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Impacts on Māori of the Ōtautahi/Christchurch earthquakes

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Introduction

> *My one safeguard is my resiliency. So far I have always bounced back. Sometimes the rebound has resembled a slow-motion performance but in the eyes of God speed has no particular significance.*
>
> Henry Miller (1969).

The earthquakes that struck Ōtautahi/Christchurch began September 2010 and continued throughout 2012 with the worse shock being February 22, 2011. The extended 'seismic event' radically altered the geophysical and socio-cultural environments of the city. This working paper presents a broad array of data describing the impacts of the disaster on Māori. These data frame the results of small email survey conducted 18 months after the most destructive February 22, 2011. This survey followed two projects investigating the resilience of Māori to the disaster (Lambert & Mark-Shadbolt, 2011; Lambert & Mark-Shadbolt, 2012; Lambert, Mark-Shadbolt, Ataria, & Black, 2012). Results show that while the term resilience has become common to the point of cliché, the Māori experience thus far is best described as *endurance*.

Background

Ōtautahi/Christchurch is the second largest city in Aotearoa/New Zealand with a population of around 400,000. The city experienced a series of earthquakes beginning on September 4th, 2010, with a magnitude (M) 7.1 event that resulted in no deaths but saw significant damage to many buildings (Stevenson et al., 2011)(Stevenson et al., 2011). It was a smaller (M6.2) but more damaging earthquake on February 22nd, 2011, that ultimately killed 185 people and caused widespread destruction in the CBD and to thousands of residential properties (Canterbury Earthquakes Royal Commission, 2011; Christchurch City Council, 2012; Tasiopoulou, Smyrou, Bal, Gazetas, & Vintzileou, 2011). There were 5 major shocks and more than 9,000 aftershocks (more than 50 were stronger than M5.0) (Bannister & Gledhill, 2012). The rebuild will cost about 10% of the country's GDP (Parker & Steenkamp, 2012) and within the global insurance sector the Christchurch earthquakes were the third most costly event of 2011 with total costs of up to $NZ30 billion of which perhaps $20 billion are insured (Munich Re, 2012).

Christchurch contains a reasonably large urban population of Māori including the majority of Māori in the Canterbury region and across the South Island. Their experiences provide invaluable if unfortunate insight into the new and emerging risks of urban life (Lambert, forthcoming).

Table 1: Total residents and Māori in Christchurch City and neighbouring districts (StatsNZ)[1]

Area	Total			Māori		
	1996	2001	2006	1996	2001	2006
Hurunui District	9,402	9,885	10,476	588	516	594
Waimakariri District	32,349	36,903	42,834	2,145	2,430	2,856
Christchurch City	316,608	324,057	348,435	22,050	22,533	25,725
Selwyn District	24,783	27,312	33,669	1,449	1,572	2,010
Ashburton District	25,176	25,443	27,372	1,158	1,179	1,641

Source: (Statistics New Zealand, 2012b).

For a better appreciation of the affects of the disaster it is perhaps more useful to understand where Māori whānau and communities live and operate. Table 2 lists those suburbs with highest percentages of Māori residents in Christchurch City and neighbouring Waimakariri District. The Eastern and coastal suburbs, Kaiapoi and Lyttleton have significant Māori communities and were severely impacted by the earthquakes with many homes and streets affected several times by liquefaction[2] as well as damage to important infrastructure and the loss of many community facilities.

Table 2: Suburbs and towns with significant Māori populations that experienced severe damage

Town / Suburb	Total Population	Māori Population	Māori % of Total Population	Per cent of Māori < 20 years	Social Dep. Index (2006)
Aranui	4,671	936	21.3%	51.1%	10
Phillipstown	3,489	546	16.7%	39.9%	10
Linwood North	2,547	405	16.4%	48.5%	9
Bromley	2,976	468	16.3%	49.0%	9
Linwood East	1,890	279	15.3%	50.0%	9
Bexley	4,134	603	15.1%	50.5%	9
Chisnall (Wainoni)	2,859	399	14.6%	43.0%	8
Waltham	1,071	144	14.4%	43.5%	10
Woolston South	2,394	330	14.4%	43.2%	9
Woolston West	3,339	426	13.2%	46.9%	9
Avonside	3,240	387	12.2%	43.8%	9
Linwood	4,587	492	11.7%	35.4%	10
Kaiapoi South	2,199	237	11.2%	44.3%	7
Kaiapoi North	4,143	447	11.0%	49.7%	6
Richmond North	2,937	297	10.4%	53.5%	5
Shirley West	3,639	357	10.3%	47.9%	8
North Beach	4,680	456	10.1%	46.1%	7
Richmond South	2,469	237	10.0%	36.7%	9
Lyttleton	3,072	279	9.2%	36.3%	4
Avondale	4,296	333	7.8%	45.5%	5

Source: Statistics New Zealand (2012d) and Ministry of Health (2012d).

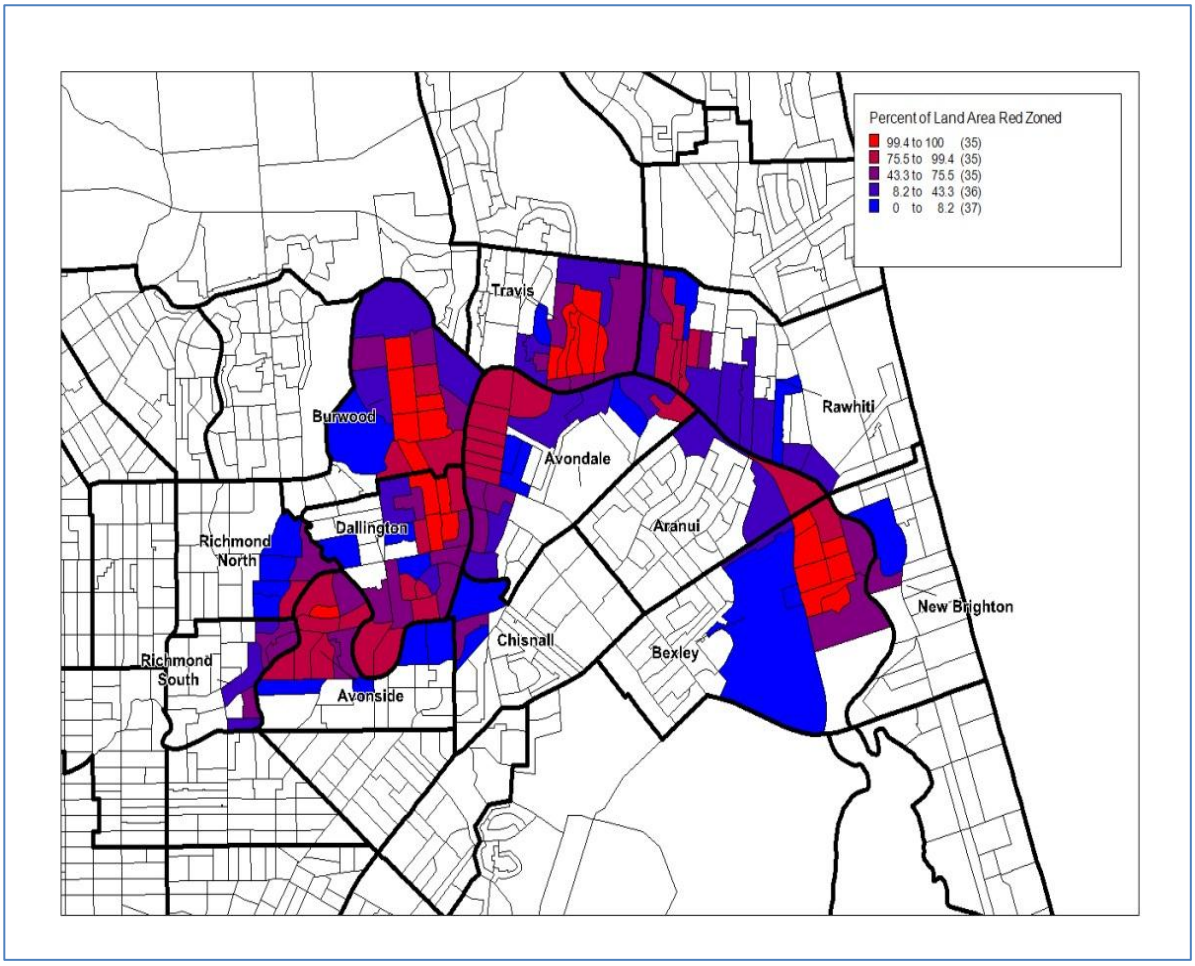
Neighbourhoods with significant Māori populations are generally younger and poorer compared to the rest of the population: the median age in Christchurch City was 36.4 years and median income $23,400;

[1] Statistics NZ cautions the interpretation of ethnic data as people can and do identify with different ethnic groups over time. Methodology, questionnaire design, classifications and coding practices have also changed over time, meaning some data is not consistent between 1996, 2001 and 2006.

[2] Liquefaction is the loss of strength, stiffness and stability of soil through the shaking and rapid loading that occurs during an earthquake. This means during an earthquake these soils will behave more like a liquid than a solid which can result in considerable damage to land and structures.

the median age for Māori was 22.5 years and median income $22,000. Of more relevance is the location of the most damaged housing and land, the red zone (Figure 1).

