Population movements following the 2010-2011 Canterbury Earthquakes: Summary of research workshops November 2011 and current evidence

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ABSTRACT

The widespread impacts of the earthquake series affecting the greater Christchurch region over 2010-2011 constituted a disaster on a scale rarely seen in New Zealand. These events created new challenges for those who, in local and national government agencies, the private sector, and elsewhere, rely on forecasting to anticipate and plan for future economic and resourcing needs based on population and economic trends. In the earthquakes' aftermath, new drivers, uncertainties and unknowns put existing forecasts in question. Attempts to identify and analyse existing and possible new sources of data to improve understanding of potential population changes and other impacts of the events began with the establishment of the 'Canterbury Earthquakes' portal on the Statistics NZ website. Later that year, in November 2011, a selection of evidence to date of immediate flight and return, permanent population loss, and the implications for future trends was presented and discussed at a workshop, and two subsequent conferences. The workshop, entitled "Population and Employment Effects of the Christchurch Earthquakes" (Lincoln University, 23rd November, 2011) preceded the NZ Association of Impact Assessment's biannual conference, entitled "Natural Disasters: Impact Assessment for Sustainable Recovery" (Lincoln University, 24-25th November, 2011). Three days later, the Population Association of New Zealand held their biannual event, entitled "New Zealand's Demographic Futures: Where to from here?" (University of Auckland, 28-29 November, 2011). This report summarises some of the relevant work presented at these three events.

KEYWORDS

Christchurch, earthquake, forecasting, economy, resourcing, demography, planning, population, future trends, data sources.

1.0 INTRODUCTION

Christchurch City had an urban population of approximately 400,000, when the first of what was to be a series of strong earthquakes struck on Saturday the 4th of September, 2010, at 4.34am local time. Of magnitude M_w 7.2, this earthquake's epicentre was located 40 km west of the city at a depth of 10 km. Shaking led to some structural and significant non-structural damage to buildings, moderate to severe damage to lifeline infrastructure (particularly underground pipe networks) and extensive liquefaction and lateral spreading close to rivers and streams in the city's central and eastern suburbs.

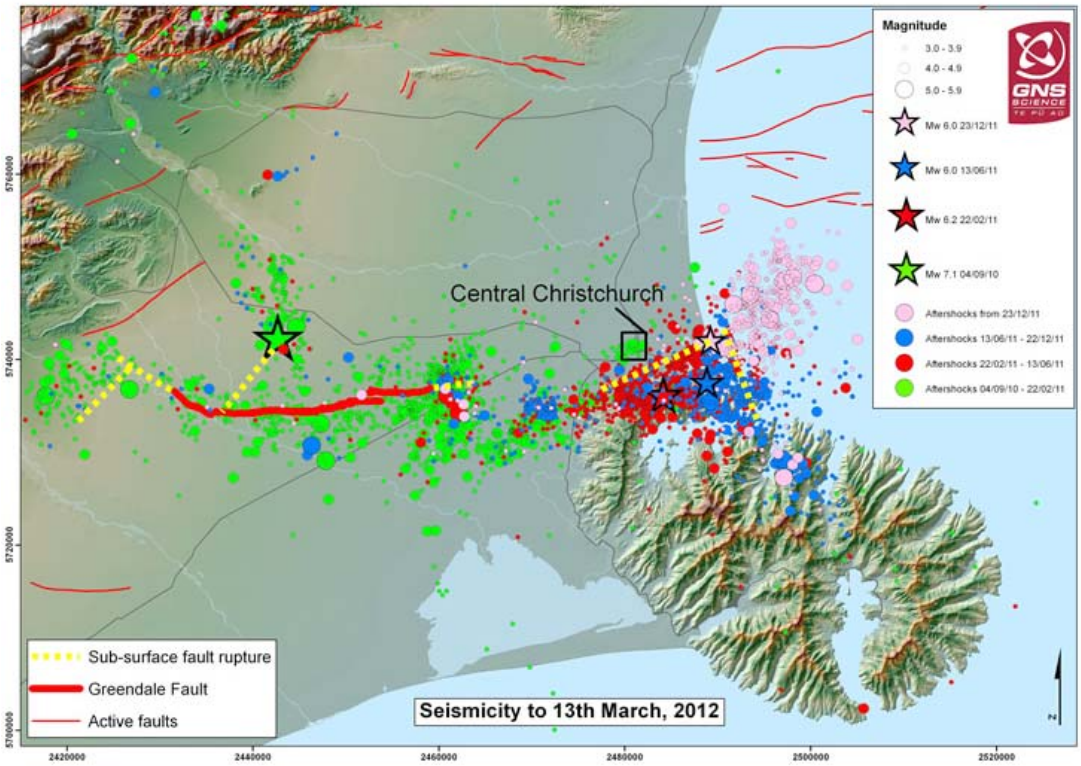


Figure 1 Aftershock sequence from September 4, 2010 to March 13, 2012. (GNS Science, 2012).

The depth, distance from the city, and timing of this earthquake meant there were no fatalities on September 4th. To date, the subsequent aftershock series has been punctuated by three further large earthquakes, each followed by a cluster of aftershocks, diminishing in frequency and intensity over time (Figure 1).

The event of the February 22nd 2011, at 12.51pm local time, was the most destructive of these larger earthquakes, causing 181 fatalities, and widespread building and infrastructure damage in the city, including building collapses in the central business district (Kaiser et al., 2012). Lateral spreading and liquefaction in riverside and coastal suburbs on the east of the city were so severe that a zoning system now requires the forced relocation of the more than 7000 households situated on 'red zone' properties in the Christchurch (~6,100) and Waimakariri (~1,000) districts, where land is deemed no longer fit for building purposes (Figure 2). A significant additional number of buildings have had to be demolished due to building and/or land damage in regions of greater Christchurch zoned green (for Canterbury Earthquake Recovery Agency land and property damage maps see CERA, 2012), while households zoned white in hillside suburbs are still undergoing geotechnical assessment of landslide and rockfall risk (Figure 2).

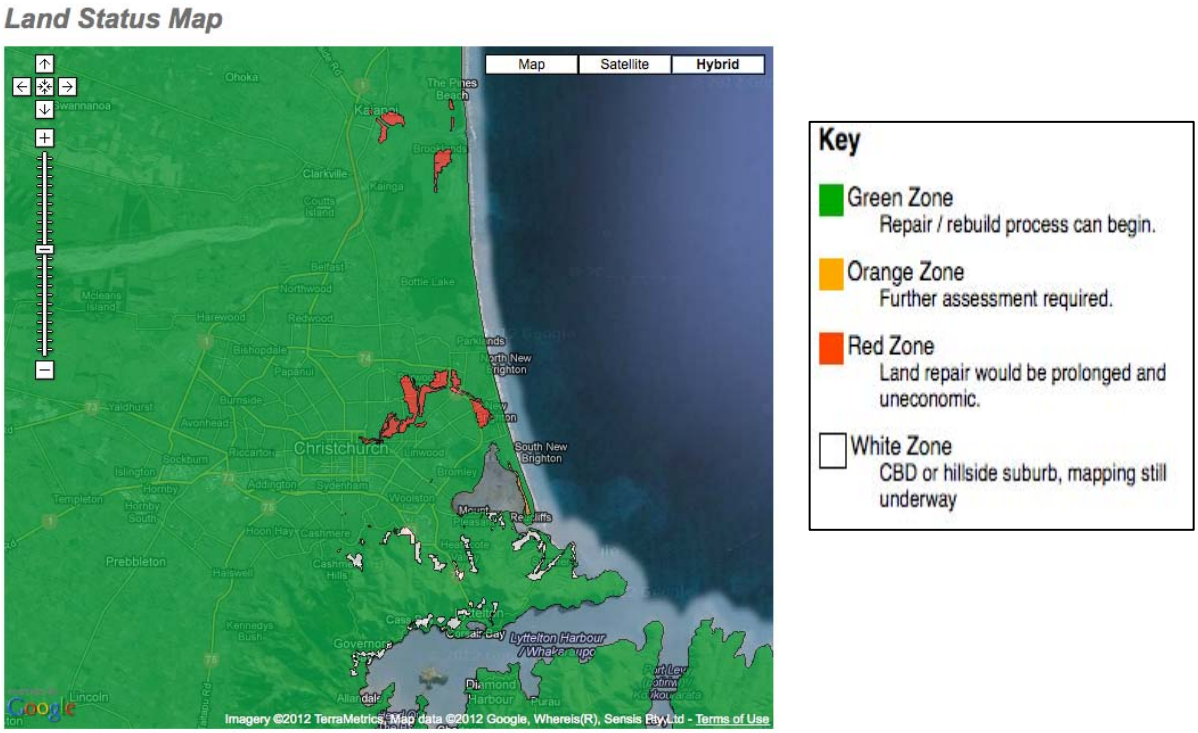


Figure 2 Canterbury Earthquake Recovery Authority (CERA) land status map showing zoning status in the greater Christchurch area as of the 23 March 2012 (CERA, 2012).

1.1 Workshop and Conferences

This earthquake series created new challenges for those who, in local and national government agencies, the private sector, and elsewhere, rely on forecasting to anticipate and plan for future economic and resourcing needs based on population and economic trends. In the earthquakes' aftermath, new drivers, uncertainties and unknowns put existing forecasts in question. Attempts to identify and analyse existing and possible new sources of data to improve understanding of the short and medium term impacts on population size and composition and economic activity, and the implications for existing forecasted trends, began with the establishment of the 'Earthquake Information' portal on the Statistics NZ website. Set up as a catalogue, with links to available statistical data and reports from Statistics NZ and other government and non-government organisations, it was established to help agencies involved in the Canterbury response and recovery operations access data and relevant research projects (Statistics NZ, 2011).

By November 2011, more evidence of the impact on population movements had become available, including the release in that month of official Statistics NZ population estimates for the year to June 2011, along with 2006 to 2011 population trends. At the "Population and Employment Effects of the Christchurch Earthquakes Workshop" (Lincoln University, 23rd November, 2011), researchers and policy analysts from local councils, the Department of Labour and Canterbury Development Corporation (CDC) presented relevant evidence to date, and the implications for existing trend forecasts; discussions followed with approximately thirty participants representing local and central government agencies, Crown Research Institutes (CRIs), Non-Governmental Organisations (NGOs), universities and private research provider organisations.

The workshop immediately preceded the NZ Association of Impact Assessment's biannual conference, entitled "Natural Disasters: Impact Assessment for Sustainable Recovery" (Lincoln University, 24-25th November, 2011). Three days later the Population Association of New Zealand included a 'Canterbury Region' stream in their biannual event, entitled *"New Zealand's Demographic Futures: Where to from here?"* (University of Auckland, 28-29 November, 2011). This report summarises some of the work presented at these three events, and is structured around three focus areas identified by David Price: data indicating short term flight and return population movements, that which points to immediate and medium term population loss, and wider implications for future growth forecasting in the region. More detailed material is provided in the Appendices, including Workshop and Conference programs (Appendix A), a 2011 synopsis of available datasets (Appendix B) and selected presentations (Appendix C).

1.1.1 Short-term population movements after earthquakes

Nissen and Potter's (2011) analysis of cell phone data comparing voice calls made by Christchurch users over the first six months of 2010 and 2011 indicated that a much larger proportion of voice calls were made from outside the city in the week after the February 22nd earthquake (Nissen and Potter 2011; Price 2011). Extrapolating from this sample indicates that around 15% (55,000) of the usual Christchurch population are likely to have left the city over this week (Figure 3). Most external calls were made from Otago, followed by Auckland and Wellington (Nissen and Potter, 2011). However, although the number calling from outside the city each weekend in March 2011 continued to be greater than that in the same time in March 2010, a month after the earthquake the weekly 2010 and 2011 patterns began to loosely coincide, suggesting that the immediate flight phase had stabilised at that point (note that Easter calling spikes on April 24th in 2011, but was later in the year in 2010 – Figure 3). In addition, Nissen and Potter's cell phone data analysis indicated that those who relocated temporarily to other South Island destinations returned to Christchurch city sooner than those who made temporary moves to North Island destinations (Nissen and Potter, 2011).

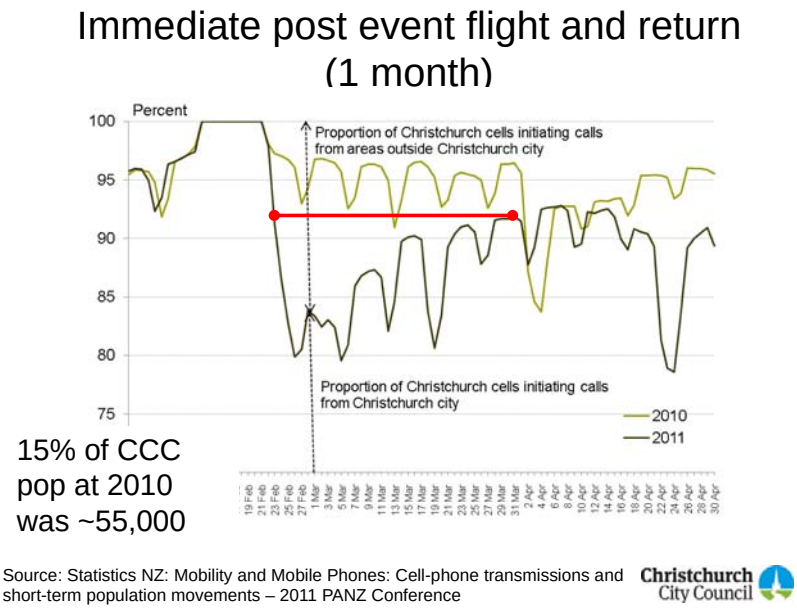


Figure 3 Comparative percentage of cell phone voice calls made by Christchurch users inside and outside the city between February 19th and April 30th in 2010 and 2011 (Nissen and Potter, 2011; Price 2011).

Price noted that postal redirection data also indicated a high degree of post-event movement inside the city, with approximately 20,000 residents redirecting mail to an alternative Christchurch address, compared with the approximately 5,000 who redirected mail to an address outside Christchurch. (Price 2011).

1.1.2 Likely longer term loss of population

Permanent and long term (PLT) migration data, taken from arrival and departure cards filled out by those arriving and departing on international flights, reveal that both the September and February events were followed by a significant fall in international arrivals (Lafferty 2011, Newell 2011).

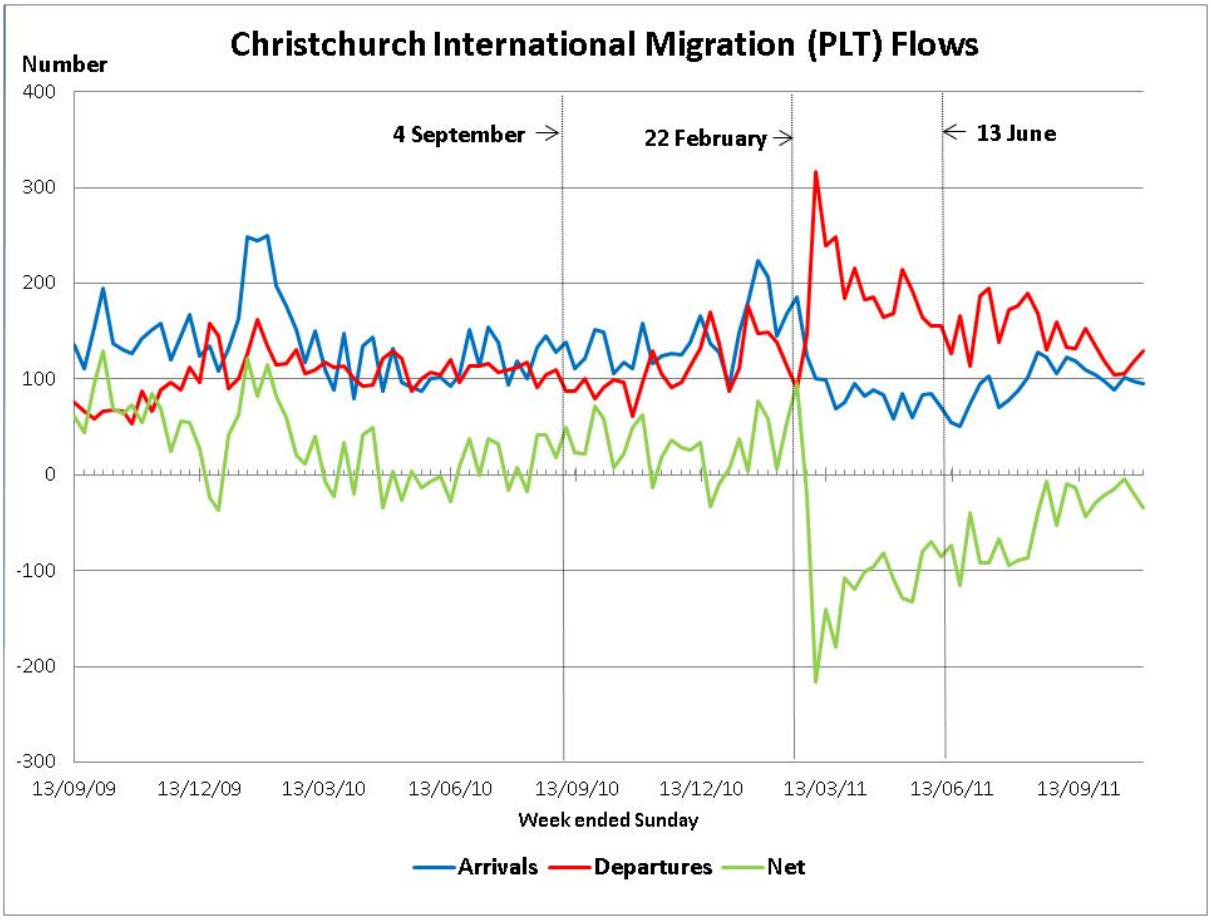


Figure 4 Christchurch International Migration flows, September 2009-September 2011 (Lafferty, 2011).

