

INDIGENOUS RESILIENCE THROUGH URBAN DISASTER

THE MĀORI RESPONSE TO THE 2010 AND 2011 CHRISTCHURCH OTAUTAHI EARTHQUAKES

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Abstract

The scale of damage from a series of earthquakes across Christchurch Ōtautahi in 2010 and 2011 challenged all networks in the city at a time when many individuals and communities were under severe economic pressure. Historically, Māori have drawn on traditional institutions such as whānau, marae, hapū and iwi in their endurance of past crises. This paper presents research in progress to describe how these Māori-centric networks supported both Māori and non-Māori through massive urban dislocation. Resilience to any disaster can be explained by configurations of economic, social and cultural factors. Knowing what has contributed to Māori resilience is fundamental to the strategic enhancement of future urban communities – Māori and non-Māori.

Keywords

resilience, disaster, emergency management, urban communities

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Background

The seismic activity affecting Christchurch Ōtautahi began on 4 September 2010 with a magnitude (M) 7.1 earthquake that resulted in no deaths but significant damage to many buildings. A smaller (M6.3) but more damaging event on 22 February 2011 killed 185 people and caused widespread destruction. An M6.3 earthquake on 13 June led to just one related death but brought further structural damage and considerable distress to many residents, as did the thousands of aftershocks, some over M5.0, that rumbled through the city.

Both Māori and Pākehā societies have firsthand experience of the hazards associated with settling such a geologically active land (Goff & McFadgen, 2003). Table 1 lists major earthquakes in Aotearoa New Zealand over the past 160 years. While these and other histories form an important backdrop to this research, they are just a starting point for a modern Māori perspective that has brought seismic change, not least among Māori whānau, kura, organisations and businesses that have established themselves in urban settings.

Risk, hazards, vulnerability and resilience

Although risk, vulnerability and resilience are imprecise terms, they nevertheless possess an “intuitive resonance” (Barnett, Lambert, & Fry, 2008), with evidence that the effects of hazards and disasters are not distributed evenly through society. Instead, we see the distribution of loss and damage, and the capacity to respond to and recover from loss and damage, varies according to social, political, economic and geographic factors (Cutter, 2010; Ellemor, 2005). The challenge for researchers is to broaden our catchment for both data and analytic approaches beyond merely aggregating and homogenising places and people for the purposes of comparison.

Risk

The word risk comes from the Greek *rhiza*, meaning the hazard of sailing along rocky coastlines, an etymology that lends itself nicely to the actuarial approach understood (from this perspective) as the sum of individual risks of all misfortunes:

TABLE 1. Significant earthquakes in NZ.

Date	M	Location	Fatalities	Damage
3 Jan 1855	8.1	Wairarapa	4	
17 Jun 1929	7.8	Murchison	17	\$133,000,000 ¹
3 Feb 1931	7.8	Napier	256	\$650,000,000 ²
24 June 1942	7.8	Wellington, Hutt Valley,		£2,000,000 ³
2 Aug 1942	6.8	Wairarapa, Manawatu		
24 May 1968	7.1	Īnangahua	3	
22 Mar 1987	6.3	Edgecumbe	1	\$300,000,000 ⁴
20 Dec 2007	6.8	Gisborne	1	\$36,000,000 ⁵
15 Jul 2009	7.8	Dusky Sound		\$6,100,000 ⁶
4 Sept 2010	7.1	Otautahi	0	
2 Feb 2011	6.3	Otautahi	185	> \$30,000,000,000 ⁷
13 Jun 2011	6.3	Otautahi	1	

¹ 1998 NZ\$ (Owens, 2001; Table 23.2). ² 2010 NZ\$. ³ <http://www.teara.govt.nz/en/1966-disasters-and-mishaps-earthquakes/3>. ⁴ Estimate (<http://christchurchcitylibraries.com/kids/nzdisasters/edgecumbe.asp>). ⁵ EQC cost (over 6,000 claims) 2010 NZ\$. ⁶ EQC cost (5,219 claims). ⁷ Estimate (Bennett, 2011).

Risk = $\sum f(p \text{ of misfortune}, \text{expected loss from misfortune})$

Despite some studies showing an increase in deaths, damage and costs over time (United Nations International Strategy for Disaster Reduction [UNISDR], 2004), governments, local authorities, businesses and households tend to ignore those risks that are seen as highly unlikely, even though their effects may be devastating, and they do not sufficiently plan, engineer or insure for these risks. This is regrettably evident within planning authorities in the development of Christchurch (Canterbury Earthquakes Royal Commission, 2011; Heather, 2011a), highlighting the political-economic contexts influencing the vulnerability of individuals, households and communities.