Figure 1: Percentage of land 'red-zoned' Source: (Newell, 2012)



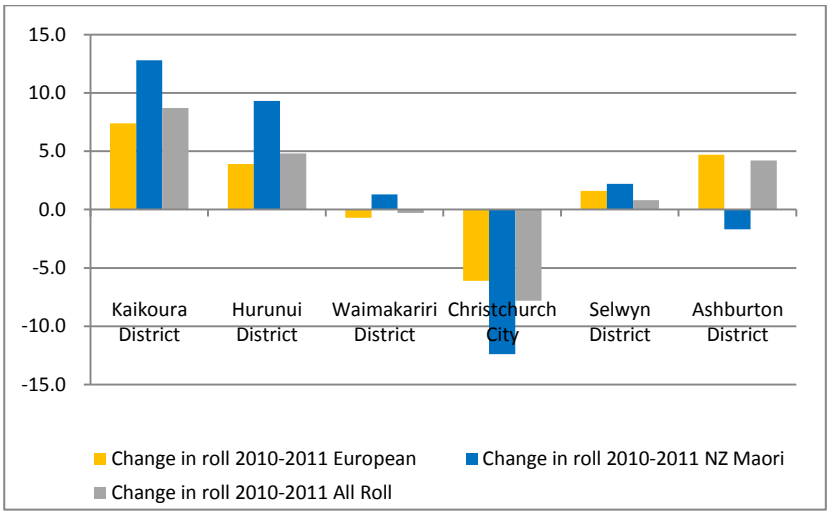
Short Term Impacts

February 22nd, 2011, challenged the courage and skills of many individuals. Some of our research participants found themselves in life and death situations (Lambert et al., 2012) and many, including first responders, did not know of the safety of tamariki, whānau, or friends for many hours - five hours in the case of one police officer working in the CBD, 11 hours for a mother to hear from her son, an adult but still the pepi of the whānau. By the night of the February event, most had been reunited with immediate family, often clustering together 'marae style' in the most suitable housing. Many of our participants spoke of the sense of community that quickly developed across the city. Neighbours were talking and helping out, often for the first time, and hosting each other for kai, allowing others to use showers and toilets, helping with repairs, childcare, and so on.

Perhaps the most robust and useful statistical indicator for the effect of the Canterbury earthquakes is the change in school enrolments between 2010 and 2011, a proxy for net migration and change in the Christchurch population. (Some caution is needed as rolls could include some children who are not long term usual residents. While this is assumed to be a small effect, it needs to be remembered as a possible source of noise in working with school roll trends. Another source of noise is any change in the proportion

home or correspondence schooled. For the year to June 2011, the enrolments in Christchurch schools saw an 8.1% reduction for students aged 5 to 9 years and 5.7% for students aged 10 to 14 years (Newell, 2012).[3] Figure 2 shows major differences in estimated net migration gains/losses by age and ethnic group for the year to June 2011. The data suggests that 3-5 times the number of Māori children left Christchurch in the days following February 22[4] compared to Pākehā children.[5]

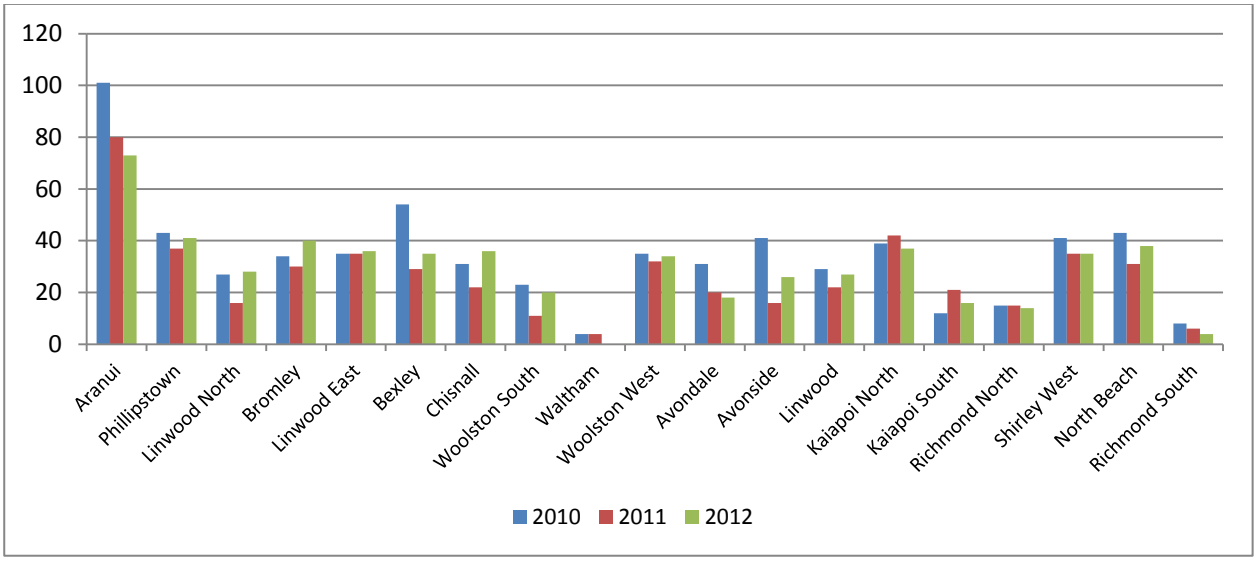
Figure 2: Per cent change in the number enrolled aged 5 to 10 years by ward 2010-2011, and by ethnicity



Source: Newell (2012).

At a neighbourhood level, some suburbs have lost significant numbers of pupils, a factor underpinning the current government strategy of school closures and mergers across the region (Shuttleworth, 2012). However it appears there has been a rebound in some schools with numbers stabilising and even increasing.

Figure 3: Māori school enrolment changes 2010-12, Years 2-5 (ages 5-9)

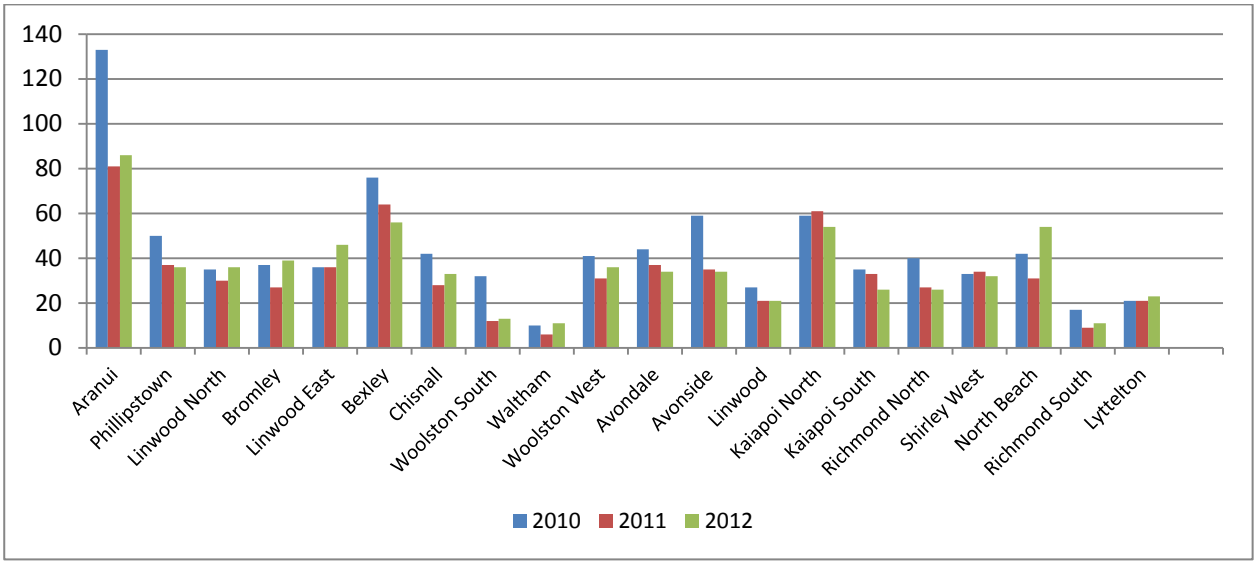


[3] This is close to Statistics NZ net migration rate assumptions for the year to June 2011 of 9.6% for the 5 to 9 year cohort and 5.8% and for the 10-14 year age cohort.

[4] Anecdotally some may have been pulled from schools and kept at home in the short term.

[5] The figures show a higher percentage Samoan children left the city.

Figure 4: Māori school enrolment changes 2010-12, Years 6-10 (ages 10-14)



Employment

The economic impacts on many Māori households will have been devastating, particularly for those within the red zone that may lose considerable equity through the circumstances of their home ownership. Others are suffering from the disruption of moving home (often more than once), stressful insurance issues and securing rental accommodation. Employment opportunities have declined for many, particularly woman employed in the hospitality, service, and light manufacturing sectors, and even those hoping to work in the reconstruction of Christchurch are limited by the delayed rebuild.

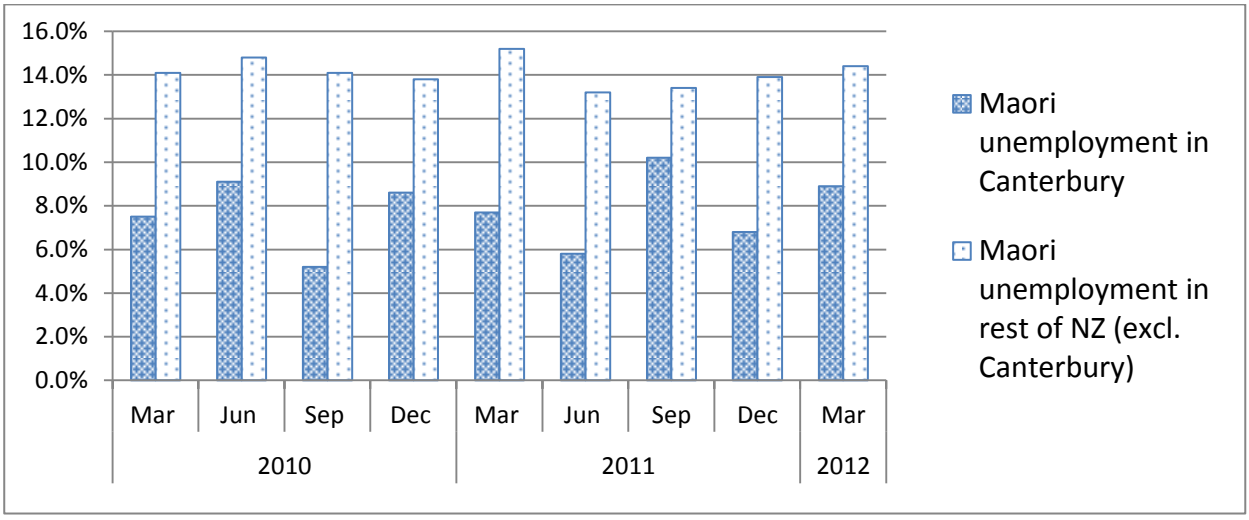
Māori employment statistics had been poor nationwide for several quarters prior to the Christchurch earthquakes. As a direct result of the February earthquake, overall employment in Canterbury fell by 28,200 people (8.3%), driven by significant decreases in part-time employment, youth employment, female employment, and people employed in the retail trade and accommodation sectors which are typically sectors with a high participation by Māori (Statistics New Zealand, 2012c).

