lots of people there in the same situation. So you can actually talk to people and have a discussion and that does help.* P_R1_SG1

Changes to personal daily routine are an important part of the Penrith resident enabler map, with these changes ranging in scale from increasing the number of showers taken per day, rearranging schedules to avoid going out during the hottest parts of the day, to staying with a friend or in a motel due to blackouts or to access air conditioning.

> P1: *Not next door, but across the road. Yeah, I had a girlfriend who used to ring me and say, "Come over and stay the night." She had air-conditioning and she only put it on for a small amount of time to cool down and then – but I stayed at her place a couple of nights and then she was looking after her son's house at one stage for a few days while him and his wife and kids went to America and she said, "Come on over, they've got the pool." We spent two days in the house with the air-conditioner on because he doesn't care about the air-conditioner…*
> M1: *It seems like a holiday.*
> P1: *Yeah, it was like a holiday.* P_R2_SG3

4.1.4. Penrith Resident Summary

Penrith resident focus groups revealed that the 2016-17 heatwave was experienced in a primarily individualistic way, with emphasis on the impacts to personal emotions, personal health, and daily routines. Pre-existing financial capacity/vulnerability can be seen to influence the resident experience of heat, impacting and being impacted by the direct increased expenses arising from increased air-conditioning or other cooling strategies, as well as personal circumstances relating to housing characteristics, tenure, mobility, and health. Finally, the physical characteristics of the heatwave can be seen to impact social relationships as well; while in some cases it increased resident time spent in commercial space, in most cases the event resulting in decreased social engagement.

4.2. 2013 Blue Mountains Bushfires

The Blue Mountains focus groups were held in Springwood and were attended by local residents with ages spanning 25-34 to 65+, with annual incomes varying from under $20,799 to over $156,000. All participants were either homeowners or living with home-owning relatives, with the majority having lived in the Blue Mountains LGA for 8 or more years.

4.2.1. Impacts

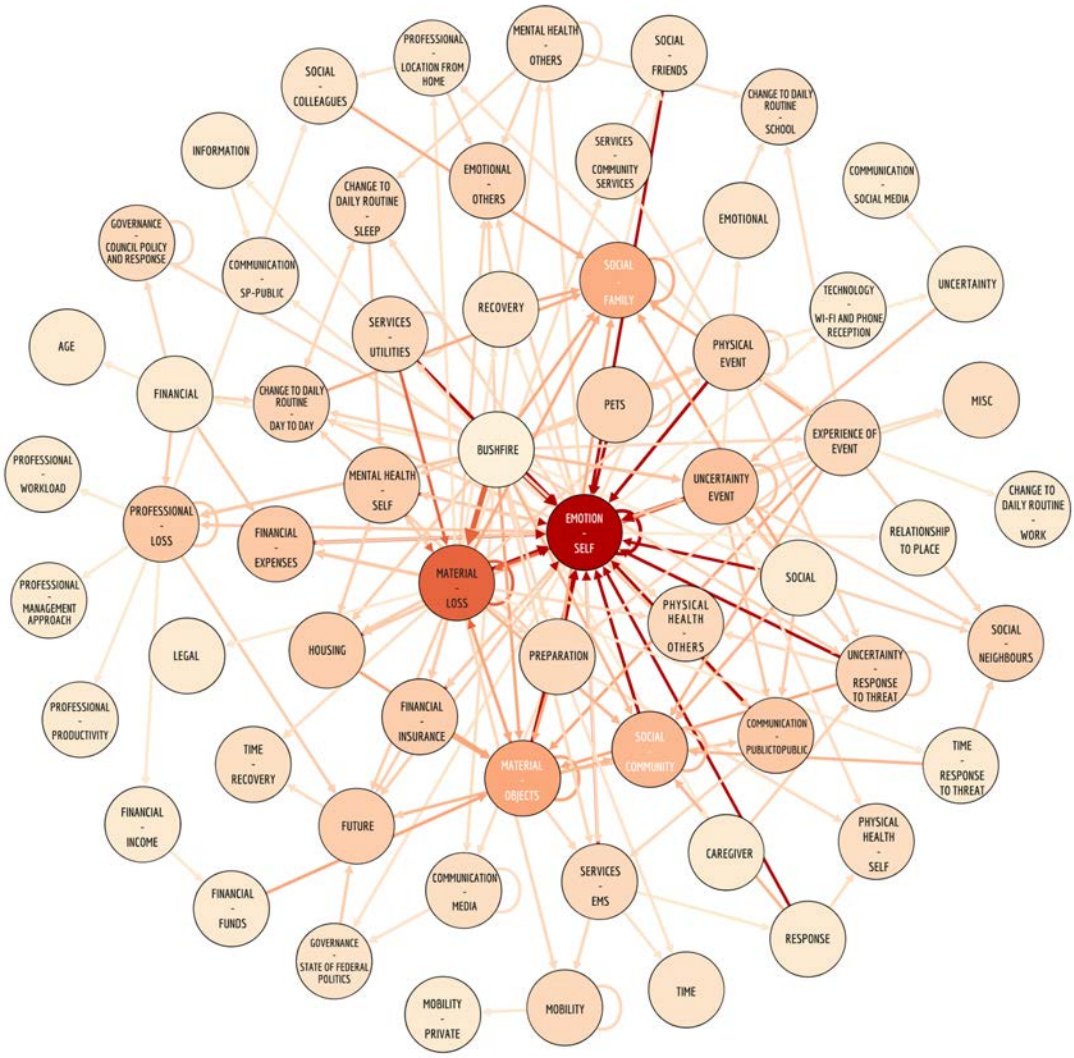


Figure 4: Blue Mountain Resident Impact Map

Most Prominent Factors:

- Emotional – self: primarily feelings of stress, fear and anxiety associated with bushfires, but also includes participant feelings of gratitude for the assistance of

community and public organisations during and following the fire, and feelings of community solidarity; strong emotional link between feelings of personal capability to fight the fire (via the presence of functioning utilities and fire unit support) and damage to property as a result of the fire.

- Material loss: loss of homes, cars, property damage (burnt fencing and outbuildings)
- Family: providing practical support in the form of emergency needs (housing, clothing), as well as emotional support in the form of humour and delegation.
- Community: concern for the wellbeing and safety of neighbours in response to fire threat; strong sense of community support, cohesion and solidarity.

For Blue Mountains residents, the experience was characterised by personal emotional state, with individual maps featuring words such as 'stress', 'anxiety' and 'fear' most often. The prominence of personal emotion in Figure 4 arises from its direct connection to the majority of significant resident factors. While on the maps clear distinctions were able to be made between particular factors and the emotional experience, it became clear in the small group discussions that personal emotion was a key component of each and every impact. This is illustrated below using the next most significant impacts.

Several participants had lost their homes in the bushfire, as well as countless other incidences of property damage and destruction. Figure 4 shows a strong link between material loss and personal emotion, and we can also see a secondary link between both utilities and emotional - self. The relationship between these three factors was extended in small group discussion and suggests that this relationship emerges from a desire to stay and defend the home, and the emotional fallout of not being able to.

> *I've always stayed and fought to defend my house every single time, but as of this year, if a fire comes to my house this year, I'm leaving. I'm not doing it. I won't do it again because yeah, I don't have the emotional stuff to get through it any more. BM_R2_SG1*

> *So we were cut off, literally, and the fire trucks couldn't get ahead of the fire front to come and help anyone out of Yellow Rock anyway. I guess the loss of water pressure, having plastic hoses – they melted. So even the hose stands, they melted. So there was no way to fight it, I guess.* BM_R1_SG1

P1: *And then a police car came and I said, "Could you take me to Springwood?" and he did and Richard wouldn't get in the car. He said, "No, I'm staying" and another man was there from Yellow Rock and he had his car that his little cat that he was able to get into his car and Richard got a lift with him back to our place.*
M1: *Why didn't he want to come back in the police car with you?*
P1*: Because he felt that he could still save the house. So I went to Springwood and he went back to the house and I didn't see him again until it must have been about 8 o'clock – a bit after 8 o'clock.* BM_R2_SG2

I think it goes back to what keeps going in my head is did I do the right thing and all the what if. What if I had have done this, could I have saved the house? BM_R2_SG2

These statements communicate a sense of historical behaviour in which the accepted norm was for residents to defend their house - and the emotional cost of that norm.

Family support came up throughout the individual maps as a key response to the bushfire, with many participants receiving offers of accommodation and immediate assistance with practical tasks such as contacting insurance companies from their families.

M1: *Where did you stay that night?*
P1: *At mum's. And my mother had two pairs of Bonds cottontails still in the packet, unopened, she said, "There's some fresh undies." And her neighbour next door was my friend and we're both similar size, so she just opened her wardrobe and said, "What do you want?" So I had a nightie.* BM_R1_SG1

P1: *The boys are funny because I had jeans and a denim shirt on and the youngest son who has practised a bit as a stand-up comedian, he came and looked at me and he said, "Oh, dad. Double denim."*
M1: *What are you thinking?*
P1: *Exactly. Fashion faux pas while my house is burning down. And that's the next thing he said, "What have you done with the house?"…Yeah, we had a bit of fun.*
BM_R1_SG1

We actually sent my parents to Sydney because my mum was just so distressed and we just said to dad, "Take her to Sydney." We booked a hotel for five nights and my brother

> *and myself, my husband and some friends, said, "We'll go out to the house. We'll sift through everything. We'll do all that stuff. We'll go to the meetings. Just take her, go away, you'll be right."* BM_R2_SG1

These excerpts highlight not only the practical support shown by immediate family, but also the significance of these acts as ways of providing emotional support, seen here to varying degrees through clothing, humour, and practical assistance.

Community

Elements of community cohesion and solidarity were immediately apparent in the individual maps, and in small group discussion, a clear theme of informal, communal response became apparent, based on concern for others in the community.

> *Yeah, and then I was worried for other people. I'm thinking, "You know, is there anyone trapped anywhere?" We couldn't get out to help anyone.* BM_R1_SG1

The excerpt below relates the on-the-day experience of one participant, whose primary concern was the wellbeing of neighbours and neighbourhood pets.

> *So when I heard, whenever it was, I think from the time I heard to the time I left was about 20 to 25 minutes, maybe half an hour, but I'm having the feeling it was about that long. The first thing I did was I thought, "Okay, who's about?" I've got next door neighbours. I don't think they were at the house at the time because I don't remember going and seeing them, but I went two doors up because that neighbour has two cats and I thought she'd be wanting to get them out. And she'd already heard about it and she was already packing some clothes and putting the cats in their cat boxes. The neighbour beyond that is a friend of my daughter's, or was at the time, living at that house and she had just had a baby on the Tuesday and I'm thinking, "Okay, I don't know if she's home" because sometimes they get them out of hospital real quick. So I go and check on that and she wasn't there, so that was a good thing. The neighbour directly across had only moved into the place a couple of months before, about six months before, and she had a young daughter who is now three, so the daughter I think was six months old at the time. And the neighbour on the other side, he had two dogs and she was trying to round up the dogs.* BM_R1_SG1

We can see here that, despite having very little time to prepare, the immediate response of this participant was communal rather than personal, and that their actions were based upon underlying knowledge of the surrounding households – who would be home, and who might need help. This level of awareness of the immediate community suggests pre-existing relationships in this area.

4.2.2. Barriers

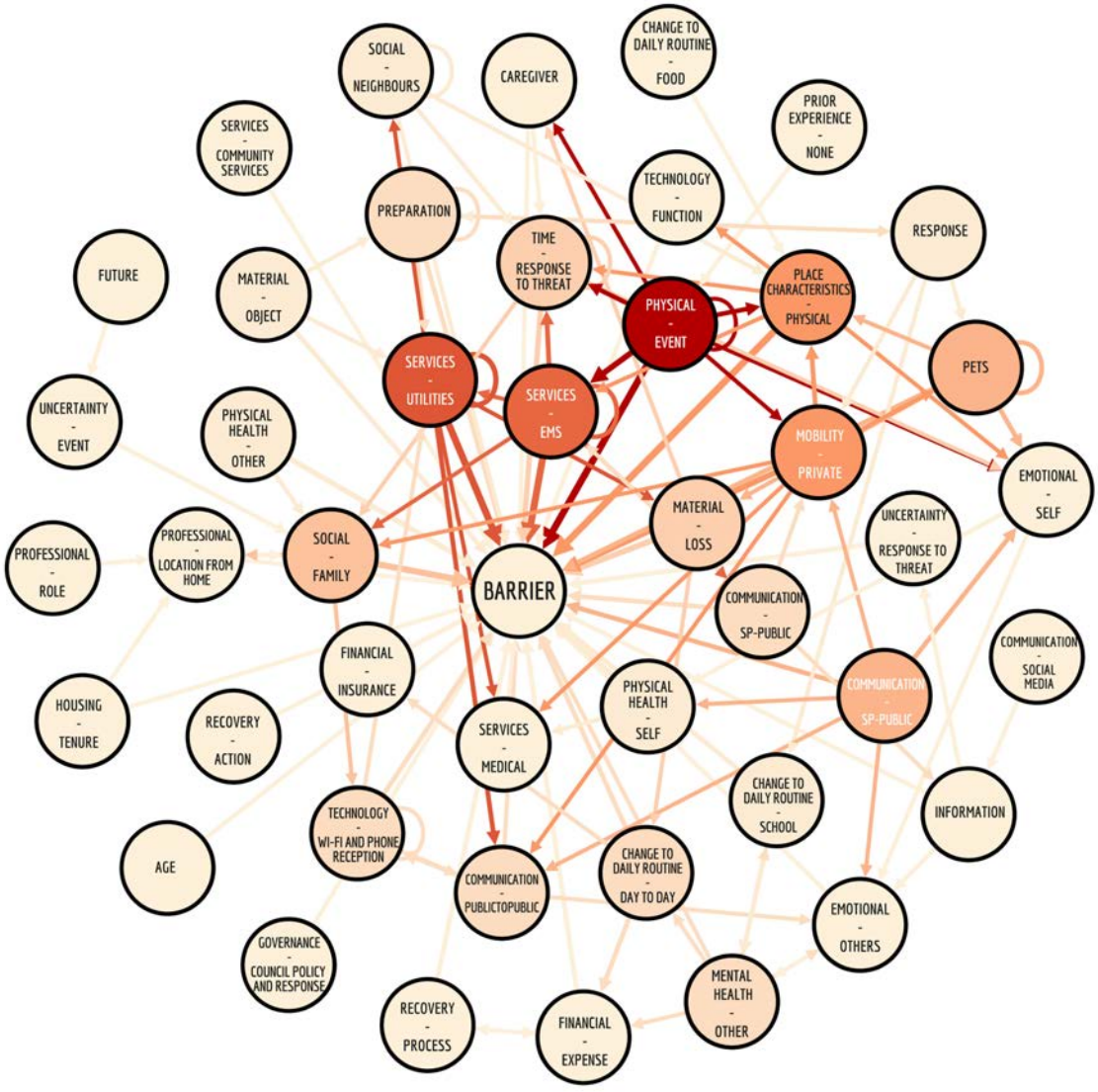


Figure 5: Blue Mountain Resident Barrier Map

Most Prominent Factors:

- Physical event: the speed and intensity of this fire related to issues of preparation, warning systems, warning neighbours, and securing personal or neighbourhood pets to evacuate
- Utilities: lack of water meant that residents lost agency to defend their home, and the loss of electricity and telecommunications network meant that SMS/internet based warning systems failed and residents were isolated)
- Emergency Service Management: due to scale of fire, many local fire units had been deployed to other areas of the Blue Mountains, delaying the arrival of help to local homes for many residents
- Place characteristics: isolation of individual homes on a ridge impeded evacuation and emergency service access due to single road access points; bushland encroachment impacting fire impact
- Pets: time required to locate and secure personal and neighbourhood pets significant barrier due to lack of warning.
- Private mobility: lack of personal vehicle (through fire damage or pre-existing preference) lowering the ability of individuals to evacuate

The primary barrier identified in the maps was the unusual intensity and duration of the event as a result of three different fire fronts, and the severe weather conditions that contributed to the speed at which the fire moved. This is directly related to the time in which participants had to respond to the fire threat, experienced as barrier by participants due to issues of preparation, warning systems, warning neighbours, and securing personal or neighbourhood pets to evacuate.

> *A lot of my arrows always went back to the intensity of this particular fire. Why my grandchildren and my son were with me, because they could get out. It was too quick. Why were there no emergency services? Why did the water go? And I did a lot of arrows back to the intensity of that fire.* BM_R2_SG2

> *…it was definitely unprecedented and so a lot of people that have been through many fires behaved or reacted completely different to probably everything they've ever thought they knew how to do.* BM_R2_SG2

> *I had one of the dogs tied up on the back verandah post and I thought, "I'd better take that dog inside otherwise he might get hit by a branch or something." So I undid the dog, walked in, put him inside. When I turned around, the fire was there. The fire was there.* BM_R2_SG2

Aside from the physical event of the fire, the most significant factors in triggering barriers to coping related to residential utilities, and the presence or role of emergency services. Many participants stated that issues around the blackout made communication very difficult, and that the redistribution of water away from residential homes made it impossible to defend their homes. We can see a similar central relationship developing in Figure 5 as in Figure 4, with an important relationship between loss of water and electricity, delayed 000 response, and the resulting vulnerability regarding their own personal safety and ability to defend their homes. The absence or slow arrival of fire units was a result multiple fire fronts drawing local units away, or the isolation of the participant's own property from areas covered by local fire units. The importance of EMS and utilities in some resident's experience again related to emotional reactions to fear and uncertainty.

> *And you know, on top of that, for us it was, "Are they going to force us to leave?" Because where do we go? …So the fear was actually quite real that we were going to be, you know, the police were going to knock on the door and we almost had a plan saying, "You hide under there", which is silly, but for us to stay, we're going, "Do we hide somewhere?" Because what else do we do? There wasn't really clear options that way.* BM_R2_SG2

All residents emphasized an appreciation of fire crews and emergency responders, yet the below excerpt demonstrates one experience in which the effectiveness of these services could be improved by communication with each other and with the general public. This participant was retrieved from his property by police after passing out while the fire front went through his property. He was injured and had his two dogs with him.

> *The police car drove me up the road and put me in a firetruck, of all places. So here I was, driving around Yellow Rock in a firetruck for a while, then they put me out of a firetruck and put me in another police car. Police car drove around for a little while, then they put me back out on the road again. So I'm here, two dogs under my arm, walking down Purvines Road… they eventually took me to the evacuation centre at the sports club. And that was*

> *about five or six hours that I was missing from my family's knowledge of whether I was alive or dead.* BM_R2_SG1

This lack of clear communication, both between fire response and police units and between service providers and the public, was highlighted in the maps as a barrier to coping before and during the fire. Although it is not stated by the participant, it is assumed that the worry caused by their disappearance was distressing for their family and added to the difficulty of the experience.

Private mobility was another significant barrier identified in the resident maps. The loss of personal vehicles as a result of fire meant that participants were trapped on their properties, while families not in immediate danger were made more vulnerable if they did not have a means of leaving independently. Private cars, a means of immediate evacuation or independence during the week-long bushfire threat, were in many cases a family's only prepared means of escape in the absence of emergency services.

> *I had a pregnant partner at home who couldn't drive. She didn't have a driver's license and we'd only just moved there, so the relationship with neighbours were fine, but it wasn't long term community stuff and then two young girls. So I was just kind of a little bit panicked and confused…* BM_R1_SG1

> *Anyway, when I went around the front of the house, the garage – I had three cars – they were all alight and I thought, "Heaven's sake."* BM_R2_SG1

Personal mobility constitutes an important element of capability where residents live in more isolated areas. This was the case for several participants, who stated that the physical characteristics of their properties acted as a barrier.

> *Well, in our position, what made it harder was the fact that we lived on a ridge with only one road in and out. So we were cut off, literally, and the fire trucks couldn't get ahead of the fire front to come and help anyone out of* [suburb] *anyway.* BM_R1_SG1

The combination of little to no time to evacuate properties immediately in the path of the fire led to participant accounts involving pets, and particularly, time spent locating and securing personal or neighbourhood animals.

> *And felt like 10 minutes, probably not quite as long. Chasing the little cat, getting the little cat in with the big cat so they're both locked away. Put the cats in the car. We had a rescue greyhound at the time, got him in the car.* BM_R1_SG1

> *…and the roof was on fire, the garage was on fire and then I remembered the dogs. The dogs were in the house. I've got to get them out…despite the fact the roof was on fire, I was able to run around inside the house and get two of the three dogs out and I rushed them out the front and went back to try and find the third dog, couldn't find it. Went back out again to get a few breaths of air and went back into the house again. Couldn't find this dog and thought I've just got to leave it. Anyway, I grabbed the two dogs and ran into the front of the yard there – this is only just good fortune rather than good management – where I collapsed through exhaustion…* BM_R2_SG1

These accounts communicate the important role that pets played in the experience of these participants. Another participant related ongoing feelings of guilt associated with the loss of the family dog in the fire, four years after the event.

> *Losing the animals was probably my biggest fear because I should have been there to save at least the little dog. I don't think we could have got the horse, but yeah, that feeling of helplessness, I guess.* BM_R2_SG2

4.2.3. Enablers

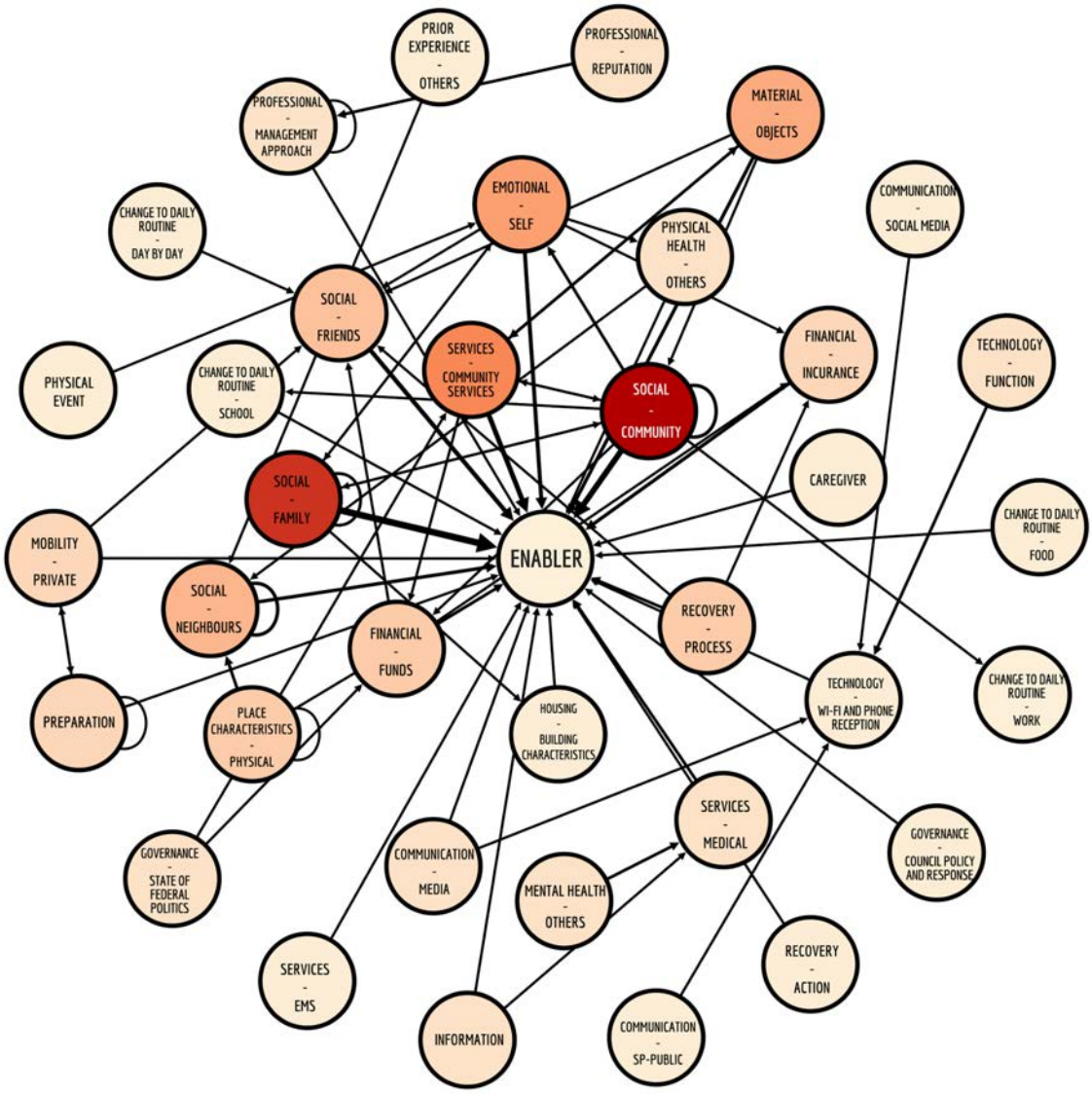


Figure 6: Blue Mountains Resident Enabler Map

Most Prominent Factors:

- Family: support of close family members – parents, children, spouses – during and after the bushfire in the form of immediate accommodation, clothing and care following on the day were reinforced with longer term support such as dealing with insurance claims, and long-term accommodation.
- Community: existing networks and high levels of community cohesion at the neighbourhood and township level; practical advice and assistance as well as a sense of shared experience

- Community services: identifying charity and community service responses in for emergency clothes, food provision, recovery assistance

An omnipresent factor on individual enabler maps was the support of close family members – parents, children, spouses – during and after the bushfire. Mentions of both practical assistance in the form of immediate accommodation, clothing and care following on the day were reinforced with longer term support such as dealing with insurance claims, and long-term accommodation. The individual enabler maps also feature many accounts of the ways in which community support and the feeling of a shared experience helped them cope with the impacts of the bushfire. Neighbours in many cases played a prominent role in advising each other and creating informal information and strategy networks.

> *What made it easier was the fact that we had neighbours who had been through all this before, including someone who had been there in '67, there was a major fire, basically went through the entire suburb. And he was great because he was like, "Don't worry, just do this, do this, wait for this, if this happens" – so that was invaluable, having neighbours who were experienced.* BM_R1_SG1

In this, a shared sense of experience was also seen as a helpful aspect of the experience.

> *…what helped was actually being with a group of people. It felt safer in this group…. That area had been burnt, so I thought, "Well, that's the safest place" and a lot of residents did the same thing. So once I got out there and parked, I thought – because you're with a group of people, so I think you feel safety in the numbers. That was the immediate, "Phew, feel better there."* BM_R2_SG2

The scale of property loss and damage was, paradoxically, a strength for those going through the experience.

> P1: *You think of these poor people that may lose their house in the fire one off and they'll get nothing. Where at least with 200 homes lost, there's such great support, isn't there?*
> P2: *Yeah. And it didn't feel like you were alone.* BM_R2_SG2

Community support came in practical forms, with examples of community working days on damaged properties, and feelings of contributing positively to the community during the fire,

for example, by assisting with food catering for Rural Fire Service and other fire units, and volunteering time and skills directly, and later in fundraising.

> *We were doing it on our own. We got a list from the school about kids who lost their houses, what they wanted. I remember that particular – the day before that, I actually got a payment of three and a half thousand dollars for a job I'd done at that stage and I took the whole three and a half thousand dollars and I went down to the plaza and I had a list of things from kids in our school.* BM_R2_SG1

This support was also emotional, with gestures of support and recognition at the community level experienced from outside known social networks. The emotional impact created a need, and opportunity, for social gestures and cohesion.

> *I got the most support, even hugs – I had a lady in the mechanic hug me. A stranger hugged me.* BM_R2_SG2

The positive emotional impact of the bushfire, both during and following, can be seen to arise directly from these informal community networks.

> *But I guess the good things were how helpful everyone was afterwards. I don't think I've said thank you so many times in my life.* BM_R1_SG1

> *…when you drove up and down Hawkesbury Road, it would just be "Thank you RFS, thank you RFS" on every second tree.* SG1

Finally, the centrality of community service workers and agency support during and in the aftermath of the fire was prominent on both individual maps and in small group discussions.

> *And Salvation Army were fantastic. Just all of the community service groups all came together. And although it was time-consuming and a slow process, having all the agencies together, that was fantastic. That was really good. Everyone was there.* BM_R2_SG1

> *Getting food and clothes, that was really positive. They helped out quite a lot, didn't they, with passports and legal documents. It was really good. That was very positive.* BM_R1_SG1

4.2.4. Blue Mountains Resident Summary

The Blue Mountains resident experience of the 2013 bushfire was characterised by intense personal emotion, material loss and practical processes surrounding that loss, including evacuation mobility, pets, and communication from and between service providers and the public. A key theme throughout individual impact, barrier and enabler maps, as well as focus group discussion, was on the collective and shared experience of the event, and the centrality of community relationships in individual experiences. In summary, the physical impacts of the 2013 Blue Mountains bushfire engaged with and, in most cases, strengthened pre-existing social networks comprised of family, friends, neighbours, and community ties. As such, the physical shock event can be seen to highlight and support social cohesion, though residents also expressed a fear of the loss of community, and place, with the next fire event.

4.3. 2014 Martin Place Siege

The resident group for the 2014 Martin Place siege was drawn from the wider Muslim community in Sydney and was held in Bass Hill in Western Sydney. This resident group was the only group in our study drawn from outside the LGA in which the event occurred and the rationale for this was two-fold. First, the location of the siege - Martin Place - is a primarily business area, to the degree that resident participation would have been highly difficult to achieve. Second, one of the major characteristics of the siege was an immediate politicisation of Islam in the mainstream Australian media. With an interest in broadening the definition of experiences of shock event impacts, we chose to explore the knock-on effects of this event on the Muslim population in Sydney. This resident group was attended by female Muslim women only, with the majority aged 55-64 and over. In order to bridge the language barrier between focus group facilitators and participants, there were two translators present who were central to the running of the event.