Hazards

A hazard is a potentially damaging physical event, phenomenon or human activity that may cause death, injury, property damage, socio-economic disruption or environmental degradation (UNISDR, 2004). On the one hand, hazards can have geological, hydro-meteorological or biological origins; on the other, individuals and communities are increasingly affected by technological hazards – as in the cases of Three Mile Island and Bhopal – or particularly challenging combinations, such as the Japanese nuclear reactor emergency at Fukushima following an earthquake and tsunami in March 2011.

Vulnerability

At its most simple, vulnerability is the potential or susceptibility to damage or loss and is determined by physical, social, economic, environmental and cultural factors. Some communities are better able to absorb and recover from disasters simply because they have access to assets, credit and useful political networks (The World Bank, 2010). Notwithstanding the value of indigenous ecological knowledge

– increasingly acknowledged and accepted in environmental management – the built environment exposes all its inhabitants to new and emerging hazards, with marginalised groups in urban areas being more vulnerable (Del Popolo, Oyarce, Ribotta, & Jorge, 2007).

Resilience

Resilience has been described as the ability of a system to absorb shocks before altering its structure in some way, or the speed of recovery of a system following disturbance (Adger, 2000). A resilient system, therefore, is one that accommodates change or absorbs shocks in such a way that the system is not fundamentally altered. This positions resilience as the inverse of vulnerability, notably in ecology (Holling, Berkes, & Folke, 1998), but also in studies of social systems (Barnett, 2001). Resilience can be built by shocks to a system provided there is “system memory” – in ecosystems, through the composition and functioning of species assemblages and, in society, through enduring communal understanding that captures the experience of past changes (Berkes, Colding, & Folke, 2003).

Response and recovery: Definitions and examples

The Ministry of Civil Defence and Emergency Management (2008) categorises four mutually inclusive phases: reduction, readiness, response and recovery. The reduction phase seeks to identify and mitigate long-term risks to life and property, while the readiness phase focuses on the preparation of operational systems and capabilities. In many respects, these two phases ended with the 4 September quake, as the 22 February event framed the intervening period as contributing to “reduction and readiness” (Heather, 2011b). The response includes all actions taken immediately before, during or directly after an emergency event, essentially seeking to save lives and protect property. The

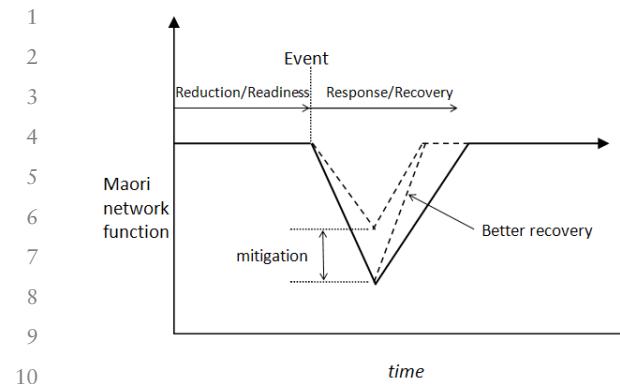


FIGURE 1. Māori network resilience model (after McDaniels, Chang, Cole, Mikawoz, & Longstaff, 2008).

recovery period consists of the regeneration of communities. Figure 1 outlines how we model the resilience of Māori networks within this conceptual framework.

For the February earthquake, national and international aid was quick to arrive (Lambert & Mark-Shabolt, 2012). Despite this rapid and professional response, the city's population was subject to considerable danger, discomfort and disruption, and significant movements of people and resources took place over the following months. Local unemployment was up 17% in the 4 months post-February (Wood & Chapman, 2011), school rolls dropped by up to 20%, and domestic violence, gambling, drinking, stress and insecurity increased (New Zealand Press Association, 2011; Stylianou, 2011). This paper reports on several broad and evolving areas in the response phase and makes some comments on the current and ongoing recovery phase. How do Māori – as individuals, communities and a society – respond and recover in such an environment?

Method

It should be clear that a broad approach is needed to account for how people are affected by hazards and disasters. This paper gives an overview of two projects that sit within a programme of three interlinked projects.