Evident after the September earthquake, this effect appeared to be tapering off in February. The February 22nd event generated a new and significant increase in departures along with another, more sustained fall in international arrivals (Figure 4) (Newell 2011, Lafferty 2011, Price 2011).

The PLT migration data showed a high percentage increase in departures in the age range 0-15 (Lafferty 2011, Newell 2011). This is consistent with school enrolment data over this period, which showed a net drop of around 3,500 in school enrolments in the greater Christchurch area between 2010 and 2011 (Johnston et al. 2011, Newell 2011, Price 2011). The migration data also shows a larger net loss of women than men, in the ratio of 1.4:1 (Lafferty 2011, Newell 2011). This appears to be consistent with a Ministry of Women's'

Affairs analysis of employment data gathered in the Statistics NZ Household Labourforce survey. This survey indicated that as much as 70% of the fall in employment after the February event involved female employment, and estimated that 5,100 women had left the labour force, compared with only 1,000 men (Newell 2011).

Several broad points were made concerning the evidence available at that point concerning loss of permanent population as a result of the earthquakes:

- June population estimates provided by Statistics NZ estimated a net population loss for Christchurch of 8,900, including the loss of 3,370 from March-September 2011, with 75% of this loss occurring up to June (Lafferty 2011, Price 2011, Newell 2011);
- Women, and families with young children make up a significant proportion of this population loss (Lafferty 2011, Newell 2011); and,
- A 30% decrease in guest nights in Christchurch is consistent with the fall in international arrivals, and impacted only hotels and backpackers; guest nights at motor camps remained steady, while those at motels increased after the February event (Price 2011).

1.1.3 Implications for future growth forecasting

Price noted that two comparative analyses of disaster impacts on regional populations and economies identified an international research consensus concerning disasters and pre-existing trends. While there is no evidence of long term disaster impact (positive or negative) on the longer term growth prospects of growing regions such as Christchurch, disasters have been found to accelerate *pre-existing* economic and regional decline (Westpac Trust 2011, Love 2011, cited in Price 2011).

Price related four possible future post-earthquake growth scenarios to pre-earthquake ‘Urban Development Strategy’ (UDS) projections.

These ranged from a rapid recovery scenario, in which the rebuild would attract permanent residents on a scale that would return Christchurch and the Waimakariri and Selwyn districts (greater Christchurch) to the pre-earthquake Medium-High growth projection for the region by 2021, down to a slow recovery scenario, in which population losses until 2016 would mean a much slower return to the Medium-High trend (Figure 5; Price 2011).

The predicted rates of population (household) growth are being used to plan greenfields developments in the greater Christchurch region. The picture is complicated, however, by the levels of uncertainty associated with population and migration effects of departures from properties that have been zoned uninhabitable, and of the labour demands associated with the rebuild of the city.

Future Household growth in the UDS area – possible futures

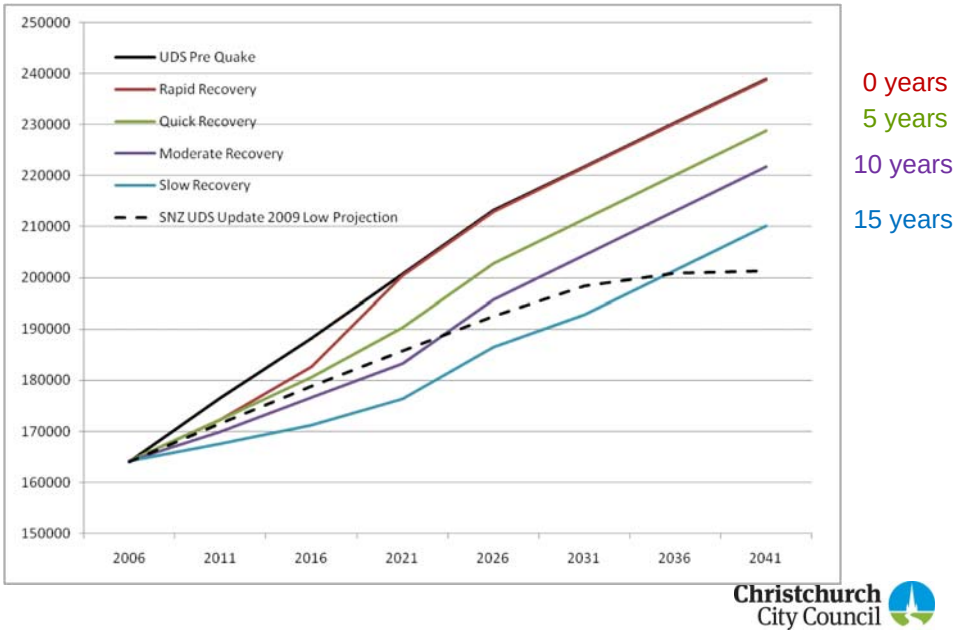


Figure 5 Range of recovery scenarios post-earthquake, in relation to the low projection made in the 2009 Statistics NZ UDS update (Price 2011)

1.1.3.1 Departures from condemned properties

Geotechnical assessment of land damage has resulted in just over 6,100 properties zoned red in the Christchurch district, and just over 1,000 in the Waimakariri district, due to land being so damaged that restoring it to a state in which it can support buildings safely would be uneconomic and too time consuming (Figure 2; see CERA, 2012). Other properties across the city have also been condemned due to excessive property and/or land damage, (CERA, 2012). The resulting population movement and redistribution had begun in November 2011, but at time of writing was not yet represented in available statistics. Similarly, the scale and length of the flight response was not fully realisable at that point.

Surveys carried out by CERA and the Waimakariri District Council (WDC) in the last quarter of 2011 asked about the relocation intentions of those owning property or living in Christchurch and Waimakariri red zones, and the results informed discussion at the workshop (Table 1). Those surveyed in the Christchurch red zone appeared to be more certain of their plans (Price 2011), while only 17% of Waimakariri red zone residents had confirmed plans to relocate inside the greater Christchurch region, with another 35% wishing to do so (Sparrow 2011).

Table 1 Relocation intentions – CERA and WDC survey responses from red zone residents.

Relocation Destination	**CERA Red Zone survey** (n=2996 responses)	**WDC Red Zone survey** (n=392 responses)
Greater ChCh region	67%	52%
Outside greater ChCh region	5% (already) 16% plan to do so	5% plan to do so
Unsure or undecided	12%	17%

In addition, the Waimakariri survey revealed that families with children were more likely to have confirmed relocation plans, highlighting the large proportion of elderly retired residents continuing to live in substandard conditions in red zoned properties in Kaiapoi and Pines Beach, due to comparatively low government valuations, and the difficulty of finding affordable property elsewhere in the district (Sparrow 2011).

These surveys offered a snapshot of resident intentions at the point of survey completion, and therefore a very broad indication of possible population movement in the medium term. Overall the CERA survey indicates that 66% of the total demand for accommodation due to red zone relocation is likely to be required in the Christchurch district, 23% within the Waimakariri district, and 5% in Selwyn (Price, 2011). In addition, responses to these surveys underlined the need for a better understanding of both the emerging demand for affordable housing, and of the position of renters, in the reconfiguration of land use in Canterbury after the earthquake.

1.1.3.2 Labour demand for the Canterbury rebuild

It is clear that the main reconstruction phase, both of the central business district and in affected suburbs, will generate a demand for skills and labour that will have to be met from outside the region. It is difficult to accurately estimate the scale and timing of this main reconstruction phase, and the associated demand for labour. While a percentage of those recruited and employed in the Christchurch rebuild are likely to bring family, and/or to settle permanently in the city, others are likely to remain only while required for the peak reconstruction period.

Brian Cosgriff and Amy McNaughton (2011) presented preliminary findings from a labour market demand model of the Canterbury rebuild. Supplied by Market Economics, the model was adapted from the Economic Futures Model to be applied in recovery contexts. On the basis of inputs including population growth, exports and productivity, the model calculates the output that will be required to meet demand, including value-added productivity, and employment requirements (Cosgriff and McNaughton, 2011).

Modelling the Canterbury rebuild involved feeding damage data into the model, including likely different work streams and the cost of the damage, with categories mapped onto construction worker occupations. The model calculated flow-ons to the wider economy, and demand by construction occupation through time, subtracting ‘Business as Usual’ from the total demand to find the effect of the Earthquake rebuild. Using scenarios with differing levels of damage, start dates and lengths of time, early runs of the model show that as many as 30,000 additional construction workers may be required at the point of peak demand (Cosgriff and McNaughton 2011).

Extrapolating from these results, Price indicated that additional housing demand in Christchurch created by this incoming labour force may be around 10,000 households, with an additional accommodation demand for 7,000 households as domestic houses are rebuilt (Price 2011).

Discussions concerning the parameters of the model identified that while the focus of labour demand modelling was on the construction sector, bottlenecks in other specialist professional occupations were likely to hold up the recovery. Planning staff indicated that the demand for building and planning consents had already become an issue, due to the huge volume of applications and major land use change. The lead time for fully qualified staff is several years, therefore certification requirements set by the NZ Planning Institute and related professional bodies were likely to limit the scope for 'pressure-cooker' training programs to help meet the expected staffing short-fall.

1.2 Conclusion

The population movement response and recovery process for Canterbury was at an early stage in November 2011. While cell phone use, postal redirection and PLT migration data had given a clearer picture of immediate population flight responses, the scale and length of this flight response was still not clear. Although the movement and population redistribution effects of the red zone abandonment had begun, this had not yet been clearly represented in the available statistics. It was becoming apparent, however, that the scale of the labour supply required for the reconstruction of commercial, industrial and residential buildings was likely to create capacity issues, and a short to medium term construction related population boom that may have a much greater impact on population growth and movement than the earthquakes. It was noted that the rebuild was likely to generate a demand for housing for as many as 17,000 households that would require any reconfiguration of land use to take the demand for affordable accommodation and for renters into consideration.

2.0 ACKNOWLEDGEMENTS

Many thanks to Kim Wright (GNS Science), and Mary Sparrow (Waimakariri District Council), for reviewing this report. Thanks are also due to David Price (Christchurch City Council), Peter Lafferty, Kirsten Nissen and Deborah Potter (Statistics New Zealand), Brian Cosgriff (Department of Labour), Amy McNaughton (Canterbury Development Foundation), and Mary Sparrow (again), for generously agreeing to make their presentations available in the Appendices. We would also like to take the opportunity to acknowledge the organising committees of the "Population and Employment Effects of the Christchurch Earthquakes" workshop, and the "Natural Disasters: Impact Assessment for Sustainable Recovery" and *"New Zealand's Demographic Futures: Where to from here?"* conferences, for providing opportunities for the dissemination of this information. Thanks to Maureen Coomer, for all her help in finalising this report and to Penny Murray for formatting the report.

3.0 REFERENCES

CERA, 2012. Canterbury Land and Property Damage Maps. Canterbury Earthquake Recovery Agency webpages. http://cera.govt.nz/maps

Cosgriff, B., & McNaughton, A. (2011). Estimating Labour Demand for the Canterbury Rebuild. *Population and Employment Effects of the Christchurch Earthquakes workshop*. Christchurch.

GNS Science, 2012. Recent Aftershock Map (as of march 2012) http://www.gns.cri.nz/Home/News-and-Events/Media-Releases/Most-damaging-quake-since-1931/Canterbury-quake/Recent-aftershock-map

Johnston, D., Beaven, S., & Wilson, T. (2011). Where have all the students gone? Student movements following the 2010 and 2011 Canterbury Earthquakes. *PANZ biennial conference "New Zealand's Demographic Futures : Where to from Here."* Auckland.

Kaiser, A., Holden, C., Beavan, J., Beetham, D., Benites, R., Celentano, A., Collett, D., et al. (2012). The Mw 6.2 Christchurch earthquake of February 2011: preliminary report. *New Zealand Journal of Geology and Geophysics*, *55*(1), 67-90.

Lafferty, P. (2011). International migration to/from Christchurch after the earthquakes. *PANZ biennial conference "New Zealand's Demographic Futures : Where to from Here."* Auckland.

Love, T. (2011) Population movement after natural disasters: a literature review and assessment of Christchurch data.

Newell, J. (2011). Population and employment effects of the Christchurch Earthquakes – some supplementary analysis to date. *Population and Employment Effects of the Christchurch Earthquakes workshop*. Christchurch.

Nissen, K., & Potter, D. (2011). Where did people relocate to? Experimental cell phone data analysis of population movements following the 22nd February Christchurch Earthquake. *PANZ biennial conference "New Zealand's Demographic Futures : Where to from Here."* University of Auckland.

Opus, Natural Hazards Platform Research, 2011. *Preliminary report on Household Relocation from and within the Canterbury Region* (Statistics NZ "Earthquake Information Portal" web page)

Price, D. (2011). Population and household trends in Christchurch post February 22 earthquake. *Population and Employment Effects of the Christchurch Earthquakes workshop*. Christchurch.

Sparrow, M. (2011). Kaiapoi - where to from here? *Population and Employment Effects of the Christchurch Earthquakes workshop*.