4.3.1. Impacts

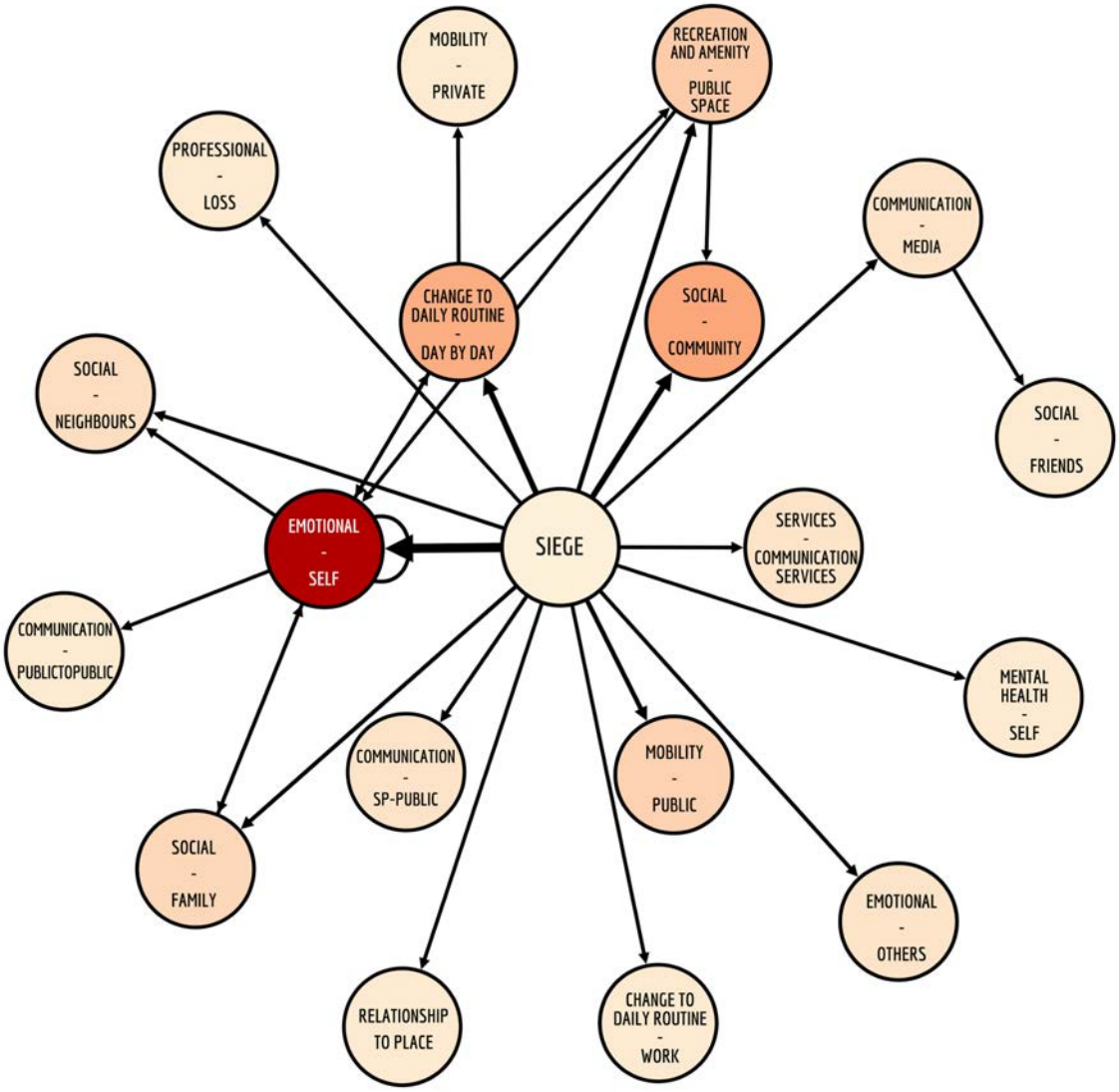


Figure 7: Martin Place Residents Impact Map

Most Prominent Factors:

- Emotional – self: increased day-to-day stress and trauma resulting from of feelings of alienation from wider society and experiences of Islamophobia; grief and fear for personal safety and that of family members and community; feelings of personal isolation from wider community and family events
- Day to day change: changes to day to day routine centred around appearing in public wearing headscarves, particularly when shopping alone, catching public transport, and in places of public recreation including parks and beaches. Trend for

participants to attend fewer public events outside their homes, and to require an escort for chores and appointments previously done alone

- Community: experiences of aggression and Islamophobia from the wider Sydney community, lack of solidarity between Muslim and non-Muslim communities at the local and city scale

Emotional - self

The Martin Place resident impact map is characterised by emotion, particularly with regard to raised levels of stress and anxiety when wearing headscarves and other forms of Islamic dress in public places. Individual maps featured words like fear and scared, based on the exacerbated Islamophobia evident in the wider community during and after the event. Feelings of fear, stress, grief and trauma can be seen to be a catalyst for changed aspects of daily life, and particularly with regards to any activities that take place in public.

> P1: *I was so scared to catch a train or bus to go to see my doctor and my doctor at Macquarie… I said no way for me to go by train and go to see my doctor…*
> P2: *Because you were scared someone would attack you on the train?*
> P1: *Yeah. Yeah. You never know. So I did cancel my appointment and I didn't go up to my doctor and it was a very, very important doctor. He wants to decide if I'm going to have my knee replacement. So it's very, very important, but I was too scared to catch a train to go to see my doctor.* MP_R_SG1

> *For me, I don't go to my doctor because he doesn't come earlier. I don't go by myself. I take my husband or I take my son or I take someone because I'm too scared to go by myself.*
> *The places I used to visit, like Manly as I said, and Sydney Tower and the city and Darling Harbour, I haven't been to there since that incident.* MP_R_SG1

These excerpts serve as a useful example of the interrelatedness of factors driving this strong behavioural change. The primary impact here is not only about personal emotion – fear, anxiety about missing an important appointment - but also suggest connections with public transport, a desire to avoid the physical or emotional reactions of the wider community, and a reliance on others to be present in order to feel safe.

P1: *This one swims every day. This one, like she lives – she's a swimmer, right? Champion swimmer. She would go to Cronulla and she would have no fear of anybody, right?*
P2: *I spent three-quarters of my life in the water.*
P1: *In the water. Now, she has to take everybody in her family with her to go swimming.*
P2: *To feel safe.* MP_R_SG1

Another way in which participants managed this emotional impact was by removing themselves from particular public spaces and experiences.

P1: *My goodness. How long is it since you've been there [to Darling Harbour and the CDB]?*
P2*: Since the incident.*
P1: *Since 2014.*
P2: *Yes. Unfortunately, yes.*
P1: *Since 2014, you haven't seen - - -*
P2: *No, I haven't. I haven't at all and I miss it so much and it does affect me inside. I love to go. I love to go and I can't do it.* MP_R_SG1

That's what happened to me last year. My son, he went to Forster and he asked me to go and I said no and I didn't go because I don't know what to expect now. MP_R_SG1

These excerpts highlight the significant impact the siege had on the ways in which these participants understand themselves within the city and as part of the wider community. They also clearly communicate that the day to day lives of these participants were not only changed following the Martin Place siege, and that the spaces they see as safe and available to them have narrowed and been restricted in the long term. Another strong theme that arose in both individual maps and in small group discussion was that of isolation from the wider community and can be seen to stem from the emotional impacts related above. Some participants recalled the discomfort of public altercations, and the resulting hurt and anger.

And I think that's what hurts them more is that no one else comes to [our defence]. MP_R_SG1

M1: It's like when you went to the park and somebody came and started yelling and swearing and nobody also did anything then?

> *P1: No. As I said to you, I was going to tape that woman because honestly, I felt that I'm boiling inside. She's swearing at us and call us names, call everyone. Imagine someone coming to tell her off, of course they're going to have a fight with her.* MP_R_SG1

This feeling of isolation from the wider community also filtered through to social media use.

> *And it affects you more when you go on Facebook and something happened and the comments we hear, the things we hear. One comment – I don't really read the comment, but once, I said, "I'm going to read one comment" and one of them said, "I agree with Pauline Hanson what she said." Since I saw that, I turned my Facebook off. I don't want to read any more.* MP_R_SG1

Participants also highlighted that their local community was also directly impacted by the Siege, and that some were dealing with grief in addition to the negative community perceptions and associations with their religion.

> P1: *So when things went a little bit – like with the death of so many people, we were affected because some of the people that died inside there, these people have their sons and daughters are lawyers, they have contacts to this woman that died there who is a friend of a friend. So the whole…*
> P2: *My son had a friend was inside…*
> P1: *Yeah. Exactly. So it was all – so that has not been captured. That, at that moment, and if you remember, everybody went down and bought flowers. There were more Muslims going down there than anyone else.* MP_R_SG1

This excerpt suggests a paradox in which participant feelings of alienation from the wider Sydney and Australian community were exacerbated by simultaneous feelings of invisibility immediately following the Martin Place Siege. The emotional aspect of these participant experiences reflects a counter-response of withdrawal as a way of minimising their interaction with the attitudes of the wider community post-siege and minimising their own direct emotional experience.

4.3.2. Barriers

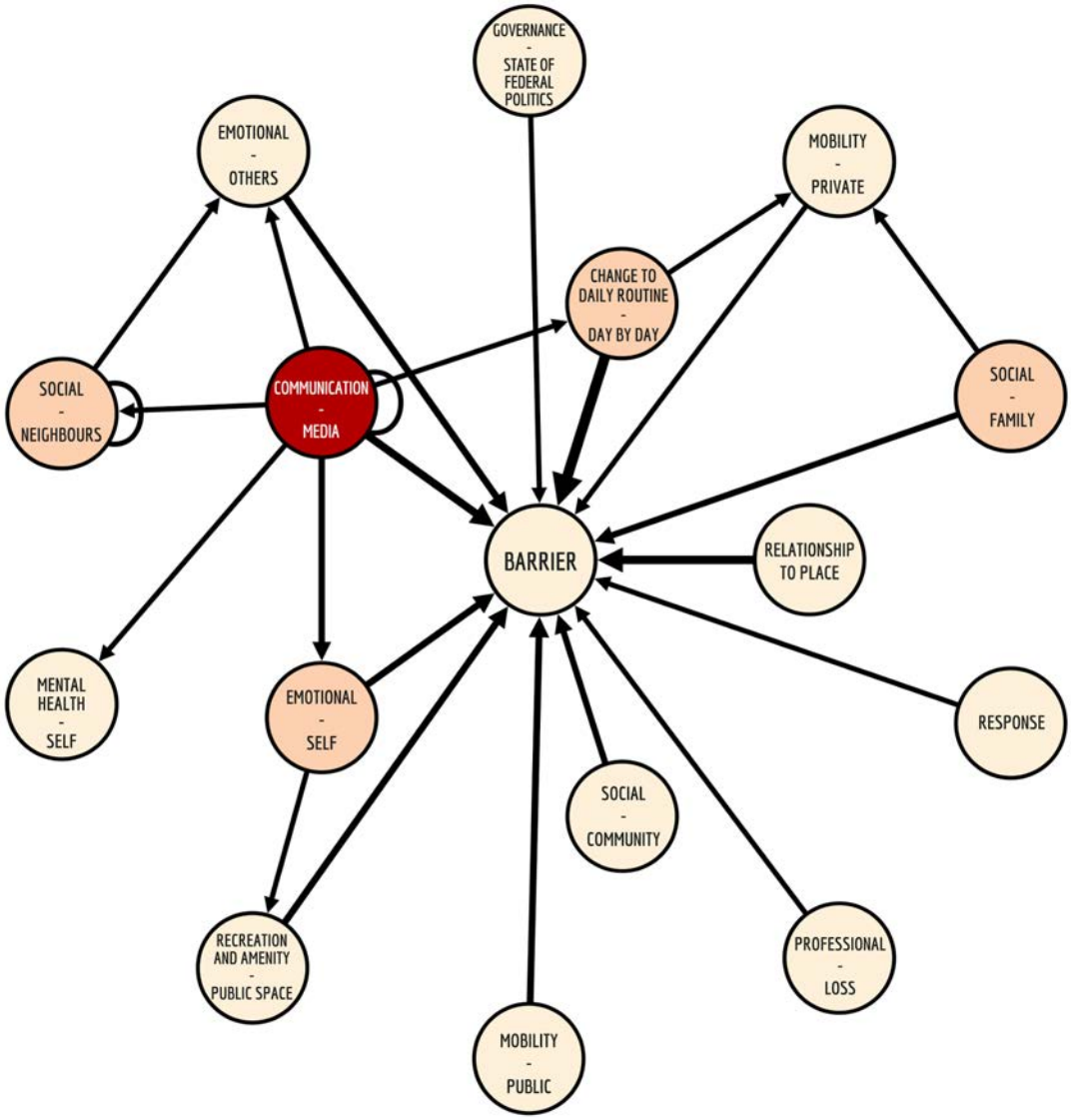


Figure 8: Martin Place Resident Barrier Map

Most Prominent Factors:

- Media: participants identified the media as perpetuating negative representations of the wider Muslim community, and presenting the Martin Place Siege as representative of Muslim values
- Day to day change: permanent and socially disabling change associated with personal isolation, resulting from decreased feelings of safety in public spaces. See in changes in clothing style; particularly in relation to the appearance of headscarves; publicly identifying as Muslim; and avoiding spending time alone and even at family gatherings in public places.

- Family: fear of negative public interactions translates to avoiding negative interactions (as well as public spaces) altogether, personal isolation leading to inter-generational divide and frustration.

The Martin Place Siege resident barrier map further explores these themes of wider community perceptions and the resulting interactions stemming from them. In this, the media was identified as a dominant factor.

> *They like to say ISIS but sometimes we go on picnic and people, they say something nice or they look nice. Some people they look at you and shook their head, like, "What's wrong with these people?" But the media makes us so ugly.* MP_R_SG1

> M1: *So have the media been worse since Martin Place?*
> P1: *Yes. Yes. Very bad. As I said to you, I used to watch the news every single – now I can't watch it any more because - - -*
> P2: *Me too.*
> M1: *Really? You don't watch the news any more?*
> P1: *No, I loved it.* MP_R_SG1

> *They talked about it for months and months. And then we had from the other people, "Muslim, Muslim, Muslim. F-Muslim, F-Muslim."* MP_R_SG1

These excerpts suggest that wider community perceptions and actions are seen to be driven by media representations of the Muslim community, and of the Martin Place Siege as representative of Muslim values. Similar to the participant above avoiding social media discourse, the strategy of withdrawing is used to minimise engagement with both the mainstream media and the negative impacts arising from it.

An important barrier in the capacity of participants to cope in the wake of the Martin Place Siege was the exacerbated anxiety related to family safety and wellbeing, which can be seen to exacerbate personal isolation and reduce wider community cohesion. Emotional undercurrents of fear around the actions and perceptions of the wider community can be seen to influence the ways in which participants manage these impacts with respect to their own families.

P1: *You have sons with you, you have boys. All these mothers – and I think it may not have been articulated – they're worried about what the boys will do. Because you're the victim and if your boy gets up to say something…*
P2: *To protect you.*
P1: *Then he becomes a perpetrator, the terrorist – see, we told you so.* MP_R_SG1

P1: *She used to take her granddaughters with her. She had no worries. Now, she will worry about her young daughter, she will worry about her sons because of what may come out of it.*
P2: *You don't know what to expect. You don't want to give your son or your daughter or your grandchildren that experience, so I prefer to stay home and I'll be safe at home.*

P1: *And they're very active. Very active. And all of a sudden, they're retracting and they're moving back.*
P2: *Staying home.* MP_R_SG1

These excerpts convey an important relationship between participant emotions of fear and anxiety, the unpredictability and vulnerability of public space, and managing potentially negative interactions with the wider community by avoiding such interactions altogether.

And then so when you ask that question about young people, young people are clearly having to always be told by their mothers and grandmothers, "Don't do the wrong thing at school. If someone speaks to you, just put your head down." MP_R_SG1

Participants highlighted that this strategy of minimising engagement with the wider community was contributing to generational divides within families and feeding back into emotional cycles of hurt and isolation.

P1: *I think the point as well about fear and being left out is sort of comes into, then, you have this generation tension, right, because say my generation, the grandparents are like, "Don't go here, don't go there, tell the kids to be careful." And we're like, "What do you mean? There's no need to worry. Come with us." "No, no, no. I can't come." "Well, why are you sad then? You're the one staying here. You're the one"…*
M1: *Right. Right.*

> P1: *So there's that tension then between the generations because my generation is like, "Well, we're born and raised here. We're going. So mum, you know what, you're choosing to be sad. We're going. You can come with us. You don't want to come? Then that's what you've got to deal with."* MP_R_SG1

The emotional conflict arising within families around public space and issues of isolation was noted by one participant and serves as a good illustration of both the internal and external nature of the problem.

> *As families…you want to do so much with your grandchildren, but that is – so we want to be able to express that in a way, but at the same time, what solution can we do to break that isolation? And that's something we have to do ourselves, but this is real pain.* MP_R_SG1

Another significant barrier is change to daily routine, and here we see the emotional impact of fear for personal safety arising from visual cues of Muslim identity. Participants shared concerns for their own safety and the ways in which this has impacted their day to day life, most notably through changes in clothing style; particularly in relation to the appearance of headscarves; publicly identifying as Muslim; and avoiding spending time alone in public places.

> P1: *Once, when I go to my doctor and I had no one to take me and I said to my husband, how I'm going to go see my doctor? It's very close to my operation. He said, "Come, we decide when we're going to do your operation." So I put a hat, a wool hat…*
> M1: *Like a beanie?*
> P1: *Like a beanie. And I put a scarf around my neck…and I wear a skivvy and I put a scarf around it, not to show my neck and I have everything and I was in the train, pulling the hat down or my beanie down because people if they see me, they warn, Muslim.* MP_R_SG1

> *To me, I feel like safe to go local but sometimes if something happens… – to be honest, sometimes I feel unsafe to go even local. Even local. Like the other time, something happened and I need to go shopping to buy presents and I said to my husband, "What I'm going to do? I'm not going to stay at home. I need to buy your presents. Will you come with me?" He said, "I don't feel that well." I went shopping. What I did – normally, when I go shopping, I go all over the places. I went only to one place, to Myer. I parked my car very close to Myer parking, I went inside, I bought what I need and went up to car park*

and went home because I said, I don't know what's going to happen. You don't know what to expect. MP_R_SG1

No, I don't cover my hair. I'm wearing exactly what I wear. They ask you, "What's your religion?" "Christian." MP_R_SG1

Other participants expressed a range of emotional reactions linked to general perceptions of the Muslim community, spanning anger and frustration, internal conflict, and hurt.

It's so hard to hide yourself. Why should I hide myself? Why some other people religion – religious people, they wear what they want to wear and we can't do that? It's a multicultural place. We should be treated fairly. That's what I believe. MP_R_SG1

Now I feel, it is my country, but I'm too scared to do what I want. MP_R_SG1

You're doing the right job, but unfortunately, they don't treat us fair. We're not getting the fairness, feel like we're left out. MP_R_SG1

And give people the benefit of the doubt, but there's a limit to how much you give people the benefit of the doubt because it becomes like you doubt your own existence in this world…and you have to suppress your own emotions and pretend they don't exist. MP_R_SG1

We start building our life and settle and raised our kids and honestly, I never, ever felt it's any different between anybody else till the incident in the city, Martin Place. MP_R_SG1

I mean, you feel everyone like against you and we didn't love – whatever we didn't like, these people doing the crime, they're not related to us in any way. We are a good people. I raise my kids here, in Australia, to be real Australian people. MP_R_SG1

4.3.3. Enablers

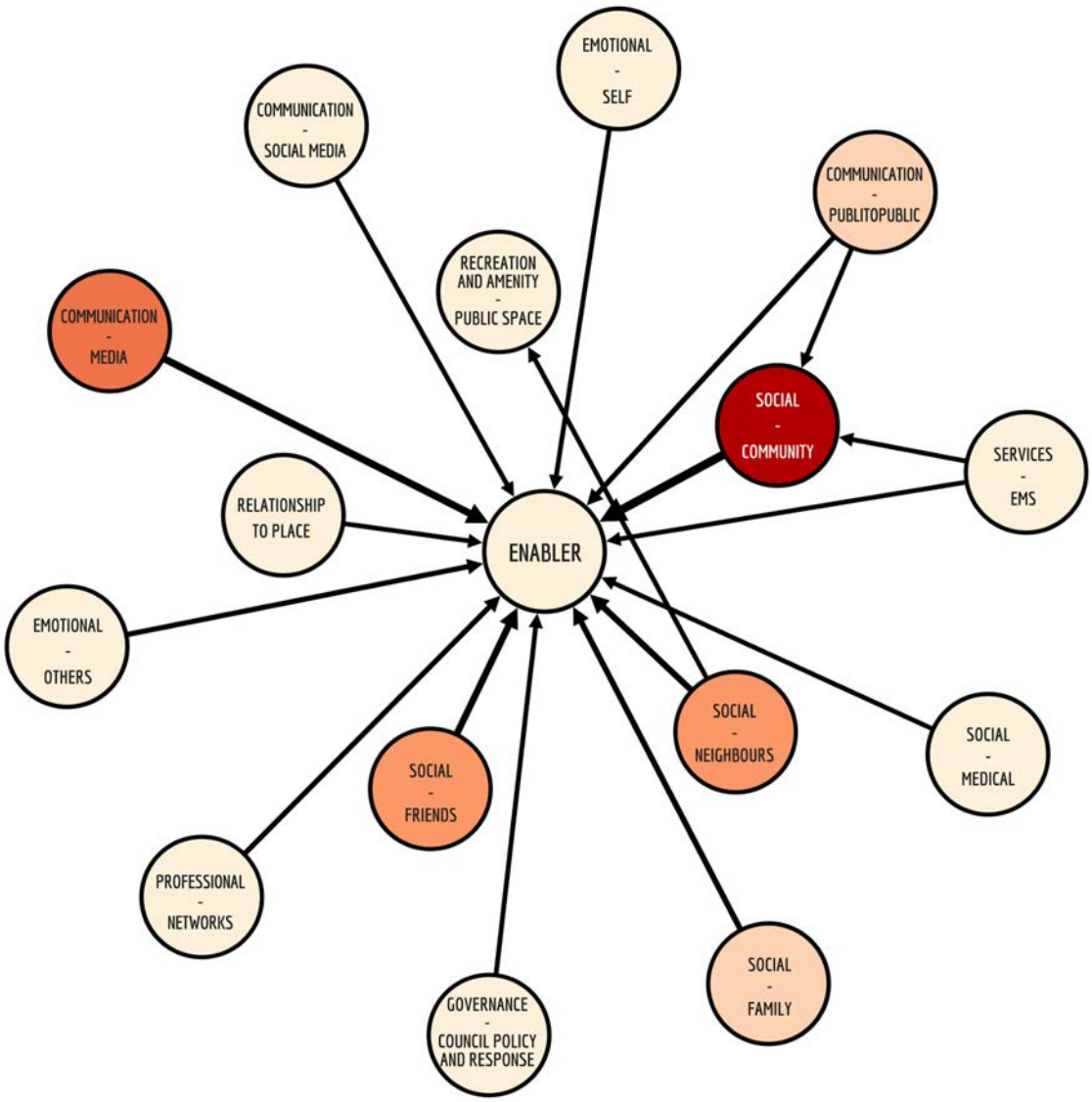


Figure 9: Martin Place Resident Enabler Map

Most Prominent Factors:

- Community: support and solidarity within the local, city and wider Muslim community as well as messages of support and friendship from individuals in the non-Muslim community
- Media: reduced or altered media consumption to avoid mainstream and social media platforms, particularly with respect to Muslim-related content
- Friends: emotional support and community cohesion within Muslim cohorts, practical support in organising group outings

- Neighbours: gestures of support and friendship from neighbours seen as a sign of local community cohesion

Community

The most important source of coping on individual resident maps was the presence and support of community, both from the immediate Muslim community as well as messages of support and friendship from individuals in the wider community. The strength of leadership within the Muslim community was discussed in the small group discussion, with many examples of proactive strategies and networks being formed and used in order to assist individuals within the community to deal with the impacts.

> P1: *We had an incident where we had a client that needed our support as an organisation. She had her Year 7 boy expelled from school. He was being bullied, but they made him out to be the bully-er. We got the premier involved in meetings. Even one time, the kids actually – he wasn't being bad, but his shirt was ripped. The teacher took him inside, gave him another shirt so his mother doesn't see the shirt. So when we actually came out and he spoke to me and told me the whole story, we document it, I spoke to the minister – I think Mike Baird.*
> P2: *Yeah, Mike Baird was very interested in it.*
> P1: *And we did the whole thing and he was the one that was being bullied. So the outcome of that, we needed to move him out of that school because everyone from Year 7 to Year 12 – because of the Martin Place.*
> P2: *Yeah, it was straight after that.* MP_R_SG1

These strategies were not only macro-scale political, but also focused on developing alternative emotional coping strategies within the Muslim community itself.

> *You appreciate what you've got and young people should be given the opportunity to say what they need to say without feeling that they have, you know, feel guilty about not agreeing with something or debating an issue. So, you know, we are having to take on that responsibility of training young people to have a discussion without being emotionally attached. That is a big thing to ask a young person to do. Young women are doing it very well. Young men are not doing very well.* MP_R_SG1

One of the biggest enablers identified on the Martin Place participant maps was taking steps to avoid and cease engagement with the media and, in more general terms, with the wider non-Muslim society. It was not clear, either on the maps or in the small group discussion, whether this withdrawal from mainstream Australian media and society was following the siege only or whether that remained as a changed behaviour in the day-to-day lives of participants. This enabler is unique in that is it one that government programs and policies should aim to undermine and disable rather than to support and enable, based as it is on self-isolation and reduced engagement with the systems through which wider society operates and informs itself, including via the media. Social support networks of friends and neighbours were highlighted as important means of coping, with one participant relating the significance of neighbours reaching out to her immediately following the siege in a gesture of public friendship.

> P1: *I had my neighbours. They were great. They helped me a couple of times.*
> M1: *Has that continued since? Like in the week after the Martin Place thing, were you going out for coffee?*
> P1: *Yeah. We'll still go out from time to time. But they made sure that week, we went out.*
> MP_R_SG1

4.3.4. Martin Place Resident Summary

The experience of Muslim residents during and in the aftermath of the Martin Place siege was characterised by personal emotion of stress, trauma, and alienation – complicated by an interplay between the social behaviours and perceptions of the local, known community and the wider city and national Australian community. The importance of Islamic community representations in mainstream and social media in relation to issues of security and threat can be seen to impact Muslim resident feelings towards belonging, place, and community, as well as practical concerns of physical safety in response to social interactions. The complexity of the social impacts arising from this event, particularly in relation to family, demonstrates the dualistic nature of some variables as both barrier and enabler. In summary, the resident focus group suggests that the impacts of the Martin Place siege resulted in social and physical withdrawal from both the wider Sydney community as well as in particular familial settings.

5. Service Providers

Table 4: Service Provider Overview

	Impacts	Barriers	Enablers
Northern Beaches	Emotional - self Prof. responsibility Prof. reputation	Org. capacity to respond State/Federal politics Org. clarity	Systems and strategy Prof. networks Experienced staff
Martin Place	Emotional - self Information Media	Information Media Interagency communication	Prof. networks Emotional - self Mgmt. approach; recovery process
Blue Mountains	Emotional - self Prof. networks Workload	Emotional - self Workload Family	Emotional - self Neighbours Prior experience – self
Penrith	Work routine Emotional - others	Workload Emotional - others	Prof. networks Community services

5.1. Penrith Service Providers

The Penrith service provider group was held in Penrith and was made up of representatives from non-emergency community services such as aged care, legal advisory and advocacy services, and local libraries in Western Sydney. The data presented here on Penrith service providers was our second attempt at collecting information from that stakeholder group. We conducted an initial workshop with a range of service providers involved in an interagency committee in Western Sydney. This focus group ultimately failed due to participants refusing to participate in the System Effects participatory mapping process and discussion. During that workshop numerous attempts were made by the project team and workshop facilitator to reengage the group in the process, but each of those attempts were ultimately futile. Our reflection on this experience is twofold. First, it is clear that members of the failed service provider workshop were largely unwilling or unable to engage with heat as a disaster event worthy of their attention. Second, there exists a significant gap between the community experience of heat - and the resilience that community members demonstrate in responding to it - and how the failed group viewed the community's level of resilience. This failed group is a particularly stark example of the gap in experience that often exists between service providers and community members, and of the value of conducting research that engages *directly* with members of impacted communities.

5.1.1. Impacts

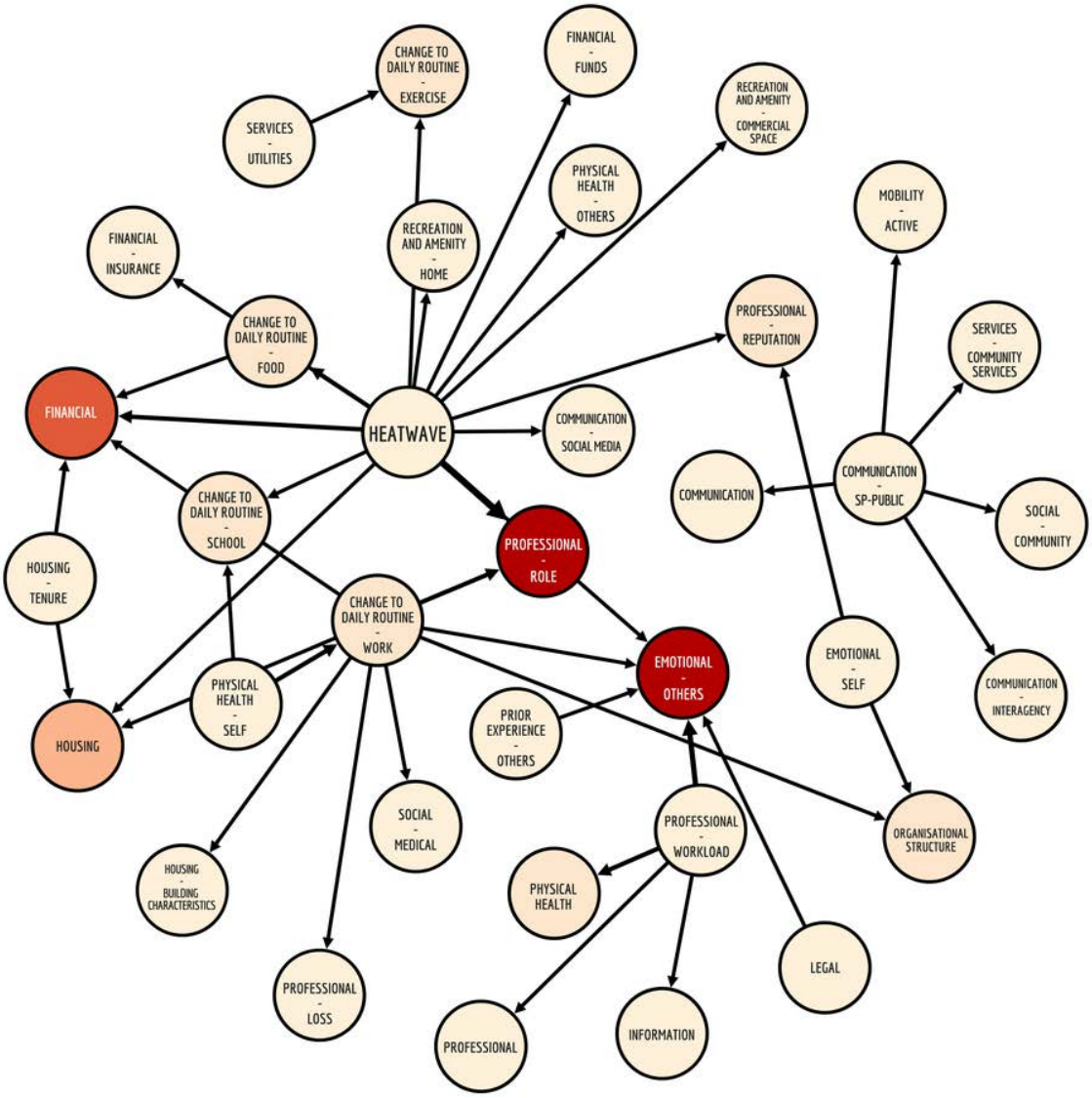


Figure 10: Penrith Service Provider Impact Map

Most Prominent Factors:

- Professional role: having to alter work routine to compensate for increased workloads, particularly in response to the impacts of power outages on vulnerable individual combined with the partial absence of telecommunications; managing the timing of work to avoid travelling during the hottest parts of day
- Emotional – others: additional time and effort spent in managing the increased emotional response (frustration and stress) of clients in areas such as housing and health care

The main impact of the day to day change arose as a result of changes in client behaviours and workload. Participants working in aged care and community housing reflected on the way heat impacts the day to day flow of work routine.