We initially undertook 10 semi-structured interviews with selected Māori informants, beginning with emergency workers and several Māori managers caught in the central business district (CBD) on the day of the February quake. This was expanded in a second project for Te Puni Kokiri that focused on whānau resilience (a third programme focusing on Māori mental health networks has just begun at the time of publishing). Transcripts were analysed for common themes, and follow-up contact – further interviews, phone calls, emails and personal meetings – were undertaken with some participants. Our approach integrates the response and recovery experiences of Māori within a context of historical and contemporary marginalisation, to bring about constructive attention to these networks so that Māori in the future might become more resilient.

The Māori response

The response to the 22 February event was the immediate mobilisation of emergency workers, hospital and medical staff, volunteers and many so-called ordinary citizens who found themselves in the midst of a damaged city and traumatised population and helped out or escaped as best they could. One of our informants had to amputate the legs of a man trapped in a building; another hurrying home to his own whānau stopped to carry an injured woman – her legs crushed – from a collapsed building. All over the city and beyond, Māori networks mobilised to contact and help whānau; many children were taken away to safe areas (often to the North Island) and mattresses were laid out in homes to accommodate the refugees.

Marae enacted their role as communal refuges, not just in the tribal area of Ngāi Tahu but across the South Island and including North Island marae such as Pipitea in Wellington (Te Puni Kokiri, 2011). Several iwi sent in teams of tradespeople and nurses; Māori wardens came, first from elsewhere in the South Island,

then from the North Island. Ngā Hau e Whā was quickly established as a recovery assistance centre (RAC) and fielded many enquiries (see Figure 2), primarily directed towards Work and Income (WINZ) and Red Cross but also including Housing New Zealand, Christchurch City Council, the Inland Revenue Department and Victim Support.

Four themes stood out in our interviews: neighbourhood, tamariki, whānau and community, with the last-mentioned connecting each of them and forming an important but also shifting concept. Social media technologies now mean people belong to a globally extensive community, and many of our participants of all ages have used Facebook to maintain links and seek reassurance and support. The safety of children was paramount for several of our respondents, and determined location and lifestyle decisions following February 2011. Many respondents were inspired by their children, who frame many whānau responses: "Everything is for our kids though so we knew if we showed panic that would reflect on them and they'd also panic";

"My oldest girl, she really stepped up, fetching water and helping out".

A constant comment was that Māori are better at disasters than others. For some, this was because of a personal and whānau history of poverty and need for self-sufficiency; for others, it was our acceptance of upheaval: "Māori are used to the last minute evacuation when it comes to tangi, book a ticket, pack a bag, ring your boss, you can be gone anywhere up to a week".

Cultural practices were reiterated: for example, in answer to a question about why some systems and processes worked well through the disaster, several respondents noted kanohi-ki-te-kanohi or kanohi kitea approaches. Yet tikanga, particularly around manaakitanga and hosting incoming helpers, was also seen as making excessive demands on whānau and organisations severely disrupted by the earthquakes, which were struggling to look after themselves.