Although unemployment in Canterbury was lower towards the end of 2011 than it was for 2010 (down by 5,100 people, or 23.7%), and the unemployment rate fell from 6.0% to 5.0% during this period (Statistics New Zealand, 2012c), this appears to be a result of people either leaving Canterbury or dropping out of the labour force. The number of hours worked and paid also fell in the region while rising nationally, with 11% of people not working their usual hours attributing this to the earthquake. In addition, 13% of people who wanted more hours of work said they were unable to work more hours because of the earthquake, and 5% of people stated the earthquake was the reason when asked why they had left their job (Statistics New Zealand, 2012a). Again, with Māori over represented in those sectors were most adversely impacted by the earthquakes, many whānau will have suffered significant declines in income.[6]

Long term employment in the rebuild of the city is expected to offer employment and training opportunities to Māori, with a peak demand in the residential sector in four years before a shift to the commercial sector in 15 years and a corresponding change to a demand for more specialised employment (Tarena, 2012).

[6] The NZ Council of Christian Social Services reports a general decline in Maori incomes relative to non-Maori since 2009 (NZCCSS, 2012b).

Figure 5: Canterbury Māori Unemployment



Source: Household Labour Force Survey (Statistics New Zealand, 2012c)

Movements

Many residents were forced to flee the city in the first few days after '22-2' but accurately quantifying these movements is difficult. Korero we've collected in our interviews talks about leaving the family home, for varying periods including permanently, and often arranging for children to live away from the city with whānau. Table 3 presents estimates for the outward movement of Māori. The first three estimates are taken from earlier studies (Newell, 2012; Price, 2011), the fourth, 'maximum' estimate reflects that the Eastern suburbs have been worst hit and as many Māori are, or were, resident in these suburbs, resulting in a higher estimate of outward migration for Māori. As with non-Māori, the numbers leaving were disproportionately young whānau and sole parents. It is estimated that at least 560 and possibly over 1,000 Māori left the city in response to the earthquakes. Statistics NZ data now indicates that 16,600 residents left the city to the two years to June 2012 ((Statistics New Zealand, 2012e). If the city average of 7.3% of this group are Māori then at least 1,200 Māori may have left Christchurch and given the impacts on the Eastern suburbs and other Maori communities and our propensity to move for opportunities, the number could be several hundred more.

Table 3: Estimates of Māori outward migration in response to earthquakes

	Overall % migration	Est. Māori leaving 2011	Est. Māori leaving 2012
Low estimate	2%	560	≈1,200
Mid-range estimate	3%	845	
High estimate	3.5%	990	
Maximum estimate	4%	1,060	

The lure of better incomes and lifestyles in Australia has seen many Maori emigrate there with research now showing as many as one in six Maori may reside in New Zealand's near neighbour (Hamer, 2008) where many already have whānau and friends that enable the move into a society in which most Māori are relatively comfortable. Again, we can only infer the number of Maori who have left Christchurch because of the earthquakes and estimate over 300 Māori to have emigrated to Australia after the

disaster. For many making this move, the earthquakes were the final push to a country with many pulls in a decision contemplated prior to the disaster.

Firmer data is found with beneficiary movements. There was a net loss of beneficiaries (both Māori and non-Māori) immediately following the February earthquake. However, the post-quake exodus has not been followed by a significant return of Māori beneficiaries to the region.

Figure 6: Total beneficiary transfers in and out of Canterbury (July 2009-February 2012)

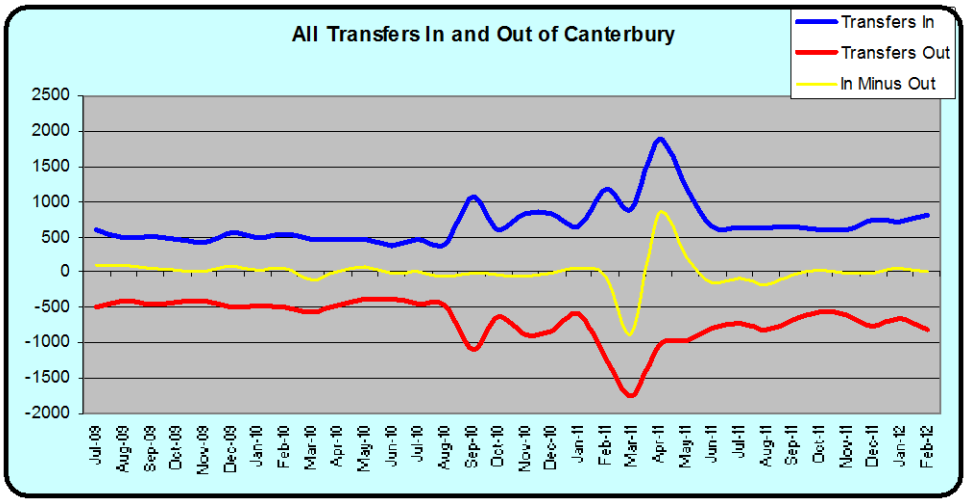
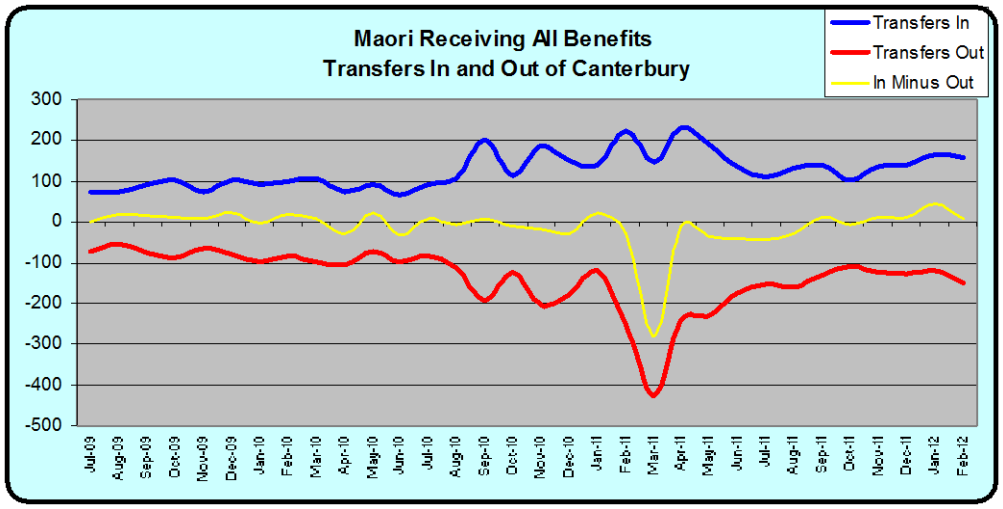
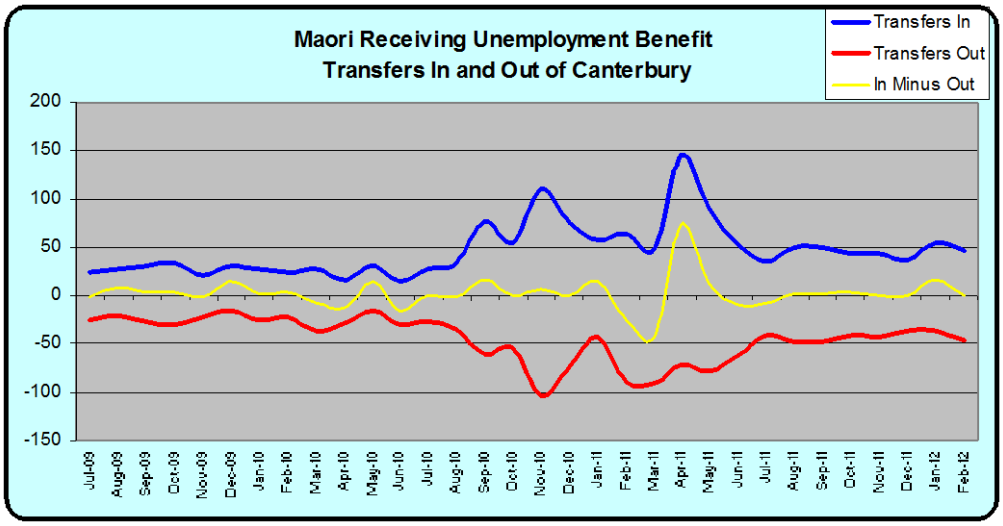


Figure 7: Māori transfers for all benefits (July 2009 - February 2012)



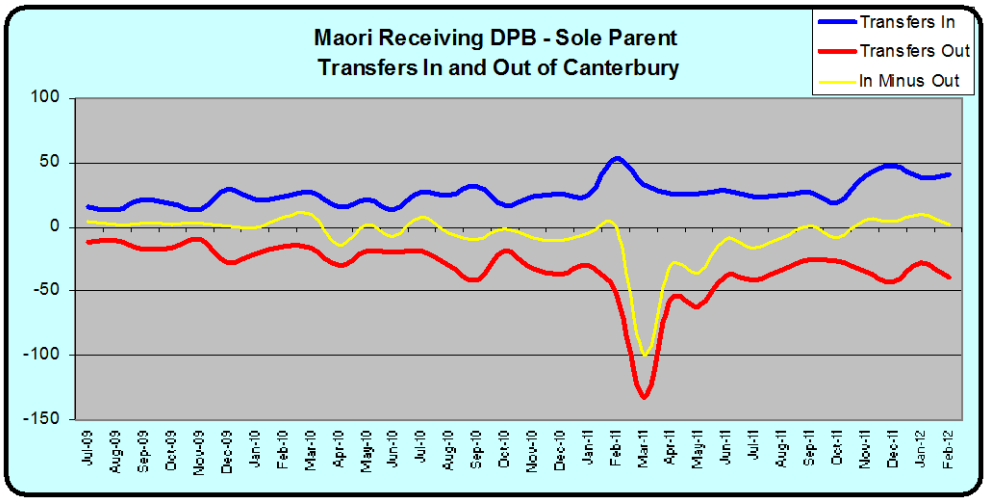
As noted, Māori unemployment was high before the earthquakes. While the immediate effect was for some Māori receiving the unemployment benefit to transfer out of Canterbury, this was quickly reversed, possibly by unemployed Māori moving to Canterbury to find work in the 'rebuild/recovery' work.