> *When they say it's extreme and the UVs and that sort of thing, but you've got to check that they're doing things. And then, they're not home because they've gone to the library, but I don't know that. So there's me, and I'm doing concern for welfare checks with the police because it's 42 degrees and my client's not answering the door. Are they dead in the doorway or are they in the library?...It was horrible. It was very difficult.* P_SP_SG1

> *More clients with rental payment problems, high terminations and evictions, increased time spent negotiating with landlords and more representation at tribunal.* P_SP_SG1

One participant noted that not only the nature of their work change, but in the event of heat related blackouts, so too does their capacity to carry out their day to day tasks in the same way.

> P1: *It's all very well when your power goes out. I've got mechanical hoists that don't work if there's no power. I've got blow up beds for pressure sores. Power goes out, they're laying flat on the ground. Their pressure sores are being exacerbated. I've got emphysema clients, you know, and…*
> M1: *With machinery.*
> P1: *With machinery. And they're on 24 hour oxygen.* P_SP_SG1

Another aspect of changed daily work routines as a result of the heatwave conditions referred to the timing of commutes in order to avoid the hottest times of the day, where possible.

> *Found it was difficult because you always try to escape the heat. It was this endless circle. So I changed my work patterns, came to work earlier, stayed a bit later, made sure I worked – well, I made sure I worked through December and January because, you know, it's beautiful air-conditioning here and I don't have to use my air-conditioning at home.* P_SP_SG1

> P1: *I suppose for me, it was there's a change in lifestyle. You know, a change in what you do at work, maybe when you work. You know, you want to get to work earlier, or maybe*

> *you come in a bit later and you work through more into the evening. Often those work patterns don't fit with your normal, you know…*
> M1: *Life.* P_SP_SG1

The intensity of heatwaves leads to changes emotional patterns and service providers stated that managing the emotions of others was a major impact of such events. One participant noted that the emotional impact of the heatwave required different emotional management of clients, as well as more face to face support for staff.

> *I mean, the heat is always, I guess, impacting on a family as individuals. Lack of sleep, lack of patience for the family, you know, when you don't have a good night's sleep then you've got the kids at home around yourself, your lack of money, you can't afford to heat up your house, you can't afford to take them anywhere – it's a huge impact in general. I would say in regards to what did I do, I see that it's very difficult for the families in that period of time. It's specifically difficult when there is no electricity at all. Everything is shutting down, where they really, truly can't use the fridge, or there is somebody sick at home with disability, having your medication, you have to have – because the fridge is not working now, so they have to buy new medication, there is no money. There's like a chain reaction to everything, as well as kids on holidays.* P_SP_SG1

> *So then because they're not drinking, they're getting heat exhaustion or they're getting urinary tract infections, which then leads to dementia-similar symptoms. They get confused, they're out doing stupid things, they forget to turn taps off, they're wandering. And you've got to get that worked out, you know.* P_SP_SG1

5.1.2. Barriers

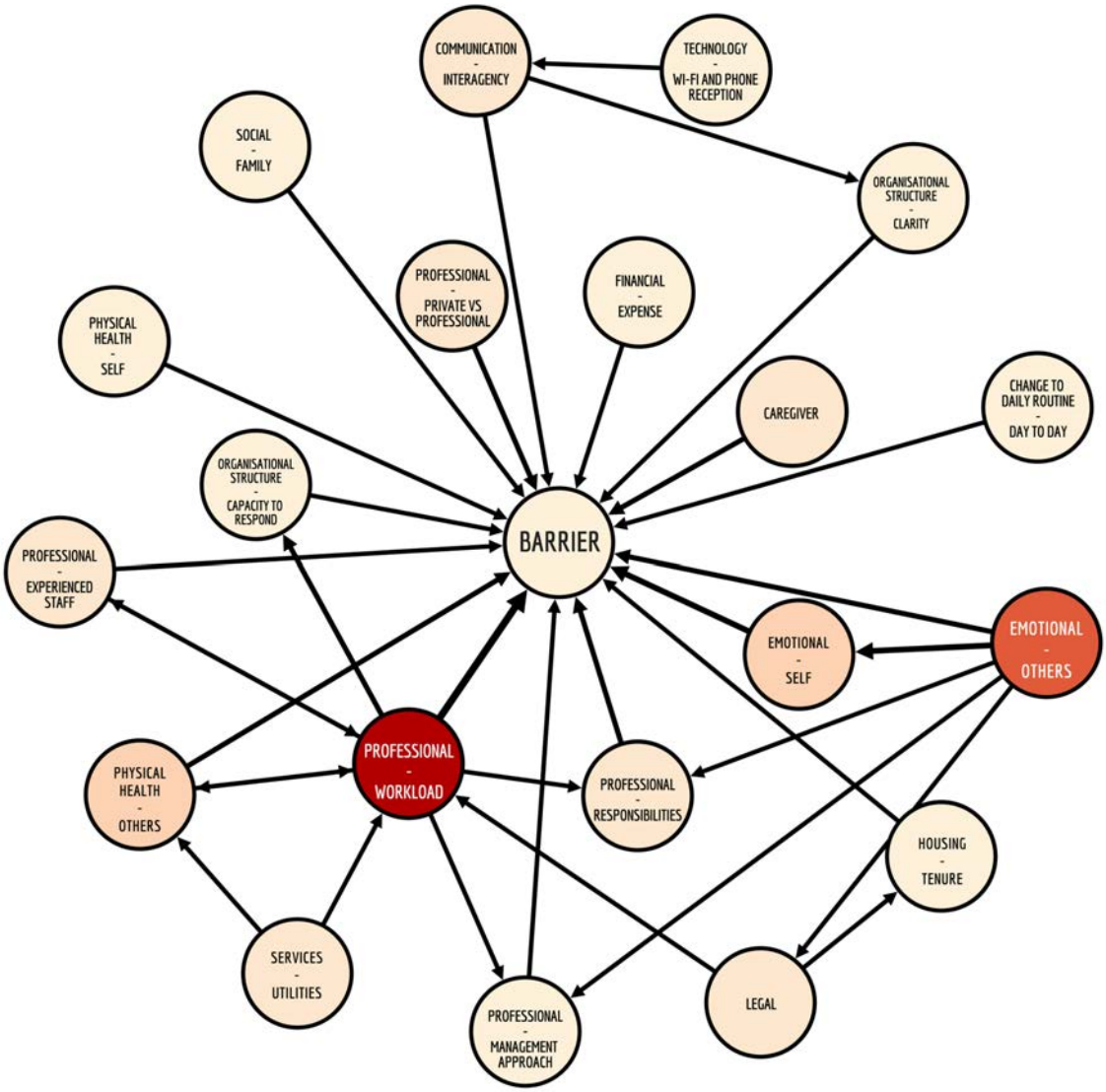


Figure 11: Penrith Service Provider Barrier Map

Most Prominent Factors:

- Workload: increased heat related client issues to do with managing temperatures and physical health, particularly during power outages, resulting in greater workload and time spent managing impacts of heat for others
- Emotional – others: additional time and effort spent in managing the increased emotional response (frustration and stress) of clients in areas such as housing and health care

Increased workload was a notable barrier in both the individual participant maps as well as a feature of the small group discussion.

I'm working with elderly clients and at the time of the last heatwave, I was actually on floor – I was ground staff, so my hours doubled because half the care stuff were in the same position. P_SP_SG1

Lots of caravan parks – they're living in caravan parks in Western Sydney as well. They're not built to that standard to keep the heat out. There is no money there to have the air-conditioning. There is no money to put air-conditioning in and there are people really getting very unwell, hospitalised. P_SP_SG1

So it's a huge demand an…d it always occurs with high bills, they can't afford to pay electricity, the rent increase happening, they can't pay their rent increase, they can't pay the rent and then it's termination and then go from there. P_SP_SG1

Individual participant maps noted that a main barrier of the heatwave was dealing with the emotions of others, in particular with members of the general public who were stressed, and whose increased agitation and frustration combined with higher expectations of service providers to assist them.

…in my work, the work that I do, I do assist clients in Western Sydney. They may not have air-conditioning. They may have air-conditioning but air-conditioning is not in working order because the landlord will not spend the money to repair it and it is affecting their lifestyle, it's affecting their – if they do have an air-conditioning, it's usually a very high electricity bill. They're unable to pay their electricity bill. They're falling behind with their rent is connected to, I guess – falling behind with the rent, notice follow, there is eviction. so the high demand in that period of time is huge, stress on the people is huge. P_SP_SG1

Often it's the single mums. They can't go to the shopping centre because every trip to the shopping centre is expensive trip with the kids. So sleepless nights, unhappy family often will happen when there is no electricity. The fridge, there is 24 hours there is no electricity, the food that was bought in for the whole week, it's off. They have no way to replace it, the food, so the kids are hungry. P_SP_SG1

It's another thing that is adding – very stressful, and when they're trying to get through to the services, they're always getting answering machine, so when they're getting the first person to talk to, and usually it would our advocate and then we get abused, they're angry, they're screaming, yelling. And then my work is to counsel them to make sure that works out smoothly. Then there is the tribunal for determinations and it's just an increase of work. Additional. And then there's what we call as well advocates. They are young and inexperienced, so you have to provide that kind of assistance as well, but in general, it's a very difficult time for families. P_SP_SG1

It's very stressful for everybody. So yeah, it's a big issue, big problem and my clients are social housing clients, tenants. They are from foreign countries, they can't speak English, they don't understand what's happening, what it's all about, what rights they have, where to go from here, so they really need our help because the high demand calls in that particular time and me as a coordinator, I need to take care of the staff as well. P_SP_SG1

5.1.3. Enablers

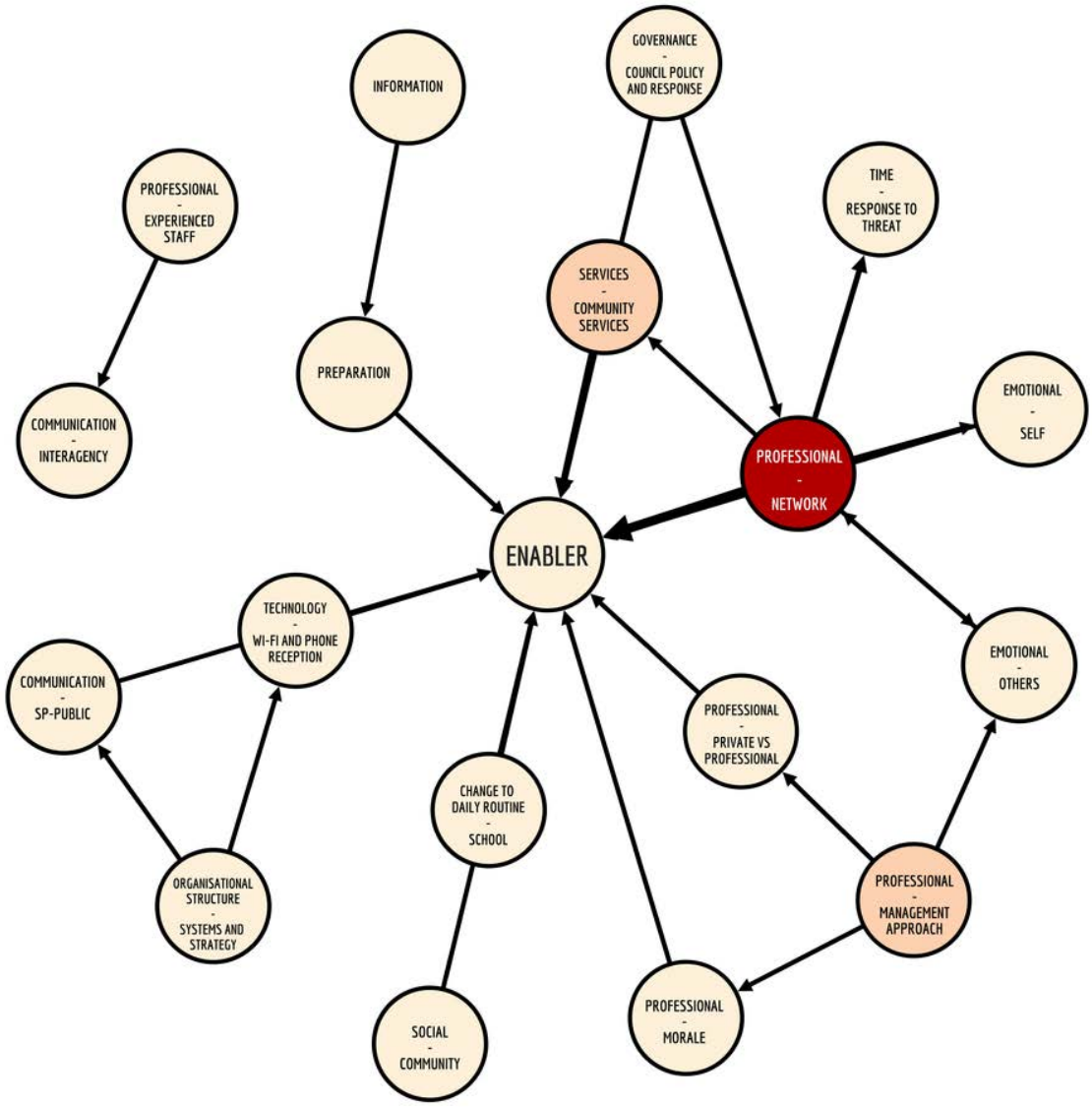


Figure 12: Penrith Service Provider Barrier Map

Most Prominent Factors:

- Professional networks: important in the sharing of resources and information between agencies; increasing the efficiency of interagency co-operation, minimising workload and increasing effectiveness of time; personal support between colleagues and feeling of solidarity
- Community services: seen as an important resource within community service provider industries as a network to support clients

Professional networks were noted as the primary enabling factor in the experience of Penrith service providers in the 2016-17 heatwave. On individual maps, good relationships with other

service providers was seen to increase the professional options available, as well as the speed at which actions could be carried out and ultimately, the degree of help that could b provided to the community. Personal relationships, direct emails and phone numbers, and saved time were highlighted as major enabling factors, as was Penrith council operating an interagency meeting four times per year to encourage relationships between different agencies in the area.

> *As service providers, something that was really important was the sharing of information. Service providers can be really insular and not want to talk to each other, but opening up and saying, you know, "There's a few beds here, maybe you can get some in" and things like that and there was a lot of backwards and forwards between services as well, which needs to be encouraged.* P_SP_SG1

> *There was no one coordinating at all. Like, from a service provider point of view. But like we would find that if there were care staff on site, we'd remove one lady, but the lady next door, they'd say, "Oh" and then we would ring that service provider and say, "Well, we've got your client in our car and we're heading down so you can mark her off as being safe" and we were putting clients into [different villages] and things like – it kind of evolved.* P_SP_SG1

> *I'm really a strong proponent of networking. I mean, that's what makes my world go round for work.* P_SP_SG1

> *So I was ringing past bosses and past fellow workers and trying to open doors and it didn't always work, but there was no one over seeing because then people were calling back and saying, "Well, no, we can't do that because under duty of care, this, this, this." You know, so it kind of had to grow itself. It was organic, but it did work. It did work.* P_SP_SG1

The efficacy of this networking approach can be seen in the working relationships between government agencies and community services.

> *Where they can't pay their rent because of the high electricity bill, we have to refer them to community organisations…to give them money for the payments of the rent or vouchers, electricity vouchers.* P_SP_SG1

Public spaces for disadvantaged people to spend time during heatwaves was seen as a positive way of helping the community.

> *Well, from the library's point of view, I suppose we're just here and this is the way we operate and we've got big open spaces and the library is always an open community space. As they say, public libraries are called the community's living room. And our spaces are used a lot. You know, we get well over a thousand people come through this place every day. P_SP_SG1*

> *Well, we do care for a lot of homeless people. We do look after them. We make sure we keep an eye on them, that they are comfortable. We make sure, you know, people don't make disparaging remarks about them or anything like that and in 99 per cent of the time, we have quite a good relationship. Everyone comes in and accepts everyone. So we don't have any problems, really. It's only on occasion that something happens. But we certainly – they certainly come in here, use the time – from the time we're open to the time we're closed. P_SP_SG1*

5.1.4. Penrith Service Provider Summary

Penrith service providers revealed that heat impacts their professional life in practical and emotional ways. Participants experienced their personal work routines and workloads differently in the heatwave event, with the emotional responses and changed behaviours of clients characterising these increased and more emotionally-laden workloads. The social aspect of these services was emphasised, both in the service provider- client/public relationships, as well as in importance of professional networks.

5.2. Blue Mountains Service Providers

The focus group for Blue Mountains service providers was attended by representatives from an emergency service provider, community charities, and community resource network organisations.

5.2.1. Impacts

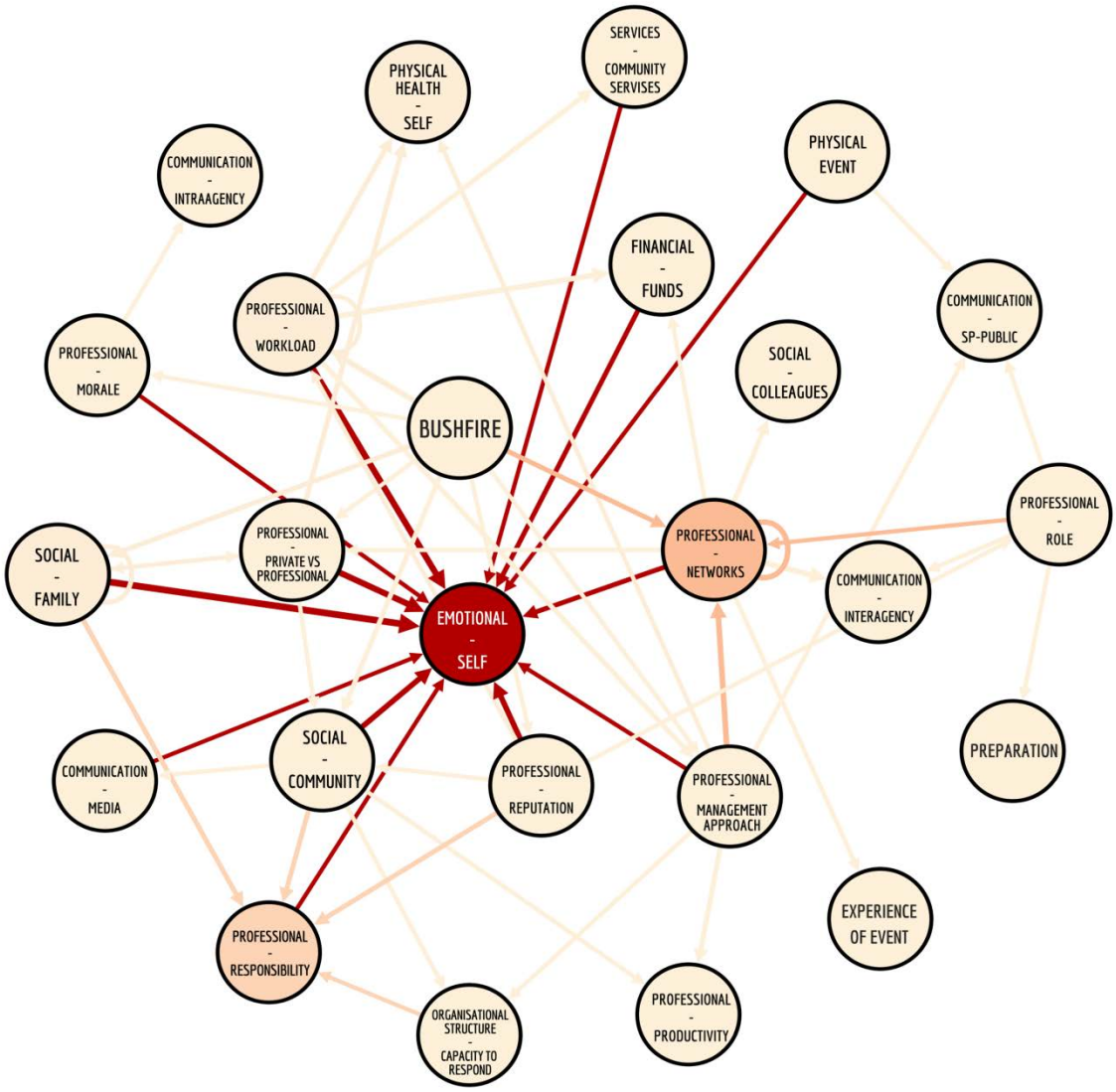


Figure 13: Blue Mountains Service Provider Impacts

Most Prominent Factors:

- Emotions – self: stress, fear for the community as well as personal fear of material damage; frustration at professional capacity to assist (wanting to "do more") and feeling guilt at role limitations, anxiety over performance

- Lack of professional networks and interagency communication and knowledge led to providers feeling isolated and to wasted time and resources (e.g. duplicated initiatives, competition for same funding)
- Extreme workload, difficulty balancing community role as both professional and resident; being the 'public face' of organisation in community 24/7

For service providers who worked during the Blue Mountains bushfires, the main impact noted on individual maps were feelings of stress, fear, frustration, anxiety, feelings of guilt and uselessness, and being overwhelmed. In talking through the experiences of Blue Mountains service providers in a small group, it was apparent that the other major impacts – professional networks, and workload – are closely related to these emotions. Professional networks – and the lack of them - were discussed as an important characteristic of the 2013 bushfires, with participants highlighting the ways in which their experiences were shaped by issues surrounding duplication, and lack of communication.

> P1:…[in my role] *I was feeding between 800 and 1200 people across five locations three meals a day and we were wondering what the hell was going on because at one point, there was no one turning up to get meals but we had tonnes of food ready to go and then we discovered that neighbourhood centres were doing the same thing so we're effectively feeding…*
> M1: *Duplicating.*
> P1: *Yeah. So that we worked in isolation, we've got to do this, this and this. We're going to set up our feeding stations and this is how we're going to do it and this is how we will do it, but then a more convenient location we didn't think of was feeding some of our crews and, you know, the sad part is, because then we threw everything in the bin. Whereas now, in that environment, a lot of that would be – we would task our spontaneous volunteers to pack some of that food and provide it to the homeless…*
> BM_SP_SG1

> *…lots of my things on my map is that prior to 2013, we didn't know the emergency management sector. I mean, you know, all heard of the RFS, but you didn't know that there was an emergency management sector and they'd certainly never really heard of us.*
> BM_SP_SG1

The lack of interagency cohesion and communication during the 2013 bushfires was seen by participants to have had long term transformational impact in the day-to-day emergency response approach.

> P1: *I think that shows how much we've grown as an organisation in the Blue Mountains by way of connecting to community because that's the stuff that we need – and for me, it's common sense, but…*
> P2: *It relies on those networks.*
> P1: *It does. It does.* BM_SP_SG1

The transformation of local agencies approach to community response and recovery has a strong emotional, interpersonal element. Individual maps as well as the comments of participants demonstrate that the emerging professional networks constitute important emotional support in addition to their practical and professional advantage.

> *But one of the really good things that did come out of it was that the people in wellbeing and* [local network] *have certainly become lifelong friends and allies.* BM_SP_SG1

> P1: *Yeah, there's sort of a wellbeing gals group and…*
> P2: *I'd say we're all pretty close.*
> P1: *And developed very deep friendships, I would say.* BM_SP_SG1

> *…we have developed the friendships and support networks really, because that's what we are. It's not just now we're buddies. It's – you know, I describe it as being like soldiers in the trenches, you know. You might have had nothing in common when you started this process, but now this is a lifelong relationship that you have because you've all been through the same thing.* BM_SP_SG1

The personal nature of service provider networks as discussed above reflect their grassroots creation and propagation. The initiative of particular agency representatives can be seen to drive not only the existing network but its consolidation and widening at the community scale.

> *This is about the whole management system, where there is this kind of divide – has been this kind of divide and so one of the things that we've been trying as* [local network] *is, you know, speaking at conferences. So we'll go to both. We'll go to the Australasian Fire*

> *and Emergency Service Authorities Council (AFAC) conference and we'll go to the Australia and New Zealand Disaster and Emergency Management (ANZDEM) conference and do a little panel with a couple of us to say, you know, why we developed* [local network] *and this collaborative relationship. We'll also go into the local community services conference and talk to them about why building resilient communities is actually their core business because whether they're ready or not, an emergency is going to come their way one day and it's better to be prepared.* BM_SP_SG1

The impact of networks as a way of maximising value, coordinating and cooperating on behalf of the wider community was emphasised as a major impact of the 2013 bushfires. We see here a holistic interagency approach to community engagement and funding that minimises overlap and in turn reduces the workload of individual agencies.

> *…eventually through the* [local network] *group, we actually said, "Look, there is a shedload of money available. Why don't we consider a project of sorts where you guys can bid for something on this side of the coin and we'll bid for something this side of it?" Therefore there's less competition in bidding for that money, there's greater moneys that come into the space, but we actually can work towards getting a result that makes better sense.* BM_SP_SG1

> P1: *I guess one of the things we realise is that we've all got Key Performance Indicators when it comes to community engagement. Now, why would cops do something and fire and rescue do something, the State Emergency Services do something else and Rural Fire Service do something else when we can piggyback on each other and just turn up to one of the things that the* [local network] *have organised and tick off that Key Performance Indicator collectively? And so I constantly say this, I think for the first time in the Blue Mountains, we put all emergency services in front of a group of residents and explain what we do…*
> P2: *And don't do.*
> P1: *Who's responsible for what in an emergency, but then explain how we interact and how we network so therefore there's a greater understanding of the boys in blue and the boys in yellow and the boys in orange – and girls – actually work together.* BM_SP_SG1

Networks are interrelated to issues of workload, a third major impact on participant maps.

> *So the immediate and longer term – really longer term impacts on me was a load of work, particularly in the first six months, when I was part of the recovery committee and chairing the wellbeing subcommittee, in addition to my day job, and that was hard…* BM_SP_SG1

Such issues of workload are discussed more thoroughly in terms of barriers, below.

5.2.2. Barriers

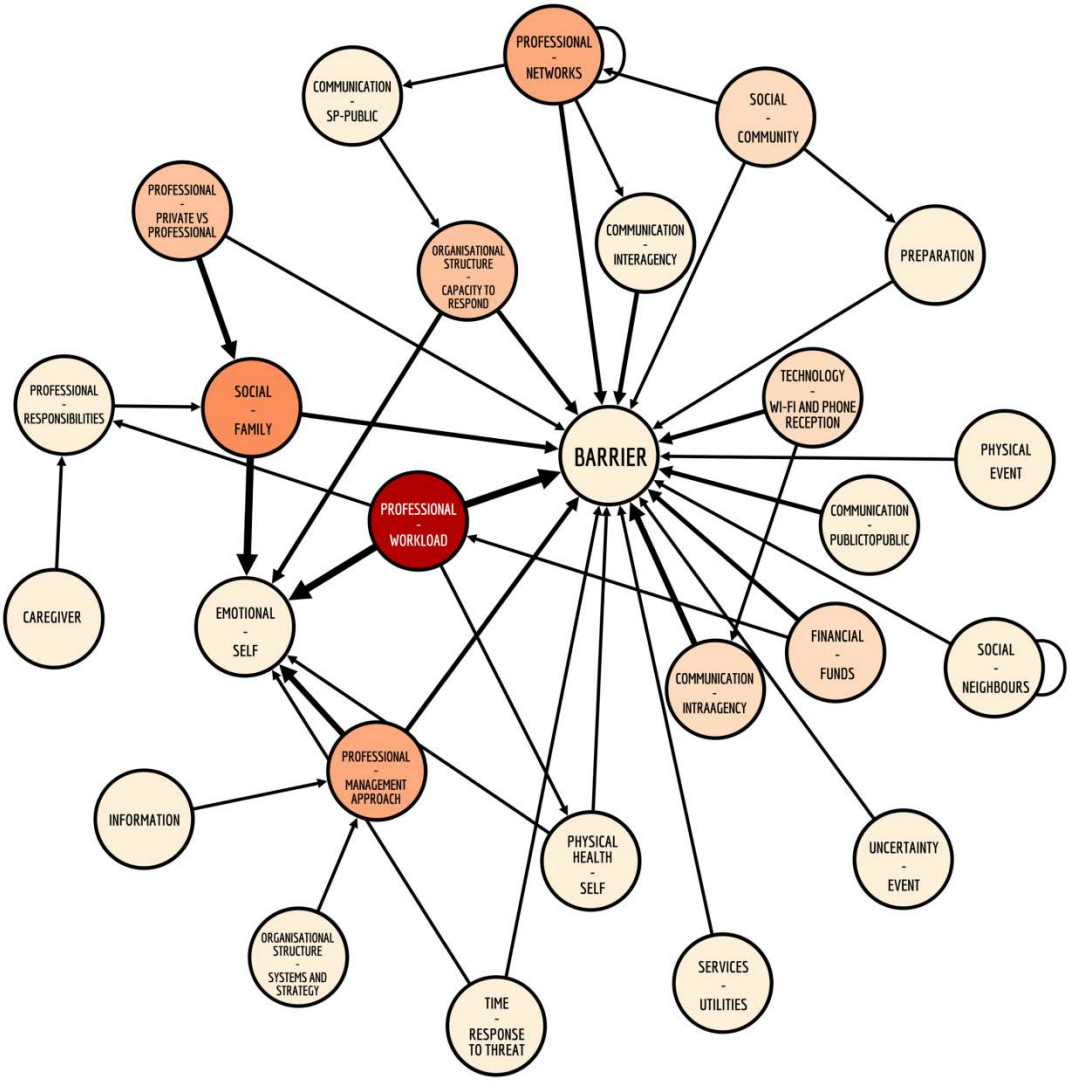


Figure 14: Blue Mountains Service Provider Barriers

Most Prominent Factors:

- Emotional – self: professional performance stress, grief over community impact and losses, and managing feelings of guilt and responsibility related to balancing professional role and private life.
- Workload: experiences of being over-burdened, having multiple jobs, feeling overcommitted, a high professional demand on time
- Family: separating professional and private responsibilities as a parent/spouse/child etc. in public; impact of professional role on family time

The individual barrier maps of service providers featured words such as stress and anxiety, with small group discussion outlining that these emotional barriers to coping were often in direct response to the increased workload.

> *So there was a lot of stress, as lot of, you know, overwork and 60-odd hours constantly, then I tried to use it up a bit and those sorts of things. I guess the impacts are longer term ones on me for health and, like, stress-related stuff for me.* BM_SP_SG1

Other service providers reflected on the ways in which their professional roles had had an impact on their private lives, in ways that made it more difficult for them as residents to exist within the community.