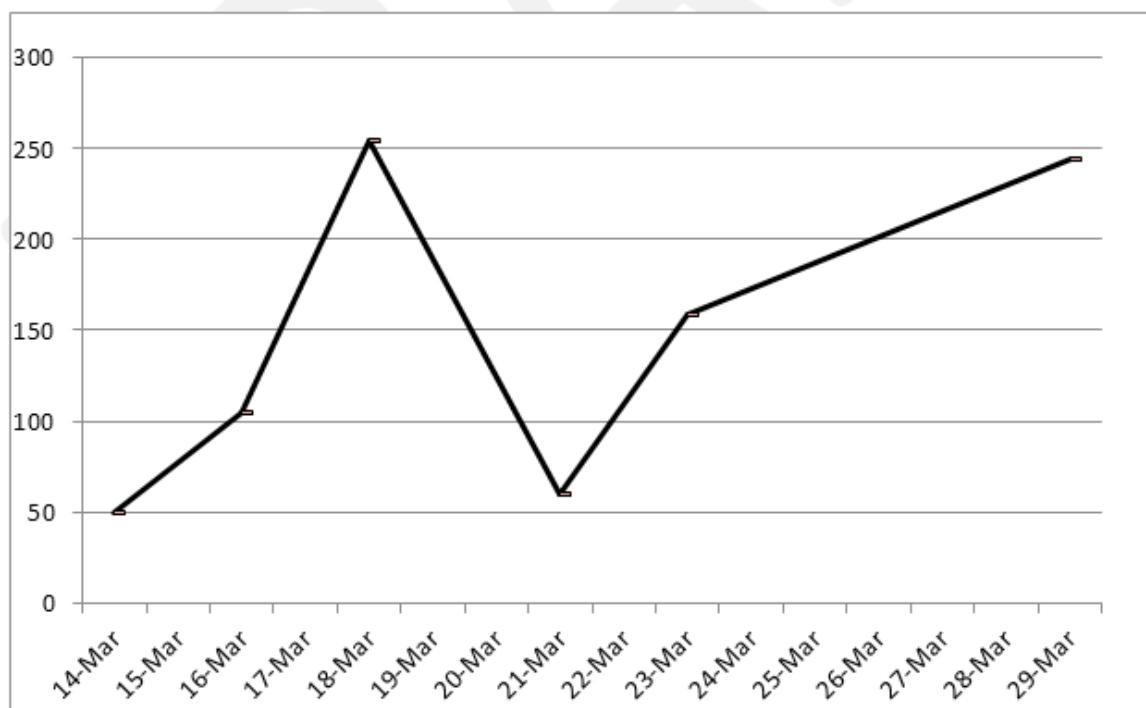


FIGURE 2. Queries to Ngā Hau e Whā (Te Puni Kokiri Quake Bulletin Updates).

1 Although the focus of emergency services was
2 in the CBD, considerable damage occurred to
3 residential properties, especially in the eastern
4 suburbs. Abundant aid was supplied in the
5 immediate aftermath: "People were happy.
6 We were prosperous!"
7

8 However, one significant lack noted by resi-
9 dents of the eastern suburbs and other observers
10 was the low number of Portaloos supplied in
11 the east compared with other areas of the city
12 (Potangaroa, Wilkinson, Zare, & Steinfert,
13 2011). This unfortunate lack draws attention
14 to the economic marginalisation of the eastern
15 suburbs. Māori unemployment nationwide had
16 been poor for several quarters, and indeed had
17 recently worsened (Statistics New Zealand,
18 n.d.). After the February event, retail and hos-
19 pitality (sectors with strong representation by
20 Māori) were badly hit, affecting female work-
21 ers more than male workers, and while Māori
22 unemployment figures in Canterbury were
23 lower than those nationwide through 2011 and
24 the beginning of 2012, many of those without
25 work appear to have left the region.

26 Environmental impacts have been sidelined
27 by the serious social and economic impacts. In
28 the immediate aftermath of the February shock,
29 many of those affected expressed concerns
30 over biohazards (primarily, water quality).
31 While, internationally, environmental impact
32 assessments are more likely to be requested
33 or required (Kelly, 2011), there are concerns
34 that the environment has yet to figure promi-
35 nently in discussions about disaster recovery
36 in Christchurch (see, e.g., Gorman, 2012, on
37 asbestos dumping). Impacts on Ngāi Tahu
38 wāhi tapu have been significant (Yates, Mark-
39 Shabolt, & Brown, 2011), as has been damage
40 to cemeteries (Dunbar, 2011). Continuing eco-
41 toxicological impacts are being experienced.
42 Approximately 35,000 m³ of wastewater was
43 being discharged daily into the Avon-Ōtākaro
44 River in mid-March 2011, although this had
45 declined to about 13,300 m³ per day by the
46 end of April (Environment Canterbury, 2011,

p. 2). New springs have been reported as a result of both the September 2010 and February 2011 events, and large numbers of birds died from avian botulism following the discharge from broken sewage pipes into treatment ponds (Martinez-Allier, 2000). Despite these events, preliminary research has indicated the urban waterway of the Heathcote River is probably recovering fairly rapidly ({AQ:1}Wells, 2012). Unfortunately, the same cannot be said for the city's social and cultural systems.

Discussion

The response and recovery of Māori to the massive dislocation of the earthquakes in Ōtautahi displays the strength and resilience of Māori cultural values and skills as well as the distressing effects of ongoing Māori economic vulnerability. The institutions of whānau, marae and iwi provided immediate and much needed help to more than just "their own", and the values of whanaungatanga and manaakitanga were manifested in the actions of countless individuals and groups.