Statistics NZ, 2011 Canterbury Earthquakes Web Portal (homepage) http://www.stats.govt.nz/tools_and_services/services/earthquake-info- portal.aspx

Statistics NZ, 2011a. *Annotated bibliography of population-related disaster research* (Statistics NZ "Earthquake Information Portal" web page)

Statistics NZ, 2011b. *Estimating local populations after the 2010/11 Canterbury earthquakes* (Statistics NZ “Earthquake Information Portal” web page)

Statistics NZ, 2011c. *Re-enrolment of Christchurch school students, at 13 September 2011* (Statistics NZ “Earthquake Information Portal” web page)

Westpac Trust. (2011). *Disasters in history: a review*. Retrieved from http://www.wib.westpac.co.nz/web/content/pdfs/Disasters_in_History

APPENDICES

APPENDIX A WORKSHOP AND CONFERENCE PROGRAMMES

Population and Employment Effects of the Christchurch Earthquakes Workshop: Programme

James Newell Monitoring and Evaluation Research Associates	*Welcome and overview*
David Price, Principal Analyst, Monitoring and Research, Christchurch City Council;	*Part 1: Synthesis of evidence of population and household effects to date*
James Newell Monitoring and Evaluation Research Associates	*Part 2: Some Supplementary analysis on effects to date*
David Price, Principal Analyst, Monitoring and Research, Christchurch City Council;	*Part 2: Future growth scenarios*
Amy McNaughton Canterbury Development Corporation Brian Cosgriff Department of Labour	*Estimating labour demand for the Canterbury rebuild*
Mary Sparrow Policy Analyst, Waimakariri District Council	*Kaiapoi – Where to from here? Indicative intentions of red zone residents of Kaiapoi and Pines Beach based on a housing intentions survey*

NZAIA 2011 Conference, Lincoln University, 24/25th November - "Natural Disasters: Impact Assessment for Sustainable Recovery": Programme Outline

Thursday 24th November		**Programme**	
9.20am		Conference opening	
9.30am		Keynote presentation**: *International trends in post-disaster impact assessment***	
Room S2		Charles Kelly Benfield Hazard Research Centre, UCL, UK	*Normal and rapid assessment of social and environmental impacts*
10.30am		Break	
11.00am	1	***The role of IA in the context of major disasters***	
Room S2		Nick Taylor Taylor Baines & Associates	*Impact Assessment in the Context of Major Disasters: opportunities and requirements*
		Anna Stevenson Canterbury DBH Christchurch CC	*Planning for a healthy, sustainable and resilient future: the Integrated Recovery Planning Guide*
12.30pm		Lunch	
2.00pm	3	***Embedding IA in resilience planning and response and recovery planning*** (Workshop)	
Room D6		Ljubica Mamula-Seadon Ministry of Civil Defense & Emergency Management	*Embedding IA in recovery planning from a MCDEM perspective – IA inputs needed*
		Bob Bach Centre for Homeland Defense and Security, Naval Postgraduate School, USA	*How consideration of community resilience might influence our approach to embedding IA in recovery planning*
		James Baines Taylor Baines Associates	*Workshop focus and questions for group discussion.*
3.00pm		*Tea*	
		Break out groups	
4.00pm		*Workshop conclusions*	
5.00pm		Posters: Stewart Building Foyer	

Friday 25th November		**Programme**	
9.00am	3	***Rapid Assessment: contribution to immediate response***	
Room S2		David Johnston Joint Centre for Disaster Research, and Institute for Geological and Nuclear Sciences	*Recent experience of rapid assessment exercise. What happened? What could be done differently in hindsight?*
		Carolyn Gallagher Christchurch City Council	*From frenzy to flourish - Getting a grip on community impacts in the first three months of recovery*
10.30am		Break	
11.00 am	4	***IA in support of recovery plans and strategy***	
Room S2		Diane Turner Christchurch Earthquake Response Authority	*Post-disaster information needs and approaches to evaluating alternative strategies/plans*
		James Newell Monitoring and Evaluation Research Associates	*Summary of population and employment effects of Christchurch Earthquakes within IA context*
12.30 pm		Lunch	
1.30 pm	5	***Strategic assessment: tools, methods and case studies related to recovery planning***	
Room S2		Tony Moore Christchurch City Council	*A Sustainability Assessment of the Christchurch Central City Recovery Plan. How and why was it done? What did it achieve?With the benefit of hindsight, could it be done better?*
		Bryan Jenkins Waterways Centre for Freshwater Management, University of Canterbury/Lincoln University	*Strategic planning and assessment – resilience approach, strategic planning, liquefaction risk and future strategy.*
3.00pm		Break	
3.30 pm	6	***Community involvement in local recovery planning***	
Room S2		Mark McEntyre Peterborough Village Pita Kaik Inc Society	*Experiences of a specific community's response - challenges, needs for skills and resources*
		Brian Parker Leanne Curtis Canterbury Communities' Earthquake Recovery Network	*Community-led practical and strategic disaster response engagement*
4.45 pm		Conference synthesis	

Final Programme for the 2011 Population Association of NZ Biennial Conference – 28/29th November 2011

Monday 28 November

9.00 -11.00	Morning programme : Welcomes and Plenary Sessions *Venue: Engineering School Lecture Theatre 401-439*			
9.00 – 9.30	Alison Reid President, PANZ	Vince Galvin Deputy Government Statistician, Social and Population Statistics		
9.30 – 11.00	Professor Wei Li School of Geographical Sciences and Urban Planning, Arizona State University *Counting Everyone in the Country: US Census and International Comparisons*		Professor Natalie Jackson Director, National Institute of Demographic and Economic Analysis, University of Waikato Vice President, PANZ *The Demographic Forces shaping New Zealand's Future*	
11.30 - 1.00	Concurrent Sessions			
	1a: Maori population *Venue: Room 403-401* *Chair: Ian Pool (TBC)* Desi Small-Rodriguez and Martin Wall. Drivers of Maori wellbeing: An investigation of the New Zealand General Social Survey Natalie Jackson. Maori and the potential collateral demographic dividend Wendy Henwood, Remana Henwood, Hine Tohu, Irihapeti Morgan and Helen Moewaka Barnes and Kiri Rihari. "Working for the river will lift the health of the people": Maori environmental community action and community health and wellbeing Tahu Kukutai, Manuhuia Barcham and Jenine Cooper. Theorising the global Maori diaspora	1b: Regional spotlight 1: Auckland *Venue: Room 403-402* *Chair: (TBC)* Charles Crothers and Ali Gale. Changing patterns of residential differentiation in Auckland Alison Reid. Auckland's demographic futures Christoph Brodnik. Perceptions of sustainability in Auckland's residential housing market Jamie Newell. A comparison of the spatial distribution of population and jobs within the Auckland, Melbourne and Christchurch labour market catchments	1c: Population ageing and the economy *Venue: Room 403-403* *Chair: Arvind Zodkegar* Mansoor Khawaja and Bill Boddington. Is working later our future? Older New Zealanders in the labour force Susan St John and Claire Dale. Spreading the costs of an ageing population Alison O'Connell. Policy on NZS age of eligibility: What longevity data is needed? Peggy Koopman Boyden and Patrick Barrett. Options for responding to the projected shortfall of carers in an ageing society.	1d: Migration and migrants *Venue: Room 403-404* *Chair: Ward Friesen* Matthew Roskruge. Immigrant integration and social capital formation Anne Henderson. Immigrants and electoral enrolment: do the numbers add up? Yaghoob Foroutan. Demographic consequences of migration and social change: cross-cultural comparisons Todd Nachowitz. The Indian diaspora in New Zealand: Changing populations and community demographics, preliminary results.

2.00 - 3.30	Concurrent sessions			
	2a. Population methods and measures *Venue: Room 403-401* *Chair: Mansoor Khawaja (TBC)* Kim Dunstan. Are official demographic projections meeting the needs of users? Quantifying uncertainty using stochastic projections David Sykes. Victoria's small area population projections using improved lot-level data Mathew Parackal, Sherly Parackal and John Harraway. Micro-level stratification: A sampling method to eliminate post survey weighting Andrew Hancock. Approaches in activity classifications for time use surveys	2b: General demography 1 *Venue: Room 403-402* *Chair: Anne Henderson* Rosemary Goodyear. The high costs of housing: investigating changes in rental affordability over time, using experimental measures based on census data Bill Boddington and Robert Didham. Inter-ethnic partnering: An analysis of new parents Robert Didham and Bill Boddington. Far from WEIRD: Maori and Pacific fertility defies expectations Jamie Newell. Rural New Zealand transformed – major change in age composition 1981 to 2006	2c. Demography and health *Venue: Room 403-403* *Chair: Alison Reid* Ward Friesen: Measuring health and wellbeing in the Pacific Evelyn Marsters. Health and mobility: the transnational story of one family and their experiences with tuberculosis Janet Amey. Diabetic retention in the national "Get Checked" programme: The case in Midlands Health Network. Sandra Baxendine. The reporting of mental health outcomes in New Zealand	Special Session 1: Demography and the public sector *Venue: Room 403-404* *Chair: Len Cook* 2- 2.45: Patrick Corr. Demographers in the public sector: roles, skills and qualifications *Discussion to follow* 2.45 – 3.30: Pop'in 5 A showcase of graduate students current research
4.00 -5.15	Plenary Panel and Discussion New Zealand's Demographic Futures: Challenges and Opportunities *Venue: Lecture theatre 401-439* *Chair: Vince Galvin* 10 minute presentations from a selected panel, followed by general discussion.		Panellists confirmed to date: Richard Bedford, Professor of Population Geography, NIDEA Judy McGregor, EEO Commissioner Tahu Kukutai, Senior Research Fellow, NIDEA Erling Rasmussen, Professor of Work and Employment, Auckland University of Technology	

Tuesday 29 November				
9.00 – 9.30	PANZ Presidential Speech and Statistics New Zealand Jacoby Prize awards			
9.30 – 11.00	Plenary Session Dr. Jeremy Gardiner Chief Executive, Te Runanga o Ngati Awa *Ko Ngati Awa te Toki: Planning for a Post-Treaty settlement future*		Ross Barker past Queensland and National President of the Australian Population Association Assistant Government Statistician, Demography and Planning. Queensland Treasury *Australia's Demographic Futures*	
11.30 - 1.00	Concurrent Sessions			
	3a: General Demography 2 *Venue: Room 403-401* *Chair: Peggy Koopman-Boyden* Ian Pool, Shefali Pawar and Ben Amey. Maori Gross National Income, 1880s to 1945 Diane Ormsby, J Haywood, P Lester and B Dixon. Ambient temperature and birth sex ratios in New Zealand: Is there a relationship? Adele Quinn and Kim Dunstan. Use of alternative data sources in estimating sub-national populations Rosemary Goodyear. "A challenge to decency": An historical overview of crowding in New Zealand since 1921	3b: Regional Spotlight 2: Canterbury *Venue: Room 403-402* *Chair: James Newell* David Johnston, Sarah Beaven and Thomas Wilson. Where have all the students gone? Student movements following the 2010 and 2011 Canterbury earthquakes Deborah Potter and Kirsten Nissen. Exploring the usefulness of cell phone data to inform emergency management Peter Lafferty. International migration to/from Christchurch after the earthquakes Wei Li. After Katrina.	3c: Population and the Pacific *Venue: Room 403-403* *Chair: Anne Henderson* Richard Bedford, Robert Didham and Graeme Hugo. The Pacific in New Zealand's demographic future Geoffrey Hayes. Population Policies in the Pacific Islands: Recent History and Prospects for the Future Tahu Kukutai and Victor Thompson. Ethnic counting in the Pacific, 1965 to 2010 Michael Berry. Census taking in the Pacific - a case study of Tokelau	

2.00 – 3.00	Special Session 2: Future Population Statistics in New Zealand Hosted by Statistics New Zealand *Venue: Engineering School Lecture Theatre 401-439* Sue Riddle. Introduction and update Andrea Blackburn, Deborah Potter and Robert Didham. Future population statistics: meeting our current and future official information needs Introduction of the draft Population Statistics Domain Plan Christine Bycroft and Susan Riddle Future censuses in New Zealand	
3.30 - 4.15	Plenary Panel and Discussion *Venue: Engineering School Lecture Theatre 401-439* Topic 'Counting Populations' 10 minute presentations from a selected panel, followed by general discussion.	Panellists confirmed to date: Len Cook, Ronji Tanielu, Social Policy and Parliamentary Unit, Salvation Army Patrick Corr, Director of Demography, Australian Bureau of Statistics James Newell, Director, MERA
4.15 - 4.30	Wrap up and conference conclusion	

APPENDIX B STATISTICS NZ 2011 SYNOPSIS OF AVAILABLE DATASETS

Statistics NZ 2011 synopsis: *Potential of different data sources to inform 30 June 2011 subnational population estimates* (Source: Statistics NZ, 2011c)

Data source	Strengths	Limitations
Birth registrations	High coverage	Births can be registered several years after occurring; vague, incomplete, and temporary addresses affect information quality.
Death registrations	High coverage	Vague, incomplete, and temporary addresses affect information quality.
International travel and migration From arrival and departure cards completed by passengers arriving in or departing from New Zealand	Virtually all movements into and out of New Zealand are recorded	Refers to external migration only – excludes movements between areas of New Zealand; actual length of stay/absence may differ from that intended or stated, so 'permanent and long-term' movements are only an indication of actual changes to resident population from migration; vague, incomplete, and temporary addresses affect information quality.
Building consents Legally required for all new dwellings	Residential building consents published monthly; useful indicator of greenfield subdivisions and apartment developments	Does not cover demolitions well. Consents can be issued although the building is never completed, and does not include information on completion, occupation or intended building use (e.g. 'all year' residence or 'holiday home').
Electoral enrolments Electoral roll includes people who are eligible to vote and who have enrolled to vote	Regularly updated; high coverage above age 30 years	Excludes people under 18 years and other subgroups ineligible to vote, such as new migrants; includes some people living overseas; propensity to enrol varies by age and geographic area; enrolment data affected by registration procedures and registration campaigns (including leading up to November 2011 General Election); usual address may differ from electoral address
Health service data People using health services, notably via primary health organisations	Regularly updated, covers people of all ages	Differential coverage of population by age, sex, and ethnicity reflects different use of health services; includes some people living overseas and excludes some residents; vague, incomplete and temporary addresses affect information quality.
Earthquake Commission rapid dwelling assessments Initial quick assessment of dwelling damage following Canterbury earthquakes	High coverage of private dwellings in greater Christchurch	Qualitative damage assessment liable to revision after full assessment; no information on number of inhabitants or their demographic characteristics

Data source	Strengths	Limitations
Linked employer-employee data (LEED) Administrative tax records from income taxed at source, which includes people who receive a salary, taxable income tested benefit, student allowance, accident compensation, paid parental leave, or NZ Superannuation	High coverage above age 20 years; data can be focused on those with changes of address	Includes some people living overseas and excludes some residents; excludes most children (under 15 years); usual address may differ from LEED address (which may be a workplace, postal, or email address); some lag between moving and recording change of address; vague and unknown addresses affect quality of geographic information
School rolls All children enrolled for primary and secondary education	High coverage of children for compulsory school ages (6–16 years)	Geographic information relates to school location rather than usual address of student; students from overseas may not be residents; incomplete coverage of students aged 16 years and over due to differing rates of school attendance; limited geographic information for home-schooled and correspondence students
New Zealand Post mail redirections Charged service for individuals or households (and businesses), to redirect mail to an address in New Zealand or overseas, either permanently or temporarily (i.e. until a specified date)	Information on both households and individuals changing address	Redirection service not used by all people who change address, partly because of charge; redirections may include non-residential addresses such as post office boxes, workplaces, and addresses of friends or family; the number of redirectees may not align with actual number of migrants
Cellphone data Calls in different time periods classified by location (e.g. cellphone tower)	Indicates movements of users between areas; cellphones tend to relate to individuals and cover an increasing proportion of the population	Difficult to identify changes in usual residence given many short-term/temporary changes in cellphone location; some people have many cellphones, others have none
Residential electricity consumption Electricity consumed by each electricity connection	Potentially identifies unoccupied dwellings	Limited to dwellings with smartmeters – electricity meters monitored remotely; difficult to distinguish temporarily unoccupied dwellings from permanently unoccupied dwellings

APPENDIX C SELECTED PDF PRESENTATIONS

01 PANZ 2011 cell phone data and ChCh earthquake.pdf
02 ChristchurchInternationalMigrationFlows.pdf
03 Post earth quake population in Christchurch AIA workshop 23 Nov.pdf
04 EstLbrDemandfor CanterburyRebuildPatched.pdf
05 Wkshp_MarySparrowScan.pdf

Where did people relocate to?