Figure 8: Māori unemployment beneficiaries (July 2009 - February 2012)



Overall, Domestic Purposes and Sole Parent figures for Maori show a large transfer out with many not returning, at least up until February 2012. A similar pattern exists for Māori on the Sickness or Invalid's Benefit.

Figure 9: Māori Domestic Purposes Benefit transfers (July 2009 - February 2012)



Environmental Impacts

Environmental impacts have been side-lined by the serious social and economic impacts. In the immediate aftermath of the February shock, many of those affected expressed concerns over biohazards (primarily water quality). While internationally, environmental impact assessments are more likely to be requested or required (Kelly, 2011), there are concerns that the environment has yet to figure prominently in discussions about disaster recovery in Christchurch (see, e.g., Gorman, 2012 on asbestos dumping). Impacts on Ngāi Tahu *wāhi tapu* have been significant (Yates et al., 2011), as has damage to cemeteries (Dunbar, 2011).

The 22-2 event resulted in drastic changes to the water chemistry of the surface water in the Ōpāwaho/Heathcote River and a significant change in the benthic invertebrate community. However, following repairs to wastewater infrastructure, the water chemistry returned to levels typically observed in minimally impacted reaches with the algal and microbial biofilms (lower trophic level organisms) recovering to levels that resembling minimally impacted reaches in the western section of the river. The recovery of benthic invertebrate populations lagged behind that of organisms at lower trophic levels, but this is typical response in the recovery of streams and rivers and demonstrates their reliance on specific water chemistry range of values and the presence of a food source. This observation reinforces the importance of having relatively un-impacted areas (conservation areas) to reseed ecosystems abruptly disturbed by natural disasters (Black, 2012).

Approximately 35,000 m^3 of wastewater was being discharged daily into the Avon/Ōtākaro in mid-March (2011) although this had declined to about 13,300 m^3 per day by the 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 (Wells, 2012). The abrupt discharge of sewage into the river was the most influential factor on the water quality and fresh water ecosystem community health; material from the liquefaction was biologically inert and did not make a substantial contribution to ecosystem changes (Black, 2012). Apart from the lag in macroinvertebrate recovery, indices of measured effects showed a complete recovery, placing the functional restoration of the Heathcote River and Estuary at the rapid end of the spectrum of similarly impacted rivers by natural disasters.

Overall Response

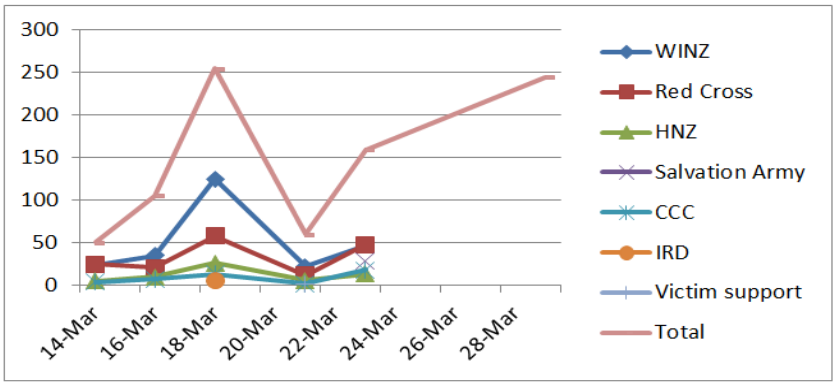
The disaster saw an outpouring of volunteer help alongside the professional national responses, epitomising the Kiwi culture of 'rolling up the sleeves' to help those in need. The international response was also important, and aspects of Māori culture were utilised during their stay and may have formed useful links for future training and support. Notwithstanding the poor distribution of port-a-loos in the Eastern suburbs (Potangaroa, Wilkinson, Zare, & Steinfort, 2011), supplies of food, water, cash, clothing, toiletries and other goods were generally available. Information, security and transport and other services were also needed by those residents affected by the disaster, a challenging component of the emergency response that has caused some controversy as this first phase of responding to the disaster passes into the recovery period.

For Māori, primary assistance originated with, and focused on, the whānau although neighbourhoods became important 'territory' due to the scale of the disaster forcing many people to stay close to home. Māori institutions and organisations contributed to supporting Māori and non-Māori through the first weeks of the disaster (Lambert et al., 2012). Kura were important centres of coordination in the response period, working with their own staff and databases to insure whānau and especially children were secure.

Many residents, including Māori, have expressed dissatisfaction with aspects of the recovery period including local and national leadership, city planning and its processes, environmental concerns, and insurance issues including the operations of EQC . This wider issue highlights the need for more formalised engagement of iwi, and particularly local iwi (Ngai Tahu in the case of the Canterbury earthquakes) in the recovery period of any disaster. Te Rūnanga o Ngāi Tahu (TRoNT) provided fuel, gas, food, blankets and toiletries to local marae (Anderson, 2012) and coordinated Canterbury marae as well as providing a free-phone number for help (0800 KAI TAHU). The large urban marae of Ngā Hau E Whā, located in Ōtautahi's eastern suburbs, was quickly established as a Recovery Assistance Centre (RAC) and fielded many enquiries Figure 10. The marae became a major distribution point where Māori Wardens,

Ngā Maata Waka, and other volunteer groups as well as WINZ, Red Cross, Housing NZ, Christchurch City Council, IRD, and Victim Support.

Figure 10: Queries to Ngā Hau e Whā RAC (March 14-28, 2012)



Source: Te Puni Kokiri (2011)

Survey

The survey was distributed via email to participants of our first two research projects as well as being posted on our webpage.[7] While the focus was on Māori (21 respondents, 10 female, 11 male), non-Māori were not dissuaded from completing the survey, indeed their responses (*n*=15) enable useful comparisons, some of which will also be presented below. The survey was very detailed, and just key insights are presented here.

Most Māori in Christchurch whakapapa to the North Island, and many of our participants are relatively recent arrivals in the city.

Table 4: Length of living in Christchurch

How long have you lived in this suburb or town?	
Answer Options	**Response Count**
All my life	2
Just arrived in last 12 months	0
6 - 12 months	0
Between 1 and 2 years	3
Between 3 and 5 years	9
Between 6 and 10 years	3
Between 10 and 20 years	3
Over 20 years	1

Most respondents were employed with many earning above average incomes, both personally and as households, meaning our survey cannot be seen as representative of Māori living in Christchurch. Unfortunately this means that those who are most vulnerable are not well-represented within our results.

[7] The method used was a SurveyMonkey database; see http://www.surveymonkey.com/

Table 5: Personal income of respondents

Personal Income	Responses
less than 18,000	1
18,001 - 23,000	1
23,001 - 28,000	2
28,001 - 35,000	0
35,001 - 45,000	2
45,001 - 55,000	0
55,001 - 65,000	5
65,001 - 80,000	1
Over 80,000	9

Table 6: Household incomes of respondents

Household Income	Responses
less than 18,000	0
18,000 - 30,000	1
30,001 - 45,000	0
45,001 - 65,000	2
65,001 - 90,000	4
90,001 - 125,000	1
125,001 - 175,000	7
Over 175,000	6

Most respondents owned their own homes, mainly 3 and 4 bedrooms, and had whānau members in the city who they contact regularly (Figures 11, 12, 13).

Figure 11: Bedrooms

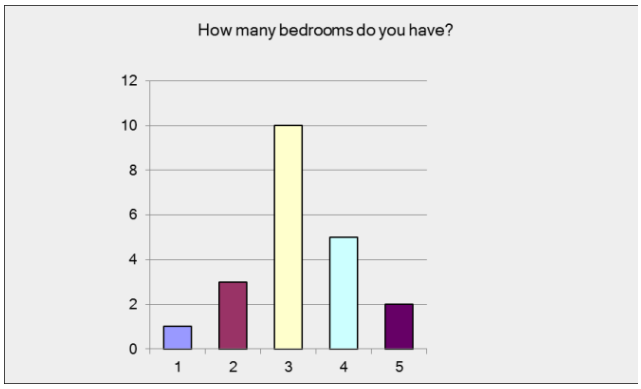


Figure 12: Whānau members in Otautahi

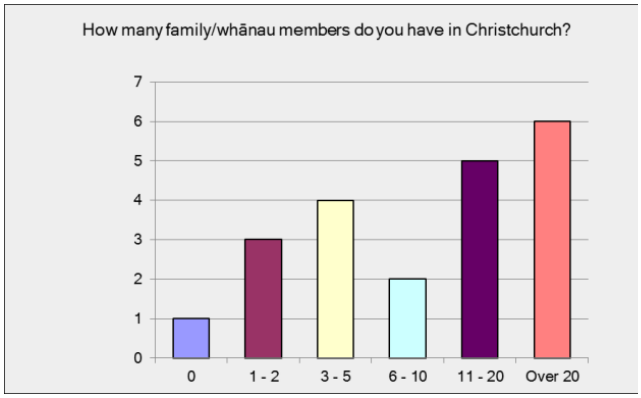
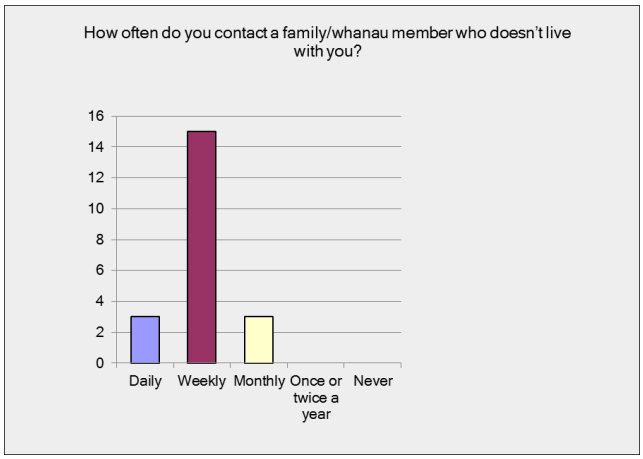


Figure 13: Whānau contact



Impacts

While the Feb 22 event was the most significant for most people, it is important to note that for some residents, one of the other shocks may well have been the most frightening event (often it was the September 10 2010 event). The scale and severity of the overall disaster has meant that most residents

have been impacted in some way, notably in levels of anxiety. Notwithstanding our small sample size, we see Maori respondents were more likely to have lost employment or hours and suffer poor health. Maori respondents were also more likely to have volunteered for earthquake work. Maori households were also more likely to have lost sewage disposal and used a port-a-loo, echoing the spatial distribution of impacts in the Eastern suburbs.