> *So for me, it was life-changing. Absolutely life-changing. Life will never be the same because, as you'll see on my thing, I live there. So just life will never be the same because I'm just surrounded by it all the time and you can't go anywhere without just meeting people all the time. It's just part of our story and my girls are in the school – both schools – and will be in school with kids who have lost houses and teachers who have lost houses. So a very long time.* BM_SP_SG1

> P1: *It's just that – yeah, I think for a long time, I lost my identity as a resident and you become the organisation and, you know, you're not a parent anymore and you're not a person, so you get…*
> P2: *Sucked into a role.*
> P1: *Yeah, you get a lot of – it's hard to just do anything normal in your community and it's hard to just be a parent at the school or do anything normal and like my record was I*

> *took three hours to get bread and milk once – I just wanted bread and milk and it – just those things. It just takes a long time to do anything.* BM_SP_SG1

Another important participant barrier was increased and cumulative workload. Individual maps featured words like over-burdened, multiple jobs, commitment and demand on time.

> *… we had a whole bunch of stuff that we needed to deal with that we didn't know that we could easily deal with it by handballing it away to somebody else. Donations. Offers of accommodation. Offers of food. Offers of something that we just went, "What are we going to do with this?" You know, four pallets of satay chicken sachets. You know, four pallets of them.* BM_SP_SG1

> *This just happens because it's our passion and our life's work, not because anyone's supporting us to do this, and that makes it hard on all the people who have got precarious trauma, they're exhausted, you know, they're the three people who work in the neighbourhood centre part time and they're there for six weeks, 18 hours a day or more.* BM_SP_SG1

The workload pressure on particular individuals within these agencies emphasises a third barrier identified by participants – that of family, or perhaps more accurately, the impacts on family as a result of their professional focus. Individual maps made it clear that family responsibilities, concerns and compromises made it harder for service providers to cope during and after the bushfire event.

> *So my girls have gotten used to it and – but it affects your whole family. Like they'll never be the same. They would just stand there very, very patiently. So they were with me that day. It's just life-changing. It's never going to be the same.* BM_SP_SG1

5.2.3. Enablers

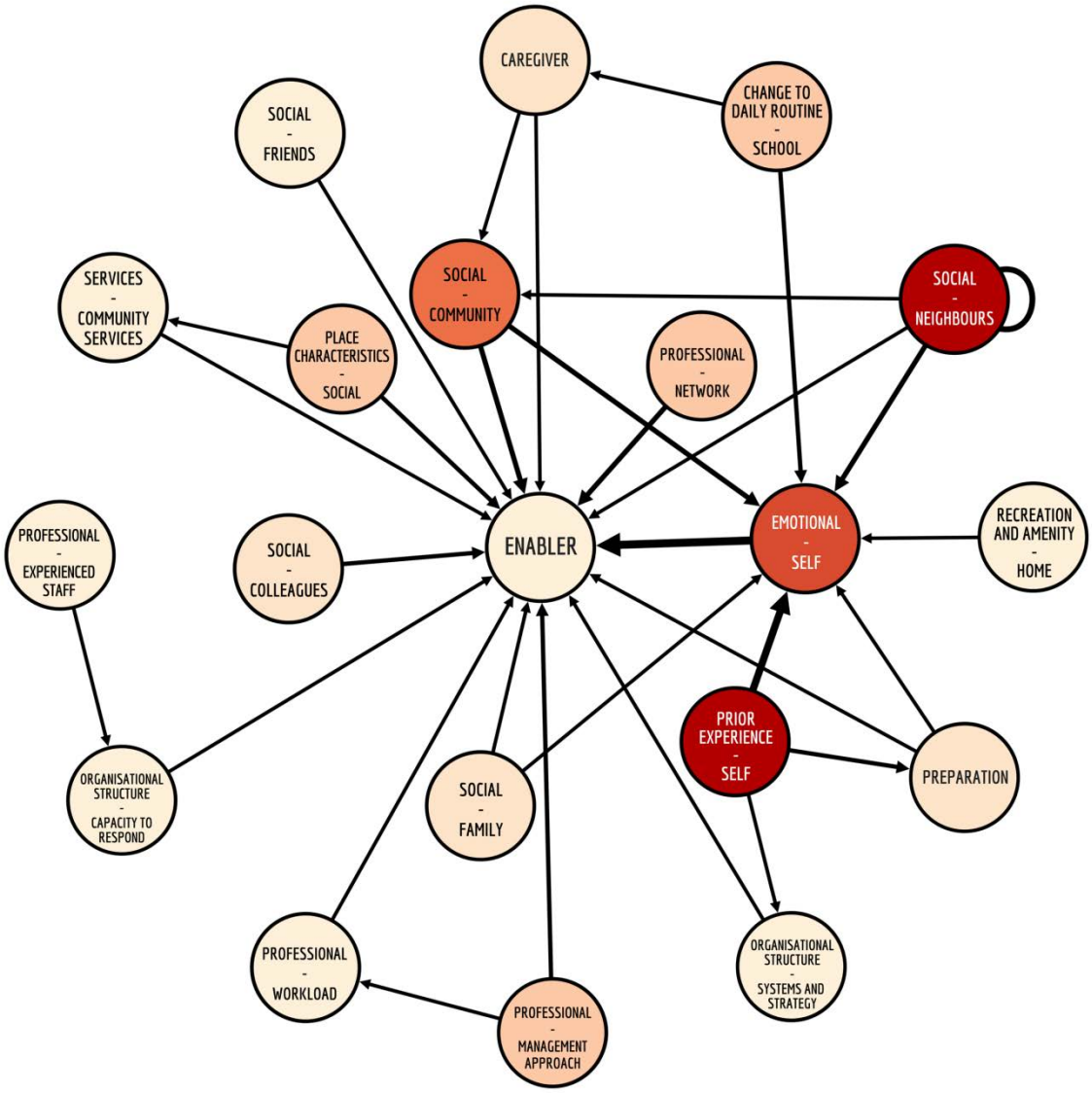


Figure15: Blue Mountains Service Provider Enablers

Most Prominent Factors:

- Emotional – self: increased recognition and value of self-care, positive feedback from community acting to reassure and encourage service providers; feelings of self-confidence and capability
- Neighbours: practical support from neighbours in providing assistance with childcare, care for pets, and emergency response during and after the fire
- Prior experience – self: positive value of prior bushfire events, knowledge of processes and feelings of capability

Of interest in the Blue Mountains Service provider maps was that emotional - self is a primary factor in all maps, including enabler. We see here that words such as self-care, reassurance, encouragement, and self-confidence indicate that personal emotion played a role in the coping capacities of participants. This suggests an important relationship between the capacity of service providers to assist others and their capacity to help themselves and be helped by others. This was emphasised by the importance of neighbours in the service provider maps.

> *fantastic neighbours, helped with the generator, were fabulous with the kids, banded together to door knock other neighbours, were at my door as soon as they could to help me…* BM_SP_SG1

> *there's been lots of really positive things, so I think the development of that intense sense of community is one of them.* BM_SP_SG1

A third important enabler on the service provider maps was that of personal prior experience, with reference to previous stressful circumstances, and feelings a practical and emotional capability stemming from previous emergency service and life experiences.

> *I've lived here all my life, so it's not my first fire, so it's not a new experience for me, but I think it's just going to be one of those defining moments because it was such an unusual fire…* BM_SP_SG1

5.2.4. Blue Mountains Service Provider Summary

The experiences of this focus group are dominated by personal emotional impacts – in particular stress and fear for the community – and the impact of the fires on both personal and professional social relationships. In individual maps as well as in the small group discussion, there was a consistent blurring of lines between personal and professional as work impacted on personal life, but professional networks enabled personal resilience. The bushfire experience of service providers in the Blue Mountains was shaped by the long-term establishment of informal social networks that underscore professional communications and resource management – and that experience

5.3. Martin Place Service Providers

The Martin Place service provider group was comprised of predominantly non-emergency service responders, including building operations managers, and public servants. Participants played a supporting role for emergency response staff and organisations and acted as a link (both for information and directing actions) between the public and the emergency response organisations during the event.

5.3.1. Impacts

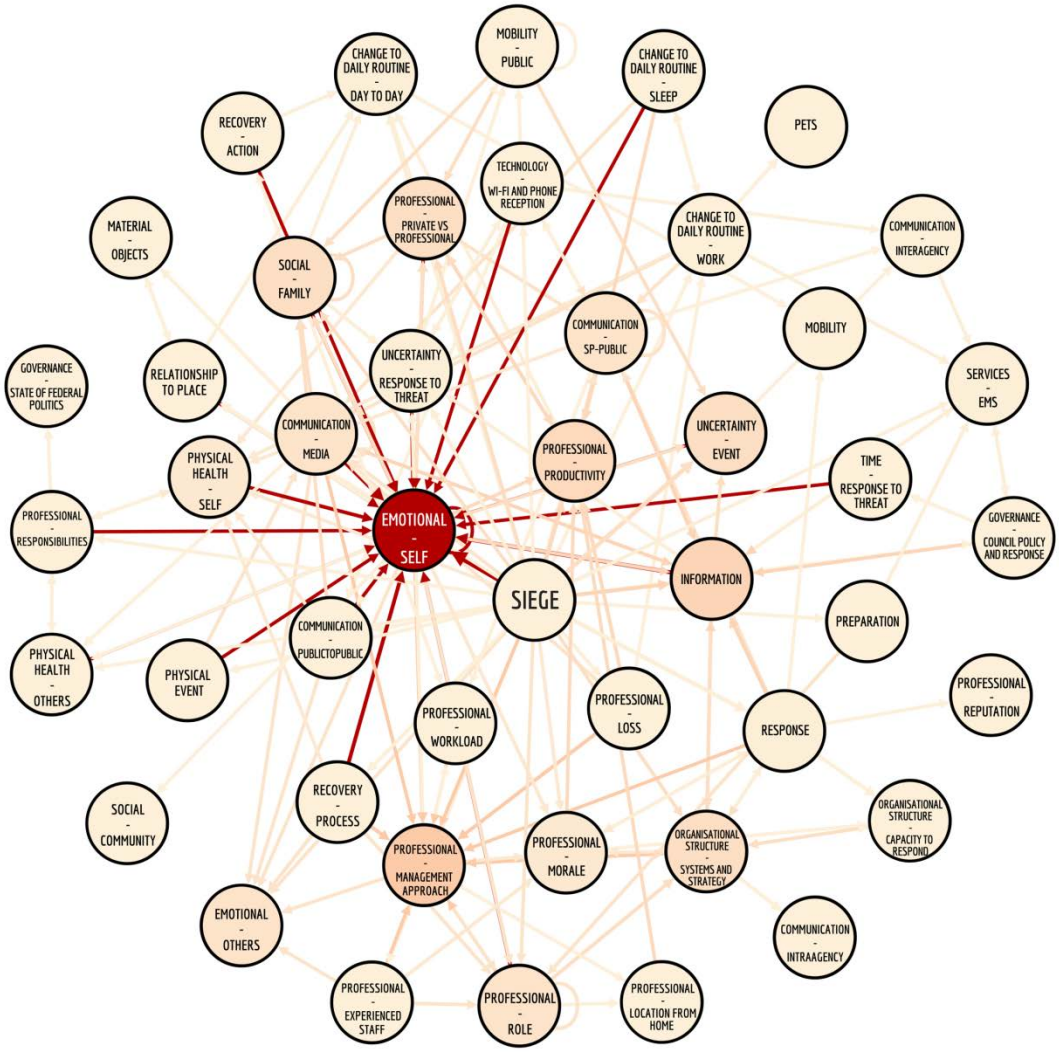


Figure16: Martin Place Service Provider Impacts

Most Prominent Factors:

- Emotional – self: personal trauma; fear, stress and anxiety related to personal safety and that of friends and family in the city; stress related to the stakes of professional performance and increased workload; negative associations with place
- Information: lack of information provided to supporting service providers on emergency state and processes (which added to stress and anxiety)
- Media: problematic overreliance on the media as a primary information source used in strategy and response planning

The primary impact on individual Martin Place service provider maps was personal emotion, with words such as anxiety, stress and fear appearing regularly. The emotion in many cases stemmed not only from their professional role during the Martin Place siege, but also fears for personal safety and wellbeing.

> *Well, my first impact was fear. When I walked into a shop and the woman was wringing her hands and then saying there are bombs in the city, there's a siege… So I was immediately afraid for my daughter in the city. So fear was my first reaction, and shock.* MP_SP_SG2

> *Yeah, so that was a bit scary, going in instead of heading south or getting out of the city, I was going straight into it and not knowing exactly whether that was the end of, you know…* MP_SP_SG1

> *You could only tell it was going to go bad, I think. That was my gut feel. Yeah, and then obviously hearing the gunshots and seeing the people, the shock on their faces is something that's always going to live in my mind forever. It's quite frightening.* MP_SP_SG1

The nature of the event also led heightened feelings of responsibility in performing professional roles, and in one case a participant was exposed more directly to the event than if they had not been directly involved in the emergency response. This escalation of professional responsibility outside the day-to-day norm can be seen to have emotional impacts.

You didn't want to let anyone down. I didn't want to do it. You know, anyone who was involved, you didn't want to let anyone down. MP_SP_SG1

Yeah, there was a little bit of post traumatic just for me, even just – because I mean, just seeing – because that image of them all running around the corner – the first person they saw happened to be me because I just needed a breath of fresh air and I stood out on the corner at 2 o'clock and they were actually running towards me, just seeing them coming towards me. MP_SP_SG1

Whilst many individual maps referred to their own fear and anxiety on the day, as well as professional stress and confusion arising during emergency response during the event. However, small group discussions revealed a temporal dimension to participant's initial feelings of personal fear and anxiety during the event with many participants referring to long-term emotional impacts.

I think it has contributed to a sustained level of anxiety, though. MP_SP_SG1

I'm very glad I have a separation between where I live and where I work. Because when I walk around the city, I just see risk everywhere I go because that's my job and you know, I think about this stuff, talk about this stuff, plan for this stuff every single day and live[far away from the Sydney CBD]. So when I'm [at home], I don't think about that stuff. MP_SP_SG1

But I'm pretty much one of those people who'd rather just, you know, the less I talk about it – it was still difficult coming here today because I'd like to put it away. MP_SP_SG1

I think the long term impact for me is I walk through Martin Place every single day. Every single day and I must say, I am not so conscious of it, but I'm very aware of my surroundings when I walk through Martin Place and I really find it has no appeal to it, Martin Place. It actually is a zone I really don't like. I walk through it as a thoroughfare, but I would never sit to stop there or take a seat and have a sandwich. I find it a really horrible place to even pass through. MP_SP_SG2

> *I've never set foot in the place [Lindt Café] since. And even when they opened it up for business again, I don't know how they did. I mean, I felt really disturbed by that.* MP_SP_SG2

Another significant impact highlighted in individual maps and extended in group discussion was information, and the experiences of participants finding and accessing reliable sources of information about the nature of the event on the day, and guidance as to what their response should be.

> *I think lack of information again was the worst thing for me.* MP_SP_SG2

> *Probably the other thing is the pressure on people to get an answer on something. You know, you probably would have found it in your organisation that your boss wants you to get information and say, "I need a decision on this" and you look around and you go, "Where am I going to get that information from?"* MP_SP_SG1

> *I think the lack of structure too, to information. So the lack of flow of information. We said earlier, we all relied on the media a lot and for a large corporate with, you know, thousands of people on site, the lack of structured information coming from either an emergency service or some sort of platform that was reliable, that could be ascertained – I think that was a challenge. I mean, most of the decisions were really made on what the media were telling us…* MP_SP_SG2

This excerpt touches on a significant, and related, major impact as identified by participants – the role of the media. In some cases, participants were alerted to the event by media sources rather than through official channels, and the coverage of the event by mainstream news outlets was a major point of discussion in small groups. For many, the aforementioned difficulty in accessing information via official channels meant that the media was significant in their professional decision-making.

> *Yeah, so 2 o'clock I was up, watching it on television in a hotel room. My boss and I stayed in a hotel room, watching it in a hotel room. You could see that there'd been people injured so we went up to the control room and checked on the staff that were working there because they would have had vision of the people being dragged out, and they did. So we had to make sure that they were okay.* MP_SP_SG1

M1: *Yeah. What about the media? Was there televisions on?*

P1: *Yeah, we had – yes, there were…*

M1: *Was it reliable information coming from the media? Do you think it was useful information?*

P1: *Well, yeah, to a certain extent, yes, I guess, in terms of at least you knew what exactly was happening…*

M1: *And where it was happening, yeah.*

P1: *And where it was happening after a certain time.* MP_SP_SG1

So of course I had no idea what she was talking about and she said she'd heard it on the radio. MP_SP_SG2

5.3.2. Barriers

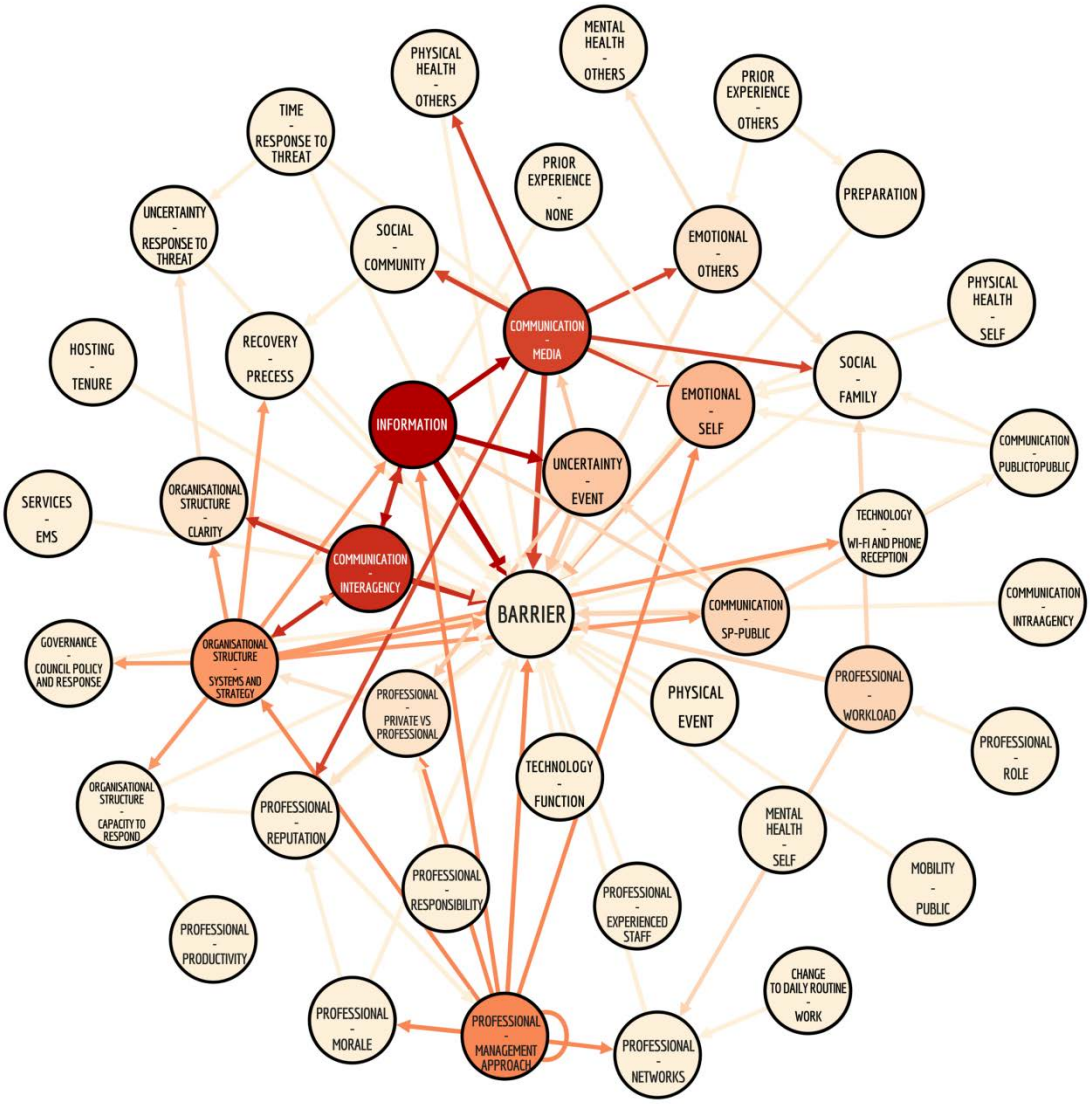


Figure 17: Martin Place Service Provider Barriers

Most Prominent Factors:

- Information: lack of information provided to supporting service providers on emergency state and processes
- Media: lack of reliability in media reporting, particularly relating to threat levels and emergency details (e.g. claims of extra bombs around the city) that served as a distraction for responders
- Interagency communication: lack of pre-existing or identified networks between supporting service providers and Emergency Management Services, particularly significant considering that many participants involved in advising direct responses were not primary emergency response and were placed in that role for the first time.

Many participants experienced the flow of information from official channels of communication and building managers as a major barrier in their effective response. This resulted in response and evacuation plans, and advice to the general public, being based on informal channels of information and even trying to find out directly.

> *…there was also whatever decisions were made were made at a worst case scenario because there was not a lot of information that was coming about exactly what was happening… And whatever information actually when it came through was through the building management network that we've got, the properties around the building have amongst each other, rather than from any regulatory body, if that makes sense.* MP_SP_SG1

> *And I think that was really the thing that struck me as being hardest about the whole thing, is that there's a lot of pressure on me and my boss in response to demands from a CEO or directors wanting information for them to make a decision. What are we supposed to do here? Go and ring your mate from the police. And that's not how it works, and they're very reluctant to give that information because they give you the wrong information, it hasn't been cleared through the channels, that type of thing, that they put themselves at risk by giving the incorrect information. So trying to find the true source of information, particularly in those early stages, is very difficult and just about everyone's accepted sense that you're almost on your own for the first hour.* MP_SP_SG1

> *I was walking out into Martin Place trying to grab a hold of anybody, going, "Okay, I could get blown up or shot here, but I'm going out there into the thick of this." You know, marching through people real purposeful. I think that's why I got the media grabbing me, "Can we have an interview? Can we have an interview?" Because I was on a mission and I was out there for a purpose and I wasn't out there to have a gander or whatever because a bullet, a bomb, anything could have happened while I was out there.* MP_SP_SG3

One of the other barriers emphasised on individual maps was the role of the media, and in particular the experience of media presence and scrutiny around the event.

> *And that was a really key part of it too, that there was the constant media scrutiny.* MP_SP_SG1

> *Again, focusing on the aftermath, what made it harder I think was just the very public nature of what we were doing. You know, there was a lot of media scrutiny, but also the public's scrutiny.* MP_SP_SG1

In the absence of more reliable sources of information, the small group discussions elaborated on the experience of relying on the media in order to inform professional actions.

> *…no communication if you didn't at least – the information I got wasn't great but, you know, I was getting some off TV.* MP_SP_SG3

> *So the way that in theory works is they establish an emergency operations centre where everyone comes together and they establish a central coordination point for public information and really that public information is the information that we're relying on.* MP_SP_SG1

The problem of relying on the media for information was seen to be lack of reliability, inflated threat levels, and insubstantial content that served as a distraction for responders.

> *This was constant. This was three to four, five, six, seven hours. And you would notice. They had no more footage. They'd just do the same thing.* MP_SP_SG3

> *So it was interesting because she had heard it on the radio, what was coming out through the media was obviously incorrect…. But because the media didn't have much to go on, a lot of it was being – the fear, I think, was being inflamed by some of their comments because they had nothing to say.* MP_SP_SG2

> *Even if you watch the ABC, it was the same footage being repeated and repeated and repeated, because we have the TV screen up. So the anxiety in the community was going up. There was no information to them, you know, about what was happening, whether it was safe, who was safe and where. So they just filled it in with their own stories and I could go on for hours about all I've heard in there.* MP_SP_SG3

The role of the media as a valuable source of information, on one hand, or as the purveyor of speculation and hyperbole, on the other, is a dilemma captured in the small group discussions.

> P1: *I guess on the flip side of that, as a corporate representative in close proximity to the event, all we had to go on was the media. There was some level of communication from the emergency services or police, but the media were – we were dependent on what was coming through in the reports. So it wasn't completely accurate. It was at least some level of information that you could start to plan around or know whether to evacuate people, whether to lockdown or whatever we thought was an eternity at the time, or what were we going to be doing around planning for any sort of business continuity? Where do we send our people if we do evacuate? Do we send them into Wynyard Station – it was the only real information that you had and coming through quite regularly.*
> P2: *Don't get me wrong, the media definitely had a role to play…*
> P1: *Yeah, I'm just saying it was the…*
> P2: *…but I would prefer it to be not quite as opinionated, if you like. I understand that there were comments made about Muslims. So it tended to inflame the situation, I think, rather than calm it. But yes, I agree with you. We do need the information but it should be responsible.* MP_SP_SG2

The lack of official information channels and a reliance on the media relate to issues of interagency communication, another barrier identified by participants. This impacted not only the actions they took but also the advice they gave to tenants and the general public. We can see here a problematic chain reaction of information and misinformation that acts as an obvious barrier to service provider coping capacity.

> *My big one about the whole thing was just communication. Lack of communication from emergency services, being a building manager and needing to communicate with 500 tenants. Not having anything to tell them – that was the biggest and the hardest thing for me. That was my biggest impact.* MP_SP_SG3

> *We got no form of communication. Unless we went and looked for it and asked, we got nothing. So we were sort of flying high most of the day by ourselves, making our own decisions. Me taking my own safety into my hands and going out into Martin Place and trying to find a police officer or somebody to talk to. And even then, they sort of look at me and think, "Well, who are you? You're a nobody. We're not telling you anything anyway."* MP_SP_SG3

> *Communications is probably the biggest thing of all in this. Certainly, from where I was sitting, it wasn't only about communications, but it was we actually didn't have all of the information and it was not possible to get all the information and so all of that certainly impounded how everyone in the city was able to be communicated with.* MP_SP_SG3

This aspect of the Martin Place event is particularly significant considering that many participants involved in advising direct responses were not primary emergency response and were placed in that role for the first time, often leading to confusion.

> P1: *So yeah, and I guess the only other thing is that it does leave – well, am I going to be or is any of us going to be required again? I don't know. It's like – and if we are, like how do we know? Like, they just kind of came to us unannounced.*
> P2: *It never occurred to me that plans would be one of the biggest things they needed. You know, you don't anticipate that when you're trying to – when you're doing scenario planning that that would be one of the key people supporting you on the day.*
> MP_SP_SG1

5.3.3. Enablers

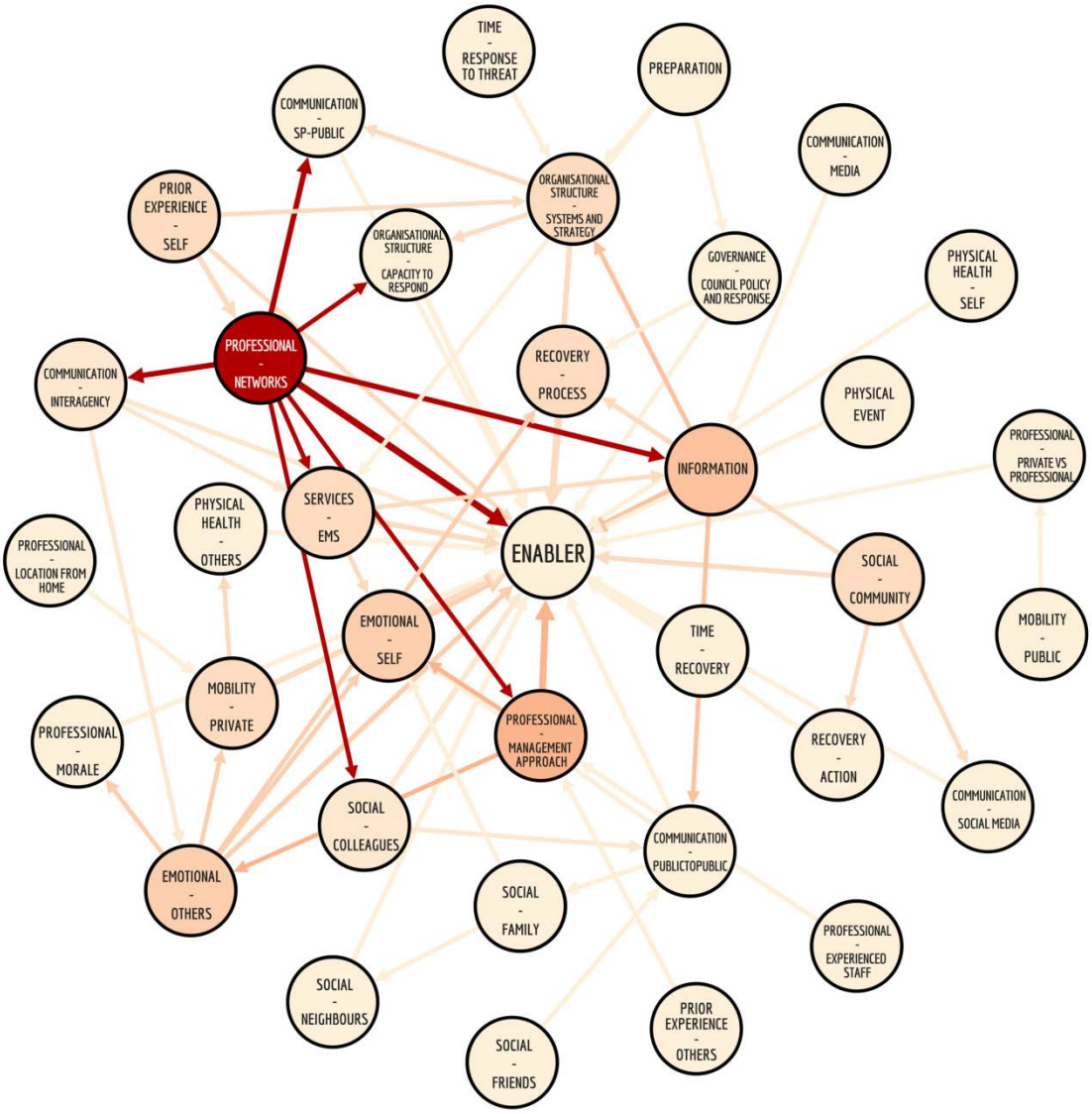


Figure18: Martin Place Service Provider Enablers

Most Prominent Factors:

- Professional networks: benefit of pre-existing professional relationships between non-emergency service providers in managing the emergency response; informal networks enabling access to information; emotional and practical support from colleagues
- Emotional – self: feelings of positivity arising from public emotional support around the event; feelings of community solidarity arising from floral tributes – including volunteering, cataloguing, and their symbolism for community support and grieving

The main factors on participant enabler maps relate to professional networks, and referred to interagency support, shared resources, colleague support and morale, and utilising formal and informal contacts and relationships to manage the emergency response.