Experimental cell phone data analysis of population movements following the 22nd February Christchurch Earthquake

Kirsten Nissen and Deborah Potter

Research and Evaluation, Population Statistics

Statistics New Zealand

Introduction

Feasibility study:

Ability of cell phone data to inform on short-term population movements following the 22nd February earthquake in Christchurch

Outline

- Dataset details
- Results
- Evaluation
- Cell-phone data potential

Information needs
- for emergency management

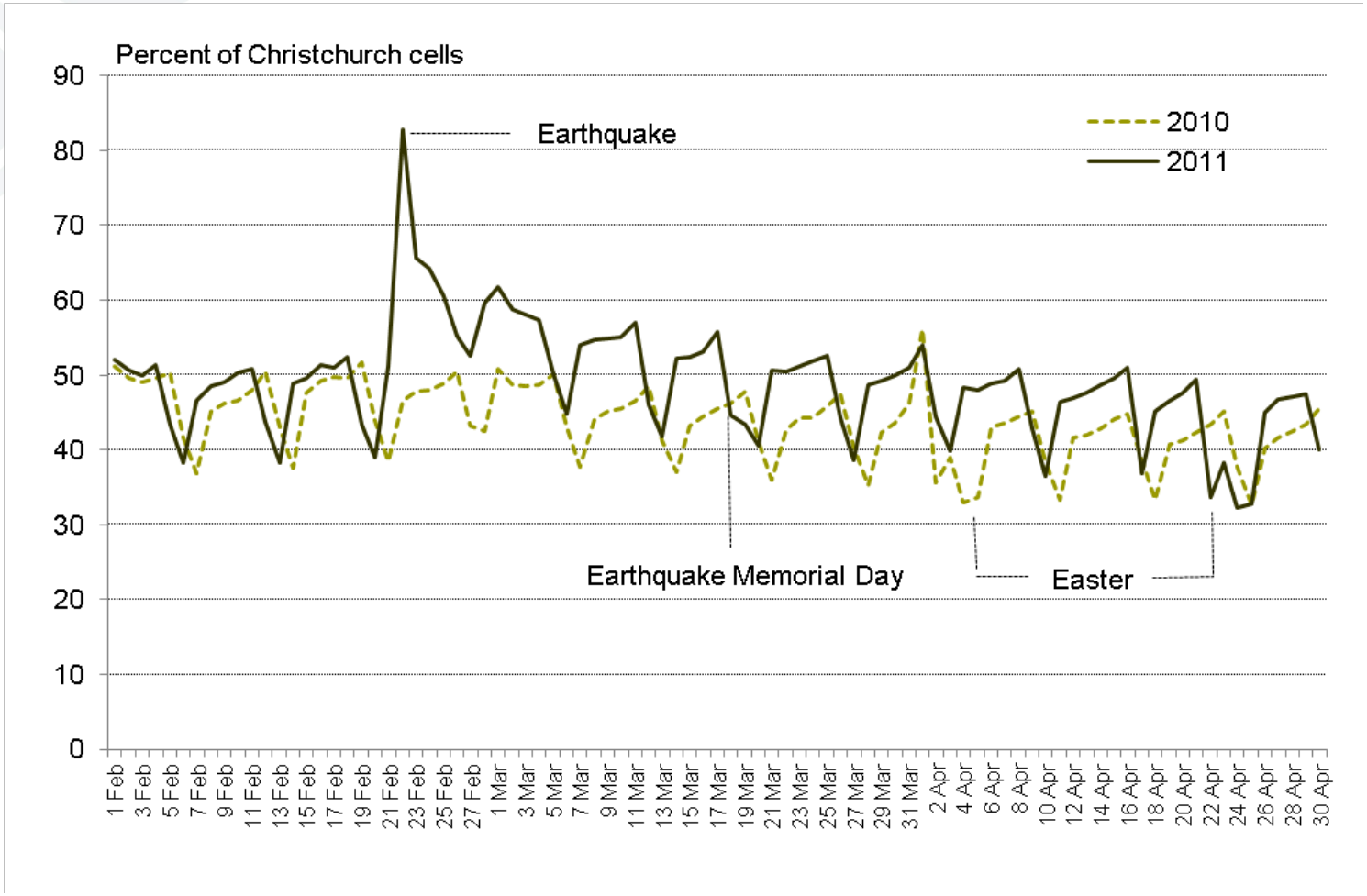
- Where do people re-locate to?
- When do people re-locate and when do most people return?
- What are the movement patterns over time?
- What are the usual patterns of movements compared with those following an emergency event?

Dataset details

- Variables
  - Anonymised cell IDs
  - Date
  - Cell site (where call initiated)
  - Number of voice calls/ SMS
- The dataset
  - Feb–April 2010/2011
  - National coverage
- Subset of cells for study
  - Cell IDs who made calls in the 10 days prior, only in Christchurch City
  - ‘Christchurch cells’
- Caveats

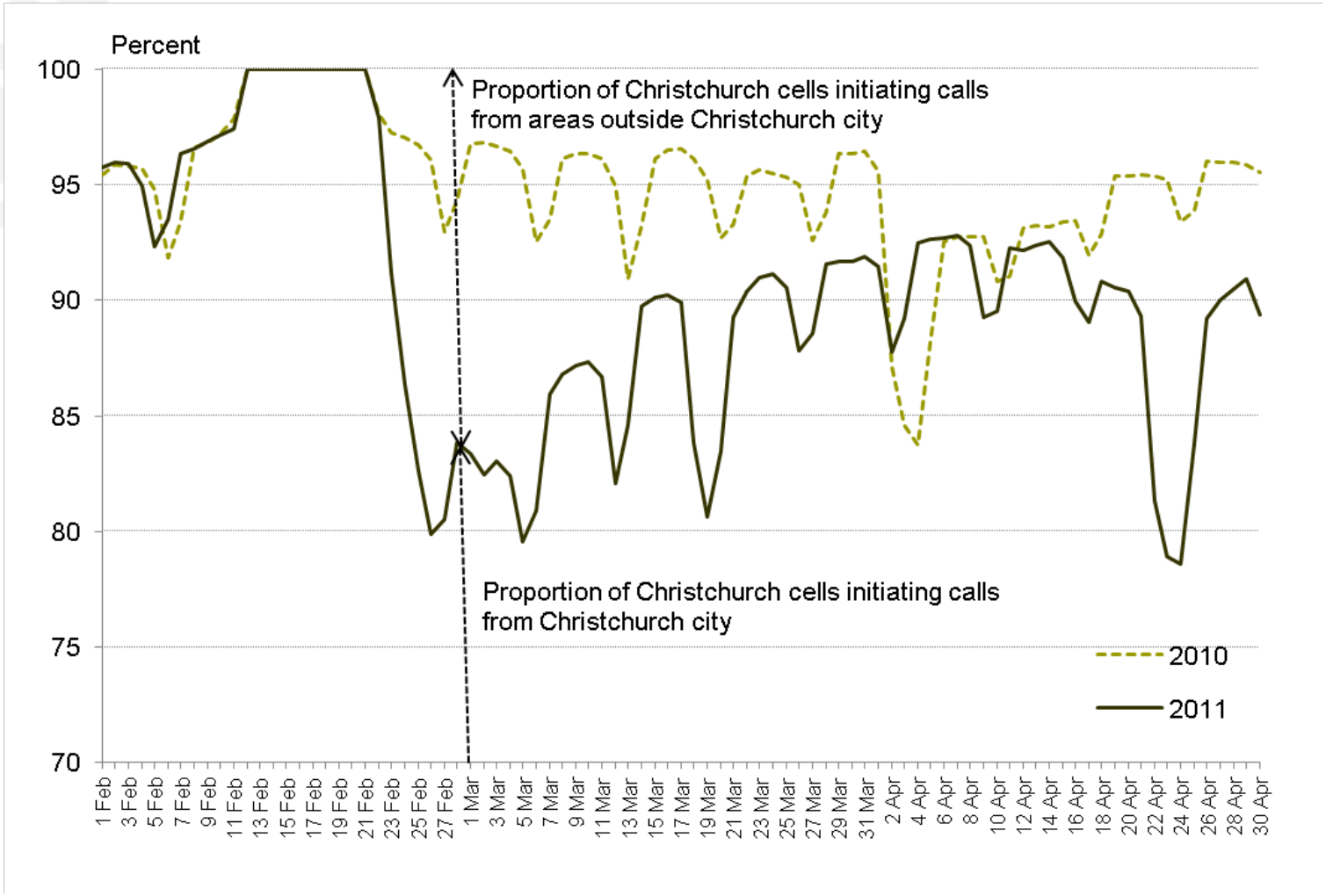
Results

Proportion making voice calls during 24-hr periods



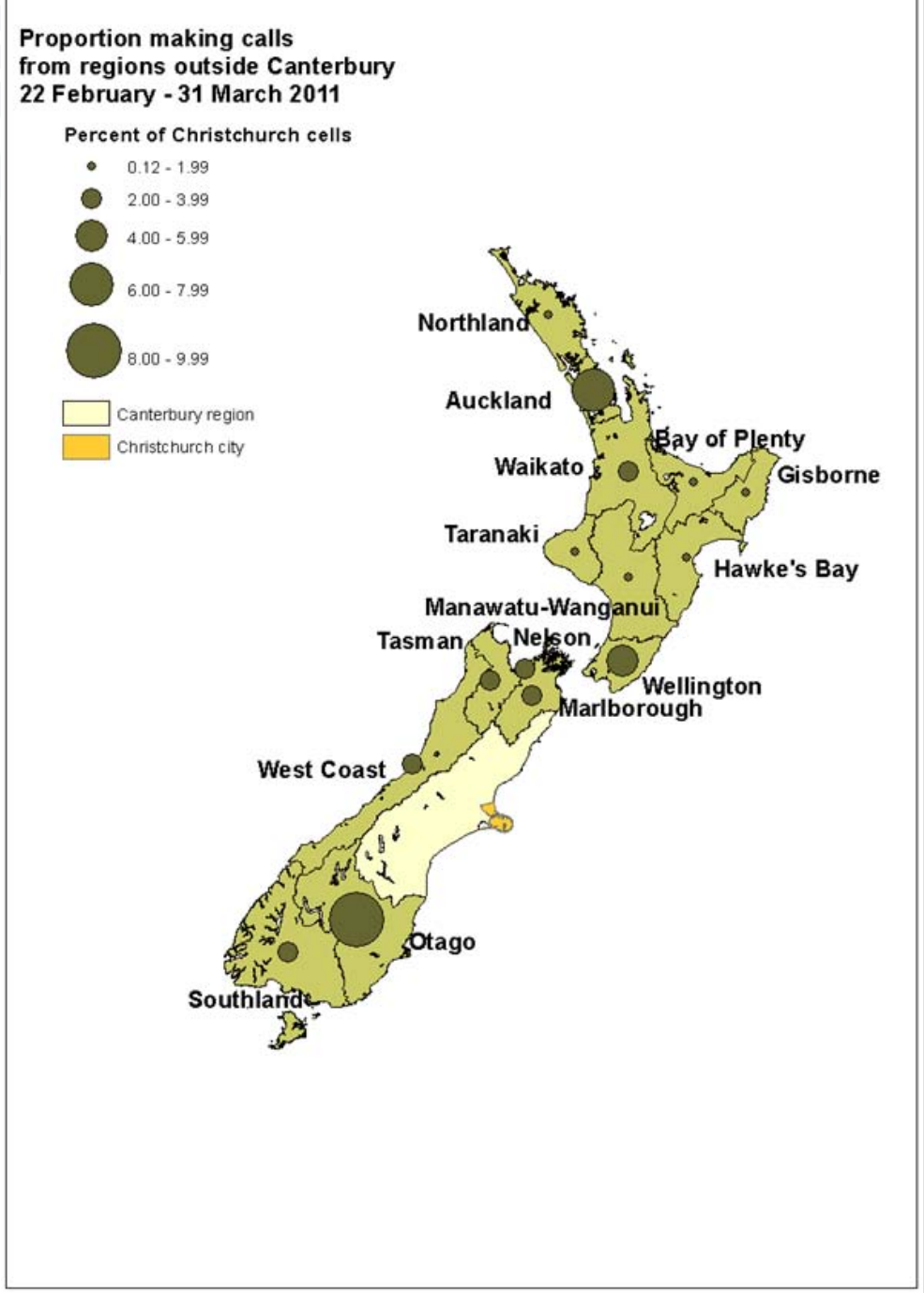
Large proportions moved away for the weekends

Distribution of voice calls initiated by Christchurch cells during 24-hr periods



Note: Percentages are based on ChCh cells making calls from one TA only during any 24-hr period

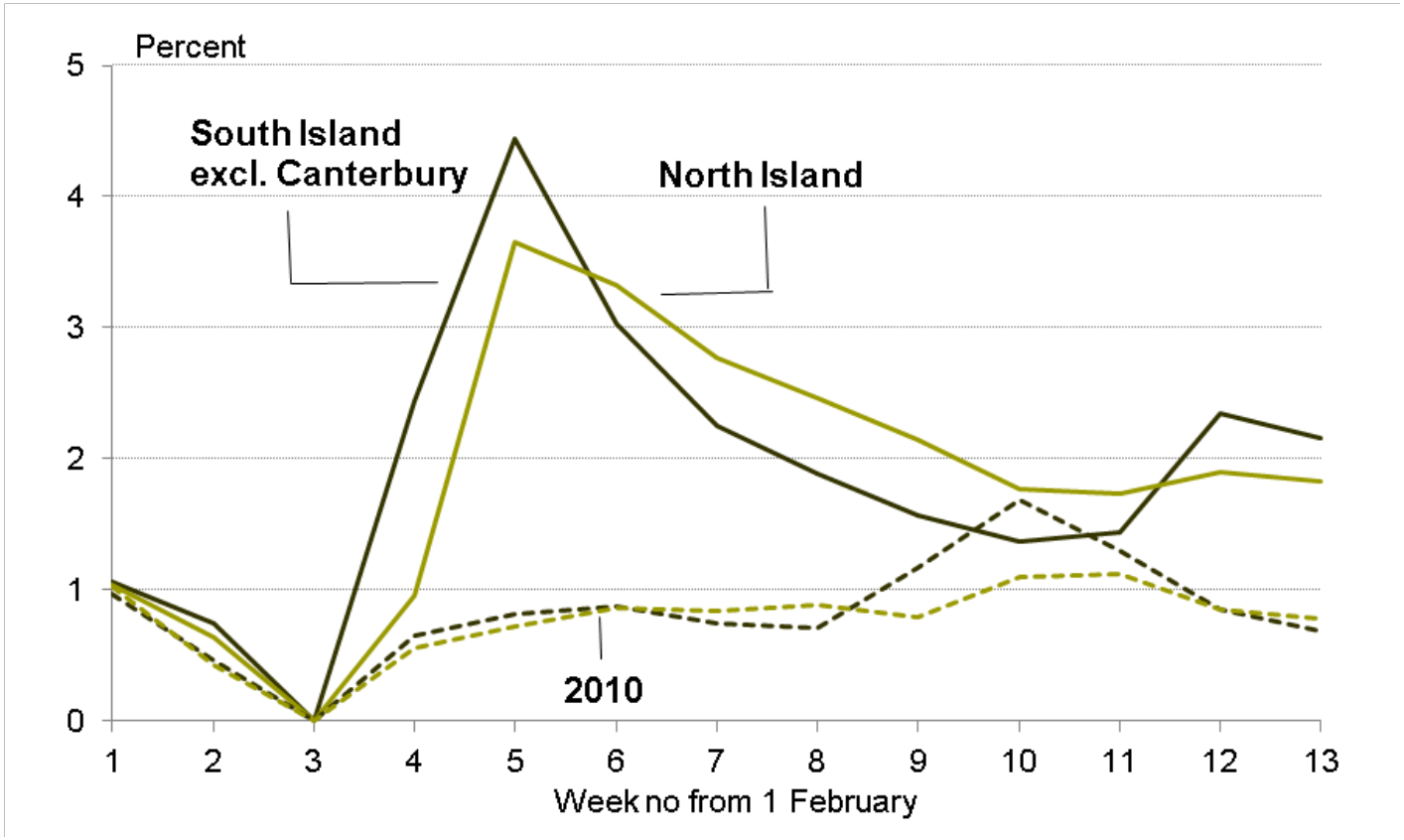
Map 1



Note: Christchurch cells making calls during days of special events (eg Red Cross fund raising event in Dunedin on 2 March 2011) were excluded.

People relocating to the North Island returned at a slower rate

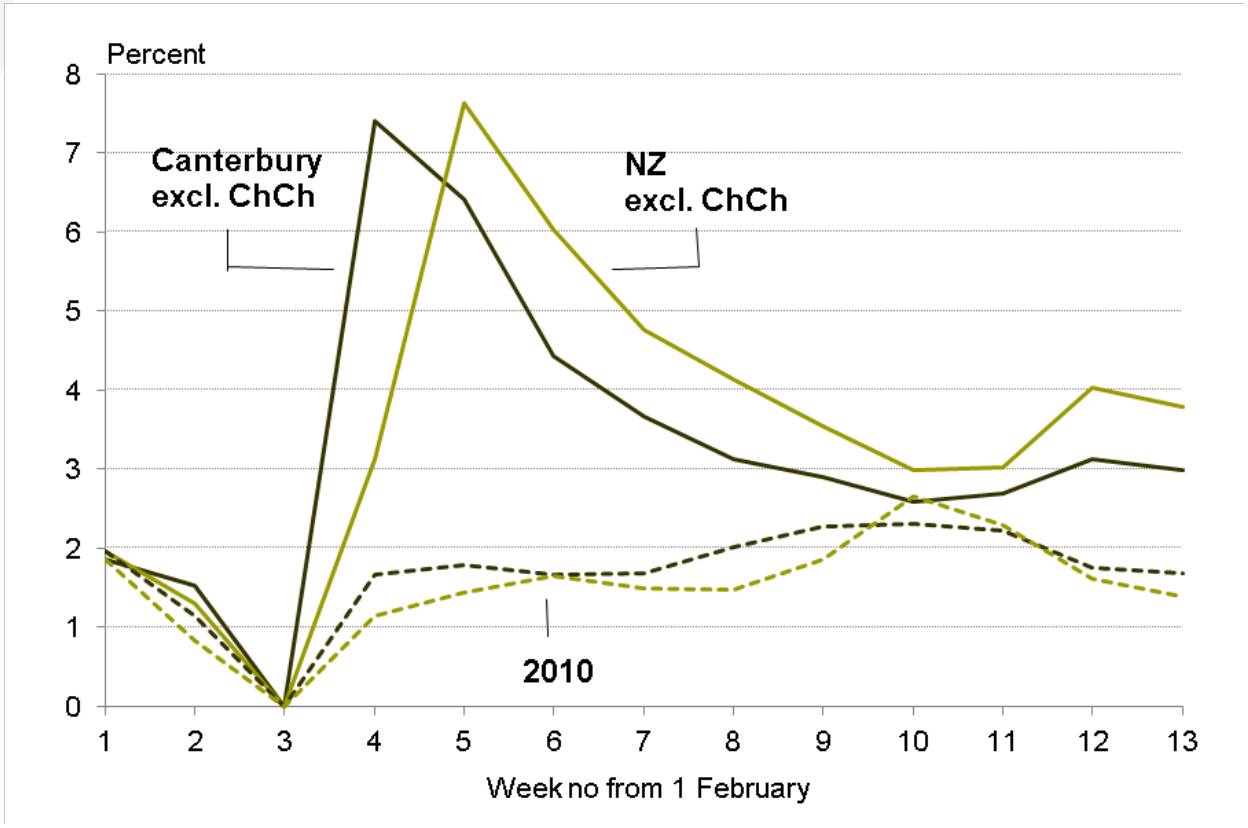
Proportions of Christchurch cells making calls during 24-hr periods averaged over week days Monday-Friday



Note: Christchurch cells making calls during days of special events (eg Red Cross fund raising event in Dunedin on 2 March 2011) were excluded.