Figure 14: Personal impacts from the earthquakes (Maori and Pakeha)

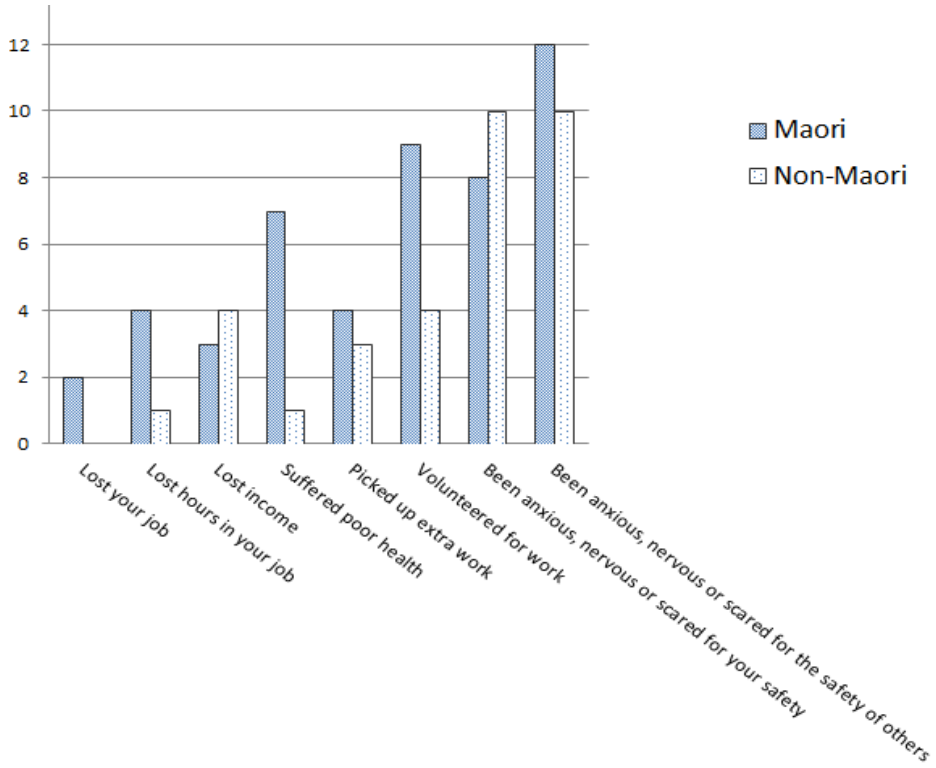
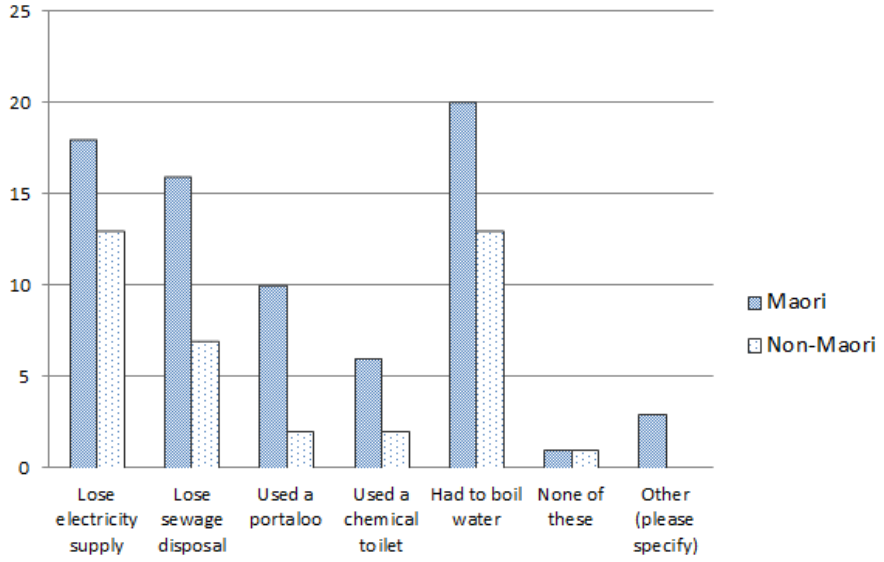


Figure 15: Household impacts from the earthquakes



Some neighbourhoods, particularly in the Eastern suburbs, have become increasingly deserted as people have vacated damaged homes or migrated out of the city. This has led to a growing sense of insecurity among many of those who remain, exacerbated by ongoing arson in these areas.

Figure 16: Who helped? (Respondents could choose more than one)

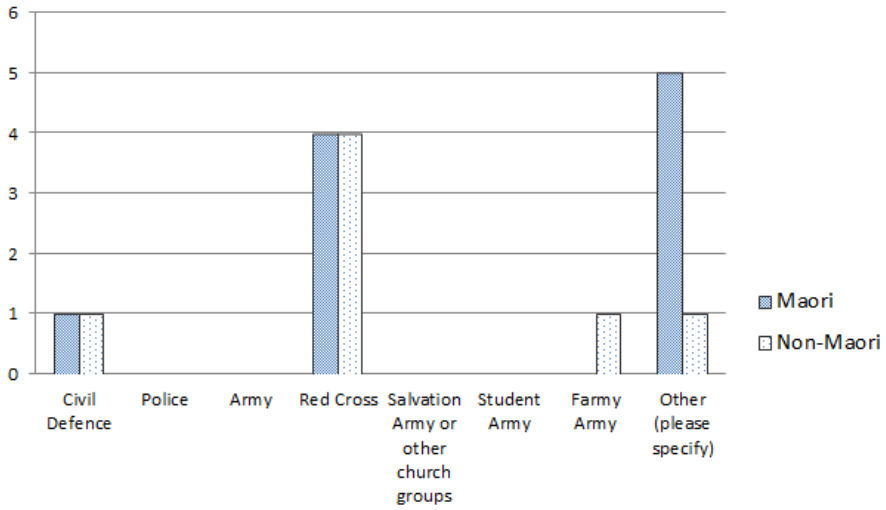
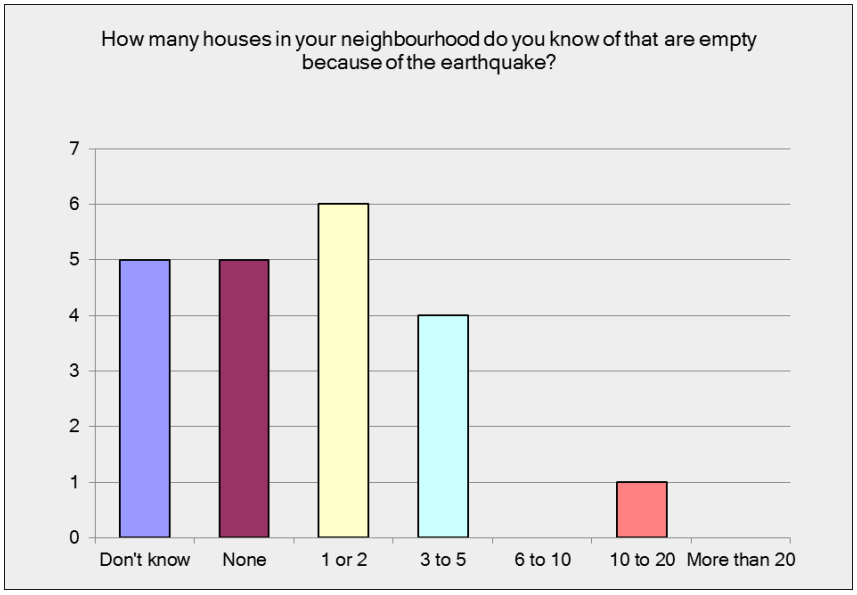


Figure 17: Neighbourhood impacts from the earthquakes



One positive has been the befriending of neighbours through sharing of food and water, port-a-loos and showers, and hosting through barbeques. We asked how many neighbours people know before the big quake, and how many people now knew.