However, we make the comment that framing Māori resilience as somehow emanating from generations of poverty risks reifying the economic vulnerability of Māori and diluting attention from a key component of resilience to hazards and disasters, namely, asset wealth (Vatsa, 2004). By emphasising that Māori resilience is nuanced, place based and culturally attuned, we hope to expand the possibilities for better disaster preparation and improved post-disaster recoveries. Simply judging Māori response(s) and recovery(ies) according to assumptions of population stability or resistance to change denies the mobility and adaption Māori have incorporated in their collective and individual reactions to disruption. As for a stronger resilience to future disasters, we can only point out the fundamental aid to expanding options, namely, economic wealth and security. Engineering a wealthier Māori society remains vital to improving the resilience

of Māori and poses a continuing challenge to efforts to reduce our collective vulnerability to what are recurring events.

References

- Adger, W. N. (2000). Sociological and ecological resilience: Are they related? *Progress in Human Geography*, 24(3), 347–364.
- Barnett, J. (2001). Adapting to climate change in Pacific Island countries: The problem of uncertainty. *World Development*, 29(6), 977–993.
- Barnett, J., Lambert, S., & Fry, I. (2008). The hazards of indicators: Insights from the Environmental Vulnerability Index. *Annals of the Association of American Geographers*, 98(1), 102–119.
- Bennett, A. (2011, October 26). Christchurch quake tab could reach \$30 billion. *New Zealand Herald*. Retrieved from http://www.nzherald.co.nz/christchurch-earthquake/news/article.cfm?c_id=1502981&objectid=10761697
- Berkes, F., Colding, J., & Folke, C. (Eds.). (2003). *Navigating social-ecological systems: Building resilience for complexity and change*. Cambridge, UK: Cambridge University Press.
- Canterbury Earthquakes Royal Commission. (2011). *Interim report*. Christchurch, New Zealand: Author.
- Cutter, S. (2010). Social science perspectives on hazards and vulnerability science. In T. Beer (Ed.), *Geophysical hazards: Minimizing risk, maximizing awareness* (pp. 17–30). Dordrecht, the Netherlands: Springer.
- Del Popolo, F., Oyarce, A. M., Ribotta, B., & Jorge, R. (2007). *Indigenous peoples and urban settlements: Spatial distribution, internal migration and living conditions*. Santiago, Chile: United Nations.
- {AQ:2}Dunbar, J. (2011). RIP disturbed. *The Press*, p. (Supplement) 5.
- Ellemor, H. (2005). Reconsidering emergency management and indigenous communities in Australia. *Global Environmental Change Part B: Environmental Hazards*, 6(1), 1–7. doi:10.1016/j.hazards.2004.08.001
- Environment Canterbury. (2011). *Ecological effects of the Christchurch February earthquake on our city rivers: Summary and management decisions*. Christchurch, New Zealand: Author. Retrieved from http://ecan.govt.nz/?attach_external_tab&30187520&3&0&0&0&iexplore
- Goff, J. R., & McFadgen, B. G. (2003). Large earthquakes and the abandonment of prehistoric coastal settlements in 15th century New Zealand. *Geoarchaeology*, 18(6), 609–623. doi:10.1002/gea.10082
- Gorman, P. (2012, 17 May). Asbestos plans not told to landfill's overseers. *The Press*. Retrieved from