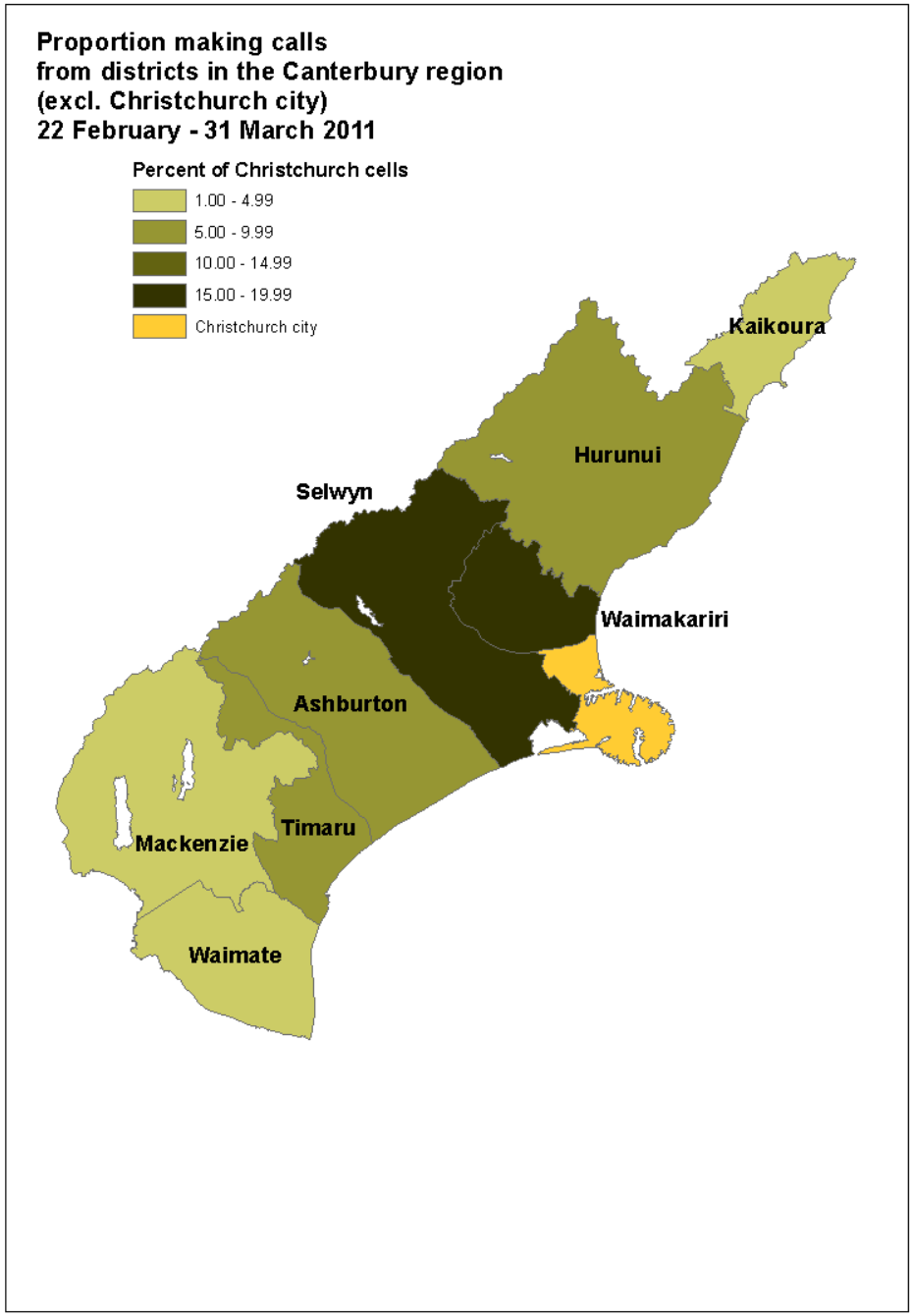
People relocated to areas outside Canterbury at a later stage

Proportions of Christchurch cells making calls during 24-hr periods averaged over week days Monday-Friday



Note: Christchurch cells making calls during days of special events (eg Red Cross fund raising event in Dunedin on 2 March 2011) were excluded.

Map 2

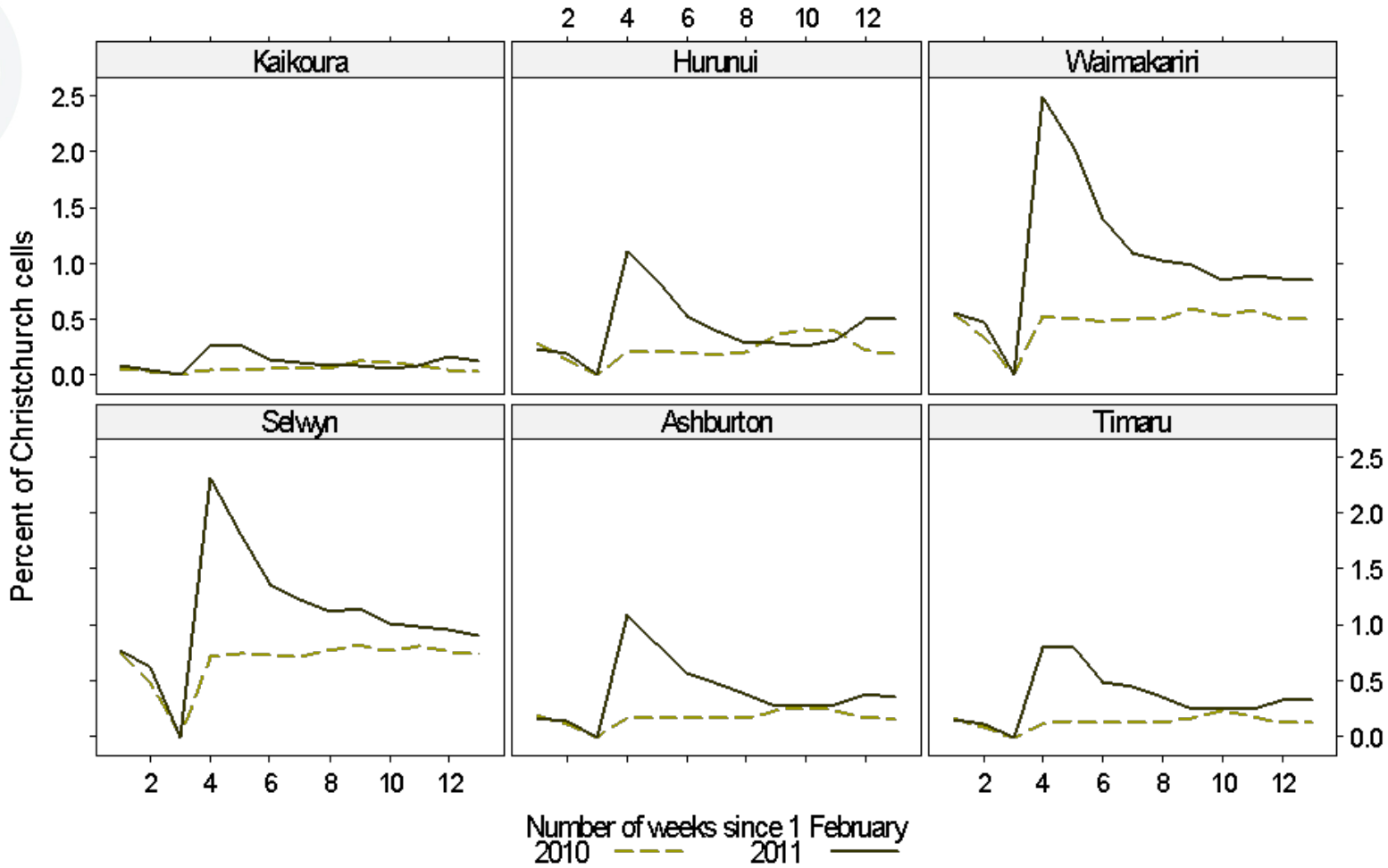


Note: Christchurch cells making calls during days of special events (eg Earthquake Memorial Day on 18 March 2011) were excluded.

New Zealand Government

Nearby and highly populated districts attracted many people

Proportions of Christchurch cells making calls during 24-hr periods from Canterbury averaged over week days Monday-Friday



Principal strengths of cell phone data

- Quickly respond to information requests on urban population movements
- interpret the dynamics of short-term population movements in flexible geospatial frameworks
- examine temporal changes in the presence of population in urban spaces (e.g. for a specific time period of the day or week).

Principal weaknesses of cell phone data

- incomplete and inconsistent coverage of the entire population (for instance the very old and very young)
- lack of demographic and socio-economic information about those who move
- no direct information on the timing and permanence of relocation.

Other potential uses of cell phone data

- Populations present in urban spaces
  - users of location-based services
  - planning of major events
  - urban planning: users of space and infrastructure, changes in population density
- Aggregated urban population movements
  - internal migration flows over a time period

Conclusion

- Unique attribute: cell phone records allow continued monitoring of people-based movements over time in any geographical context
- The need to seek information from a range of data sources
- Increasing population coverage for voice calls
- First feasibility study published (www.stats.govt.nz/earthquake) and presented to stakeholders

Statistics NZ contact: Kirsten.Nissen@stats.govt.nz

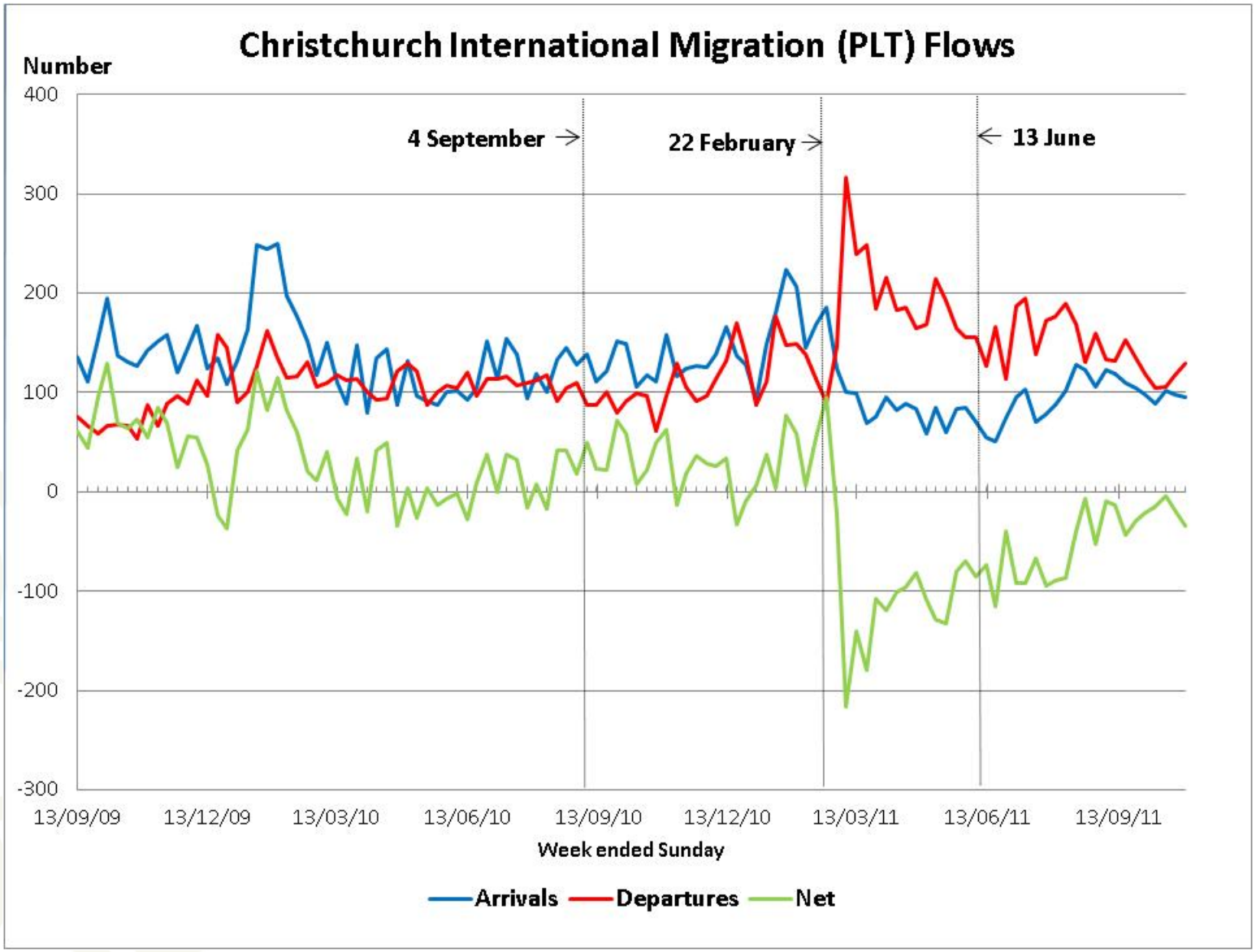
International migration to/from Christchurch after the earthquakes