> *P1: if you had good relationship, you got good outcomes in terms of, like, at that point of time for* [business name]*, four buses was quite…*
> *M1: It wouldn't have been easy that particular day.*
> *P1: It wasn't easy to get four buses come in to take people out of the city, but that was only because relationships would there that things like that could happen.* MP_SP_SG1

> *…relationships between different organisations and while you're not supposed to, you know, use the old mates actors, as the police refer to it as, it does mean that you get some informal advice or advice on where you go to for the formal advice. I think that was one of the key things, having those relationships that are just – you know, you build them in day-to-day operations, but they come in very handy…* MP_SP_SG1

> *So you were never out there on your own and there was always someone from our team and if we did the support in Martin Place, we went out in pairs. There'd be three pairs per shift and so we went out in pairs. So you were never, ever alone and we were trained to take care of each other. I think that's probably the thing that did us, that was good for us…* MP_SP_SG3

Another enabling aspect of the experience for service providers was their positive emotional response to the public actions of commemoration and support during and following the event. This was seen in response to the massive flower memorial that developed in Martin Place, as well as the response of individuals volunteering to deal with them in a respectful manner.

> *I agree, and from my perspective, I think Sydney was a leader in terms of that compassionate response, the overwhelming public support for the victims and what they'd just been through and for everybody to just come with those tributes and flowers and things in the numbers that they did, I think left a much more positive feeling for me from the whole thing.* MP_SP_SG1

> *…people put their personal needs – the vast majority of people put their personal needs aside and they are in for the wellbeing of others and I think that people chip in. Like, the*

> *volunteers that we had to come down and do flowers when we had to collect the flowers – you know, they didn't have to do it. The sweltering conditions in some tin shed in the middle of summer down at Bay Street, pulling all the flowers apart and – you know, there was well and truly enough people to do it and there was no question that people were going to chip in and your experience was that every single person in that room was there to try and get the best outcome and my experience around work is that if you weren't directly involved, you were very empathetic towards the people that were involved and I think that's a really positive thing to take out of it…*MP_SP_SG1

> *And that's life-affirming, isn't it? That's what I was talking about in the aftermath. It sort of reaffirms your faith in humanity that the vast majority of people are actually good and want to do the best for others. It's just this very small minority who are out to harm.* MP_SP_SG1

> *I found great comfort in the flowers and…I came down multiple times every day to see the flowers and to see the people. I found it very comforting.* MP_SP_SG2

> *I'm there a lot and up and down and I'm looking forward to the flower tribute that will come. To me it was a beautiful coming together of the community to say we care and we see what's happened and it matters.* MP_SP_SG2

> *Personally it just gave me – I felt okay, you know, being a little bit upset by it, a little bit emotional about it and the fact that so many people just outwardly showing so much emotion about it helped me, I guess, just deal with a little bit.* MP_SP_SG3

This emotional support was reflected in the management and eventual disposal of these tributes.

> *You know, with Martin Place, there was so much effort put into that, into the respectful management of the flowers and then the ultimate removal of the flowers was done in a – you know, like we had to use special trucks, not garbage trucks. All the flowers were packed neatly into boxes and all the other tributes were similarly and respectfully stored and removed from site and the flowers were all composted on site and stored because no one was really sure what the outcome of all of that was going to be, so we had to sort of cater for the eventuality.* MP_SP_SG1

5.3.4. Martin Place Service Provider Summary

The lack of clear communication between emergency service providers and non-emergency service providers characterised participant experiences of the Martin Place siege. Participants highlighted a reliance on mainstream media for information and updates on the siege, with many reporting that media coverage formed the basis of large scale strategies relating, for example, to office evacuations. The emotional aspect of this event was emphasised, not only during the event but with some service providers relating long-term changes their comfort in and relationship to Martin Place.

5.4. Northern Beaches Service Providers

The focus group for the Northern Beaches east coast low was held in Collaroy and attended by emergency service workers as well as council staff involved in the emergency management and coordination of the response.

5.4.1. Impacts

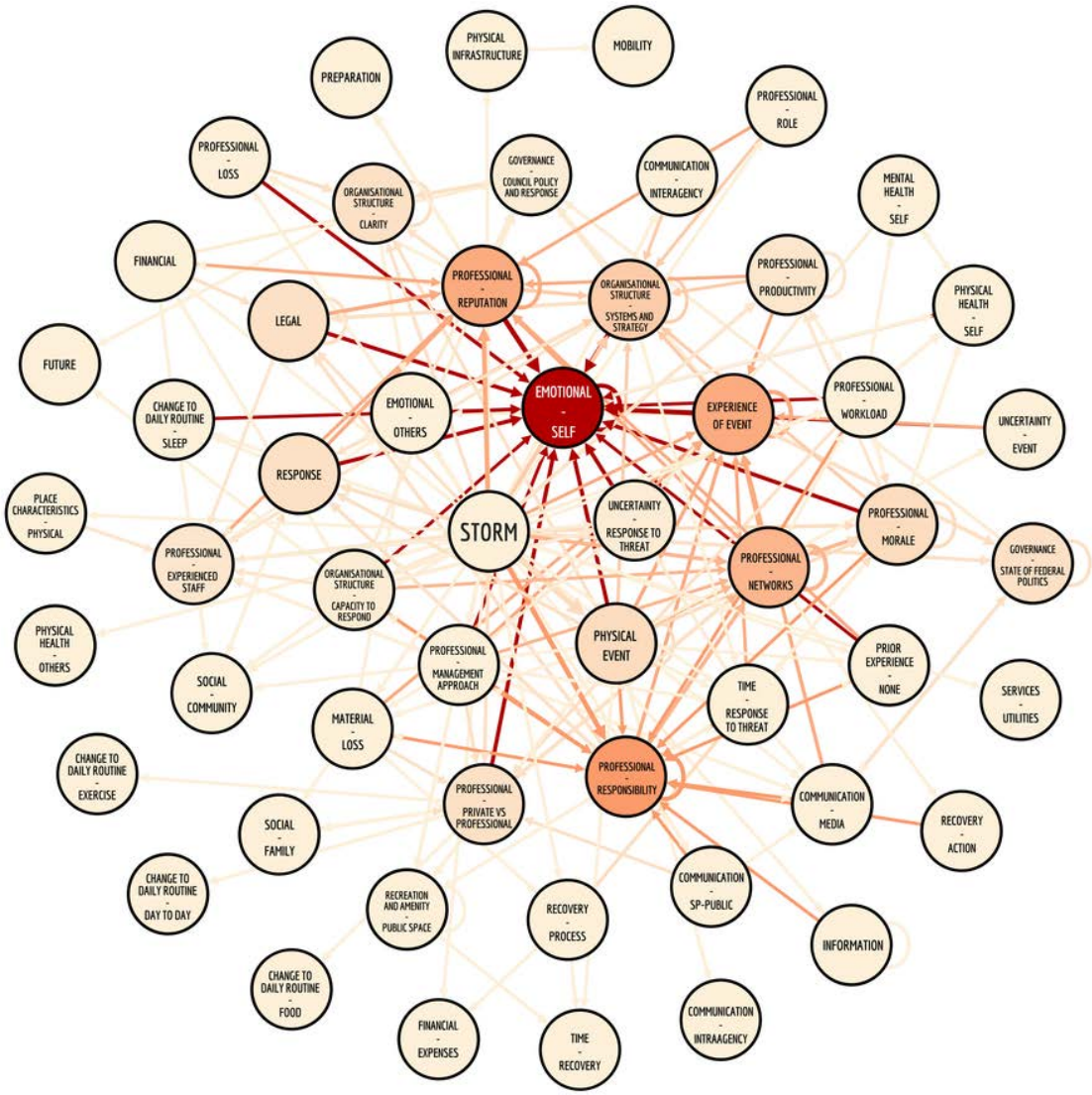


Figure19: Northern Beaches Service Provider Impact Map

Most Prominent Factors:

- Emotional – self: emotional exhaustion, stress; anxiety around professional performance; feelings of needing to impress colleagues and superiors; emotional effort required to deal with high volume of public concerns; sensitivity to criticism.

Positive emotional responses were also indicated as pride and relief in performance and enjoying the camaraderie between colleagues.

- Professional responsibility: feeling of being directly accountable for professional decisions, both politically and practically
- Professional reputation: high pressure environment due to the Northern Beaches council amalgamation, increased need to impress colleagues and superiors to keep or justify current role, high level of media and political scrutiny.

The impact maps of the Northern Beaches service providers were dominated by personal emotion. Individual impact maps consistently featured words such as stress, frustration, and anxiety. In small group discussions, different sources and manifestations of that emotion were highlighted. Participants related direct stress arising from the workload and nature of emergency response itself, the baseline emotional experience.

> …*people were getting exhausted and there was a lot of stress, you know*. N_SP_SG2

However, emotional factors beyond this baseline stress were evident. Participants reflected a wide range of emotions arising from and in response to a range of different factors, experienced together. Professional interactions, community feedback and organisational frustrations all fed into the expected stress of facilitating the emergency response.

> *In terms of what it did for the community and also the council and me personally, it was stressful, it was – it had all of that involved, long hours, backlog of work, but pulled teams together and I guess at the end, people were very happy and proud of what was achieved. But there was a huge amount of angst in the involvement and real hurt along the way from a community point of view. I guess there was a whole range of things for me around frustration, around policy on the run*. N_SP_SG2

The range of emotional terms evident in this excerpt demonstrate the complexity of the emotional experience of this participant. Another major source was the high level of scrutiny surrounding the emergency response.

> *I remember being hypersensitive to criticism. Like I remember that. So people coming along and saying, "This bit's not working" and it would be something so far down the*

> *beanpole in terms of the level of importance that it just would make your blood boil in an instant, which is then just another distraction and another layer on top.* N_SP_SG1

> *I think it's also a bit of bravery. You know, you've taken a punt that – you know, you've basically put your neck on the line to say, "That's the right thing to do."* N_SP_SG1

These excerpts demonstrate that the requirement for service providers to make decisions in uncertain conditions results in a personalisation of those decisions, and a feeling of being directly accountable for them, both politically and practically. A third source of emotional impact was the longer-term communications required with a variety of residents, where the necessity to represent a professional role and organisation caused an emotional strain.

> *And some had really significant problems. Some just had a crack in their fence. And everyone felt, you know, their issue was significant. And it gets hard emotionally over time to process that. And I guess we're still doing that, but yeah, in the week to three weeks following the storm, a lot of what you're doing is communicating.* N_SP_SG1

While the emotional dimension of the Northern Beaches emergency response to the East Coast Low event was not always explicitly referred, the following examples of the other primary service provider impacts around responsibility and reputation can also be seen to stem from these emotional impacts. Individual participant maps referenced feelings of responsibility for community and staff safety and managing the risks encountered by themselves and others in an emergency response timeframe.

> *For me, it was probably a huge amount of personal – I felt a huge amount of personal accountability for the entire thing. N_SP_SG1*

This is significant, as the management responsibilities of this event were compounded by the organisational context of recent Northern Beaches council amalgamations, which resulted in far higher scrutiny on the emergency response. Issues of personal and professional reputation were often present on individual maps and emerges as a major impact characterising this event.

> *In terms of impact, my main impacts that I was worrying about, I guess, was probably organisational reputation, you know, we're supposedly a big organisation. I don't know*

> *how, you know, any of the individual councils would have handled that okay, but because we were a new council, there was an expectation we'd do it as well as and probably better than.* N_SP_SG1

> *So that was sitting in the back of my mind going, "We can't put a single foot wrong here or we'll be criticised" because the amalgamations were fairly contentious. So that was bubbling around in the back of my head.* N_SP_SG1

These excerpts show the blurring of personal, professional and organisational reputation in the expectations around the event's outcome, and extended discussions on this revealed that these expectations were experienced as both opportunity and risk.

> *And so yeah, you're thinking, professionally this is like a make or break – so despite, I suppose, me going on holiday on the Saturday, I desperately wanted to be involved because it's something where you're standing up and being counted and showing that you can take on that level of responsibility.* N_SP_SG1

> *…and even down at the officer level, even though we don't have to go for our jobs, it was about standing up and being counted, I think.* N_SP_SG1

> *And everybody was watching, from the media right the way down. This is the most studied patch of coastline, so again focusing on Collaroy and Narrabeen, but the rest of it, it's the most studied patch of coastline in Australia. Every coastal expert, every lawyer, every insurance company – everybody's watching what was going on here. So whatever steps we were making… if we made wrong steps, professional criticism for the rest of your career. What a big bunch of idiots, what did you do down on that beach?* N_SP_SG1

5.4.2. Barriers

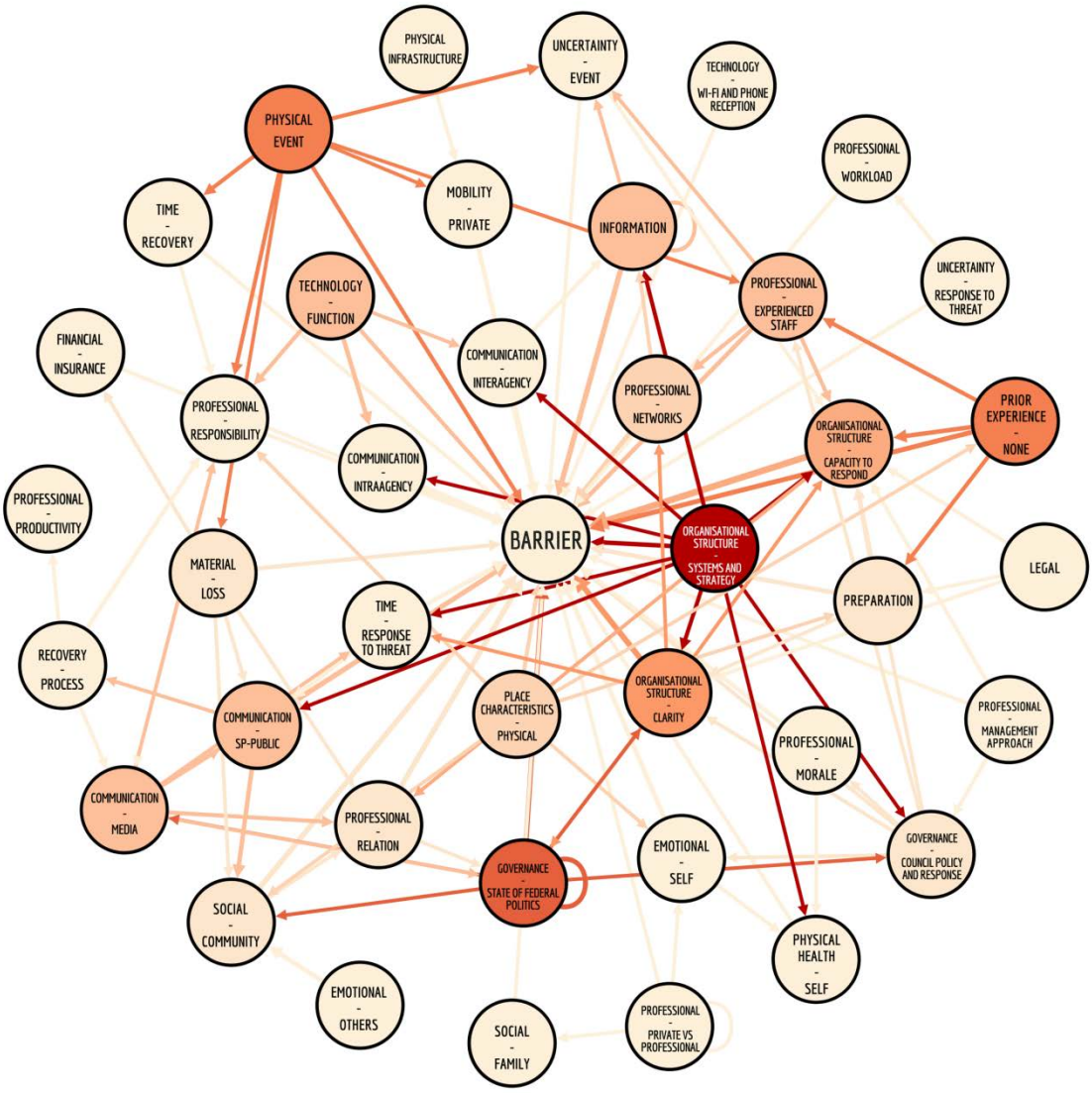


Figure 20: Northern Beaches Service Provider Barrier Map

Most Prominent Factors:

The barriers experienced by Northern Beaches service providers can all be seen to stem from the organisational context of the Northern beaches council amalgamations.

- Organisational capacity to respond: new working relationships and systems resulting from council amalgamations meant that relationships had to be established during response; loss of experienced colleagues
- State/ Federal politics: location of the incident in the electorate of the premier, amalgamations of several local councils into one contributing not only to decreased organisational networks and clarity, but to media scrutiny of the event management and heightened concern around council reputation.

- Organisational clarity: unclear professional hierarchies; management redundancies; lack of clarity around colleague competencies and knowledge

The barriers experienced by Northern Beaches service providers can all be seen to stem from the organisational context of the Northern beaches council amalgamations. Individual maps conveyed a decreased organisational capacity to respond to the event due to unfamiliar and new management structures, unknown colleagues and network skillsets, and lost local knowledge as a result of staff redundancies. In small groups, participants related their experiences of, in some cases, meeting their new management teams as the storm was beginning to impact the area.

> *And it's a familiarity thing. And putting ourselves in their shoes, they've just taken on brand new jobs for very big things as well and gone, "Holy shit. This is not what I wanted on Day 1."* N_SP_SG1

> *In 12 months, we would have lost a thousand years of experience out of the organisation. It's ridiculous.* N_SP_SG2

> *One of the biggest things was the unknowns of being a brand-new council …who our new colleagues were, what their levels of capacity, willingness, ability to work together.* NB_SP_SG1

The stress of not only the scrutiny of the event but the organisational context in which it happened heightened the emotional experience for service providers, particularly as many responders were anticipating the need to reapply for their positions in the new council.

> *…for me, I guess, similarly – …I don't have to go for my job again, there's still massive uncertainty around not only the event, but also the amalgamations, you know...* N_SP_SG2

The influence of high level political scrutiny, involvement and decision-making was another significant impact experienced by service providers, and it can be seen to influence and be influenced by the organisational context of the council's amalgamation.

> *The premier comes down at 9.15 on Monday morning and says the state's got money to help protect these people* [but] there's *not actually a framework for that money to be handed out to residents and we have to work through that.* N_SP_SG3

The third major barrier on participant maps was organisational clarity, and is directly related to both the council's capacity to respond with newly amalgamated staffing and the interruption of localised decision-making by higher level state and federal political actors. On individual maps, participants related that issues stemming from unclear professional hierarchies made the experience more difficult, as did not knowing the capabilities of new staff or the boundaries of their own and new staff member roles.

> P1: *He was the CEO of one, but even just the other levels below that, there was…*
> P2: *You still had 10 executives.*
> P1: *At that point, we still had three general managers from the three former councils, we had a whole stack of ex-directors or whatever they were called, you know. Plus there was a whole range of managers. None of us had been confirmed into new roles at that point…* N_SP_SG2

> *I'd lost my direct report and so the two levels of management that I'd been working with for the past 10 years both left in the week or so prior to the event.* N_SP_SG2

5.4.3. Enablers

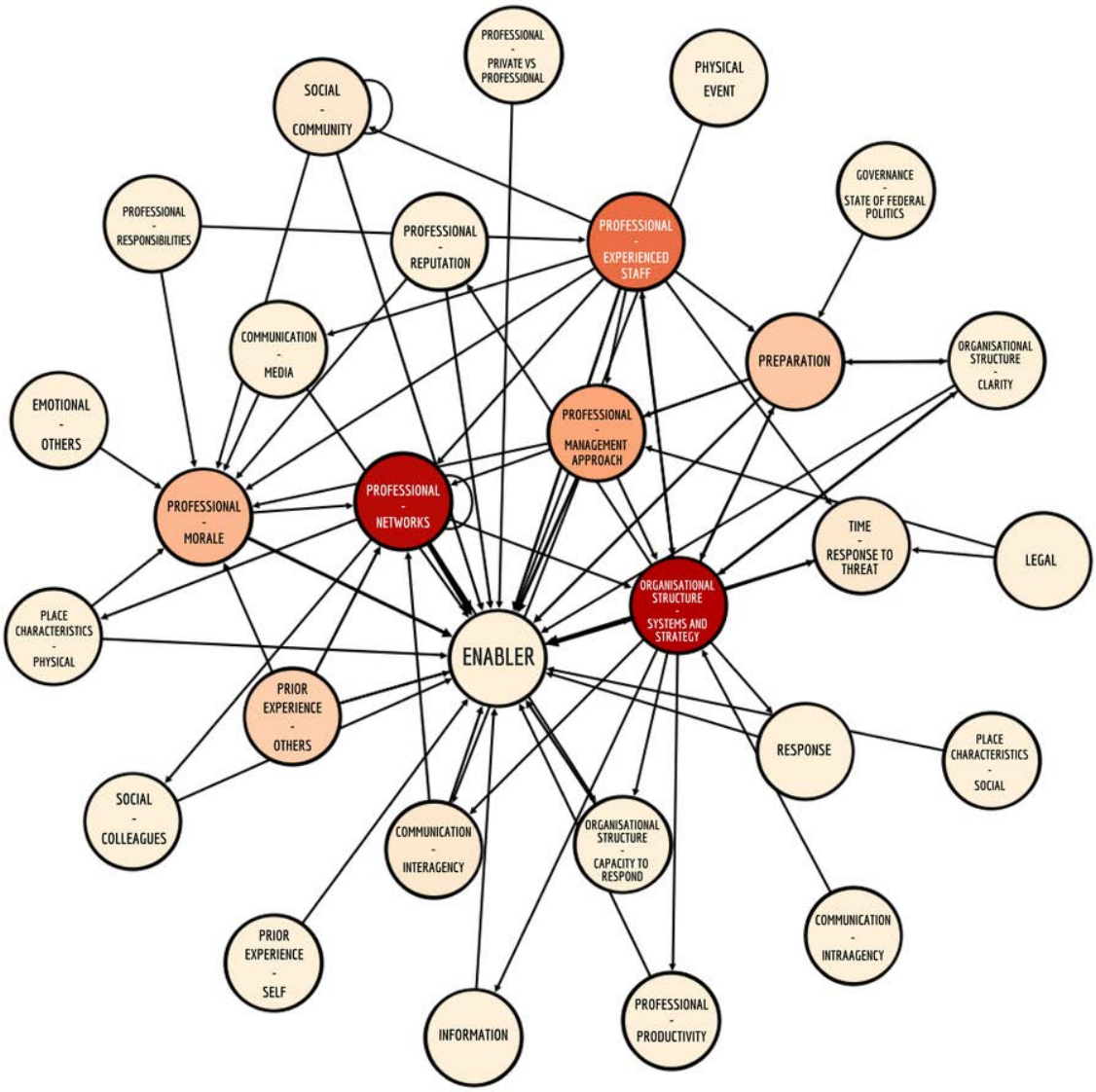


Figure 21: Northern Beaches Service Provider Enabler Map

Most Prominent Factors:

- Systems and strategy: clear boundaries and responsibilities established through Australasian Inter-Service Incident Management System (AIIMS) framework; use of common system eased transition between new colleagues;
- Professional networks: pre-existing relationships between and within local emergency response organisations
- Experienced staff: professional approach to response; high level of intragency support, reliability and cohesion despite brief time to develop working relationships

The most commonly cited factor in participant enabler maps was clear organisational systems and strategies around emergency response. The majority of individual maps credited the pre-existing organisational use of the Australasian Inter-Service Incident Management System (AIIMS) framework as the factor that made the event easier to manage.

> *We had our AIIMS in place, we had structures, we had roles, we had responsibilities and it was all set up. So I thought we handled it as best as we could...* N_SP_SG2

> *…we had a lot of people already trained in that AIIMS system, from ex-Warringah and that was the largest council and that's where a lot of the impacts happened, that we just sort of rolled straight into – not business as usual, you might say, but into something that we had practised and we had sort of thought about east coast lows a fair bit and that sort of thing.* N_SP_SG2

> *One of the good things that nobody had really done on here is having the AIIMS framework, which is the scalability side of things, which worked really, really well as far as being able to call on the other support agencies – combat agencies.* N_SP_SG2

A benefit of this system was seen to be preparation and training for different events, as well as a clear delineation of roles and responsibilities during emergency events. Participants stated that the formal lines of communication and interagency networks created in advance were essential in their response.

> P1: *Yeah, so we took the decision to also train our people in that so that when we do have to work inter-operatively, we all understand where they're coming from and where we need to go together sort of thing.*
> P2: *That really made the difference, didn't it? If we didn't have that, you wouldn't have been able to cope with some things.*
> P1: *Massive help.*
> P2: *It helped us integrate into what the police and the fire brigade and ambulance and all of those groups did.* N_SP_SG2

> *…in events, people want to do everything and so it's very clear responsibilities and the intelligence people and planning people, they can concentrate on that...* N_SP_SG2

> *And the AIIMS framework allows that [clear roles] really well. You've got someone doing planning, someone doing comms – a whole range of areas. It means that you can focus and from my perspective in dealing with residents before and after, it makes it so easy that you know things are being looked after. I don't need to worry about emergency response, I don't need to know the detail because I know very capable people are communicating with council about that. I don't know how it works elsewhere. I've only ever experienced it at Northern Beaches.* NB_SP_SG2

The clear boundaries and roles delineated in advance are here highlighted, as is guidance on managing a diverse range of tasks, skillsets and outcomes. Another focal enabler in both individual maps and in small group discussions was the existence of professional networks, and this corresponds to the AIIMS system in that officials from different agencies had pre-existing relationships and could respond quickly.

> *I think the Northern Beaches, there's probably a lot of areas like it, that were quite unique in the fact that the combat agencies – ambulance, RFS, SES, police, fire and rescue – we have a very close working relationship to the point where the senior management of each agency are all on a first-name basis. We all have each other's number in the phone. I ring* [Name] *and go, "*[Name]*, I need a hand." He does the same. Same with police.* NB_SP_SG3

> *But it's out of the fact that collectively, we recognise our own strengths and weaknesses and well, RFS can do this so we'll ring them or [name] can sort this out or* [Name] *rings both of us and goes, "I need 1000 people now to search for someone in the bush or to do a police operation" and we have that relationship and it's the same with the senior management of council as well. So that really comes to the forefront when something like this unfolds because there's already a network and we have trust and we know each other's capabilities.* NB_SP_SG3

The effectiveness of pre-existing networks and a strong response framework were especially important, as one participant notes, in accessing resources and information in the newly amalgamated council.

> *I think it was a very good response from a brand-new council. We were literally weeks old at that time, but there was heaps of good will from across all the people in council. It*

> *was great resource sharing. We had a lot of consultants already on panels. We had a lot of contractors on panels. We had great access to materials and really good systems, good mapping and good modelling systems in house.* N_SP_SG2

The event also served to develop the professional networks of individuals working together for the first time, enabled by co-operative relationships that helped to create cohesion and positive morale.

> *I had camaraderie, like just it's a funny sort of thing. Everybody who was involved, it didn't matter where they came from or what they were doing, when they turned up, they were there to help and they were there to do whatever they needed to do regardless of where they came from, where they sat in hierarchy. It was just absolute dedication.* N_SP_SG1

> *The internal support was massive and there's nothing like a crisis to bring a family together and it really was. It was so many relationships made during this period.* N_SP_SG1

> *P1: I had mateship on mine and sort of dedication was more for people that I didn't know, but I relied very heavily on people that – like I called in favours from people, saying, "I need you." At 4 o'clock in the morning, I'll be calling.*
> *P2: And that was because you knew that you could rely on them.* N_SP_SG1

Individual enabler maps reveal that the Northern Beaches response relied to a high degree on technical knowledge provided by new and pre-existing contractors, as well as the experience of council staff. The presence of experienced senior staff specialising in large storm events, and the morale and emotional factors of staff played a role in positively influencing the experiences of service providers.

> *…we have staff who want to work with those issues and people who love what they do, I think, and love the area, so it's that sort of value proposition of the organisation that people aren't kind of begrudgingly coming along. They're going, "Yeah, this is what I want to do. This is why I come to work every day."* N_SP_SG1

5.4.4. Northern Beaches Service Provider Summary

The Northern Beaches service provider focus group indicate that the experience of the 2014 East Coast Low was characterised by an organisational context that merged professional and personal response. At an individual level we see not only an underlying awareness of the political and organisational significance of the council response, but also the implications of performance on personal job security, professional reputation and career advancement. Formal strategies of response and long-term professional networks are central to accounts of the experience, with reference not only the quality of interagency relationships but the clarity of intragency roles and relationships as well.

6. Overall Findings

6.1. General

- It is clear that the emotional response to events has emerged as the central defining characteristic of both resident and service provider experiences of shock event impact. While the nature of the emotional impact varies with each event and group, stress, anxiety, fear, grief, and trauma more need to be more fully brought in to event planning and policy as these factors tend to underpin, interact with, and at times exacerbate, a range of other shock impacts.
- Social support networks were consistently cited in both resident and service provider groups as the central enabling factor.

6.2. Residents

- There is a temporal dimension to impacts on residents, evident in the relatively short-term impacts of the Penrith heatwave in comparison to the medium- and long-term impacts of house rebuilding in the Blue Mountains and the continuing day to day social impact of the Martin Place event. Characterising shock event impacts within a single general timescale is problematic because impacts, barriers and enablers exist at a range of timescales for all of the events. However, clustering or generalising trends within our results with respect the temporal dimension of their impacts enables us to compare the scope of the impact and assess the appropriateness and efficacy of intervention strategies.
- Resident group experiences feature different combinations of social responses to shock events they experienced. At both the individual and community level we see social cohesion arising as a result of a physical impact in the Blue Mountains, social withdrawal arising as a result of a physical impact in Penrith, and social withdrawal arising as a result of a social impact in Martin Place.

Penrith Residents

The resident experience of heat in Penrith was also complex and multifaceted, relayed as anxiety over the duration of the heatwave and spending time in hot environments (e.g. at home), anger and frustration arising from landlord/tenant interactions over property maintenance, financial stress arising from higher cooling bills, concern for youthful or elderly

relatives and those reliant on electrical healthcare machines, and general irritability arising from discomfort, fatigue and disrupted sleep cycles.

Changes in day to day routines impacted resident experiences, ranging from decreased energy for housework and cooking, to making decisions around when to travel to and from work. Such changes were most significant for participants with caring responsibilities, as fear of excessive heat or blackout often meant missing work to care at home or making arrangements to ensure the wellbeing of heat-sensitive patients. In addition, many reported physical effects ranging from discomfort (sweating, fatigue) to illness (inflammation, nausea). Many people noted bodily fatigue, lethargy, and exhaustion in their individual maps.

There was a high rate of interrelated barriers to coping in Penrith, including expenses related to higher bills, having to stay in motel, and replacing food gone bad during a blackout, and building controls, strata policy, and public housing regulations that impeded tenant heat preparations, for example the installation of air-conditioners, shade trees, and or shade awning structures.

Prominent coping factors included the use of personal fans, wet towels, and spray bottles, receiving assistance from family in the form of social support and/or temporary accommodation, spending time at the local shopping centre or clubs as a strategy to access free air-conditioning.

Blue Mountains Residents

The highest range of emotional impacts was found in the Blue Mountain resident groups, including anxiety about the safety of family and friends, fear for personal safety and safety of home, guilt and grief associated with pet loss, as well as stress and sadness arising from reviewing losses post-event. Positive emotions were also conveyed, focusing on feelings of community strength and closeness, and gratitude for assistance from emergency services, community services, and neighbours.