- 1 <http://www.stuff.co.nz/the-press/news/6936242/Asbestos-plans-not-told-to-landfills-overseers>
- 2
- 3 Heather, B. (2011a, 3 December). Liquefaction data ignored - report. *The Press*. Retrieved from <http://www.stuff.co.nz/the-press/news/christchurch-earthquake-2011/6079565/Liquefaction-data-ignored-report>
- 4
- 5 Heather, B. (2011b, 7 November). September Canterbury earthquake "saved lives". *Stuff*. Retrieved from <http://www.stuff.co.nz/national/5919904/September-Canterbury-earthquake-saved-lives>
- 6
- 7 Holling, C., Berkes, F., & Folke, C. (1998). Science, sustainability and resource management. In F. Berkes & C. Folke (Eds.), *Linking social and ecological systems: Management practices and social mechanisms for building resilience* (pp. 342–362). Cambridge, UK: Cambridge University Press.
- 8
- 9 Kelly, C. (2011, November). *Normal and rapid assessment of social and environmental impacts*. Paper presented at the Natural Disasters: Impact Assessment for Sustainable Recovery Conference, Lincoln University, Lincoln, New Zealand. Retrieved from <http://www.nzaia.org.nz/Conference/2011/NZAIA%20Nov%202011%20Conference%20Programme.pdf>
- 10
- 11 Lambert, S., & Mark-Shabolt, M. (2012, June). *Māori experiences and expressions of leadership through the Christchurch/Otautahi earthquakes*. Symposium conducted at the International Indigenous Development Research Conference, Auckland, New Zealand.
- 12
- 13 Martinez-Allier, J. (2000). Environmental justice as a force for sustainability. In J. N. Pierterse (Ed.), *Global futures: Shaping globalisation* (pp. 148–174). London, UK: Zed Books.
- 14
- 15 McDaniels, T., Chang, S., Cole, D., Mikawoz, J., & Longstaff, H. (2008). Fostering resilience to extreme events within infrastructure systems: Characterizing decision contexts for mitigation and adaptation. *Global Environmental Change*, 18(2), 310–318.
- 16
- 17 Ministry of Civil Defence and Emergency Management. (2008). *National civil defence emergency management strategy 2007*. Wellington: Author. Retrieved from [http://www.civildefence.govt.nz/memwebsite.NSF/Files/National_CDEM_Strategy/\\$file/National-CDEM-strategy-2008.pdf](http://www.civildefence.govt.nz/memwebsite.NSF/Files/National_CDEM_Strategy/$file/National-CDEM-strategy-2008.pdf)
- 18
- 19 New Zealand Press Association. (2011, January 25). Rehab attendance up 10-fold after quake. *The New Zealand Herald*. Retrieved from http://www.nzherald.co.nz/christchurch-earthquake/news/article.cfm?c_id=1502981&objectid=10701819
- 20
- 21 Owens, I. (2001). Natural hazards. In A. Sturman & R. Spronken-Smith (Eds.), *The physical environment: A New Zealand perspective* (pp. 427–446). South Melbourne, Australia: Oxford University Press.
- 22
- 23 Potangaroa, R., Wilkinson, S., Zare, M., & Steinfort, P. (2011). The management of portable toilets in the eastern suburbs of Christchurch after the February 22, 2011 earthquake. *Australasian Journal of Disaster and Trauma Studies*, 2011(2), 35–48.
- 24
- 25 Statistics New Zealand. (n.d.). *New Zealand in Profile: 2012*. Retrieved from http://www.stats.govt.nz/browse_for_stats/snapshots-of-nz/nz-in-profile-2012.aspx
- 26
- 27 Stylianou, G. (2011, May 19). *Drinking at home fans rise in domestic abuse*. *Stuff*. Retrieved from <http://www.stuff.co.nz/national/christchurch-earthquake/5023291/Drinking-at-home-fans-rise-in-domestic-abuse>
- 28
- 29 Te Puni Kokiri. (2011). *Earthquake bulletin No.1*. Wellington, New Zealand: Ministry of Māori Development. Retrieved from <http://www.tpk.govt.nz/en/newevents/news/earthquake-bulletin-1>
- 30
- 31 The World Bank. (2010). *Natural hazards, unnatural disasters: The economics of effective prevention*. Washington: The World Bank/The International Bank for Reconstruction and Development.
- 32
- 33 United Nations International Strategy for Disaster Reduction. (2004). *Living with risk*. New York, NY: Author. Retrieved from [http://www.unisdr.org/2956791F-8E4A-4980-9810-58DE88EA6B45/files/657_lwr1.pdf](http://www.unisdr.org/2956791F-8E4A-4980-9810-58DE88EA6B45/FinalDownload/DownloadId-FA47FE27D46CB3AFB1F587A9EA276163/2956791F-8E4A-4980-9810-58DE88EA6B45/files/657_lwr1.pdf)
- 34
- 35 Vatsa, K. S. (2004). Risk, vulnerability, and asset-based approach to disaster risk management. *The International Journal of Sociology and Social Policy*, 24(10/11), 1–48.
- 36
- 37 {AQ:3}Wells, N. (2012). *Re-establishment of ecosystem function in an urban river following a major earthquake*. Manuscript submitted for publication.
- 38
- 39 Wood, A., & Chapman, K. (2011, July 7). Canterbury dole numbers jump. *The Press*. Retrieved from <http://www.stuff.co.nz/national/5250019/Canterbury-dole-numbers-jump>
- 40
- 41 Yates, K., Mark-Shabolt, M., & Brown, H. (2011). In the wake of Ruaumoko. *NZ Historic Places Trust/Pouhere Taonga* (June 2011), 16–21.

Author Queries

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