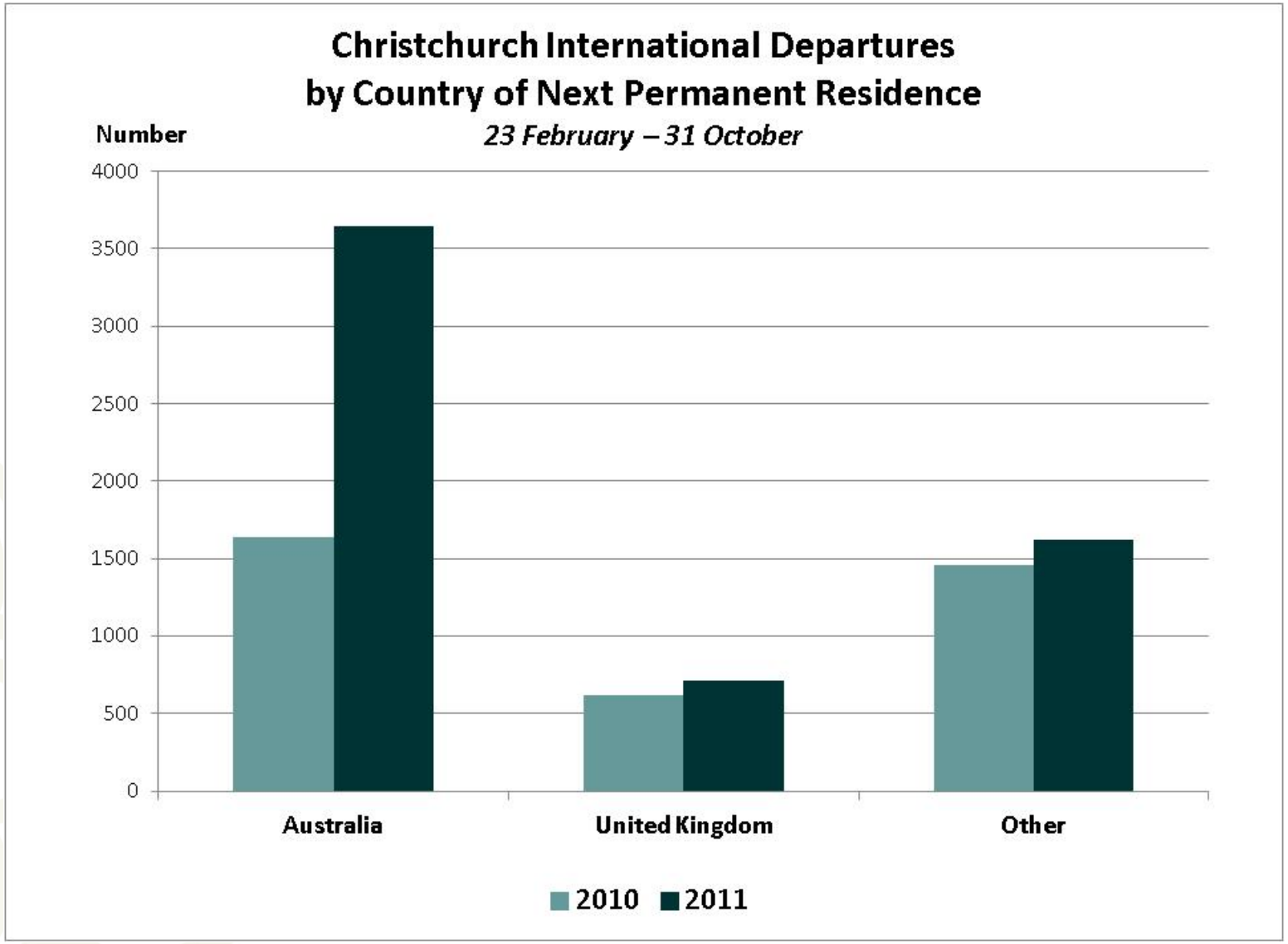
Peter Lafferty

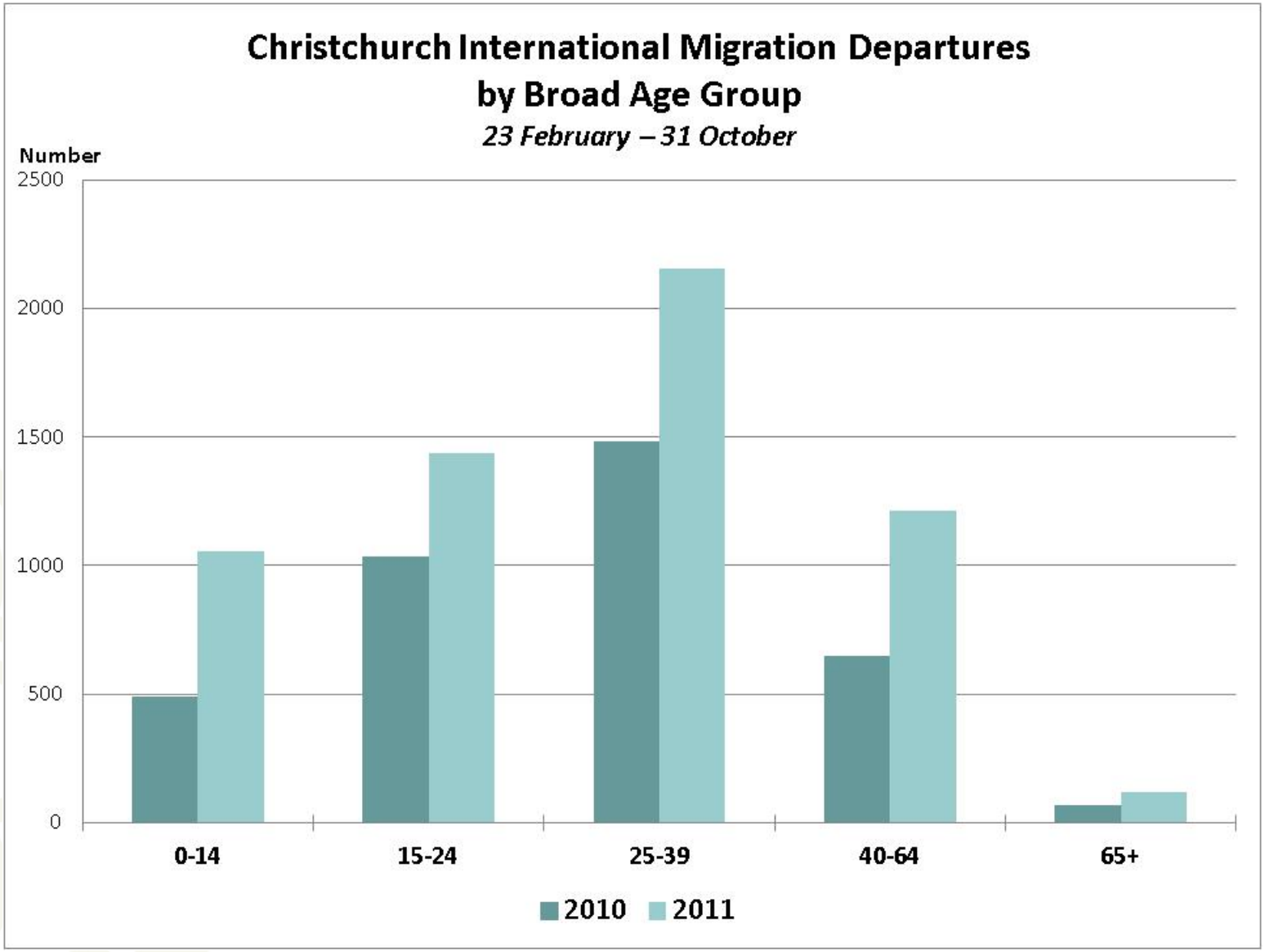
29 November 2011

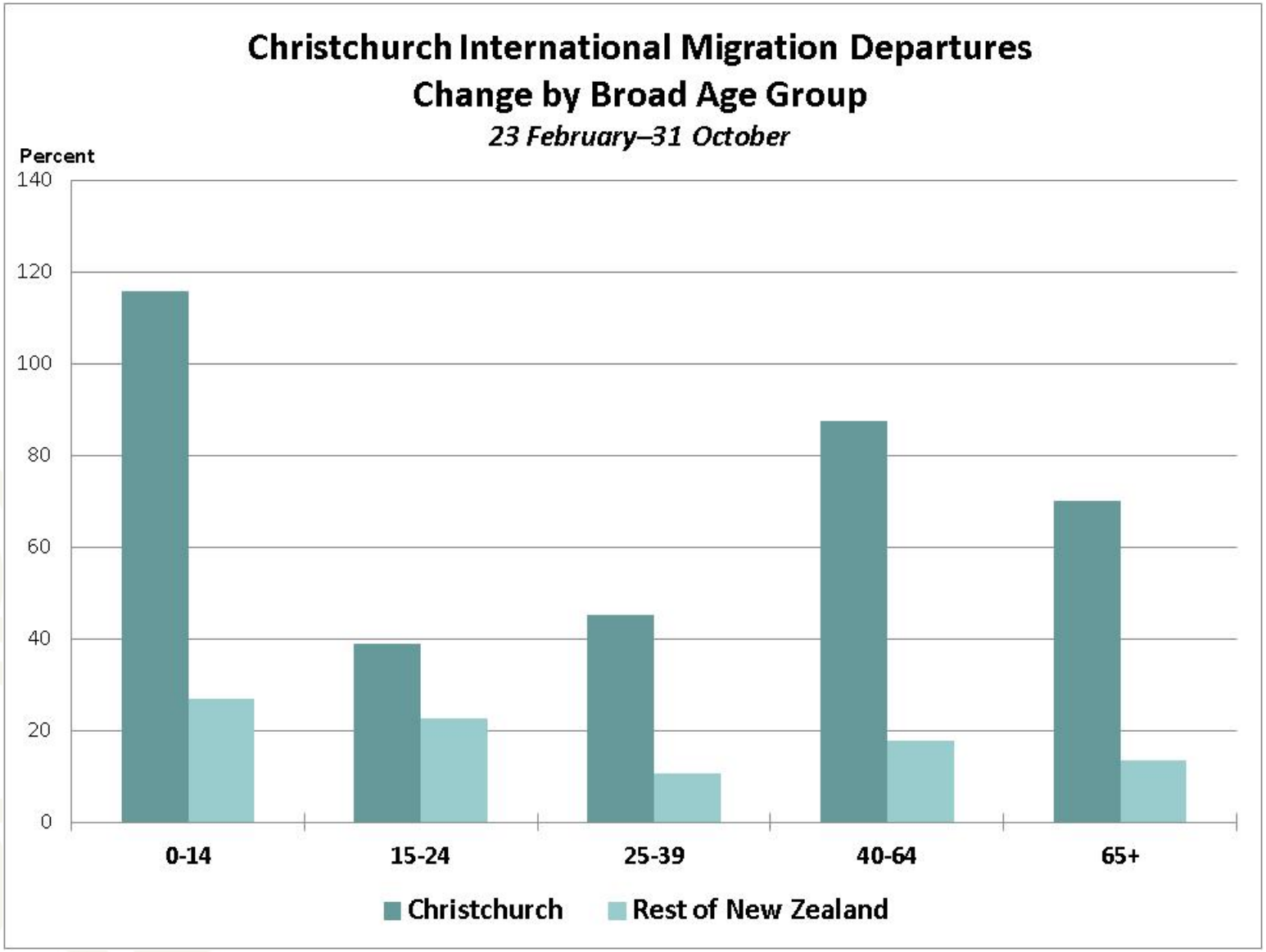
Speech contents

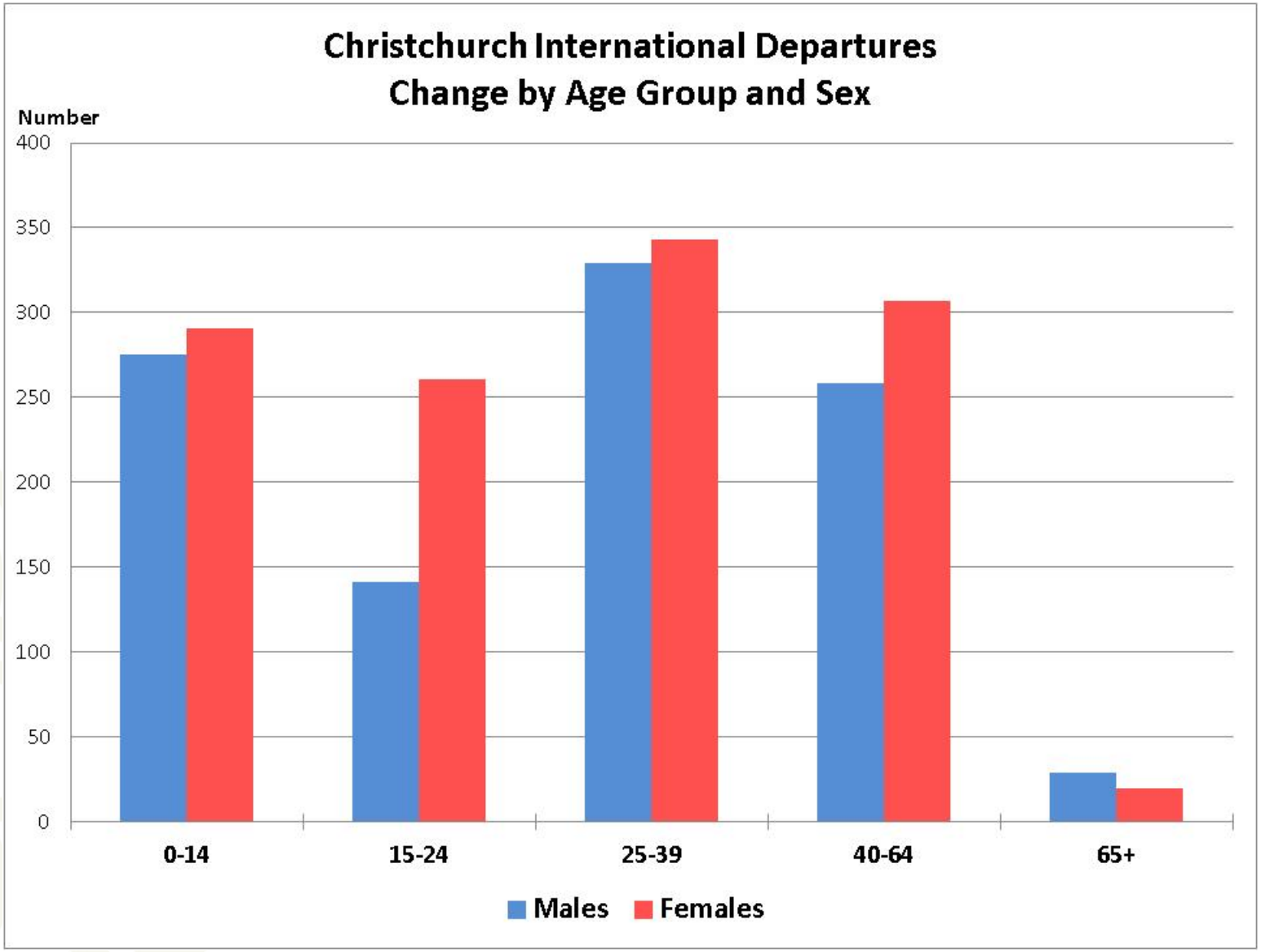
- Overview of Christchurch international migration flows after recent earthquakes
- Where are they going?
- What age and sex structure do they have?
- What are the occupations?
- Summary
- Questions.

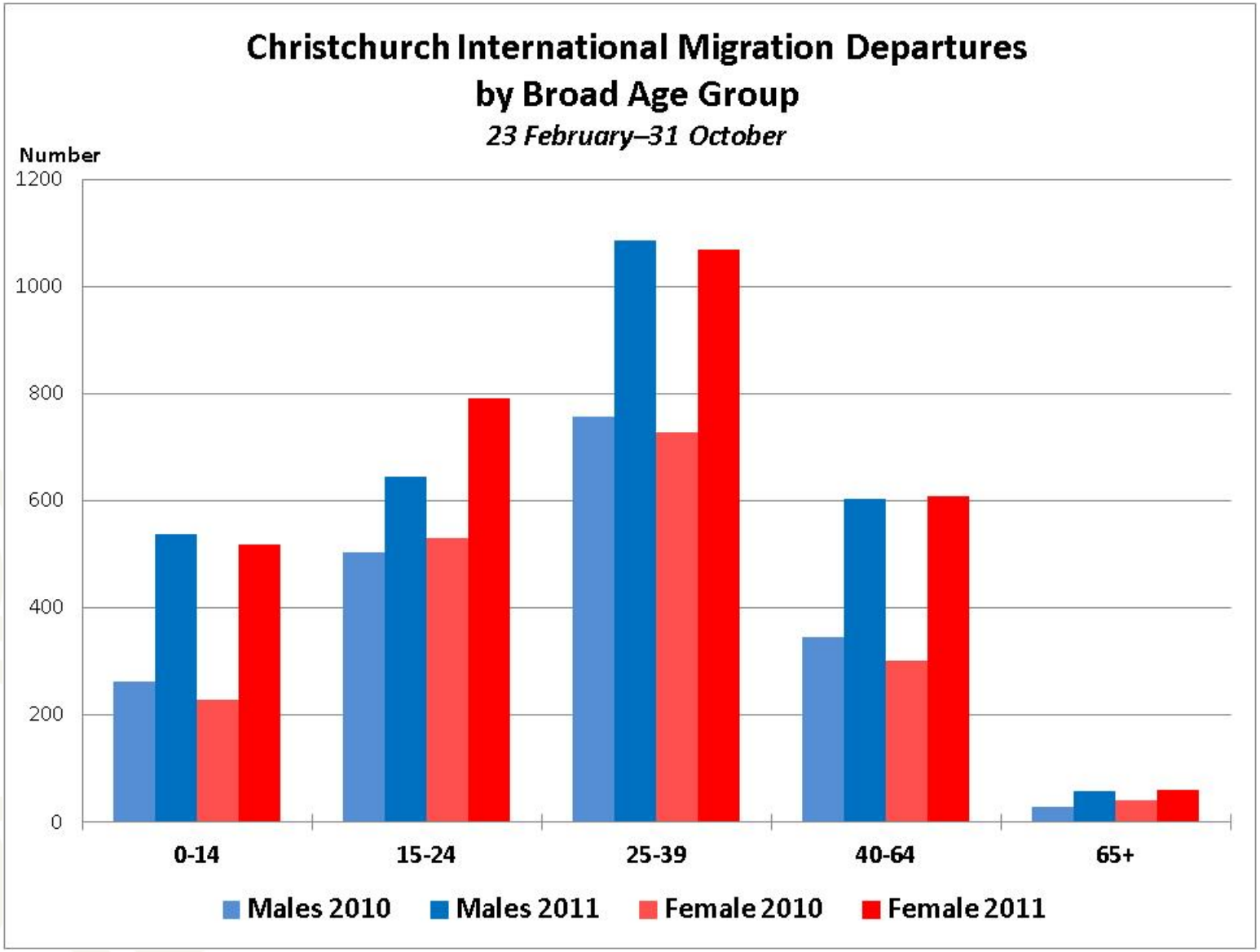

Christchurch International Migration (PLT) Flows
Number
400
300
200
100
0
-100
-200
-300
4 September
22 February
13 June
13/09/09
13/12/09
13/03/10
13/06/10
13/09/10
13/12/10
13/03/11
13/06/11
13/09/11
Week ended Sunday
Arrivals
Departures
Net