A combination of factors characterised this experience for residents, including the speed and intensity of this fire impeding preparation and evacuation, loss of water and therefore lost agency to defend homes, loss of electricity and telecommunications, and the slow response of fire units due to multiple fire fronts. Some participants relayed frustration over feelings of personal incapability to fight the fire due to the lack of functioning utilities and fire unit support, and damage to property as a result of the fire.

We see a strong theme throughout this resident group for community level coping mechanisms, through existing networks at the neighbourhood and township level which provided practical advice and assistance as well as a sense of shared experience. While this

social cohesion at the household, neighbourhood and community scale was generally positive, we can also see that interpersonal relationships are also experienced in complex ways and can themselves be a stress.

A good example of the multiple and cumulative sources of emotion can be seen in the experience of one participant, who identified sources of stress and anxiety starting on the day of the fires and continuing to the present day following the loss of their uninsured parental home in the fire. Stress came from a range of causes, including three extended family members moving, the long-term personal financial strain of supporting the household, the additional stress of living with extra people whilst rebuilding the parental home, and managing an ongoing fire-related PTSD diagnosis for their child.

Martin Place Residents

The Martin Place resident group had the most consistent emotional experiences, conveying personal fear for their own safety and that of Muslim family and friends' due to verbal and physical abuse from members of the general public following the Martin Place siege, particularly on public transport and in public spaces. Participants communicated anxiety and fear leaving their homes as a continuing impact of this event, resulting in social isolation not only from the wider community but also from public and particularly outdoor family gatherings. The fear of community backlash significantly impacted the public movement of participants, and this event can be seen to characterise their current day-to-day experiences.

An important barrier in the capacity of participants to cope in the wake of the Martin Place Siege was their fear around the wellbeing of their family. This manifested as emotions of fear and anxiety during family gatherings in public spaces and managing their own feelings of vulnerability regarding potentially negative interactions with the wider community by avoiding public outings altogether. This personal isolation was related to inter-generational divide and frustration, with family members unable to understand the reasoning behind this reduced social engagement and presence at public gatherings.

Another significant barrier is change to daily routine, and here we see the emotional impact of fear for personal safety arising from visual cues of Muslim identity. Participants shared concerns for their own safety and the ways in which this has impacted their day to day life, most notably through changes in clothing style; particularly in relation to the appearance of headscarves; publicly identifying as Muslim; and avoiding spending time alone in public places.

Support and solidarity within the local, city and wider Muslim community as well as messages of support and friendship from individuals in the non-Muslim community was

identified as a positive outcome of the Martin Place Siege. Participants also reported reducing or altering their media consumption to avoid mainstream and social media platforms, particularly with respect to Muslim-related content, in order to avoid the stress and anxiety associated with negative representations of the wider Muslim community.

6.3. Service Providers

- Service provider experiences are strongly characterised by the nature of their organisational culture. In the Northern Beaches, participant experiences feature frequent reference to formal structures, and high-level resources. Blue Mountain service provider experiences are characterised by personal structures, communal structures, and grassroots resource coordination. Martin Place service providers related a fragmented and somewhat individualist organisational response, reflecting the absence of formal emergency response training and inclusion in this group.
- Within the service provider experiences, we see that managing personal and professional aspects of the shock event at an individual scale can cause internal discord and add to emotional stress.

Blue Mountains Service Providers

The emotional impact on Blue Mountains service providers primarily focused on work related stress around workload and the performance and balancing their professional role with their personal life. Participants also identified being away from their homes and families during a fire, feelings of personal responsibility for managing the impacts of the fire, and the privacy challenges arising from living and working publicly in the same area as a source of anxiety.

Challenges included a lack of professional networks at the time of the fire, with low levels of interagency communication and knowledge leading to providers feeling isolated, as well as wasted time and resources through, for example, duplicated initiatives or competition for same funding. Another challenge was the extreme workload associated before, during, and after the event, often with little organisational support and financial constraints. Providers also related a personal difficulty in balancing the community role as both professional and resident, with impacts on both time and privacy from being the 'public face' of organisation in community. Separating professional and private responsibilities was highlighted as problematic as a parent/spouse/child in public, and the overall impact of playing a high-profile community role on family time in public.

Service providers in the Blue Mountains related an increased recognition in the value of self-care as helping to coping capacity, as well as positive feedback from the community reinforcing feelings of self-confidence and capability. Neighbours were identified as providing practical support through childcare, care for pets, and emergency response during and after the fire.

Northern Beaches Service Providers

The emotional impacts of Northern Beaches service providers varied from straightforward anxiety and stress related to managing extra workload and pressure, to personal frustration at being unable to help in some cases, fear of professional embarrassment, to pride, enjoyment and relief at delivery. The experiences of this group were highly influenced by the political context of the Northern Beaches Council amalgamation, in which several local councils had merged into one in the weeks preceding the storm. In some cases, participants were meeting their managers and colleagues for the first time when responding to the storm threat and managing professional job security at a time of widespread redundancies was of prime concern to some at that time.

In this context, we can see the impact of issues around professional responsibility, particularly in feeling directly accountable for politically and practically significant decisions, as well as issues around professional reputation, particularly the increased need to impress colleagues and superiors to keep or justify current role, in combination with a high level of media and wider political scrutiny.

Significant barriers identified by participants were reduced organisational capacity to respond resulting from the new working relationships and systems, as well as the loss of experienced colleagues. Another barrier related to the heightened political significance of the event due to the location of the incident in the electorate of the premier leading to extensive political and media scrutiny of response, and to heightened concerns around council reputation.

Factors that enabled coping were the clear boundaries and responsibilities established through AIIMS framework and the use of this common system eased transition between new colleagues. This system also encourages pre-existing relationships between and within local emergency response organisations, which was also seen to contribute to the coping capacity of participants, along with the professional approach to response among colleagues and the high level of intragency support, reliability and cohesion despite brief time to develop working relationships.

Penrith Service Providers

The data presented in the above report on Penrith service providers was our second attempt at collecting information from that stakeholder group. We conducted an initial workshop with a range of service providers involved in an interagency committee in Western Sydney which ultimately failed due to the members of that group refusing to participate in the System Effects participatory mapping process and discussion. During that workshop numerous attempts were made by the project team and workshop facilitate to reengage the group in the process, but each of those attempts were ultimately futile. Our reflection on this experience is twofold. First, it is clear that members of the failed service provider workshop were largely unwilling or unable to engage with heat as a disaster event worthy of their attention. Second, there exists a significant gap between the community experience of heat - and the resilience that community members demonstrate in responding to it - and how the failed group viewed the community's level of resilience. This failed group is a particularly stark example of the gap in experience that often exists between service providers and community members, and of the value of conducting research that engages *directly* with members of impacted communities.

The second group of service provider participants related stress arising from higher workloads during heatwaves as a major impact. This workload increase corresponds to increased heat related client issues, for example managing the health and wellbeing of aged homecare clients, particularly during power outages. Concern for client wellbeing in the aged care, and increased rate of conflict between tenants and landlords around building conditions and maintenance of air-conditioning were cited as the two main sources of professional stress.

Utilising professional networks were identified as an important coping strategy, particularly regarding the sharing of resources and information between agencies, increasing the efficiency of interagency co-operation, minimising workload and increasing the effectiveness of time. On a personal level, feelings of support and solidarity between colleagues was seen as an important part of service provider coping mechanisms.

Martin Place Service Providers

Martin Place Siege service provider participants played a supporting role for emergency response staff and organisations and acted as a link (both for information and directing actions) between the public and the emergency response organisations

during the event. They identified the highest range of emotional impacts, ranging from concern and fear around personal safety, personal sadness and grief over the event, stress arising from the stakes of their professional performance, anger around the media hype, ongoing sadness and negative associations with Martin Place, and feelings of unity and community associated with the floral tributes that were placed in the area following the event.

Participants also stated that lack of information provided to supporting service providers on emergency state and processes added to stress and anxiety over decision-making. In some cases, participants were alerted to the event by media sources rather than through official channels, and the coverage of the event by mainstream news outlets was a major point of discussion in small groups. For many, the aforementioned difficulty in accessing information via official channels meant that the media was significant in their professional decision-making. This highlights a lack of pre-existing or identified networks between supporting service providers and Emergency Management Services and is particularly significant considering that many participants involved in advising direct responses were not primary emergency response and were placed in that role for the first time.

Significant coping factors related to the presence of social networks, including the benefit of pre-existing professional relationships between non-emergency service providers in managing the emergency response, in informal networks enabling access to information, and in the emotional and practical support from colleagues.

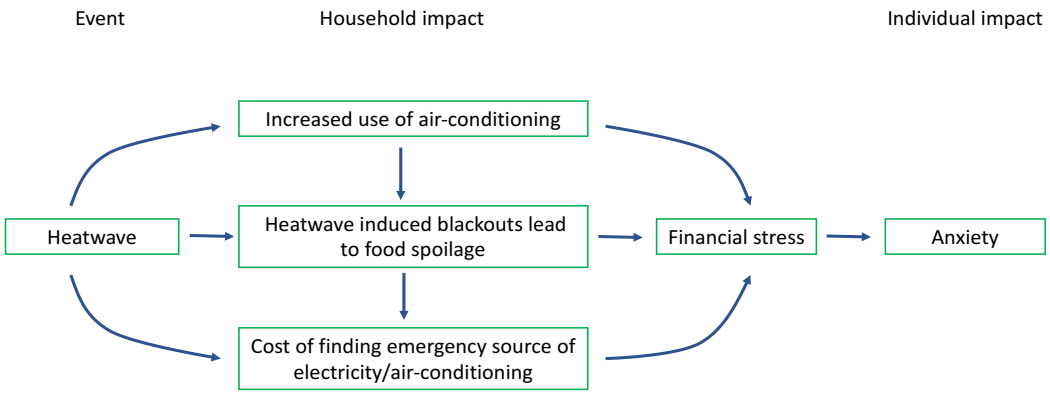
7. Complex Pathways

The findings of this research highlight the complexity of the lived experience of shock events, demonstrated through participant maps and throughout focus group discussions in the inter-related nature of mechanisms of both coping and burden.

Below is an example of a complex pathway between pre-existing financial vulnerabilities and cumulative impacts of heat. The experiences of the Penrith resident group demonstrate the interrelated nature of shock event impacts, as well as the importance of pre-existing place-dependent contexts in understanding how communities will respond.

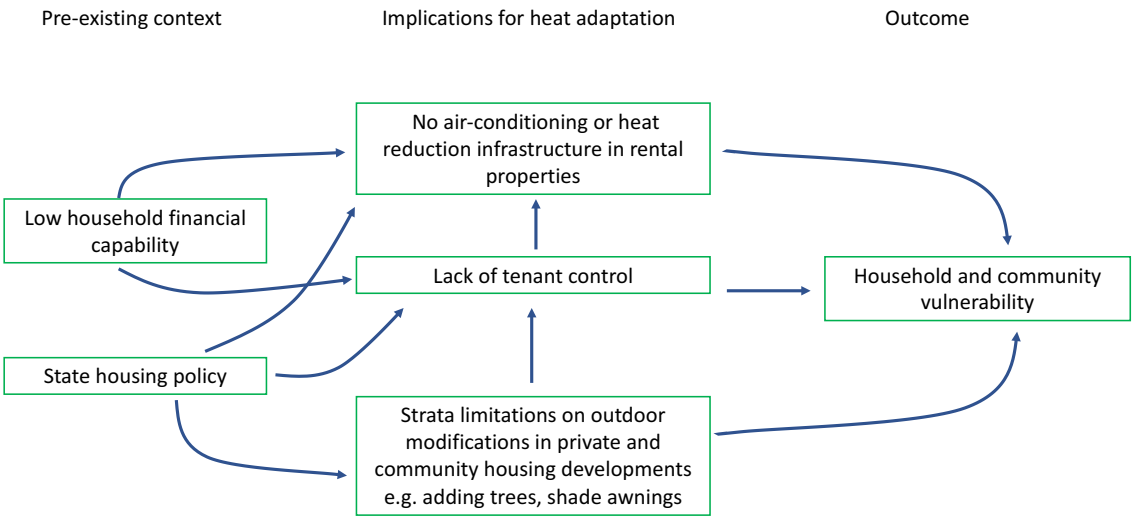
By exploring the relationship between pre-existing vulnerabilities and financial stress, we see in these examples a double barrier – not only financial pressure, but also pre-existing vulnerabilities that make that financial pressure both more likely and harder to accommodate for particular residents.

In Penrith, we see stress and anxiety relating to financial outlays related to the heatwave. These not only included the direct financial costs associated with higher air-conditioning electricity bills, but also indirect costs, such as those associated with periodic blackouts, including replacing a fridge and freezer full of spoiled food, or an emergency hotel stay to access air-conditioning for health reasons.

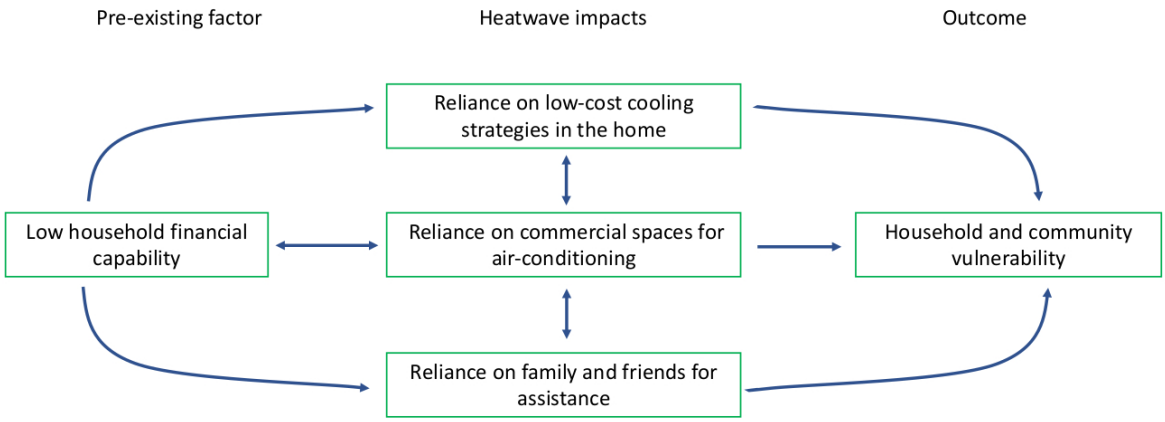


We also see the importance of pre-existing household financial capacity. A high proportion of participants relied exclusively on public transport and walking for transport due to their income levels, and we see that the pre-existing inability to own a private car interacted with physical vulnerabilities. For example, travel time in crowded, hot busses and trains was found to be especially difficult for those with pre-existing health conditions and those with children.

We see housing policy at the state and private development level act as a barrier to coping for tenants renting homes, as opposed to homeowners. For participants in public housing, it was not only the lack of air-conditioning units that inhibited their coping capacity, but also their inability independently to install them that limited their coping capacity for heat. Similarly, participants identified building controls and strata policy forbidding planting trees and inserting shade awnings in private housing developments as a limitation to their ability to take action to minimise the impact of heat. We see that individuals in community housing, as well as those in the private rental market, are more vulnerable to heat as a result of their lack of financial agency to own their own home and thus be able to take these household prevention measures.



Financial cost can be seen to inform the coping strategies of Penrith residents Low-cost alternatives to air-conditioning are highlighted, relying on household items such as personal fans, wet towels, and spray bottles. We also see that carers for people with special needs, particularly those recovering from illness, are reliant on assistance from family and friends to access temporary accommodation during heat related blackouts and during the height of the heat. A final major coping strategy for dealing with heat involved spending extended time in commercial spaces, particularly the local shopping centre. This has implications on spending and raises a justice question of having commercial space answer social needs.



The above examples highlight the complex and interacting pathways through which participants experience financial stress. We see that direct and indirect factors of impact interact with pre-existing financial capacity such that the heatwave was experienced as a problematic financial burden. This is only one pathway of many experienced at the household, neighbourhood and community level, and it demonstrates that addressing financial vulnerability to heat requires wide engagement with pre-existing factors of vulnerability. It also demonstrates the utility of this method in identifying the role of indirect impacts as well as direct impacts on issues of, for example, financial capacity.

Recommendations

8. Recommendations

Our results reflect the experience of specific shock events, for both residents and service personnel. However, by taking a broad view of impact and response patterns across and between event and respondent types, we are able to identify trends and patterns. Overall, we found that the experience of the examined shock events for both residents and service providers was characterised by broadly ranging personal emotional impacts, highly varied and event-specific barriers, and enablers that are primarily collective and social in nature. These impacts have implications for a range of personal and community wellbeing, including personal financial, professional and social outcomes, some of which are profound and long-lasting.

We have developed distinct recommendations as a result of our findings, presented below, which range in scope from those that address overarching thematic findings, to those aimed at a particular shock event type, and finally to those that are aimed a specific group type. Many recommendations are made with reference to the NSW State Emergency Management Plan (EMPLAN) and the supporting NSW Recovery Plan, as well as sub-plans relating directly to the shock types examined in this study, specifically the NSW Heatwave Plan, NSW Storm Plan, NSW Counter Terrorism Plan, NSW Sydney Evacuation Plan, and the NSW Bushfire Plan.

These plans, and the emergency response agencies they direct, represent areas of responsibility and control held by the state, and tend to be material, organisational, and systematic. The NSW Recovery Plan is distinct in both its language and approach, reflecting an awareness that recovery, unlike emergency response, is a spontaneous and community-led aspect of disaster. The Recovery Plan highlights an approach that prioritises supporting existing community activities, as opposed to directing specific plans of recovery. This distinction between the emergency response and recovery approaches is relevant to positioning resilience research within the existing policy context, as emergency management is one aspect of many affecting community resilience before, during, and after shock events. The complexity of community level resilience is exemplified through the prominence of social relationships in our findings, some form of which emerges as a major enabling factor across all groups and event types. Prominent social enablers such as family, friends, colleagues and neighbours are established and maintained through on-going interpersonal interactions, rather than specifically in response to emergencies.

Section 603 of the EMPLAN identifies 'building community resilience' as one of six key elements of disaster preparation, and the goal of this research was, in part, to identify what this looks like in Sydney communities. The answer is, unsurprisingly, complex, and reveals resilience to be a product of a range of personal, household, neighbourhood, and community factors. Social and emotional aspects of community resilience are more difficult to identify and improve than those of emergency response, in that the range of impacts on individuals over time may be distinct, complex, and more difficult to address through policy tools than impacts requiring a communal emergency response. In making the following recommendations, we do not necessarily suggest that expanding the existing EMPLAN or attendant sub-plans is required, although in some cases this may be appropriate. Rather, the message for planning bodies is that resilience cannot be reduced to, nor fully achieved, through information and processes as it is a product of complex interactions between the individual and their social environment at the local level across time. That can mean interactions between neighbours on a daily basis, Emergency Management Services personnel and residents on the day of an emergency response, or interactions between Emergency Management Services agencies, various levels of government and communities post-event.

8.1. Core Recommendations

Recommendation 1: Expand the focus on, and response to, the individual emotional and social well-being aspects of resilience in disaster policy, planning, support, and recovery.

Emotional and social well-being are central to resilience. This research suggests that the emotional impact of events plays a key role in the ways that residents and service providers experience and manage responses to those events. Personal emotional stress and anxiety were the most common reported impact across events and between group types, and while the range, types and degree of emotions differed across event and group types, some form of emotion tended to characterise (at least in part) the experience for every participant. Section 121 of the NSW EMPLAN states that "the nexus between community and government to achieve resilience will vary but should as much as possible be via the existing channels that work for each community." This central finding around emotional well-being draws out critical theoretical and practical considerations around community resilience, and specifically the capabilities and limits of the state in managing and encouraging improvements around personal experiences of characteristically stressful events. While we acknowledge that community resilience is a product of individual and social factors at the local scale that extend beyond the

remit of emergency management, we do identify a need to improve and expand the availability and type of support services for emotional stress for both residents and service providers in response to shock events. Section 902 of the EMPLAN state that recovery operations aim to "assist the affected community to manage its own recovery, while recognising that there may be a need for external technical, physical and financial assistance". The narrow perception of the state's role in community recovery here can be seen in these parameters. The NSW Recovery Plan has a more expansive recognition of both community needs and the responsibility of state recovery initiatives in supporting them, stating that "[e]ffective recovery can be achieved by supporting affected communities in the reconstruction of the physical infrastructure and *the restoration of emotional, social, economic and physical wellbeing*" (P.3, emphasis added). The inclusion of emotional wellbeing here is significant, as it is so clearly tied to other aspects of individual, financial, and social well-being as the result of a complex event; as such, its absence in planning around preparation, planning and response in the NSW EMPLAN and attendant sub-plans should be addressed.

The following recommendations identify the ways in which our findings resonate with the existing shock-specific plans in operation in NSW. These recommendations address overlooked aspects of the resident and service provider experience that can be improved by such "technical, physical or financial assistance" to improve the emotional dimension of resilience planning.

Recommendation 2: Provide a funding platform for both council and grassroots neighbourhood-level social initiatives in order to establish, maintain or improve community cohesion. Develop recovery plans for social cohesion.

Community Resilience (as opposed to disaster resilience) is defined in the EMPLAN and supporting sub-plans as "communities and Individuals harnessing local resources and expertise to help themselves in an emergency, in a way that compliments the response of the emergency services. Resilient communities are better able to withstand a crisis event and have an enhanced ability to recover from residual impacts.". Important here is that it identifies community resilience as reliant on local networks of material and social resources. Important to our findings is that the key to accessing such networks in the small timeframe afforded by disaster events such as bushfires is that neighbours are essential in shaping and allowing access to materials and knowledge. In all instances, support from family and friends was the dominant enabling factor.

Our results identify social cohesion and strong household, neighbourhood and community level networks as critical to building urban resilience and demonstrate that initiatives that support pre-existing networks or develop new ones have the potential to significantly reduce the disruption caused by shock events. The link between community cohesion, localised social networks, and resilience to a wide range of shock events is well established in the academic literature (see Pelling, 2003; Adger, 2005; Townsend et al., 2014). The positioning of social cohesion as a public policy issue is well established, and can be seen, for example, in the Australian Housing and Urban Research Institute's 2006 report Housing, Housing Assistance and Social Cohesion. There are several examples of policy initiatives from states and local governments that directly target community cohesion through hyper-local funding platforms. Micro-grants are one example, and are characterised as small, one-time-only, cash awards given to community groups for short-term community projects. According to the Community Tool Box developed by the Centre for Community Health and Development at the University of Kansas, micro-grants are uniquely effective in enhancing community-level cohesion for the following reasons:

- Micro-grants can engage "hard to reach" or "yet to be reached" community members because they tend to be awarded to hyper-local 'grassroots' groups, such as parent teacher associations and neighbourhood associations, that have a close understanding of vulnerable groups and individuals in the community.
- Micro-grants can be awarded to groups not eligible for traditional grant funding, due to legal or financial status requirements.
- Micro-grants tend to be awarded within the range of $400-$2000 per grant. This scale tends to discourage larger agencies from applying while encouraging smaller initiatives who may not otherwise apply, thus encouraging more equitable and targeted community-level funding opportunities.

The Community Micro Grants Program established by the City of Townsville is one example of micro-funding being enacted at the local government level. This program provides quick-response funding to not-for-profit community applicants in order to encourage community services and development, with a focus on community participation, cohesion and capacity building. At the state level, the Community Harmony Program is a targeted funding initiative by the Victorian Multicultural Commission and the Victorian State Government to identify and respond to local

challenges to social cohesion and community harmony. While restricted to infrastructure funding, the NSW Community Building Partnership is another initiative while promoting community participation, inclusion and cohesion.

In New South Wales, positive relationships between residents at the community, neighbourhood, and street scale are recognised in the Terrorism Sub-plan, which identifies pre-existing and managed community cohesion as a key component of community resilience to that particular threat. The NSW Recovery Plan also takes a broader view of community resilience by identifying that recovery requires the "restoration of emotional, social, economic and physical wellbeing." This focus on wellbeing is absent in the EMPLAN and sub-plans on heat, storm and bushfire. Indeed, Section 614 of the EMPLAN's approach to building community resilience states that "the community needs to be equally prepared as response agencies for the impacts of all hazards and in particular, the impacts of natural disasters", and goes on to outline community resilience from a hazard-focused perspective regarding communication and engagement. This overarching emergency planning perspective fails to recognise the holistic nature of community resilience, most notably that it is a product of local social networks and community cohesion in a broader sense, the outcome of which includes but is not limited to hazard preparation and shock resilience. The dominance of social coping mechanisms in our results reinforce the sociability of urban resilience at the hyper local scale - family, household, neighbourhood.

Our results demonstrate that factors of community are relied upon across all shock events, such that community cohesion and neighbourhood level initiatives that promote any form of social cohesion at the household, neighbourhood or community level should be approached as a measure of broader disaster and emergency management preparedness. As such, we recommend funding initiatives be developed in line with the examples outlined above that explicitly recognise the positive correlation between community cohesion and resilience to shock events of all types. The form of such initiatives must engage with the pre-existing issues and nature of both place and community, and as such we recommend encouraging a grassroots-style funding program that supports hyper local social initiatives in all urban communities. Comments from Blue Mountains residents demonstrate the importance of applied and practical engagement with shock event risk and management at the community and neighbourhood level; these can be seen in neighbourhood fire preparation units, as

well as in informal working-bees and fundraising events following the bushfire. Conversely, we can see that social withdrawal in response to both social (Martin Place Siege) and physical (Penrith heatwave) shock events negatively affect community resilience. Our suggestion here is to consider all community cohesion initiatives, whether in direct relation to emergency response or not, as vital to fostering urban and social resilience to both physical and social shock events. And after major events, we propose the specific development of recovery plans for social cohesion, to tackle and reduce ongoing community grief, safety, and social isolation as a result of shock events.

Recommendation 3: Utilise social network development and engagement strategies to improve the efficacy and quality of disaster preparation communication between the state and vulnerable populations.

The NSW Recovery Plan is informed by The National Principles for Disaster Recovery, in which state-supported but community-led approaches are identified as an important aspect of successful community recovery. It also highlights that such an approach can improve overall social cohesion, identified as "critical to sustainable recovery outcomes". While this understanding of the benefits of social cohesion addresses a more holistic understanding of community resilience than hazard-specific approaches, there is a significant opportunity to utilise the benefits of social network development in the preparation and response phases of emergency management, specifically to improve community services communication and support in advance.

Our results demonstrate a gap between existing emergency management communications and on-the-day resident experiences. Long- and short- term residents in the Blue Mountains related feeling confused and unsure about what to do on the day, and some actively disagreed with Emergency Management Services protocol (not wanting to evacuate their homes) in a way that impacted service provider-resident interactions on the day and in some cases bordered on conflict. Northern Beaches Service providers also related conflict arising from negative resident-Emergency Management Services interactions around flood evacuation. In both cases we can see that on-the-day Emergency Management Services processes could be made more effective if there was community level knowledge (and consensus) around Emergency Management Services protocol. In addition, trauma and stress could be better managed for both residents and service providers by minimising aspects of conflict on-the-day. The NSW Recovery Plan recognises the role of such social interaction in

managing shock events, specifically "that the processes used by government and other key recovery agencies to interact with communities are critical and can impact either positively or negatively on the capacity of individuals and groups to manage their own recovery process". There is an opportunity for the NSW EMPLAN to guide more effective interactions between state and council Emergency Management Services organisations and the resident populations they work within in the preparation and response contexts of emergency management.

Finally, our results identified a need to promote the resilience of vulnerable urban groups, particularly with respect to less visible shocks such as heat. Our recommendation is that attention needs to be paid to building and supporting relationships and connections in such vulnerable populations to support social and financial well-being. For example, many agencies or support services rely on online communication for information diffusion during shock events, but this form of communication does not actually connect people to each other. More on-the-ground information sharing would both increase the efficacy of the information and may also be used to develop and promote local social networks. One example of such community-based awareness is the federally endorsed Neighbour Day[5] initiative managed by Relationships Australia, who publish a social media guide to assist in fostering community engagement beyond formal websites and official forums.

Recommendation 4: Encourage more diverse service provider stakeholder engagement by government agencies to identify and educate on the impacts of shock events and ways of mitigating them.

The EMPLAN mentions the importance of managing threats to vulnerable people through preparation and community engagement, and NSW sub-plans identify specific vulnerable communities tied to their threat profile: schools, hospitals, aged care facilities for bushfires; those over 65 years of age, pregnant women, babies and young children, outdoor workers and those with a chronic illness for heat; and specific businesses for terror.

Our results in Penrith demonstrate that disaster response extends beyond the official capacity of local emergency service management and impacts the work of frontline workers in for example, aged care and community and housing services. Our results

[5] Annual event on last Sunday in March that encourages people to connect with those who live in their neighbourhood through street parties, barbeques and social events organised independently or sponsored by local councils.

suggest that non-emergency service workers from such services should be included in the development of management strategies for particular threats. This point is particularly important in light of the response from our first service provider group with representatives from an interagency committee in Penrith, the majority of whom felt that they could not productively contribute to our research process because in their professional experience heat was not considered a threat that significantly impacts the community. Similarly, our resident data highlights that for members of vulnerable groups, particularly those with chronic illnesses impacted by heat and importantly, those caring for them, are not finding support in the existing management systems. This suggests a recognition gap between resident experiences and the provision of services, which can be addressed by looking at the connections between, for example, community housing policy around air-conditioning modifications, the experiences of community tenancy services, and the experiences of those living in community housing. The findings from both resident groups and non-emergency service provider groups convey an entirely different experience of heat to that of emergency service providers, highlighting a significant perception gap that would have gone unacknowledged in traditional resilience feedback models. This finding reinforces the need highlighted by the literature gap identified in Section 2.1 for policy to engage directly with community members as well as service providers outside emergency response roles to gain a more holistic understanding of the experiences and impacts around disaster events. In addition to emergency response, we see that business representatives and both general and mental health providers should be included, as well as representatives that serve particularly vulnerable communities such as aged care services, community services and a wider range of government agencies. Creating more inclusive decision-making and information networks would result in more holistic community knowledge underpinning local policy making processes.

More diverse inclusion in preparation planning would also address the knowledge gaps of non-emergency service providers in emergency response roles. The Martin Place Service Provider results highlight the need for wider and more holistic inclusion in emergency preparation activities as a way to improve information provision networks between emergency and non-emergency responders. Implementing and/or improving strategies of information provision and coordination between emergency services and non-emergency responders is critical as a means of maximising primary points of contact for communicating with and managing the general public in an urban shock event. Focus groups with building managers demonstrate an existing reliance on

mainstream media coverage or informal networks as the basis of large scale emergency decision-making, particularly problematic given reflections on the often insubstantial and speculative nature of such media coverage. Our results suggest that establishing such networks in advance may improve the procedural efficiency of emergency response, as well as assist in managing and minimising experiences of stress, anxiety and trauma for emergency responders and non-emergency service providers in critical response environments.

Recommendation 5: Develop and mandate broad, experience-based post-event reflective mechanisms for service workers in emergency response strategies, recovery strategies, and in longitudinal recovery strategies.