Figure 18: Maori respondents knowing their neighbours

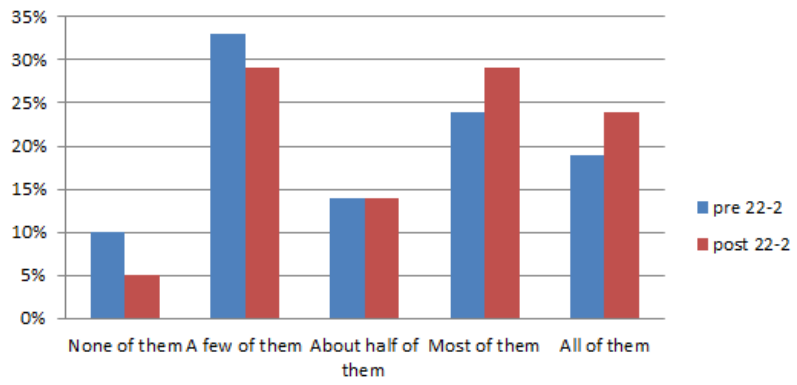
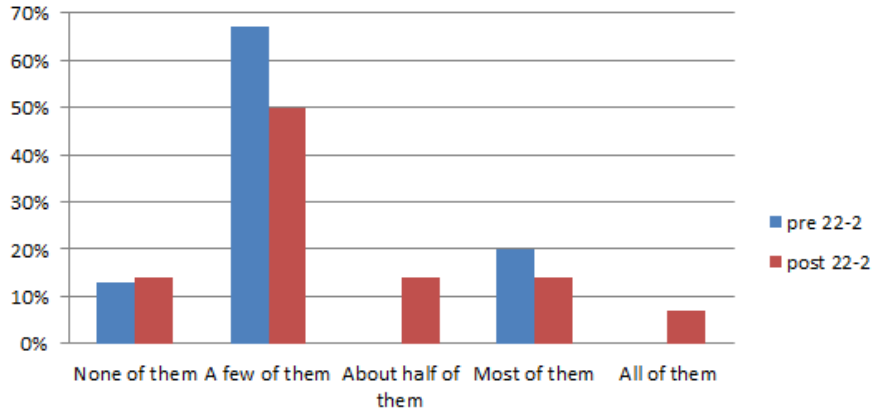


Figure 19: Pakeha respondents knowing their neighbours



Damages

Most of our respondents (Maori and Pakeha) experienced physical damage to house and or contents.

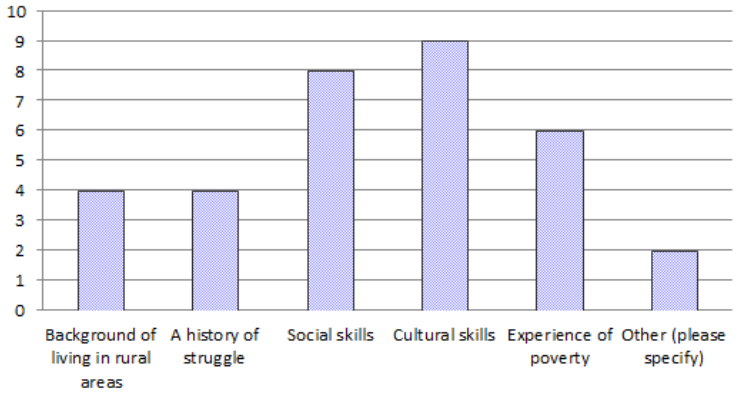
Table 7: Cost of damages to house and contents

Cost of damages		Less than $5,000	5,001 - 10,000	10,001 - 20,000	20,001 - 50,000	50,001 - 100,000	Over $100,000
Maori	House	2	1	1	5	1	5
	Contents	8	3	2	1	1	0
Pākehā	House	1	1	3	2	2	3
	Contents	6	3	0	0	1	0

Māori 'ability' in responding to disasters

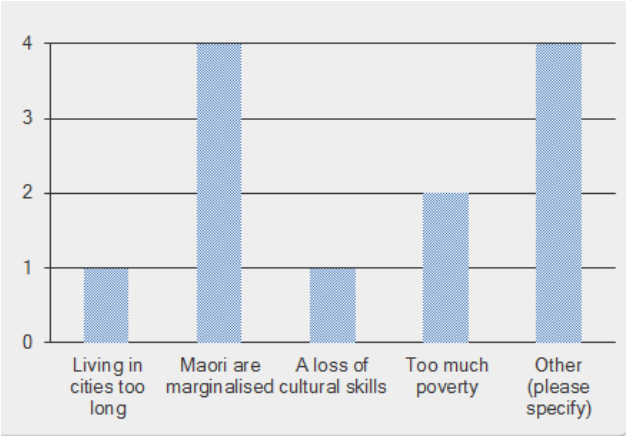
We were interested in perceptions that Māori consider themselves somehow 'better' at surviving disasters than non-Māori. 12 respondents considered Māori better at disasters, with social and cultural skills as the main reasons, with experiences of living in poverty third.

Figure 20: Reasons for Māori being better in disasters



However, five respondents considered Māori worse at disasters because of our history of poverty and marginalisation. This accords with the research literature in which marginalised communities are more at risk from natural hazards, and more vulnerable in the event of disaster.

Figure 21: Are Māori *worse* in disasters?



One respondent commented that 'a lack of money and WHERE Maori are located (poorer housing) may make things hard for us as a people.' Another thought it was 'Hard to suggest any culture is better in disasters. Arguments for both.'

Role of Culture in the Responses

The perceptions of Maori being better at disasters revolve around Maori cultural skills, also evident in the important contributions from Māori institutions and organisations (Kahi & Borrell, 2011; Lambert et al., 2012; Tarena, 2012).

> *[Our] organisational skills, knowing your community, knowing who to contact, that's it in a nutshell: knowing your community, the right people to approach and yeah, being Māori does help a big way because of what's in here, it's not what's up here, it's what's in here and you can go and cuddle anybody you know, it doesn't. Well, Māori cuddle Māori anyway … as soon as you've done that it sort of breaks down those barriers, and I think the Police have actually seen another side of that part of being Māori.*

Certainly, most participants considered 'being Māori' an important aspect of how and why they managed to cope with the earthquakes. This included the perhaps romanticised interpretation of rural backgrounds to many whānau (albeit two or more generations removed). Some whānau members knew they could rely on uncles and cousins to secure food through hunting and fishing although it should be noted that food was not in short supply in the immediate weeks following the February event.

> *It's just sort of part of your culture … you don't always have to rely on supermarkets … you know what puha looks like and you can probably go to your brothers or aunties and get something if you needed it.*

Several participants considered cultural attitudes to death to have been an important factor in the professionalism of care around victims with facilities at the nearby Burnham Military Camp with its large Māori workforce used as the mortuary for victims.

Manaakitanga and whānaungatanga were regularly named by participants as fundamental to the Māori response. Further cultural components were communicated to tamariki through mythology and story-telling, especially with korero on Rūaumoko. One important expression of this was our hosting of whānau,

friends and neighbours in the days and weeks following 22-2, shown by 16 of our 21 Māori respondents. (Of course Pākehā also hosted people, the difference identified by our survey was that none of our Pakeha respondents hosted nine or more guests and Maori manuhiri tended to stay longer.)

Figure 22: Numbers hosted

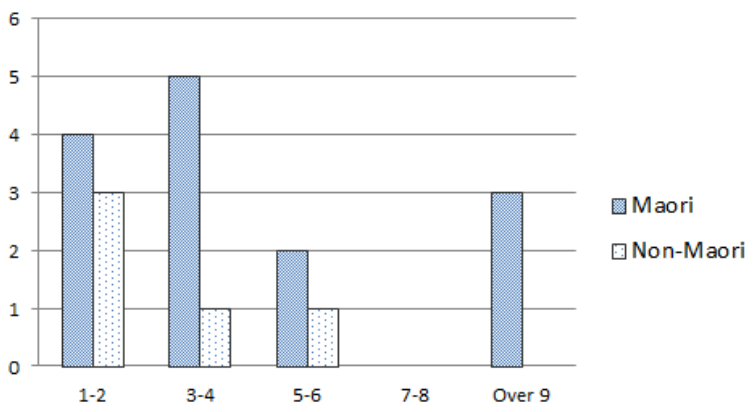
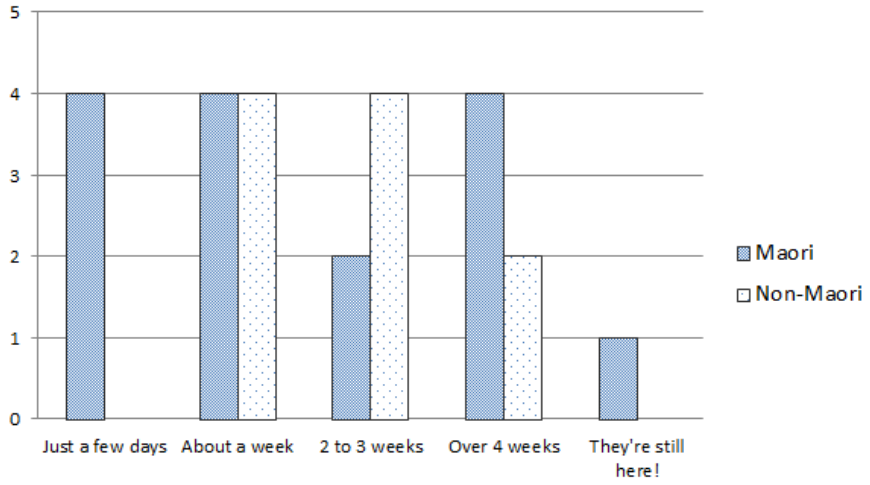


Figure 23: Length of hosting (Maori and Pakeha)



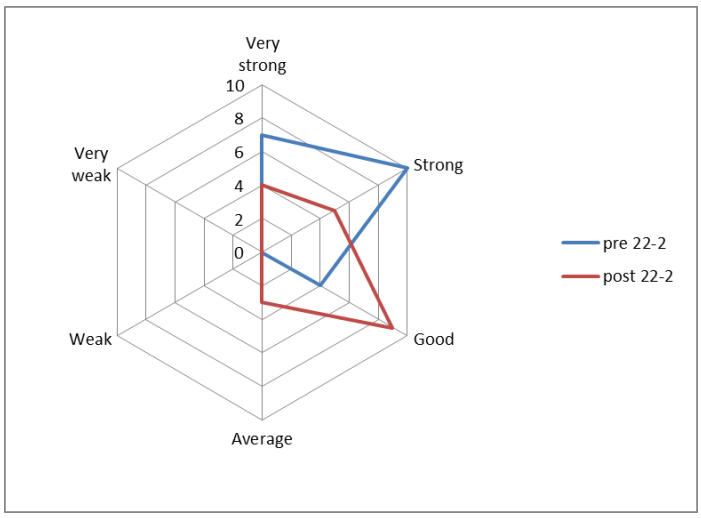
Resilience

One of the primary aims of our survey was to attempt to describe and measure resilience. Our approach was to build questions towards an understanding of wellbeing across four contexts: economic, environmental, social and cultural.[8] We asked participants to describe their wellbeing across these four *pou* before the February 22 event and at the time of the survey, that is 17-18 months after.