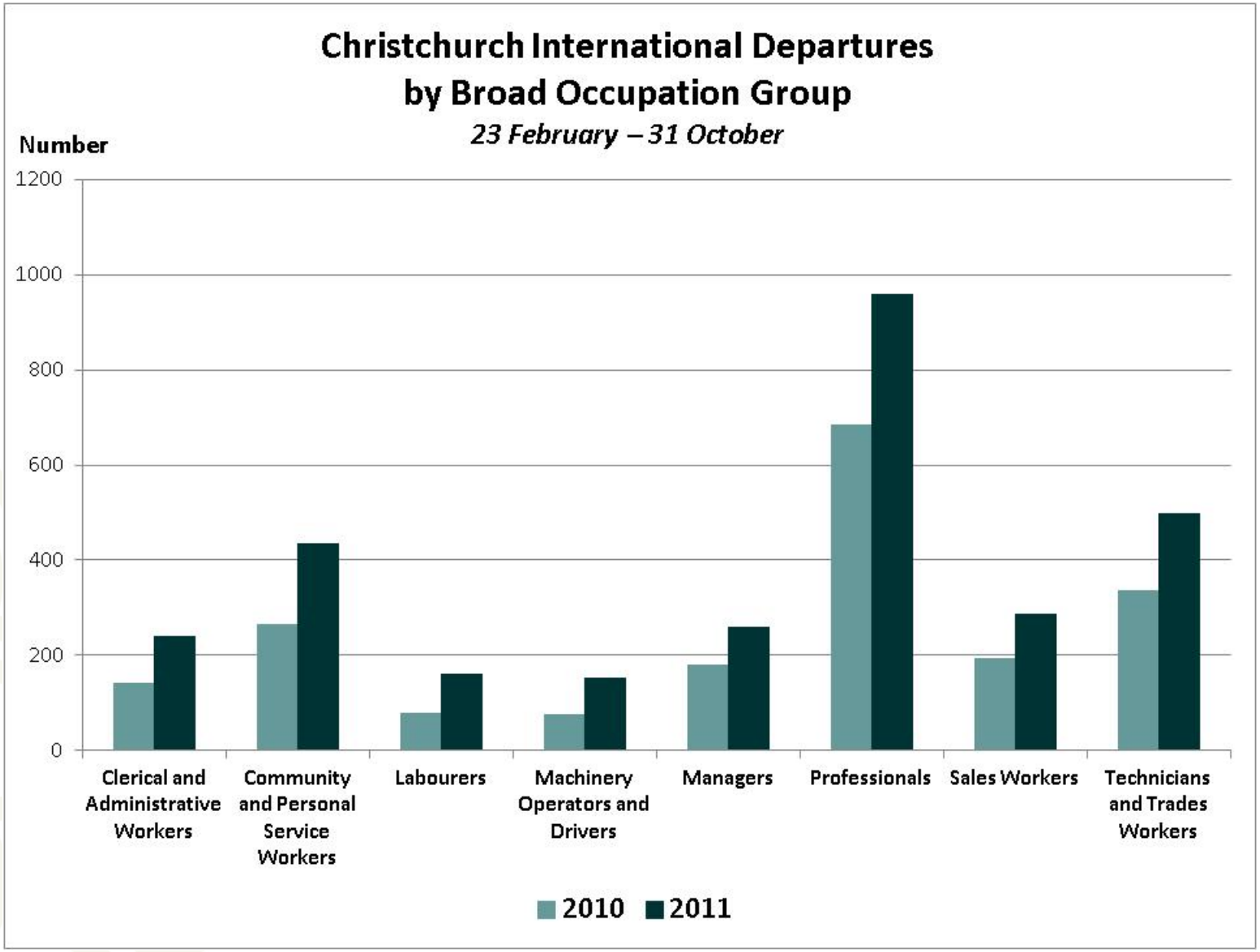

Christchurch International Departures
by Country of Next Permanent Residence
23 February – 31 October
Number
4000
3500
3000
2500
2000
1500
1000
500
0
Australia
United Kingdom
Other
2010
2011

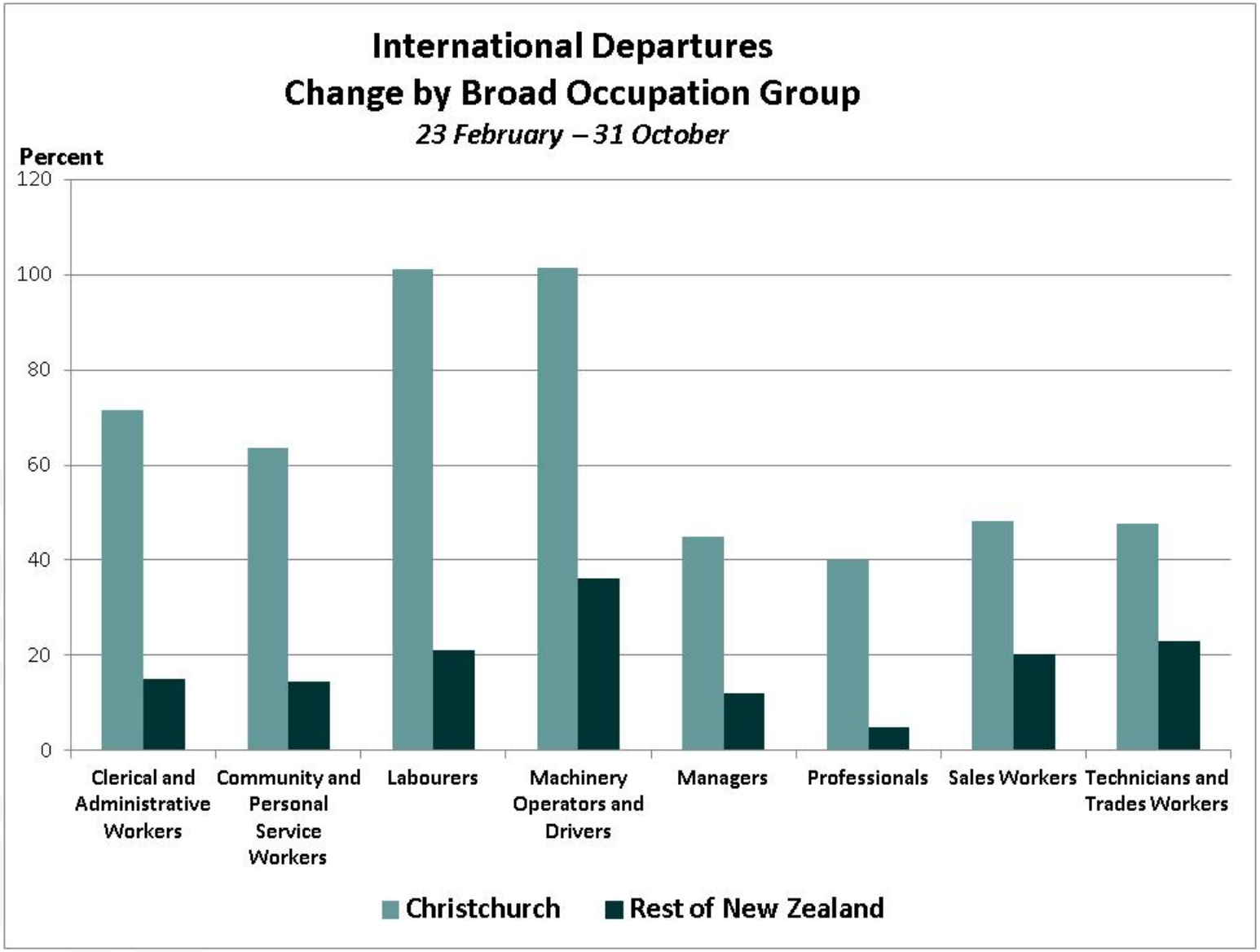

Christchurch International Migration Departures
by Broad Age Group
23 February – 31 October
Number
2500
2000
1500
1000
500
0
0-14
15-24
25-39
40-64
65+
2010
2011


Christchurch International Migration Departures
Change by Broad Age Group
23 February–31 October
Percent
140
120
100
80
60
40
20
0
0-14
15-24
25-39
40-64
65+
Christchurch
Rest of New Zealand


Christchurch International Departures
Change by Age Group and Sex
Number
400
350
300
250
200
150
100
50
0
0-14
15-24
25-39
40-64
65+
Males
Females


Christchurch International Migration Departures
by Broad Age Group
23 February–31 October
Number
1200
1000
800
600
400
200
0
0-14
15-24
25-39
40-64
65+
Males 2010
Males 2011
Female 2010
Female 2011


Christchurch International Departures
by Broad Occupation Group
23 February – 31 October
Number
1200
1000
800
600
400
200
0
Clerical and Administrative Workers
Community and Personal Service Workers
Labourers
Machinery Operators and Drivers
Managers
Professionals
Sales Workers
Technicians and Trades Workers
2010
2011


International Departures
Change by Broad Occupation Group
23 February – 31 October
Percent
120
100
80
60
40
20
0
Clerical and Administrative Workers
Community and Personal Service Workers
Labourers
Machinery Operators and Drivers
Managers
Professionals
Sales Workers
Technicians and Trades Workers
Christchurch
Rest of New Zealand

Summary

- Shockwave impact of earthquakes on Christchurch migration
- Australia main departure destination
- Change in departures more obvious for females
- All occupation groups affected – percentage change for Christchurch more obvious for labourers, machine operators and drivers
- Long term trend is unknown.

www.stats.govt.nz\Infoshare

QUESTIONS?

Population and household trends in Christchurch post February 22 earthquake

New Zealand Association of Impact Assessment

Population and Employment Effects of Christchurch Earthquake Workshop

23 November 2011

David Price

Principal Analyst – Monitoring and Research

Christchurch City Council

Presentation Structure

Part 1

- Key issues / policy / planning Context
- Indicators of population / household loss
- SNZ June Estimates
- Impact on Visitors
- Intra City movements

Part 2

- Future growth scenarios
- Short – medium term uncertainty

Christchurch City Council

What a the key issues post earthquake

- Immediate flight and dispersal, short term issues
  - Response issue
- Medium to long term issues – recovery, long term planning
  - PC1 – was about to go to environment court
  - Long term plans – demand for new / replacement infrastructure
  - Planning for underlying growth versus complicating short to medium term pressures/uncertainties
  - Housing for displaced households – Temp and Permanent
  - Pressure on Council services , infrastructure and facilities

Christchurch City Council

Temporal Components of Population / Household Loss

- Post event flight and return (1 month)
- Immediate permanent loss after the earthquake (usual resident population at June 2011)
- What is likely to happen over the next couple of years?
- When are we likely to return to a pre –earthquake growth trend – if we do?

Christchurch City Council

Immediate post event flight and return (1 month)

A fifth of Christchurch's population may have left

Updated at 7:35 pm on 4 March 2011

It is estimated that about 70,000 people, or a fifth of Christchurch's population, have fled the city since the earthquake on 22 February.

Christchurch Mayor Bob Parker is one who thinks as many as 70,000 have left.

Airlines and ferry companies say there has been a significant uptake of their services by Christchurch residents leaving the city.

Air New Zealand says it has flown about 60,000 people out of Christchurch since Wednesday 23 February.

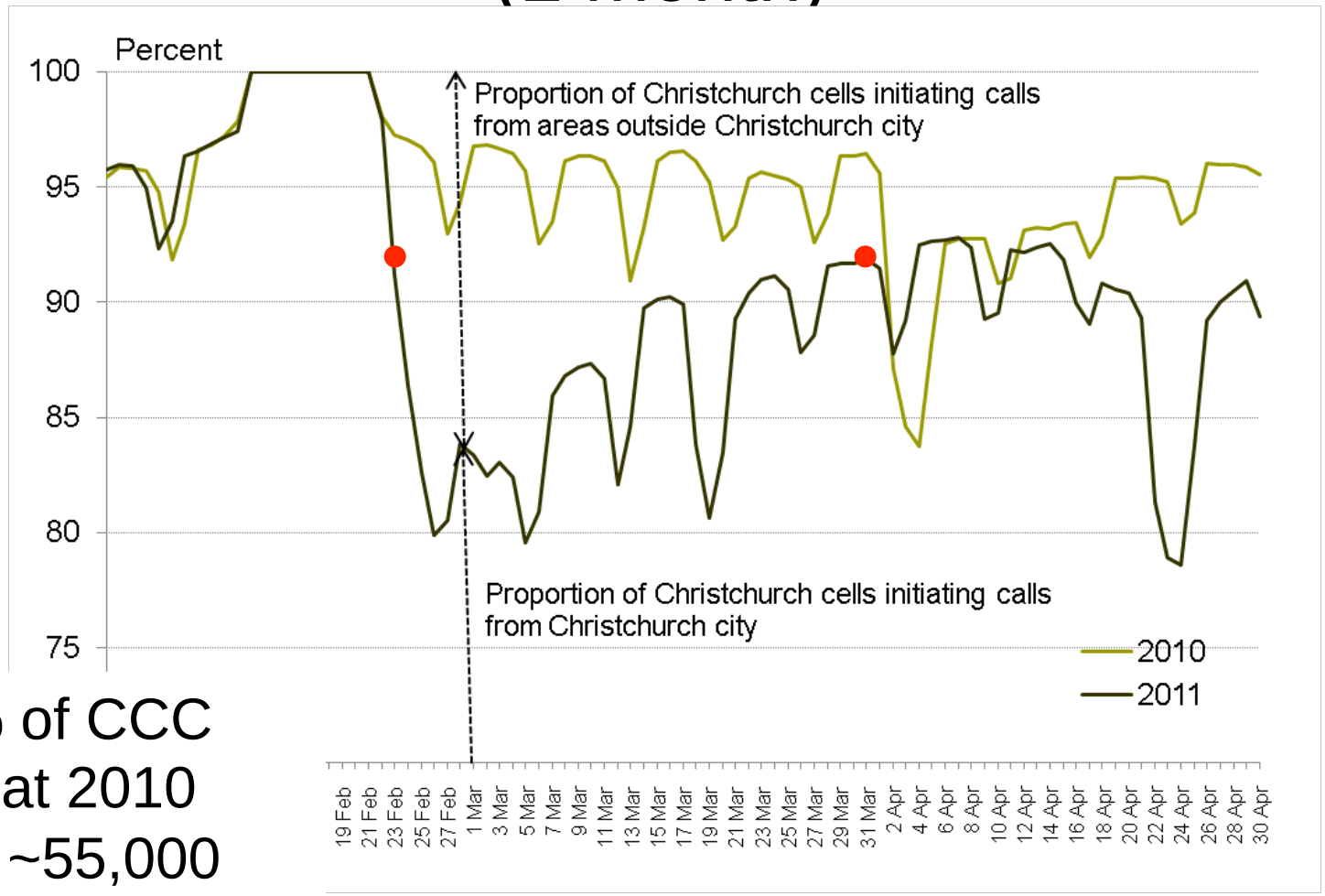
Cook Strait ferry operators Interislander and Bluebridge say they have had an influx of additional passengers and vehicles

Messages left on boarded up doorways and windows in Christchurch.