Service provider feedback suggests a need for personal learning opportunities to reflect on what worked and what didn't at the organisational and regional level in the aftermath of an event. Such initiatives could not only improve organisational processes of response, but also address the more personal, emotional, and political challenges of such events at the individual level. This could take the form of individual, intra-agency and/or interagency debrief sessions that focus on encourage organisational feedback, including reflections on informal coping mechanisms. This acknowledges the relationship between procedural utility in maximising organisational efficiency and the therapeutic benefit of reflective processes for individuals. Feedback from service workers throughout this project suggests that opportunities to reflect on the experience, as opposed to the performance of organisational systems, are not incorporated into post-event systems. This misses the importance of acknowledging the personal impact of the experience on workers, beyond its implication for professional capacity. Such events allow Emergency Management Services workers to reflect not only as professionals but as people affected by stress, and discuss the choice between professional and personal responsibilities, and acknowledging and discussing strategies of dealing with such issues. The recommendation is for a holistic review of the emergency responder experience, not just a reflection on the efficacy of operational systems. Issues raised by service providers, including workloads, communications, interagency and intergovernmental conflicts, and reputational and career implications of performance in shock events have both professional and personal impacts. An experiential debrief process would allow workers and management to improve holistic management, as well as performance and experience in the future.

8.2. Specific Recommendations

Recommendation 6: Reduce the burden of cumulative financial vulnerability around utility cost assistance in heatwaves.

Providing residents with access to utility bill support during heatwaves would contribute to easing the physical impacts of heat as well as the emotional stress associated with additional financial burdens. However, the Penrith resident results highlight that there are a range of ways that the financial vulnerability associated with heat – through the increased use of air-conditioning as well as the absence of air-conditioning – in residential homes is currently exacerbated. These points have been translated into the strategies below:

- Reform tenancy building codes to encourage heat minimisation retrofitting, both in commercial developments and community housing. Specific actions to encourage include the planting of shade-providing vegetation on private property as a mechanism to reduce urban heat island effect as well as building; installation of external shade cloths and awnings; financial support for energy efficient, low cost air-conditioning units.
- Identify, provide and distribute information on low-cost cooling strategies to residents. Such information could be based on existing strategies in use by the community and gathering such information would form a good entry point for community engagement in heatwave awareness and management actions.

This is particularly important for vulnerable communities, noted in the findings as being community housing tenants, migrant communities, and carers, for whom the added financial burden of heat events is experienced as a major barrier, adding to service provider strain and over-reliance on commercial space.

Recommendation 7: Provide and advertise non-commercial public spaces during heatwaves.

The frequency of commercial space as a coping mechanism on individual maps and in group discussion suggests a problematic reliance on spaces that may exacerbate the financial and emotional burdens that are experienced as a result of heat. For example, the recommendation that families that in many instances cannot afford to install or run air conditioning spend extended periods of time in shopping centres to cool off is unrealistic and ignored by vulnerable families. The recommendation,

residents report, would mean exacerbating financial strain (unexpected purchases while there) or the emotional strain (struggling to keep children entertained without spending money and denying them purchases). Important here is the context in which heatwaves tend to occur - during the peak summer months that correspond to school holidays, making managing heat particularly problematic for households without access to home air-conditioning. While public libraries are a vital resource for local communities they also tend to be quiet spaces and may not always be appropriate spaces for families to utilise for long periods of time during a heatwave. We suggest that providing additional public alternatives for air-conditioned spaces, for example by funding, utilising and advertising community centre programmes and facilities to a greater degree, could be a useful way of opening up more public space for use during heatwaves without exacerbating the financial stress of residents or forcing them to see agency recommendations as contrary to their experience and need. Specific strategies to consider:

- Local councils to provide access to public air-conditioned spaces suitable for individuals and families over the school holidays as an alternative to commercial spaces that may exacerbate financial stress, such as shopping centres. Such spaces could also serve the function of an information distribution point, as well as a space for social engagement and support in times if extreme heat.

Recommendation 8: Distribute caregiver information on managing heatwaves in heat prone areas.

The NSW Heatwave sub-plan identifies individuals over 65 years of age, pregnant women, babies and young children, outdoor workers and those with a chronic illness as particularly vulnerable to the impacts of heat. They also identify electrical and public transport infrastructures as particularly vulnerable to heat. Our results found significant overlap in these vulnerable groups, for example one participant relied on public transport to get her son, who had a heat-sensitive congenital heart defect, to hospital during a heatwave. A significant portion of maps and small group discussions around heat suggest that carers of aged relatives or people with heat related conditions are highly impacted by heat and require targeted support and information in how to prepare. Our results suggest that cumulative vulnerabilities are produced when vulnerable groups are reliant on vulnerable infrastructures, for example elderly or ill residents reliant on electrical medical equipment. Beyond the physical health

implications, the emotional stress and anxiety of caregivers was evident in our results, with examples of relying on relatives or neighbours for alternative housing access in the event of a black out, or resorting to a hotel. Providing resources for such individuals that include information on heat, preparation strategies, and resource access would minimise strain on hospitals and emergency services, reduce the emotional stress and anxiety of resident caregivers and their wards, as well as minimise the financial and logistical burden of emergency accommodation.

Recommendation 9: Designate community hubs, or a central information collection and distribution point, for local communities prior to, during, and after of bushfires.

Section 157 of NSW Recovery Plan details the establishment of Recovery Centres in the wake of a disaster event as a place for residents to both access emergency and community services and to "[p]rovid[e] a safe place for those affected by the disaster to meet and discuss their experience". Blue Mountains Residents did communicate the benefit of the formal Recovery Centre established in the wake of the bushfires as a site for official communications. Our results also suggest that avenues of informal communication between community members may be necessary during electronic communication disruption. The establishment of a central message board or designated site for personal communications between residents, friends and family with regard to safety and wellbeing – of people, property, and animals – may be appropriate in order to streamline the function of the official Recovery Centre.

Recommendation 10: Develop specific industry guidance on crisis reporting around security events and engage the media industry in advance. Expand media training for both emergency service and community leaders.

Our results suggest that media coverage played a role in exacerbating the stress and isolation of both the local responders during, and the Muslim community after, the Martin Place Siege. For the emergency response community, including building managers and charities, clear lines of communication from federal, state, or local police and emergency responders is crucial for both their work and wellbeing. Without it, there was an over-reliance on the news media for operational information, which was of very limited use. For the Muslim community, especially after suspected 'terror' events, the emotional and social impacts of this distress on individuals are ongoing and significant, and our results suggest that these impacts were exacerbated significantly by the media coverage associating Islam and the wider Muslim community with the

siege. General Principle 10 of the Australian Press Council (APC) is to "avoid causing or contributing materially to substantial offence, distress or prejudice, or a substantial risk to health or safety, unless doing so is sufficiently in the public interest;" at the very least, emergency managers need to work more closely with the APC and the Australian Communications and Media Authority (MCMA) to increase awareness around the implications of crisis reporting to wider communities. We also recommend media preparedness training for both emergency responders and community leaders, to enable them to more effectively and productively engage with the media, establish lines of communication, and represent their various communities. Media training can help community leaders better respond to, and clearly articulate, community rights and realities in the face of vilification. A full emergency management response that includes recovery plans for social cohesion at its core must address a range of tactics aimed at both the community and the broader public.

9. Conclusions and Further Research

In identifying aspects of community resilience through the complex systems approach, the purpose of this research is to identify efficient, effective, and strategic interventions to minimise disruption and reduce shock event related trauma and suffering within communities. This is a significant contribution to traditional emergency management process and marks a reorientation in resilience thinking from a hazard-centric management approach to a community-centric and experiential model.

The results of this study correspond to and reinforce the gaps identified in the resilience literature in Section 2 of this report, particularly in recognising the importance of pre-existing contextual vulnerabilities in shaping the ability of households, neighbourhoods and communities to responds to shock events. and form an evidence base supporting this shift, in three distinct ways:

1. Resilience studies often fail to reflect the complex lived experience of shock events from multi-stakeholder community perspectives. We find that community experiences are not being reflected either in existing resilience methods or frameworks. The results reinforce the findings of Hendricks (2010) and Friend and Moench (2013) that assessing resilience perspectives at multiple scales - from the governance authority to the community, to the household, to the individual - is critical in uncovering hidden dimensions of vulnerability. Our findings highlight the gap between diverse community experiences, captured here through resident and service provider input, and existing policy approaches. This was particularly apparent around issues of heat in Penrith, and the contrasting perspectives of the Local Emergency Management Committee and other emergency service providers, versus the perspectives of Penrith residents and non-emergency service providers working in heat-impacted community services.

2. **Our research illustrates that resilient communities are socially cohesive communities.** The results emphasise the importance of **pre-existing** social cohesion and solidarity at the household, neighbourhood, and community level in supporting the coping capacity of residents before, during, and after shock events. Social cohesion and networks, and the lack thereof, are also highlighted in the coping capacities of service providers. Such networks are not limited to

disaster management contexts, but develop and exist organically as a result of human interactions over time. Recognising the role of social networks in community resilience levels, and supporting initiatives that develop and strengthen them represents a broader field of opportunity than is currently represented in hazard-focused community resilience initiatives.

3: Emotional impacts are under-represented in existing resilience approaches. In identifying the primary impacts of shock events as a complex range of emotional states, with recurring reference to stress, anxiety and fear across all events, we demonstrate a need to:

- incorporate more sophisticated emotional support systems into of shock event preparation, response and recovery strategies;

- prioritise initiatives that can reduce the trauma and suffering experienced at the household, neighbourhood and community scale in response to shock events; and

- embed emotional management awareness at the household, neighbour, and community level into resilience strategies.

Factors of emotion, including stress, anxiety and trauma may indeed represent what Carpenter et al (2009) identify as the 'noncomputable' elements of shock events, in that the complexity and individuality of emotion is as difficult to manage as other noncomputables (conflicting viewpoints, experiences and fragmentary knowledge). However, these results emphasise the significant short-, medium- and long-term emotional impacts of the events examined in this study as barriers and enablers of community level coping. The lack of recognition and accommodation of the emotional dimension of shock events in existing resilience planning documents is problematic in that it does not represent the lived experiences, challenges, and coping strategies of contemporary Sydney communities.

9.1. Understanding Community Resilience – Future Research

There remains significant scope to further use the methodology to understand the community impact of disaster events, and to support the work of Emergency NSW and Resilient Sydney more broadly. We see a number of particularly generative opportunities for future research:

1. **Tracking the impact of disasters over time:** the findings presented here capture the community perception of impact at one point in time. Future research could incorporate a longitudinal component, repeating a similar mapping exercise with community members at different points of the recovery process to see how impacts emerge and change over time.
2. **Assessing the 'systemic cost' of disaster events:** the orthodox approach to costing the impact of disaster events often focuses on a limited number of easily quantifiable factors e.g. infrastructure loss and damage, injury, productivity loss from days of work. The system maps generated through the System Effects process present opportunities to assess the broader 'systemic cost' of particular disasters and how they are experienced by community members. Future research is needed to integrate System Effects with different costing methodologies.
3. **Developing models to predict future impact:** future research should focus on how System Effects data can be used to develop predictive models to assist policymakers in the design and implementation of resilience interventions targeted to particular demographics. These models would aim to simulate the likely systemic impact of particular disaster events for particular demographics based on previous community member lived experience.
4. **Evaluating the impact of policies and programs aimed at promoting resilience:** policymakers often face challenges in assessing the full impact of resilience interventions, as they typically multifaceted, resulting in a range of social, cultural, and economic impacts. Future research should focus on how to use the System Effects approach to more effectively capture the impact of, and cost saving produced by, particular interventions across time.

References

Ackerman, J., Gottschalk Druschke, C., McGreavy, B., & Sprain, L. (2016). The Skunkwork of Ecological Engagement. *Reflections*, *16*: 75-95.

Adger, W. N., Hughes, T. P., Folke, C., Carpenter, S. R., & Rockström, J. (2005). Social-ecological resilience to coastal disasters. *Science*, *309*(5737), 1036-1039.

Adger, W. Neil. (2010) Social capital, collective action, and adaptation to climate change. In Voss, M. (ed.) *Der klimawandel*. VS Verlag für Sozialwissenschaften, 327-345.

Amelung, B., & Nicholls, S. (2014). Implications of climate change for tourism in Australia. Tourism Management, 41, 228-244.

Bambrick, H. J., Capon, A. G., Barnett, G. B., Beaty, R. M., & Burton, A. J. (2011). Climate change and health in the urban environment: adaptation opportunities in Australian cities. Asia Pacific Journal of Public Health, 23(2), 67S-79S.

Barnett, J., L. S. Evans, C. Gross, A. S. Kiem, R. T. Kingsford, J. P. Palutikof, C. M. Pickering, and S. G. Smithers. (2015). From barriers to limits to climate change adaptation: path dependency and the speed of change. *Ecology and Society* 20(3): 5.

Batty, M. (2008). The size, scale, and shape of cities. Science, 319(5864), 769-771.

Batty, M. (2016). Urban resilience: How cities need to adapt to unanticipated and sudden change. *Perspectives on Complex Global Challenges: Education, Energy, Healthcare, Security and Resilience: Education, Energy, Healthcare, Security and Resilience*, 169-171.

Berry, M. M. (2013). Thinking Like A City: Grounding Social-Ecological Resilience in an Urban Land Ethic. *Idaho Law Review, 50*(2), 117-152.

Boronyak-Vasco, L., & Jacobs, B. (2016). Managing natural resources for extreme climate events: Differences in risk perception among urban and rural communities in Sydney, Australia. In *Climate Change Adaptation, Resilience and Hazards*(pp. 181-194). Springer International Publishing.

Buckle, P., Mars, G., and Smale, S. (2000) New Approaches to Assessing Vulnerability and Resilience. *Australian Journal of Emergency Management,* 15(2): 8-14.

Bulkeley, H. (2013). *Cities and climate change*. Routledge.

Carpenter, S., Folke, C., Scheffer, M., & Westley, F. (2009). Resilience: accounting for the noncomputable. *Ecology and Society*, *14*(1).

Chelleri, L. (2012). From the «Resilient City» to Urban Resilience. A review essay on understanding and integrating the resilience perspective for urban systems. *Documents d'Anàlisi Geogràfica, 58*(2), 287-306.

Chelleri, L., Waters, J. J., Olazabal, M., & Minucci, G. (2015). Resilience trade-offs: addressing multiple scales and temporal aspects of urban resilience. *Environment and Urbanization*, *27*(1), 181-198.

Chhetri, P., Hashemi, A., Basic, F., Manzoni, A., & Jayatilleke, G. (2012). Bushfire, Heat Wave and Flooding Case Studies from Australia. *Report from the International Panel of the Weather project funded by the European Commission's 7th framework programme. Melbourne.*

Coaffee, J., & Lee, P. (2016). *Urban resilience: Planning for risk, crisis and uncertainty*. Palgrave Macmillan.

Colic-Peisker, V., Mikola, M., & Dekker, K. (2016). A multicultural nation and its (Muslim) Other? Political leadership and media reporting in the wake of the 'Sydney siege'. Journal of Intercultural Studies, 37(4), 373-389.

Craven, L. K. (2017). System Effects: A Hybrid Methodology for Exploring the Determinants of Food In/Security. Annals of the American Association of Geographers, 107(5), 1011-1027.

Cretney, R. (2014). Resilience for Whom? Emerging Critical Geographies of Socio-ecological Resilience. *Geography Compass, 8*(9), 627-640.

Deppisch, S., & Schaerffer, M. (2011). Given the Complexity of Large Cities, Can Urban Resilience be Attained at All? German Annual of Spatial Research and Policy 2010, Springer, 25-33.

Dilling, L., Daly, M. E., Travis, W. R., Wilhelmi, O. V., & Klein, R. A. (2015). The dynamics of vulnerability: why adapting to climate variability will not always prepare us for climate change. *Wiley Interdisciplinary Reviews: Climate Change*, *6*(4), 413-425.

El-Zein, A., & Tonmoy, F. N. (2015). Assessment of vulnerability to climate change using a multi-criteria outranking approach with application to heat stress in Sydney. *Ecological Indicators,* 48: 207-217.

Fletcher, D., & Sarkar, M. (2013). Psychological resilience: A review and critique of definitions, concepts and theory. *European Psychologist.*18: 12-23.

Friend, R., & Moench, M. (2013). What is the purpose of urban climate resilience? Implications for addressing poverty and vulnerability. *Urban Climate, 6*, 98-113.

Hassler, U., & Kohler, N. (2014). Resilience in the built environment. *BUilding Research and Information, 42*(2), 119-129.

Head, B., & Alford, J. (2008). *Wicked problems: Implications for policy and management.* Paper presented at the Refereed paper delivered to the Australasian Political Studies Association Conference.

Hendriks, C. M. (2010). Inclusive governance for sustainability. In Brown, V., Alfred Harris, J., and Russell, J. (Eds), *Tackling wicked problems through transdisciplinary imagination,* Earthscan: 150-160.

Hughes, S. (2015). A meta-analysis of urban climate change adaptation planning in the US. *Urban Climate*, *14*, 17-29.

Intergovernmental Panel of Climate Change (IPCC) (2014). Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. R.K. Pachauri and L.A. Meyer (eds.). Geneva, Switzerland.

Janković, V., & Schultz, D. M. (2017). Atmosfear: communicating the effects of climate change on extreme weather. *Weather, Climate, and Society*, *9*(1), 27-37.

Jaroszweski, D., Hooper, E., & Chapman, L. (2014). The impact of climate change on urban transport resilience in a changing world. Progress in Physical Geography, 38(4), 448-463.

Keck, M., & Sakdapolrak, P. (2013). What is social resilience? Lessons learned and ways forward. Erdkunde *67*(1), 5-19.

Lorenz, S., Dessai, S., Forster, P. M., & Paavola, J. (2017). Adaptation planning and the use of climate change projections in local government in England and Germany. *Regional Environmental Change*, *17*(2), 425-435.

McGranahan, G., Balk, D., & Anderson, B. (2007). The rising tide: assessing the risks of climate change and human settlements in low elevation coastal zones. *Environment and urbanization*, *19*(1), 17-37.

McPhearson, T., et al. (2016). Advancing understanding of the complex nature of urban systems: Elsevier.

Meerow, S., & Newell, J. P. (2016). Urban resilience for whom, what, when, where, and why? *Urban Geography*, 1-21.

Meerow, S., Newell, J. P., & Stults, M. (2016). Defining urban resilience: A review. *Landscape and urban planning*, *147*, 38-49.

Mulligan, M., et al. (2016). *Resilient Melbourne: Implementing the Rockerfeller Foundation 100 Resilient Cities Project in Melbourne*. Retrieved from Melbourne: http://cur.org.au/cms/wp-content/uploads/2016/06/resilient-cities-report.pdf

O'Brien, K., Hayward, B., & Berkes, F. (2009). Rethinking social contracts: building resilience in a changing climate. *Ecology and Society*, *14*(2).

Pelling, M. (2003). *The vulnerability of cities: natural disasters and social resilience*. Earthscan.

Pelling, M., & Manuel-Navarrete, D. (2011). From resilience to transformation: the adaptive cycle in two Mexican urban centers. *Ecology and Society, 16*(2).

Rawluk, A., et al. (2017). Public values for integration in natural disaster management and planning: a case study from Victoria, Australia. *Journal of environmental management, 185*, 11-20.

Rogers, P., Burnside-Lawry, J., Dragisic, J., & Mills, C. (2016). Collaboration and communication: Building a research agenda and way of working towards community disaster resilience. *Disaster Prevention and Management*, *25*(1), 75-90.

Rosenzweig, C., Solecki, W. D., Hammer, S. A., & Mehrotra, S. (Eds.). (2011). *Climate change and cities: First assessment report of the urban climate change research network*. Cambridge University Press.

Soden, R., Palen, L., Chase, C., Deniz, D., Arneson, E., Sprain, L., ... & Dashti, S. (May 2015). In Palen, Büscher, Comes & Hughes (Eds).The Polyvocality of Resilience: Discovering a Research Agenda through Interdisciplinary Investigation & Community Engagement. *Proceedings of the ISCRAM 2015 Conference*, Kristiansand, May 24-27.

Spaans, M., & Waterhout, B. (2016). Building up resilience in cities worldwide–Rotterdam as participant in the 100 Resilient Cities Programme. *Cities, 61*, 109-116.

Strand, P. J. (2014). Cultivating 'Civity': Enhancing City Resilience with Bridging Relationships and Increased Trust. *Idaho Law Review, 50*(2), 153-193.

Townshend, I., Awosoga, O., Kulig, J., & Fan, H. (2015). Social cohesion and resilience across communities that have experienced a disaster. *Natural Hazards*, *76*(2), 913-938.

APPENDIX 1: IMPACT CODING KEY

Id	Label
a	Centralevent
b	Age
c	Caregiver
d	Changetodailyroutine
e	ChangetoDailyroutine-daytoday
f	ChangetoDailyroutine-exercise
g	ChangetoDailyroutine-food
h	ChangetoDailyroutine-work
i	ChangetoDailyroutine-school
j	ChangetoDailyroutine-sleep
k	Communication
l	Communication-interagency
m	Commuication-intragency
n	Communication-media
o	Communication-publictopublic
p	Communication-socialmedia
q	Communication-SP-Public
r	Emotional
s	Emotional-others
t	Emotional-self
u	Experienceofevent
v	Financial
w	Financial-expense
x	Financial-funds
y	Financial-income
z	Financial-insurance
aa	Future
ab	Governance
ac	Governance-councilpolicyandresponse
ad	Governance-stateorfederalpolitics
ae	Housing
af	Housing-buildingcharacteristics
ag	Housing-tenure
ah	Information
ai	Legal
aj	Material
ak	Material-loss
al	Material-objects
am	Mentalhealth
an	Mentalhealth-others
ao	Mentalhealth-self
ap	Misc
aq	Mobility
ar	Mobility-active
as	Mobility-private
at	Mobility-public
au	OrgStructure
av	Orgstructure-capacitytorespond
aw	Orgstructure-clarity
ax	Orgstructure-systemsandstrategy
ay	Pets
az	Physicalevent
ba	Physicalhealth
bb	Physicalhealth-others
bc	Physcialhealth-self
bd	Physcialinftrastructure
be	Placecharacteristics
bf	Placecharacteristics-physical
bg	Placecharacteristics-social
bh	Preparation
bi	Priorexperience
bj	Priorexperience-none
bk	Priorexperience-others
bl	Priorexperience-self
bm	Professional
bn	Professional-experiencedstaff
bo	Professional-locationfromhome
bp	Professional-loss
bq	Professional-mgmtappch
br	Professional-morale
bs	Professional-networks
bt	Professional-privatevsprofessional
bu	Professional-productivity
bv	Professional-reputation
bw	Professional-responsibility
bx	Professional-role
by	Professional-workload
bz	Recovery
ca	Recovery-action
cb	Recovery-process
cc	Recreationandamenity
cd	Recreationandamenity-commericalspace
ce	Recreationandamenity-home
cf	Recreationandamenity-publicspace
cg	Relationshiptoplace
ch	Response
ci	Services
cj	Services-comnservices
ck	Services-EMS
cl	Services-Medical
cm	Services-Utilities
cn	Social
co	Social-colleagues
cp	Social-community
cq	Social-family
cr	Social-friends
cs	Social-neighbours
ct	Technology
cu	Technology-function
cv	Technology-wifiandphonereception
cw	Time
cx	Time-recovery
cy	Time-responsetothreat
cz	Uncertainty
da	Uncertainty-event
db	Uncertainty-responsetothreat

APPENDIX 2: BARRIER AND ENABLER CODING KEY

Id	Label
a	Central event
b	Age
c	Caregiver
d	Change to Daily routine day to day
e	Change to Daily routine exercise
f	Change to Daily routine food
g	Change to Daily routine work
h	Change to Daily routine school
i	Change to Daily routine sleep
j	Communication interagency
k	Commuication intragency
l	Communication media
m	Communication publictopublic
n	Communication social media
o	Communication SPPublic
p	Emotional others
q	Emotional self
r	Experience of event
s	Financial expense
t	Financial funds
u	Financial income
v	Financial insurance
w	Future
x	Governance council policy and response
y	Governance state or federal politics
z	Housing building characteristics
aa	Housing tenure
ab	Information
ac	Legal
ad	Material loss
ae	Material objects
af	Mental health others
ag	Mental health self
ah	Misc
ai	Mobility active
aj	Mobility private
ak	Mobility public
al	Org structure capacity to respond
am	Org structure clarity
an	Org structure systems and strategy
ao	Pets
ap	Physical event
aq	Physical health others
ar	Physcial health self
as	Physcial inftrastructure
at	Place characteristics physical
au	Place characteristics social
av	Preparation
aw	Prior experience none
ax	Prior experience others
ay	Prior experience self
az	Professional experienced staff

Id	Label
ba	Professional location from home
bb	Professional loss
bc	Professional mgmt appch
bd	Professional morale
be	Professional networks
bf	Professional private vs professional
bg	Professional productivity
bh	Professional reputation
bi	Professional responsibility
bj	Professional role
bk	Professional workload
bl	Recovery action
bm	Recovery process
bn	Recreation and amenity commercial space
bo	Recreation and amenity home
bp	Recreation and amenity public space
bq	Relationship to place
br	Response
bs	Services comn services
bt	Services EMS
bu	Services Medical
bv	Services Utilities
bw	Social colleagues
bx	Social community
by	Social family
bz	Social friends
ca	Social neighbours
cb	Technology function
cc	Technology wifi and phone reception
cd	Time recovery
ce	Time response to threat
cf	Uncertainty event
cg	Uncertainty response to threat

APPENDIX 3: RESIDENT NETWORK STATISTICS

Id	Label	weighted indegree	weighted outdegree	Weighted Degree	odularity_cla	pageranks	eigencentrality
t	t	57	30	87	1	0.085446	1
a	a	0	65	65	3	0.005234	0
ak	ak	24	41	65	3	0.019386	0.282473
da	da	8	18	26	1	0.012313	0.279052
al	al	13	8	21	1	0.027495	0.339237
az	az	5	11	16	1	0.006201	0.083788
cq	cq	12	3	15	0	0.03359	0.310139
bp	bp	7	7	14	0	0.009915	0.268143
cp	cp	10	4	14	0	0.027218	0.27447
u	u	4	9	13	4	0.007153	0.082143
bh	bh	4	7	11	0	0.006975	0.083262
w	w	7	4	11	3	0.01056	0.271216
cm	cm	4	6	10	1	0.005395	0.008342
cn	cn	1	9	10	0	0.005395	0.002071
db	db	5	5	10	1	0.011811	0.11565
o	o	7	2	9	1	0.01562	0.346701
z	z	6	3	9	3	0.009789	0.269754
ae	ae	6	3	9	3	0.016367	0.349361
ao	ao	6	3	9	3	0.022829	0.402653
ck	ck	4	5	9	1	0.02072	0.356036
ay	ay	5	3	8	1	0.006068	0.036242
aa	aa	6	2	8	0	0.031881	0.484309
e	e	5	2	7	0	0.019078	0.297092
an	an	3	4	7	4	0.008983	0.261872
v	v	1	5	6	0	0.005395	0.002071
ac	ac	4	2	6	0	0.006326	0.014614
j	j	4	2	6	1	0.01911	0.321388
aq	aq	4	2	6	3	0.010733	0.167663
n	n	3	2	5	0	0.006263	0.036105
s	s	5	0	5	4	0.014687	0.342128
cs	cs	5	0	5	4	0.010492	0.09744
bb	bb	4	0	4	3	0.012362	0.299727
bo	bo	2	2	4	4	0.006713	0.081717
cj	cj	3	1	4	3	0.006713	0.081717
cy	cy	1	3	4	4	0.00604	0.060555

Figure 1: Blue Mountains Resident Impact

Id	Label	weighted indegree	weighted outdegree	Weighted Degree	modularity_class	pageranks	eigencentrality
a	a	63	0	63	0	0.26587	1
bx	bx	6	18	24	0	0.021097	0.330198
by	by	4	15	19	0	0.017105	0.325721
bs	bs	4	10	14	0	0.020501	0.155567
ca	ca	7	6	13	0	0.028845	0.111333
q	q	4	8	12	0	0.02472	0.241274
bz	bz	6	5	11	0	0.040499	0.221914
ae	ae	2	7	9	0	0.014974	0.063997
t	t	3	4	7	0	0.02174	0.190315
cc	cc	5	1	6	2	0.042001	0.017285
v	v	3	3	6	0	0.024084	0.168842
bu	bu	3	2	5	3	0.024021	0.008643
av	av	2	3	5	1	0.014761	0.04973
at	at	1	4	5	0	0.010535	0.013216
bc	bc	3	2	5	4	0.019526	0.026431
aj	aj	1	3	4	1	0.014761	0.030228
bm	bm	0	4	4	0	0.010535	0
aq	aq	1	2	3	0	0.014834	0.088768
h	h	1	1	2	0	0.012806	0.121997
l	l	0	2	2	2	0.010535	0
y	y	0	2	2	0	0.010535	0
z	z	1	1	2	0	0.013459	0.114955
ab	ab	0	2	2	3	0.010535	0
af	af	0	2	2	3	0.010535	0
bh	bh	0	2	2	4	0.010535	0
cb	cb	0	2	2	2	0.010535	0
c	c	0	1	1	0	0.010535	0
d	d	0	1	1	0	0.010535	0
f	f	0	1	1	0	0.010535	0
n	n	0	1	1	2	0.010535	0
o	o	0	1	1	2	0.010535	0
x	x	0	1	1	0	0.010535	0
ap	ap	0	1	1	0	0.010535	0
ax	ax	0	1	1	0	0.010535	0
bl	bl	0	1	1	0	0.010535	0

Figure 2: Blue Mountains Resident Barrier

Id	Label	weighted indegree	weighted outdegree	Weighted Degree	odularity_cla	pageranks	eigencentrality
a	a	63	0	63	0	0.26587	1
bx	bx	6	18	24	0	0.021097	0.330198
by	by	4	15	19	0	0.017105	0.325721
bs	bs	4	10	14	0	0.020501	0.155567
ca	ca	7	6	13	3	0.028845	0.111333
q	q	4	8	12	0	0.02472	0.241274
bz	bz	6	5	11	0	0.040499	0.221914
ae	ae	2	7	9	0	0.014974	0.063997
t	t	3	4	7	0	0.02174	0.190315
cc	cc	5	1	6	5	0.042001	0.017285
v	v	3	3	6	0	0.024084	0.168842
bu	bu	3	2	5	2	0.024021	0.008643
av	av	2	3	5	1	0.014761	0.04973
at	at	1	4	5	3	0.010535	0.013216
bc	bc	3	2	5	4	0.019526	0.026431
aj	aj	1	3	4	1	0.014761	0.030228
bm	bm	0	4	4	0	0.010535	0
aq	aq	1	2	3	3	0.014834	0.088768
h	h	1	1	2	0	0.012806	0.121997
l	l	0	2	2	5	0.010535	0
y	y	0	2	2	0	0.010535	0
z	z	1	1	2	0	0.013459	0.114955
ab	ab	0	2	2	2	0.010535	0
af	af	0	2	2	2	0.010535	0
bh	bh	0	2	2	4	0.010535	0
cb	cb	0	2	2	5	0.010535	0
c	c	0	1	1	0	0.010535	0
d	d	0	1	1	0	0.010535	0
f	f	0	1	1	0	0.010535	0
n	n	0	1	1	5	0.010535	0
o	o	0	1	1	5	0.010535	0
x	x	0	1	1	0	0.010535	0
ap	ap	0	1	1	0	0.010535	0
ax	ax	0	1	1	3	0.010535	0
bl	bl	0	1	1	0	0.010535	0