The following charts show this self-reported wellbeing. Resilience would be shown by *no* reduction in scores, i.e., respondents have at least *absorbed* the impacts of the disaster and possible increased their scores. But what we see is a decline across all four contexts, meaning a *lack* of resilience over this time.

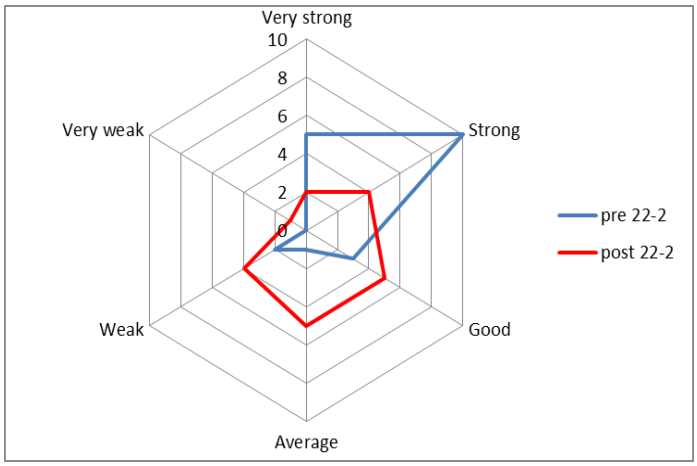
[8] This is an extension of the triple-bottom line approach of sustainability whereby environmental and social criteria are added alongside economic indicators with culture increasingly accepted as the 'Fourth Pillar' (Dunphy, 2007; Eames, 2004).

Figure 24: Māori economic wellbeing



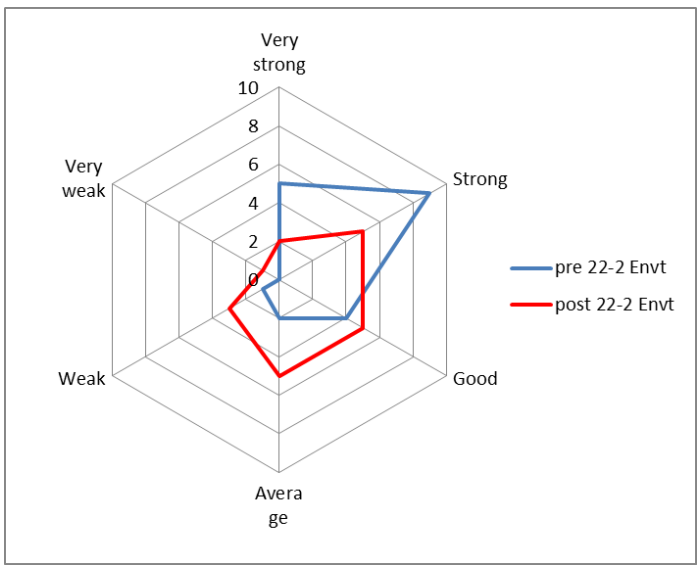
Māori whānau and communities were under considerable economic pressure prior to any of the earthquakes. Figure 19 above shows that 2 of our Māori respondents lost their jobs because of the disaster, and a further four lost hours.

Figure 25: Māori Social wellbeing



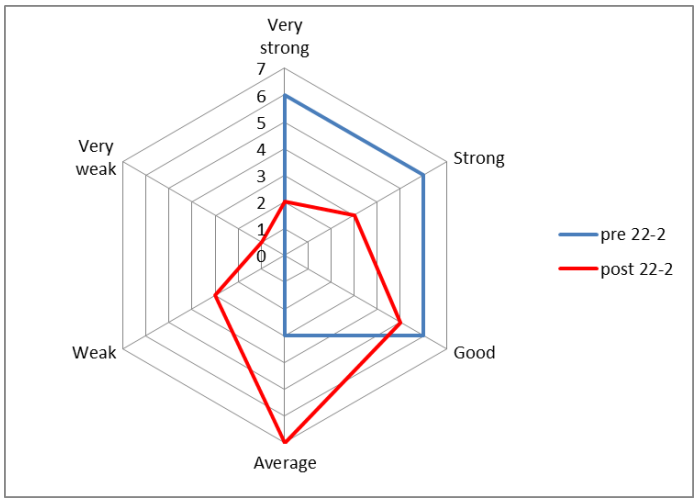
As with economic pressures, negative social outcomes were an issue before the disaster. With ongoing cuts to funding, many social programmes are at risk. (See also NZCCSS, 2012a).

Figure 26: Māori Environmental wellbeing



The wider Canterbury environment was also under pressure from the unprecedented expansion in dairying activities on the Canterbury Plains. Water quality and biodiversity are of fundamental concern to Māori in their role as *kaitiaki*. Other issue are access to safe waterways for swimming and mahinga kai. (See also Wells, 2012).

Figure 27: Māori Cultural wellbeing



Impacts on Ngāi Tahu wāhi tapu have been significant (Yates, Mark-Shadbolt, & Brown, 2011) as has damage to cemeteries (Dunbar, 2011; Lambert & Mark-Shadbolt, 2011). The loss of important facilities and ongoing funding pressures will challenge many cultural activities. (See also 'Quakes impacts on arts', 2012).

But is this finding a little premature? We know from other disasters that it can take many years for communities to bounce back, and not all of our respondents have experienced declines in their wellbeing with several recording *improvements*. One respondent noted …

> *"My personal well-being has ranged hugely during this time. At the moment I am happy to rate these four as strong or good, but during this period there were often months when I would have rated them weak."*

Another person commented:

> *[My] overall economic well-being is down because life has become more expensive. I am stressed out dealing with EQC replacement valuations and repairs, dealing with different people all the time.*

Despite the difficulties in defining, describing and measuring resilience and well-being, we considered it an important debate to contribute to, both methodologically and empirically. Table 8 shows the wellbeing scores for our Māori respondents. Adding scores for pre- (econ1, soc1 etc.) and post- well-beings, and then subtracting pre-quake from post-quake scores gives a number which, if positive, can be interpreted as a display of resilience and if negative numbers, a lack of resilience. We see that two cases (6 and 8) have no decline and have at least absorbed the worst impacts of the earthquakes, and two cases (19 and 20) have improved their wellbeing. Others (2, 13, and 16) have minimal decline (just -0.2) and could also be said to have generally withstood the effects of disruptions. However most respondents have experienced a decline in their wellbeing and cannot be said to be resilient.

Table 8: Wellbeing and Resilience scores for Māori survey respondents

Case	econ1	soc1	envt1	cult1	econ2	soc2	envt2	cult2	wb1	wb2	Res
1	1	1	1	1	0.6	0.4	0.6	0.8	4	2.4	-1.6
2	1	1	1	0.6	1	0.8	1	0.6	3.6	3.4	-0.2
3	0.8	1	1	1	0.6	0.8	0.2	0.2	3.8	1.8	-2
4	0.8	0.8	0.8	0.8	0.6	0.2	0.2	0.2	3.2	1.2	-2
5	1	1	1	1	1	0.2	0.2	0.4	4	1.8	-2.2
6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	3.2	3.2	0
7	1	0.8	1	0.4	0.4	0	0	0	3.2	0.4	-2.8
8	1	1	0.8	1	1	1	0.8	1	3.8	3.8	0
9	0.8	0.8	0.8	0.8	0.4	0.2	0.4	0.4	3.2	1.4	-1.8
10	0.8	0.8	0.8	0.8	0.8	0.6	0.6	0.8	3.2	2.8	-0.4
11	0.6	0.6	0.8	0.4	0.8	0.4	0.4	0.4	2.4	2	-0.4
12	0.6	0.6	0.6	0.6	0.6	0.2	0.4	0.2	2.4	1.4	-1
13	0.6	0.8	0.8	0.4	0.8	0.6	0.4	0.6	2.6	2.4	-0.2
14	0.8	0.8	0.6	0.6	0.6	0.6	0.4	0.4	2.8	2	-0.8
15	0.6	0.6	0.6	0.6	0.4	0.4	0.6	0.6	2.4	2	-0.4
16	0.8	0.6	0.4	1	0.6	0.4	0.6	1	2.8	2.6	-0.2
17	1	0.8	0.8	1	0.6	0.6	0.8	0.6	3.6	2.6	-1
18	0.8	0.8	0.8	0.8	0.8	0.4	0.8	0.4	3.2	2.4	-0.8
19	1	0.2	0.2	0.6	0.8	1	1	0.6	2	3.4	1.4
20	0.8	0.2	0.4	0.4	1	0.6	0.6	0.4	1.8	2.6	0.8
21	0.8	0.8	0.6	0.8	0.6	0.6	0.4	0.4	3	2	-1

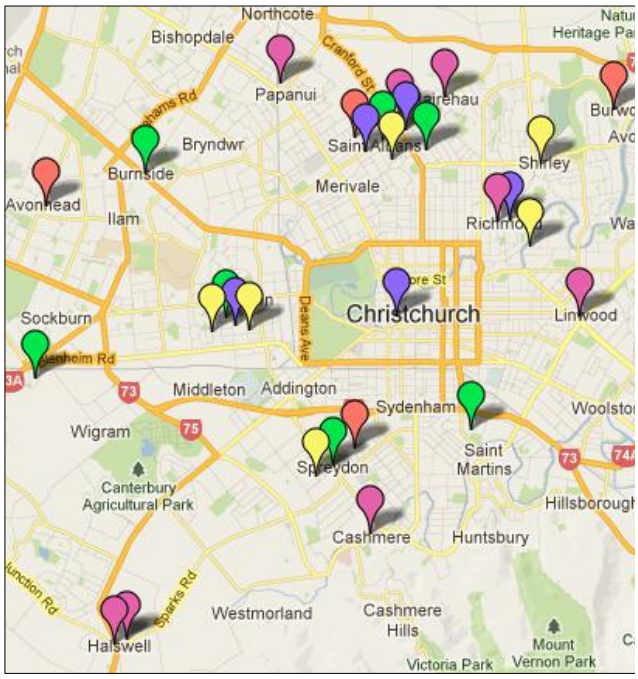
Note: Resilience (Res) is defined as the difference in well-beings pre- and post 22-2 (i.e., wb2 – wb1) scored across four contexts economic (econ), environmental (envt), social (soc), and cultural (cult).