Figure 3: Blue Mountains Resident Enabler

Id	Label	weighted indegree	weighted outdegree	Weighted Degree	modularity_class	pageranks	eigencentrality
a	a	0	75	75	0	0.033762	0
t	t	33	6	39	0	0.123392	1
e	e	11	4	15	0	0.056798	0.464325
cp	cp	12	0	12	0	0.057989	0.112995
cf	cf	6	2	8	0	0.052051	0.218236
at	at	5	0	5	0	0.0357	0.004597
cq	cq	4	1	5	0	0.056798	0.464325
n	n	2	1	3	0	0.0357	0.004597
cs	cs	3	0	3	0	0.056798	0.464325
q	q	2	0	2	0	0.0357	0.004597
s	s	2	0	2	0	0.0357	0.004597
cj	cj	2	0	2	0	0.0357	0.004597
h	h	1	0	1	0	0.0357	0.004597
ao	ao	1	0	1	0	0.0357	0.004597
bp	bp	1	0	1	0	0.0357	0.004597
cg	cg	1	0	1	0	0.0357	0.004597
as	as	1	0	1	0	0.050112	0.213639
cr	cr	1	0	1	0	0.064522	0.013137
o	o	1	0	1	0	0.05486	0.459728

Figure 4: Martin Place Resident Impact

Id	Label	weighted indegree	weighted outdegree	Weighted Degree	modularity_	pageranks	eigencentrality
a	a	50	0	50	0	0.362269	1
l	l	1	14	15	0	0.030457	0.108441
d	d	1	12	13	0	0.034178	0.108441
q	q	3	5	8	0	0.034178	0.108441
bq	bq	0	7	7	0	0.030457	0
p	p	2	4	6	0	0.04878	0.47561
bp	bp	1	4	5	0	0.045059	0.108441
ca	ca	2	2	4	0	0.034178	0.47561
ak	ak	0	4	4	0	0.030457	0
by	by	0	4	4	0	0.030457	0
aj	aj	2	1	3	0	0.058084	0.11801
bx	bx	0	3	3	0	0.030457	0
ag	ag	1	0	1	0	0.034178	0.108441
y	y	0	1	1	0	0.030457	0
bb	bb	0	1	1	0	0.030457	0
br	br	0	1	1	0	0.030457	0

Figure 5: Martin Place Resident Barrier

Id	Label	weighted indegree	weighted outdegree	Weighted Degree	odularity_cla	pageranks	eigencentrality
l	l	0	6	6	0	0.034949	0
a	a	39	0	39	0	0.431241	1
m	m	0	3	3	0	0.034949	0
bx	bx	2	9	11	0	0.064632	0.082122
n	n	0	1	1	0	0.034949	0
p	p	0	2	2	0	0.034949	0
q	q	0	1	1	0	0.034949	0
x	x	0	1	1	0	0.034949	0
be	be	0	2	2	0	0.034949	0
bq	bq	0	1	1	0	0.034949	0
bt	bt	0	2	2	0	0.034949	0
bu	bu	0	1	1	0	0.034949	0
by	by	0	3	3	0	0.034949	0
bz	bz	0	5	5	0	0.034949	0
ca	ca	0	5	5	0	0.034949	0
bp	bp	1	0	1	0	0.04979	0.041061

Figure 6: Martin Place Resident Enabler

Id	Label	weighted indegree	weighted outdegree	Weighted Degree	modularity_class	pageranks	eigencentrality
a	a	0	74	74	0	0.00456	0
t	t	50	17	67	1	0.146514	1
bc	bc	27	30	57	0	0.033275	0.433576
e	e	23	9	32	0	0.044889	0.576761
af	af	10	15	25	4	0.020121	0.211212
w	w	12	12	24	1	0.031649	0.36504
at	at	11	10	21	0	0.006774	0.085103
bb	bb	10	9	19	4	0.023142	0.258552
bu	bu	12	7	19	3	0.025706	0.371202
cl	cl	7	12	19	1	0.023936	0.37728
cm	cm	9	9	18	0	0.020919	0.188038
j	j	6	10	16	3	0.006774	0.069618
v	v	9	7	16	2	0.025971	0.270604
ay	ay	7	9	16	0	0.016135	0.199846
ao	ao	9	6	15	0	0.025459	0.26367
g	g	11	4	15	2	0.027551	0.397349
ce	ce	8	6	14	0	0.030614	0.496165
c	c	4	8	12	0	0.007552	0.045711
cu	cu	4	4	8	0	0.008912	0.085653
x	x	6	1	7	1	0.017748	0.231121
ag	ag	4	3	7	4	0.020603	0.242088
al	al	4	3	7	0	0.00469	0.001622
cd	cd	4	2	6	3	0.012639	0.103361
cq	cq	4	2	6	0	0.018974	0.24039
h	h	4	2	6	3	0.020228	0.221328
i	i	4	2	6	1	0.021022	0.2143
y	y	3	2	5	2	0.008477	0.058013
aq	aq	2	3	5	1	0.006146	0.017107
ch	ch	4	1	5	0	0.007486	0.034349
s	s	3	1	4	3	0.015244	0.135602
bo	bo	1	3	4	3	0.006173	0.036021
ar	ar	1	2	3	4	0.00469	0.001622
az	az	3	0	3	0	0.00469	0.001622
bp	bp	2	1	3	0	0.005628	0.011283

Figure 7: Penrith Resident Impact

Id	Label	weighted indegree	weighted outdegree	Weighted Degree	odularity_cla	pageranks	eigencentrality
a	a	77	0	77	0	0.161444	1
q	q	15	18	33	2	0.027188	0.315148
s	s	16	17	33	0	0.02721	0.320159
z	z	10	16	26	0	0.036238	0.178139
ar	ar	13	12	25	0	0.039984	0.373265
f	f	10	11	21	3	0.012684	0.144029
bv	bv	6	15	21	3	0.019102	0.118105
ai	ai	7	11	18	0	0.019861	0.24292
d	d	9	9	18	0	0.034046	0.28845
c	c	7	9	16	4	0.035371	0.174243
p	p	3	13	16	0	0.01485	0.063745
ak	ak	6	9	15	0	0.019042	0.179093
by	by	7	6	13	0	0.024496	0.168395
ba	ba	2	10	12	0	0.010907	0.063226
ap	ap	4	7	11	0	0.023683	0.077817
bb	bb	5	6	11	4	0.02368	0.136875
ao	ao	1	9	10	2	0.00785	0.019937
ag	ag	3	5	8	2	0.009543	0.044304
t	t	3	4	7	0	0.011353	0.078225
aq	aq	2	5	7	4	0.01821	0.1144
i	i	5	2	7	0	0.02556	0.292402
bu	bu	3	4	7	0	0.011101	0.059117
br	br	3	3	6	0	0.014007	0.099973
u	u	3	2	5	4	0.013479	0.069695
o	o	3	2	5	1	0.023564	0.00731
b	b	0	4	4	0	0.006568	0
bc	bc	1	3	4	4	0.010907	0.045066
aa	aa	2	2	4	2	0.009171	0.076805
aj	aj	3	1	4	0	0.014319	0.17655
bg	bg	2	2	4	4	0.017327	0.037162
m	m	1	2	3	3	0.009315	0.033271
ae	ae	0	3	3	4	0.006568	0
af	af	0	3	3	2	0.006568	0
bj	bj	1	2	3	4	0.011293	0.013133
g	g	1	1	2	0	0.008143	0.01816

Figure 8: Penrith Resident Barrier

Id	Label	weighted indegree	weighted outdegree	Weighted Degree	odularity_cla	pageranks	eigencentrality
a	a	66	0	66	0	0.210776	1
ae	ae	9	17	26	0	0.020865	0.102274
d	d	11	11	22	2	0.036816	0.442802
by	by	7	14	21	1	0.018229	0.202591
bn	bn	7	13	20	0	0.014478	0.187575
q	q	5	11	16	2	0.01688	0.224903
bu	bu	8	6	14	1	0.028645	0.239881
z	z	4	10	14	0	0.013655	0.089949
br	br	3	11	14	0	0.008246	0.006824
bo	bo	6	7	13	0	0.024646	0.128849
bz	bz	4	9	13	2	0.027107	0.219834
f	f	3	8	11	0	0.011912	0.132515
ak	ak	4	4	8	0	0.01606	0.28106
c	c	2	5	7	1	0.012435	0.058012
cb	cb	4	2	6	0	0.018776	0.070239
av	av	2	3	5	0	0.011912	0.092498
aj	aj	3	2	5	2	0.019442	0.098411
t	t	2	2	4	0	0.014021	0.176062
x	x	3	1	4	3	0.011827	0.002952
ba	ba	3	1	4	1	0.018706	0.084667
bx	bx	0	4	4	3	0.008246	0
u	u	2	1	3	2	0.019442	0.066236
ap	ap	3	0	3	0	0.011853	0.034889
aq	aq	0	3	3	1	0.008246	0
bd	bd	2	1	3	4	0.022571	0.005905
ca	ca	1	2	3	0	0.008246	0.006824
g	g	1	1	2	2	0.012219	0.121002
h	h	1	1	2	2	0.012219	0.121002
bb	bb	1	1	2	2	0.012219	0.121002
p	p	0	2	2	0	0.008246	0
s	s	1	1	2	1	0.01028	0.058151
ab	ab	0	2	2	1	0.008246	0
ay	ay	0	2	2	1	0.008246	0
bp	bp	0	2	2	0	0.008246	0

Figure 9: Penrith Resident Enabler

APPENDIX 4: SERVICE PROVIDER NETWORK STATISTICS

Id	Label	weighted indegree	weighted outdegree	Weighted Degree	modularity_class	pageranks	eigencentrality
a	a	0	74	74	2	0.00456	0
t	t	50	17	67	0	0.146514	1
bc	bc	27	30	57	2	0.033275	0.433576
e	e	23	9	32	2	0.044889	0.576761
af	af	10	15	25	1	0.020121	0.211212
w	w	12	12	24	0	0.031649	0.36504
at	at	11	10	21	2	0.006774	0.085103
bb	bb	10	9	19	0	0.023142	0.258552
bu	bu	12	7	19	3	0.025706	0.371202
cl	cl	7	12	19	0	0.023936	0.37728
cm	cm	9	9	18	2	0.020919	0.188038
j	j	6	10	16	3	0.006774	0.069618
v	v	9	7	16	4	0.025971	0.270604
ay	ay	7	9	16	2	0.016135	0.199846
ao	ao	9	6	15	2	0.025459	0.26367
g	g	11	4	15	4	0.027551	0.397349
ce	ce	8	6	14	0	0.030614	0.496165
c	c	4	8	12	0	0.007552	0.045711
cu	cu	4	4	8	2	0.008912	0.085653
x	x	6	1	7	0	0.017748	0.231121
ag	ag	4	3	7	1	0.020603	0.242088
al	al	4	3	7	2	0.00469	0.001622
cd	cd	4	2	6	1	0.012639	0.103361
cq	cq	4	2	6	0	0.018974	0.24039
h	h	4	2	6	3	0.020228	0.221328
i	i	4	2	6	0	0.021022	0.2143
y	y	3	2	5	4	0.008477	0.058013
aq	aq	2	3	5	0	0.006146	0.017107
ch	ch	4	1	5	2	0.007486	0.034349
s	s	3	1	4	3	0.015244	0.135602
bo	bo	1	3	4	1	0.006173	0.036021
ar	ar	1	2	3	0	0.00469	0.001622
az	az	3	0	3	2	0.00469	0.001622
bp	bp	2	1	3	0	0.005628	0.011283
cg	cg	1	2	3	3	0.00469	0.001622

Figure 1: Blue Mountains SP Impact

Id	Label	weighted indegree	weighted outdegree	Weighted Degree	odularity_cla	pageranks	eigencentrality
a	a	32	0	32	1	0.260807	1
q	q	15	0	15	2	0.100799	0.419456
bk	bk	1	10	11	1	0.025135	0.010786
by	by	4	6	10	2	0.057509	0.094611
bc	bc	2	5	7	2	0.047706	0.021573
be	be	2	5	7	1	0.022627	0.188228
al	al	1	4	5	2	0.036767	0.15376
k	k	1	3	4	1	0.025135	0.010786
bf	bf	0	4	4	2	0.017611	0
bi	bi	2	1	3	0	0.038015	0.045255
j	j	1	2	3	1	0.022436	0.177442
t	t	0	3	3	1	0.017611	0
ar	ar	1	2	3	1	0.022968	0.034468
bx	bx	0	3	3	1	0.017611	0
ca	ca	1	2	3	1	0.017611	0.094114
cc	cc	0	3	3	1	0.017611	0
m	m	0	2	2	1	0.017611	0
o	o	1	1	2	2	0.022436	0.177442
av	av	1	1	2	1	0.022627	0.010786
ce	ce	0	2	2	2	0.017611	0
c	c	0	1	1	0	0.017611	0
ab	ab	0	1	1	2	0.017611	0
an	an	0	1	1	2	0.017611	0
ap	ap	0	1	1	1	0.017611	0
bv	bv	0	1	1	1	0.017611	0
cf	cf	0	1	1	1	0.017611	0

Figure 2: Blue Mountains SP Barrier

Id	Label	weighted indegree	weighted outdegree	Weighted Degree	odularity_cla	pageranks	eigencentrality
a	a	28	0	28	0	0.369584	1
q	q	17	7	24	1	0.104874	0.36244
ca	ca	4	9	13	1	0.023204	0.111247
ay	ay	0	9	9	1	0.023204	0
bx	bx	2	6	8	1	0.042234	0.14905
av	av	2	2	4	1	0.029786	0.011421
c	c	1	2	3	1	0.033077	0.011421
h	h	0	3	3	1	0.023204	0
au	au	0	3	3	0	0.023204	0
bc	bc	0	3	3	0	0.023204	0
be	be	0	3	3	0	0.023204	0
al	al	1	1	2	0	0.042951	0.011421
an	an	1	1	2	0	0.029786	0.011421
bs	bs	1	1	2	0	0.033077	0.011421
bk	bk	1	1	2	0	0.033077	0.011421
bw	bw	0	2	2	0	0.023204	0
by	by	0	2	2	0	0.023204	0
az	az	0	1	1	0	0.023204	0
bo	bo	0	1	1	1	0.023204	0
bz	bz	0	1	1	0	0.023204	0

Figure 3: Blue Mountains SP Enabler

Id	Label	weighted indegree	weighted outdegre	Weighted Degree	modularity_class	pageranks	eigencentrality
a	a	0	74	74	2	0.00456	0
t	t	50	17	67	0	0.146514	1
bc	bc	27	30	57	2	0.033275	0.433576
e	e	23	9	32	2	0.044889	0.576761
af	af	10	15	25	1	0.020121	0.211212
w	w	12	12	24	0	0.031649	0.36504
at	at	11	10	21	2	0.006774	0.085103
bb	bb	10	9	19	0	0.023142	0.258552
bu	bu	12	7	19	3	0.025706	0.371202
cl	cl	7	12	19	0	0.023936	0.37728
cm	cm	9	9	18	2	0.020919	0.188038
j	j	6	10	16	3	0.006774	0.069618
v	v	9	7	16	4	0.025971	0.270604
ay	ay	7	9	16	2	0.016135	0.199846
ao	ao	9	6	15	2	0.025459	0.26367
g	g	11	4	15	4	0.027551	0.397349
ce	ce	8	6	14	0	0.030614	0.496165
c	c	4	8	12	0	0.007552	0.045711
cu	cu	4	4	8	2	0.008912	0.085653
x	x	6	1	7	0	0.017748	0.231121
ag	ag	4	3	7	1	0.020603	0.242088
al	al	4	3	7	2	0.00469	0.001622
cd	cd	4	2	6	1	0.012639	0.103361
cq	cq	4	2	6	0	0.018974	0.24039
h	h	4	2	6	3	0.020228	0.221328
i	i	4	2	6	0	0.021022	0.2143
y	y	3	2	5	4	0.008477	0.058013
aq	aq	2	3	5	0	0.006146	0.017107
ch	ch	4	1	5	2	0.007486	0.034349
s	s	3	1	4	3	0.015244	0.135602
bo	bo	1	3	4	1	0.006173	0.036021
ar	ar	1	2	3	0	0.00469	0.001622
az	az	3	0	3	2	0.00469	0.001622
bp	bp	2	1	3	0	0.005628	0.011283
cg	cg	1	2	3	3	0.00469	0.001622

Figure 4: Penrith SP Impact

Id	Label	weighted indegree	weighted outdegree	Weighted Degree	odularity_cla	pageranks	eigencentrality
a	a	28	0	28	0	0.375177	1
bk	bk	4	11	15	0	0.074964	0.28628
p	p	0	8	8	2	0.022339	0
q	q	3	3	6	2	0.026134	0.007034
aq	aq	2	3	5	0	0.042449	0.201985
bi	bi	2	2	4	0	0.036757	0.201985
j	j	1	2	3	1	0.041313	0.007034
ac	ac	1	2	3	2	0.026134	0.007034
bc	bc	2	1	3	0	0.036757	0.201985
al	al	2	1	3	0	0.032962	0.194951
az	az	1	2	3	0	0.032962	0.194951
c	c	0	2	2	0	0.022339	0
am	am	1	1	2	1	0.039899	0.019581
aa	aa	1	1	2	2	0.033441	0.019581
bf	bf	0	2	2	0	0.022339	0
bv	bv	0	2	2	0	0.022339	0
d	d	0	1	1	0	0.022339	0
s	s	0	1	1	0	0.022339	0
ar	ar	0	1	1	0	0.022339	0
by	by	0	1	1	0	0.022339	0
cc	cc	0	1	1	1	0.022339	0

Figure 5: Penrith SP Barrier

Id	Label	weighted indegree	weighted outdegree	Weighted Degree	modularity_class	pageranks	eigencentrality
a	a	18	0	18	0	0.327768	1
be	be	2	11	13	0	0.078042	0.28747
bs	bs	1	3	4	0	0.039779	0.27686
p	p	2	1	3	2	0.047301	0.28747
bc	bc	0	3	3	2	0.026524	0
o	o	1	1	2	1	0.037807	0.010609
q	q	1	1	2	0	0.039779	0.27686
x	x	0	2	2	0	0.026524	0
av	av	1	1	2	3	0.049089	0.010609
an	an	0	2	2	1	0.026524	0
cc	cc	1	1	2	1	0.037807	0.010609
bd	bd	1	1	2	2	0.034046	0.010609
bf	bf	1	1	2	2	0.034046	0.010609
ce	ce	2	0	2	0	0.039779	0.27686
h	h	0	1	1	0	0.026524	0
ab	ab	0	1	1	3	0.026524	0
az	az	0	1	1	4	0.026524	0
j	j	1	0	1	4	0.049089	0.010609
bx	bx	0	1	1	0	0.026524	0

Figure 6: Penrith SP Enabler

Id	Label	weighted indegree	weighted outdegree	Weighted Degree	modularity_	pageranks	eigencentrality
t	t	44	22	66	3	0.088731	1
a	a	0	58	58	0	0.005242	0
ah	ah	11	12	23	0	0.042884	0.438061
n	n	8	13	21	3	0.017413	0.15405
bq	bq	13	7	20	3	0.03916	0.490342
q	q	8	8	16	2	0.014236	0.173487
ax	ax	9	7	16	0	0.03798	0.349075
bt	bt	9	7	16	1	0.029289	0.33066
bx	bx	8	8	16	3	0.019596	0.399908
ch	ch	6	10	16	0	0.01754	0.156234
cq	cq	9	7	16	1	0.02211	0.491283
bu	bu	10	4	14	1	0.036427	0.440806
cb	cb	2	9	11	3	0.005386	0.002033
da	da	9	2	11	0	0.019795	0.333304
h	h	3	7	10	2	0.007888	0.010673
bc	bc	7	3	10	3	0.020014	0.190903
br	br	7	3	10	0	0.023668	0.414475
db	db	6	3	9	0	0.021714	0.31879
s	s	8	0	8	3	0.022145	0.401187
at	at	4	4	8	0	0.015149	0.16803
bp	bp	2	6	8	1	0.005386	0.002033
bw	bw	4	4	8	0	0.021277	0.103282
cg	cg	4	4	8	3	0.025431	0.254653
ck	ck	6	2	8	0	0.035973	0.146737
cv	cv	3	5	8	2	0.013308	0.107287
e	e	6	1	7	1	0.038585	0.325284
o	o	3	4	7	3	0.012721	0.230278
bb	bb	4	2	6	0	0.01712	0.269898
ac	ac	2	3	5	0	0.020768	0.038449
bn	bn	1	4	5	3	0.005386	0.002033
j	j	1	4	5	3	0.006363	0.007635
av	av	4	1	5	0	0.01927	0.186794
l	l	3	1	4	2	0.017718	0.132052
by	by	3	1	4	1	0.014925	0.240181
al	al	3	1	4	3	0.017581	0.253649

Figure 7: Martin Place SP Impact

Id	Label	weighted indegree	weighted outdegree	Weighted Degree	modularity_	pageranks	eigencentrality
t	t	44	22	66	3	0.088731	1
a	a	0	58	58	0	0.005242	0
ah	ah	11	12	23	0	0.042884	0.438061
n	n	8	13	21	3	0.017413	0.15405
bq	bq	13	7	20	3	0.03916	0.490342
q	q	8	8	16	2	0.014236	0.173487
ax	ax	9	7	16	0	0.03798	0.349075
bt	bt	9	7	16	1	0.029289	0.33066
bx	bx	8	8	16	3	0.019596	0.399908
ch	ch	6	10	16	0	0.01754	0.156234
cq	cq	9	7	16	1	0.02211	0.491283
bu	bu	10	4	14	1	0.036427	0.440806
cb	cb	2	9	11	3	0.005386	0.002033
da	da	9	2	11	0	0.019795	0.333304
h	h	3	7	10	2	0.007888	0.010673
bc	bc	7	3	10	3	0.020014	0.190903
br	br	7	3	10	0	0.023668	0.414475
db	db	6	3	9	0	0.021714	0.31879
s	s	8	0	8	3	0.022145	0.401187
at	at	4	4	8	0	0.015149	0.16803
bp	bp	2	6	8	1	0.005386	0.002033
bw	bw	4	4	8	0	0.021277	0.103282
cg	cg	4	4	8	3	0.025431	0.254653
ck	ck	6	2	8	0	0.035973	0.146737
cv	cv	3	5	8	2	0.013308	0.107287
e	e	6	1	7	1	0.038585	0.325284
o	o	3	4	7	3	0.012721	0.230278
bb	bb	4	2	6	0	0.01712	0.269898
ac	ac	2	3	5	0	0.020768	0.038449
bn	bn	1	4	5	3	0.005386	0.002033
j	j	1	4	5	3	0.006363	0.007635
av	av	4	1	5	0	0.01927	0.186794
l	l	3	1	4	2	0.017718	0.132052
by	by	3	1	4	1	0.014925	0.240181
al	al	3	1	4	3	0.017581	0.253649

Figure 8: Martin Place SP Barrier

Id	Label	weighted indegree	weighted outdegree	Weighted Degree	odularity_cla	pageranks	eigencentrality
a	a	67	0	67	0	0.324918	1
be	be	3	19	22	2	0.015194	0.006435
ab	ab	5	7	12	0	0.029357	0.066623
q	q	5	6	11	0	0.050179	0.245319
bc	bc	3	8	11	0	0.033573	0.027787
bm	bm	4	5	9	0	0.031328	0.130942
an	an	4	5	9	0	0.034846	0.078715
p	p	2	6	8	0	0.02517	0.057828
bt	bt	3	5	8	0	0.020619	0.041784
j	j	3	4	7	2	0.013455	0.014917
aj	aj	2	5	7	0	0.026176	0.056616
m	m	3	3	6	0	0.033856	0.086277
o	o	4	1	5	2	0.023332	0.082945
al	al	2	3	5	0	0.023332	0.082945
ay	ay	0	5	5	2	0.011841	0
bw	bw	1	4	5	0	0.013455	0.014917
bx	bx	0	5	5	3	0.011841	0
aq	aq	1	3	4	0	0.022972	0.045363
by	by	1	2	3	0	0.021437	0.067422
bd	bd	1	2	3	0	0.016117	0.050181
x	x	1	2	3	0	0.015194	0.006435
av	av	0	3	3	0	0.011841	0
bl	bl	1	2	3	3	0.014356	0.006435
ca	ca	1	2	3	0	0.020946	0.04505
n	n	1	1	2	3	0.014356	0.006435
bf	bf	1	1	2	1	0.0219	0.006435
l	l	0	1	1	0	0.011841	0
ak	ak	0	1	1	1	0.011841	0
ap	ap	0	1	1	0	0.011841	0
ar	ar	0	1	1	0	0.011841	0
ax	ax	0	1	1	0	0.011841	0
az	az	0	1	1	0	0.011841	0
ba	ba	0	1	1	0	0.011841	0
bz	bz	0	1	1	0	0.011841	0
cd	cd	0	1	1	0	0.011841	0

Figure 9: Martin Place SP Enabler

Id	Label	weighted indegree	weighted outdegree	Weighted Degree	modularity_class	pageranks	eigencentrality
a	a	0	77	77	1	0.00389	0
t	t	48	5	53	5	0.08298	1
bw	bw	22	19	41	1	0.023302	0.436695
bv	bv	19	20	39	5	0.019481	0.406829
u	u	19	15	34	0	0.017789	0.485745
az	az	10	22	32	1	0.003978	0.007801
bs	bs	17	14	31	0	0.010218	0.321843
ax	ax	13	13	26	5	0.02201	0.419654
br	br	10	13	23	6	0.007861	0.165825
bq	bq	6	13	19	0	0.009115	0.161946
bt	bt	9	10	19	4	0.014445	0.193767
ai	ai	9	9	18	5	0.00975	0.271049
av	av	7	11	18	3	0.006586	0.122818
by	by	6	11	17	6	0.007611	0.164994
ch	ch	9	8	17	1	0.016441	0.221373
bn	bn	8	6	14	5	0.015159	0.298508
bu	bu	8	6	14	6	0.005673	0.105467
ad	ad	9	4	13	0	0.010289	0.197427
aw	aw	9	4	13	5	0.027838	0.245943
n	n	6	5	11	0	0.012826	0.237193
s	s	6	4	10	5	0.022137	0.299918
ak	ak	5	5	10	1	0.006739	0.140203
cy	cy	6	4	10	0	0.009901	0.268641
db	db	7	3	10	5	0.023356	0.203464
ac	ac	7	2	9	5	0.021805	0.407041
cf	cf	6	2	8	1	0.006018	0.137593
bc	bc	6	2	8	6	0.055072	0.298704
v	v	3	4	7	5	0.007018	0.117913
bp	bp	3	4	7	5	0.005865	0.087876
cp	cp	6	1	7	3	0.00921	0.109709
bj	bj	3	3	6	1	0.006018	0.105261
q	q	2	3	5	1	0.003978	0.002004
cb	cb	2	3	5	1	0.005145	0.034406
ah	ah	2	2	4	1	0.003978	0.007801
cq	cq	3	1	4	4	0.006068	0.04682

Figure 10: Northern Beaches SP Impact

Id	Label	weighted indegree	weighted outdegree	Weighted Degree	odularity_cla	pageranks	eigencentrality
a	a	93	0	93	0	0.253855	1
al	al	14	9	23	0	0.040512	0.20281
y	y	7	12	19	0	0.03776	0.303699
am	am	6	10	16	0	0.024977	0.16338
bx	bx	9	6	15	0	0.032439	0.163144
an	an	0	15	15	0	0.009232	0
ab	ab	6	8	14	0	0.022286	0.09755
o	o	5	8	13	0	0.024141	0.119964
az	az	4	8	12	0	0.015177	0.051558
aw	aw	1	11	12	0	0.010547	0.004016
l	l	3	8	11	0	0.030732	0.168335
bh	bh	5	6	11	0	0.046514	0.221033
bi	bi	9	2	11	1	0.02703	0.10104
ap	ap	0	11	11	1	0.009232	0
av	av	4	6	10	0	0.015427	0.015738
be	be	3	7	10	0	0.016741	0.090195
x	x	3	6	9	0	0.018024	0.106785
ce	ce	3	5	8	0	0.018661	0.127056
cb	cb	0	8	8	1	0.009232	0
q	q	3	4	7	0	0.015085	0.05386
ad	ad	1	6	7	0	0.010359	0.004016
at	at	0	7	7	0	0.009232	0
k	k	4	2	6	1	0.011993	0.008032
cf	cf	4	2	6	1	0.019939	0.076154
j	j	2	3	5	0	0.011993	0.008032
bm	bm	1	4	5	1	0.016095	0.048653
aj	aj	2	3	5	0	0.018246	0.008032
bf	bf	1	4	5	2	0.009232	0.010009
ar	ar	3	1	4	0	0.021503	0.049816
bd	bd	1	3	4	0	0.011798	0.039835
cd	cd	2	2	4	1	0.010359	0.004016
p	p	0	3	3	0	0.009232	0
ac	ac	0	3	3	0	0.009232	0
bc	bc	0	3	3	0	0.009232	0

Figure 11: Northern Beaches SP Barrier

Id	Label	weighted indegree	weighted outdegree	Weighted Degree	odularity_cla	pageranks	eigencentrality
a	a	102	0	102	0	0.271131	1
an	an	11	29	40	0	0.057551	0.34311
be	be	11	28	39	0	0.063953	0.372772
az	az	2	19	21	1	0.02323	0.11685
bd	bd	9	11	20	0	0.068646	0.212989
bc	bc	3	13	16	0	0.027421	0.115618
av	av	5	9	14	1	0.03785	0.216757
ce	ce	5	5	10	0	0.025428	0.15738
ax	ax	0	8	8	0	0.013165	0
j	j	2	5	7	0	0.023476	0.155587
bx	bx	2	5	7	1	0.015363	0.06769
al	al	2	4	6	0	0.026707	0.236332
am	am	2	3	5	1	0.0241	0.185341
bh	bh	1	4	5	0	0.017636	0.113552
at	at	2	3	5	0	0.022236	0.12278
l	l	1	3	4	1	0.015363	0.04053
ab	ab	1	1	2	0	0.017636	0.113552
ac	ac	0	2	2	0	0.013165	0
bg	bg	1	1	2	0	0.017636	0.113552
br	br	1	1	2	0	0.017636	0.113552
bw	bw	1	1	2	0	0.022236	0.12278
bi	bi	0	2	2	1	0.013165	0
k	k	0	1	1	0	0.013165	0
p	p	0	1	1	0	0.013165	0
y	y	0	1	1	1	0.013165	0
ap	ap	0	1	1	0	0.013165	0
au	au	0	1	1	0	0.013165	0
ay	ay	0	1	1	0	0.013165	0
bf	bf	0	1	1	0	0.013165	0

Figure 12: Northern Beaches SP Enabler