As mentioned, our email survey was very detailed, and we have many variables which can be tested for their relationships to these resilience measures (which likewise can be interpreted in multiple ways). While a more in-depth analysis of this data is in progress, cases of resilience identified by this approach have several factors in common, the most significant combination is that of **high personal and household incomes**, **minimal damage to house and contents** and **minimal impacts** from any of the earthquakes.[9] While they are often (but not always) 'grounded' in Māoritanga and have large whānau in the city whom they have regular contact with, these factors are also evident in cases of *declining* wellbeing and cannot be considered causal in resilience despite many if not most interview participants naming exactly these factors in their narratives of survival.

The map below shows the rough location of all respondents – Māori and Pakeha – who lived in or close to the city. (Several participants are located outside the city). While we know that the effects of any disaster are not distributed evenly across society or a landscape, it is difficult to identify a spatial pattern for the resilience of our respondents.

[9] The methodology and results of this analysis will feature in a future Working Paper.

Figure 28: Survey respondents' locations



Key: 5 (most resilient) to 1 (least resilient)

5

4

3

2

1

Discussion

Māori in Ōtautahi/Christchurch City have exhibited their own culturally-attuned collective responses to the disaster. From whānau clustering together marae-style, centralising responses through kura, locating services and information on marae, to iwi engaging in the distribution of aid, Maori institutions and approaches were brought into action almost immediately and although coordination was challenging and not always achieved, this was mirrored by mainstream organisations (see Pilling, 2012 for a report on the performance of the NZ Fire Service).

However, perhaps the most significant response was migration, whether short-or-medium term or permanently. While it is difficult to ascertain accurate Māori demographic changes due to a lack of robust statistical frameworks, this report estimates outward Māori migration in 2011 at between 560 and 1,100 with young whānau and single young women comprising a disproportionate number of these migrants. To 2012, over 1,200 Māori have probably left. There is some evidence of a general movement to northwards and on to the North Island; emigration to Australia is also an attractive and obvious option for many Māori, an entrenched response to cyclical downturns and the long-term decline of the New Zealand economy. Thus while 300 plus Māori may have emigrated from Canterbury to Australia post-quake, the disaster itself may be only one of a series of events or trends that has prompted such a decision.

School enrolments indicate that although the numbers of Māori in the Eastern suburbs have declined, there is a rebound in Māori children enrolled in most schools: whānau are either returning to the city and/or new whānau are moving in. Māori children made up more than one in four of the net loss of children aged 6 to 15 years enrolled in schools in Greater Christchurch over the year to June 2011. Research literature identifies depression affecting a small but significant number of children one to two years post-disaster and points to increasing clinical and organisational demands for Māori and other residents of the city.

Māori beneficiary movements show an initial exodus was not matched by a rapid return as with non-Māori beneficiaries, although Māori receiving the unemployment benefit moved into the city, presumably

looking for work in the construction sector (Lambert, 2013). Overall, Ōtautahi's Māori population should rebound, especially once the somewhat delayed rebuild gets underway, but neighbourhoods historically home to many Māori communities may suffer such a decline in numbers and community wealth as to be more vulnerable to future economic and social shocks.

For those residents in the eastern or coastal suburbs, severe damage to housing, schools, shops, infrastructure and streets has meant disruption to their lives, children's schooling, employment and community functioning. Ongoing abandonment of homes by many has meant a growing sense of unease and loss of security, exacerbated by arson, burglaries, increased drinking, a stalled local and national economy, and general confusion about the city's future (see, e.g., Gates, 2012; Wright, 2012). Considerable numbers of Māori may migrate into the Canterbury region for employment in the rebuild, and trades training strategies have already been established.

While the recovery and rebuild phases offer considerable options for Māori and iwi, with Ngāi Tahu set to play an important stakeholder in future infrastructural, residential, and commercial developments, some risk and considerable unknowns are evident. With many iwi now increasingly investing in property, the risks from significant earthquakes are now more transparent, not least to insurers and the reinsurance sector. Iwi authorities need to be aware of insurance issues and ensure sufficient coverage exists and investments and developments are undertaken with a clear understanding of the risks from natural hazards and exposure to future disasters.

Conclusions

Aotearoa/NZ is a geologically active land and this disaster begs prompt and relevant strategic decisions within whānau, kōhanga and kura, businesses, communities, and wider neighbourhoods in mitigating future events. Comprehensive disaster management plans should by drafted iwi in collaboration with central government, regional, and city or town councils as well as the private sector.

The series of earthquakes experienced by residents of Christchurch have radically altered the physical and social landscapes of the city. Throughout the disaster, Māori institutions naturally and automatically helped non-Māori, underpinned by the cultural practices of manaakitanga and whanaungatanga. This manifestation of Māori cultural resilience enabled a considerable network of people and resources being available to Māori through whānau, marae and kura.

While resilience has become a commonplace term within the city, our results show the Māori experience thus far is best described as *endurance*: the 'bounce back' in people's well-being that this report interprets as resilience has yet to happen across Maori communities. This should not be a surprising conclusion at this stage of a recovery process that will take many years to complete.

Overall, Māori are remarkably philosophical about the effects of the disaster with many proudly working in their roles through a historic event of great significance to the city and country. Most believe that 'being Māori' has helped cope with the disaster although for some this draws on a collective history of poverty and marginalisation, features that undoubtedly contribute to the vulnerability of Māori to such events. Reducing our future vulnerability will require the collective continuance of our cultural practices and an increase in Māori economic wellbeing.

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Appendix

The following are a selection of quotes from our interviews.

I wrapped her up and said a little prayer to myself. 'If this is it, please protect my girl.' (September 4th, 2010 earthquake)

I just stood there waiting for the floor to fall through so I could catch [our girl].

Me personally? Oh I didn't have time to be affected by the EQ … on the day we were in the CBD ... I was more worried about my entire team dying in front of my eyes actually.

When I evacuated the office, my work colleague who was pregnant needed help... As I was walking past Joe's Garage, I could hear screaming in there. I helped this one lady out, I ended up carrying her. Both her legs were crushed.

When I looked at it, my house was unsafe, there was glass everywhere … All I wanted to do was create a safe place. Closed the rest of the house off…all that stuff wasn't worth a dime. [The kids] were playing under the table … For a long time there were no chairs.

Q: Are Māori better at disasters?

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.

Oh shit yeah!

Of course!

Kanohi kitea (in answer to questioning about why some processes worked well through the disaster).

Q: What inspired you?

Our kids inspired me because they just dealt with it so well.

I would like to add, that my oldest girl surprised me by going out and finding water on the bike, getting water, cooking dinner in our makeshift kitchen out the back, boiling water for dishes, she really stepped up in time of a disaster.

...the kids were pretty inspiring through it because ... we were watching all these other kids fall apart and not sleeping but I just put that down to the close relationships they've all got with each other and that's why I think it would never have worked for us to split up.

Comradeship

Q: How have things changed for you?

I don't go out much anymore, I'm more 'stay at home'. I don't like going to malls, I'm not keen on big crowds now, especially inside...[we've] changed a whole lot of

things around the house, some EQ proof stuff for instance, and some pictures on the wall, we've taken them down now, some mirrors that were in the spare room

Can't stand them, hate our house now and if we could move we would not be living in Christchurch.

Living through a disaster like that is going to have life changing effects. It can't not.

I'm way more enthusiastic about life. Your time could be up any old, it could be up could be gone tomorrow!

I still hate parking in carparking buildings…I'm constantly looking around (couple who had moved to Australia)

I'm more assertive

...but you never know, and I probably need to see, um, get some counselling later when I get enough time I can fit it in

To think we were so proud of our crystal!

Miscellaneous

I think that's been one of the most frustrating things even now all these people with their red zones and their yellow zones who have been stickered, who are going to get a payout?! … All of their grief … there's fighting going on with EQC and insurance companies to be paid but a lot of it is red tape bullshit that's getting in the way with people getting on with their lives and that's bloody that's been disappointing. In the end a lot of its coming down to money and whose going…

All my whānau who lived here shot back to the North Island, we're a poor whānau, solo mums … [my sister] with 8 kids, they jumped on a plane and went to Tokoroa. They're still there.'

We got a lot of help from the iwi, Tuhoe, through Rehua marae, they were catching up with whānau, ringing up, 'Are you guys alright? We've got money here'

[The Australian police] got welcomed in [to their accommodation]. They had a poroporoaki for them when they left, everyone of them was given a pounamu. They were here for three to four weeks, 300 hundred of them. Those relationships are still good…

My dad's idea was to ring up and yell at me, and go 'go home!' Which means to go to Kaikoura. But the reality is we didn't want to go back, we didn't want to live on the marae. Because when we come back, it's still gonna be here. Nothing's going to change.

I will never go back to Aranui. I'm just so scared of the unknown.

The University College of Arts seem to do all they can to make things worse for me!

[The] September earthquake was a huge shock – post-September, whānau preparedness for emergencies was stronger. Having full time work enabled whānau to afford emergency kit, etc. Impact of aftershocks, and cancer diagnosis of youngest child increased stress within whānau. Inequities of earthquake

observed e.g., portaloos remaining in streets when they should have been supplied to the Eastern suburbs.

Rūaumoko has sent a message, but it is one of opportunity to change for the better: to look after the environment better and to reflect our history and heritage better!