PHOTO: AFP

Christchurch City Council

Immediate post event flight and return (1 month)



15% of CCC pop at 2010 was ~55,000

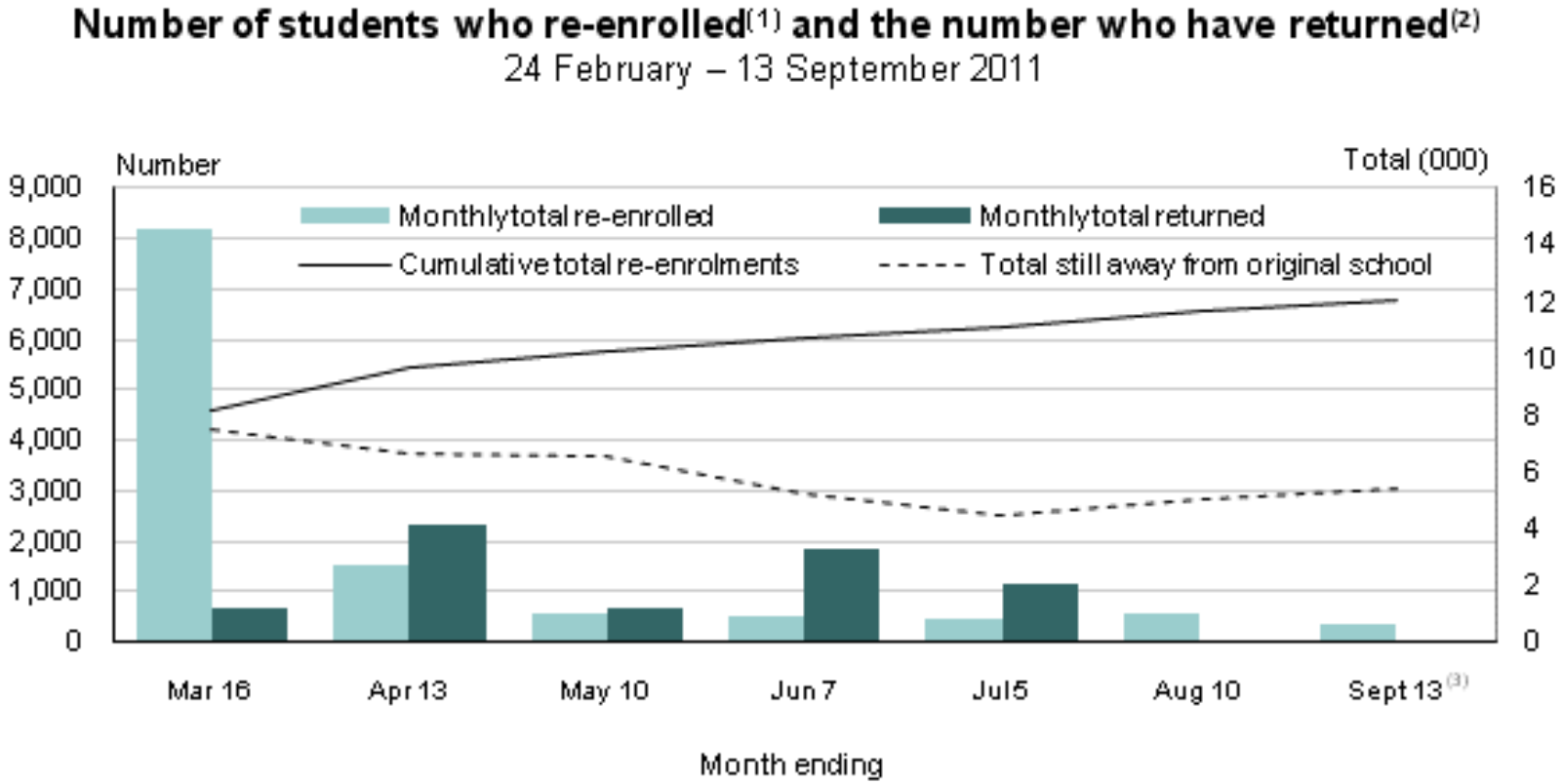
Source: Statistics NZ: Mobility and Mobile Phones: Cell-phone transmissions and short-term population movements – 2011 PANZ Conference

Christchurch City Council

What was the permanent loss as a result of the earthquakes?

Christchurch City Council

School Students (13 Sept update)



1. Previously enrolled in Christchurch, Selwyn, and Waimakariri.
2. Returned to their original school.
3. Administrative processes applied to the data means that the total returned for this month is unavailable.

Source: Ministry of Education

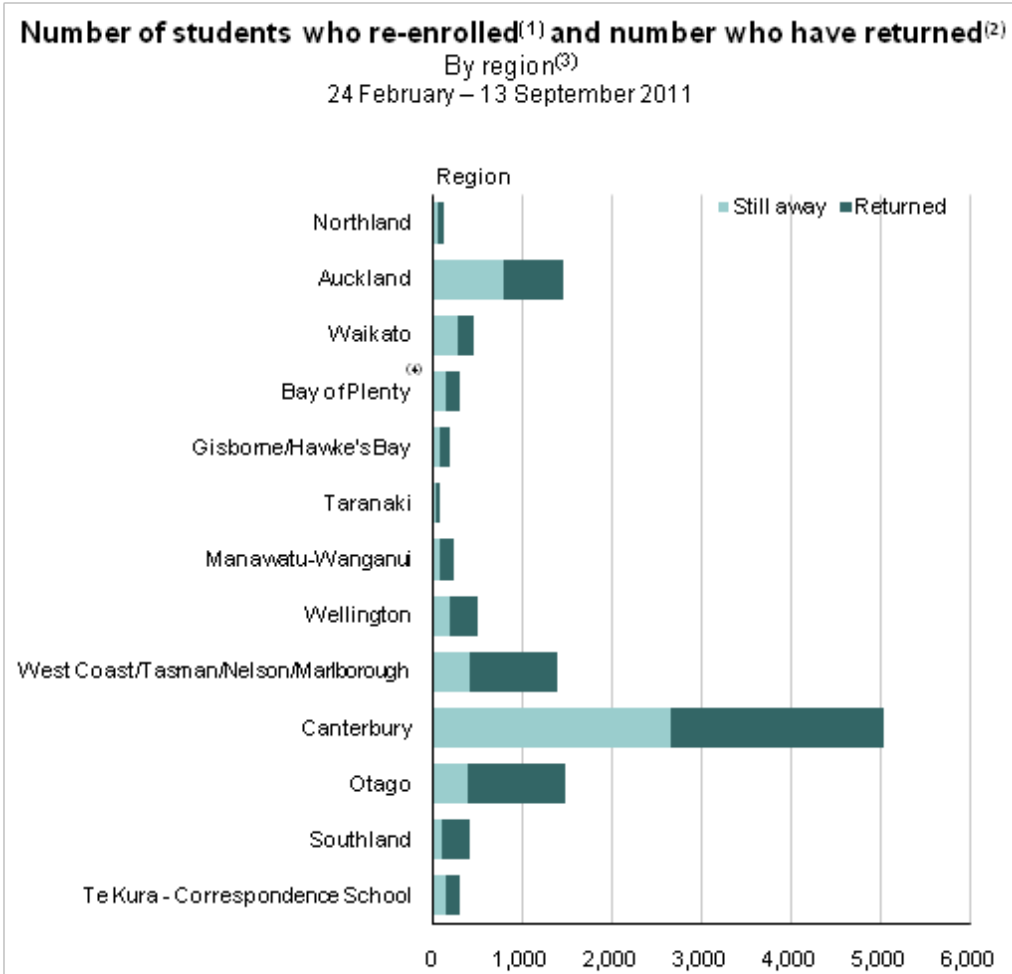
School Students (13 Sept update)

- 3250 School students have left the UDS area
- 1600 moved within Chch
- 375 and 225 within or to Waimakariri and Selwyn respectively

Number of students who re-enrolled[1] and number who have returned By territorial authority and region[2] 24 February – 13 September 2011				
Territorial authority students moved to	Region students moved to	Number of students who have returned to their original school	Number of students still away	Number of students who re-enrolled
Christchurch city	Canterbury	270	1,596	1,869
Auckland	Auckland	678	783	1,464
Waimakariri district	Canterbury	318	375	690
Selwyn district	Canterbury	393	225	624
Timaru district	Canterbury	429	150	576
Ashburton district	Canterbury	369	171	540
Dunedin city	Otago	345	171	513

Christchurch City Council

School Students (13 Sept update)



1. Previously enrolled in Christchurch, Selwyn, and Waimakariri.
2. Returned to their original school.
3. Where students have moved multiple times since the earthquake, only the latest location data is used.
4. Rotorua is included in Bay of Plenty region.

Source: Ministry of Education

Christchurch City Council

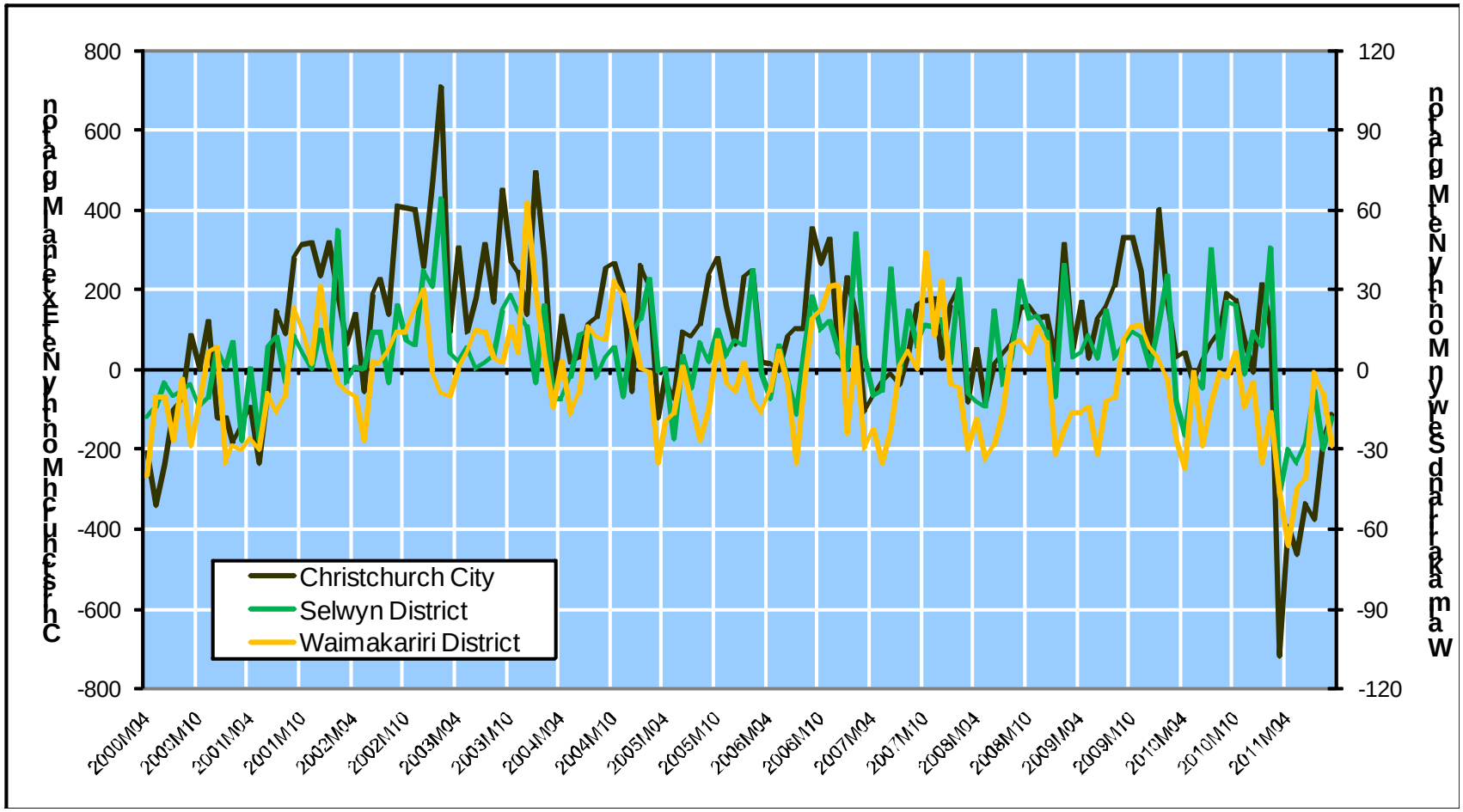
Postal Redirect data (12 April)

- 6 weeks post earthquake 25,000 movements - majority within Chch
- 5360 to other parts of NZ or Overseas
- Uncertainty around coverage and length of move

(http://www.resilience.org.nz/Household%20Relocations%20for%20Canterbury%2022%20February%20-%206%20April%20NZ%20Post%20Data%20Analysis.pdf)

Christchurch City Council

External migration (SNZ)



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External migration (SNZ)

March – September 2011

- UDS net loss 3370 people
- Chch net loss of 3000 people
- 75% of loss occurred up to June for both UDS and CCC

(including adjustment for long term trends for same period (+350 and +420 respectively)

Christchurch City Council

Sapere Research (Tom Love 17 April 2011)

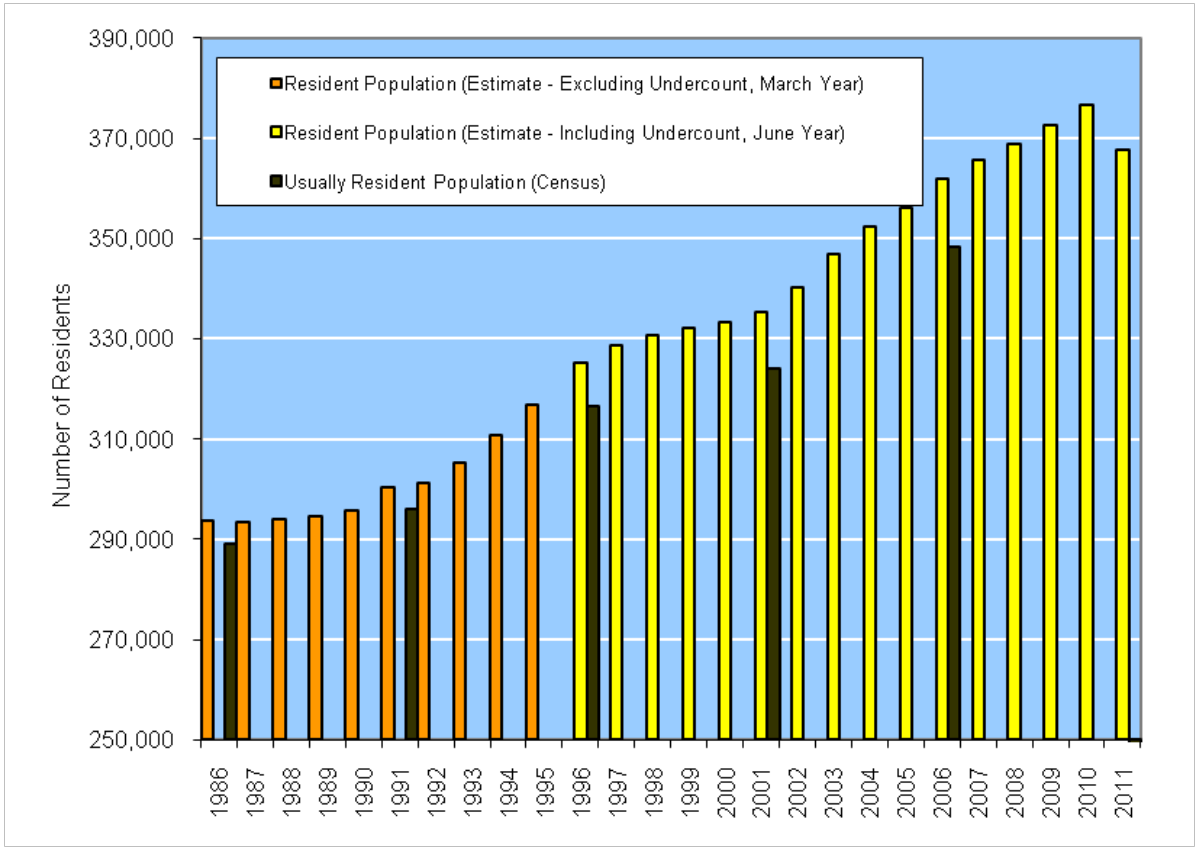
- Applied the experience from other international natural disasters such as Kobe and Hurricane Andrew
- Result - population was likely to decline by between 1 to 2 percent (3770- 7500) in the first year and then recover.

Summary of Immediate Loss 5th October

- For June 2011 – somewhere around a loss of 10,000 people from Chch (2-3%)
- Selwyn and Waimakariri – no loss – possible gains from Chch compensate lower migration flows

Christchurch City Council

SNZ 30 June 2011 estimated Population - Christchurch



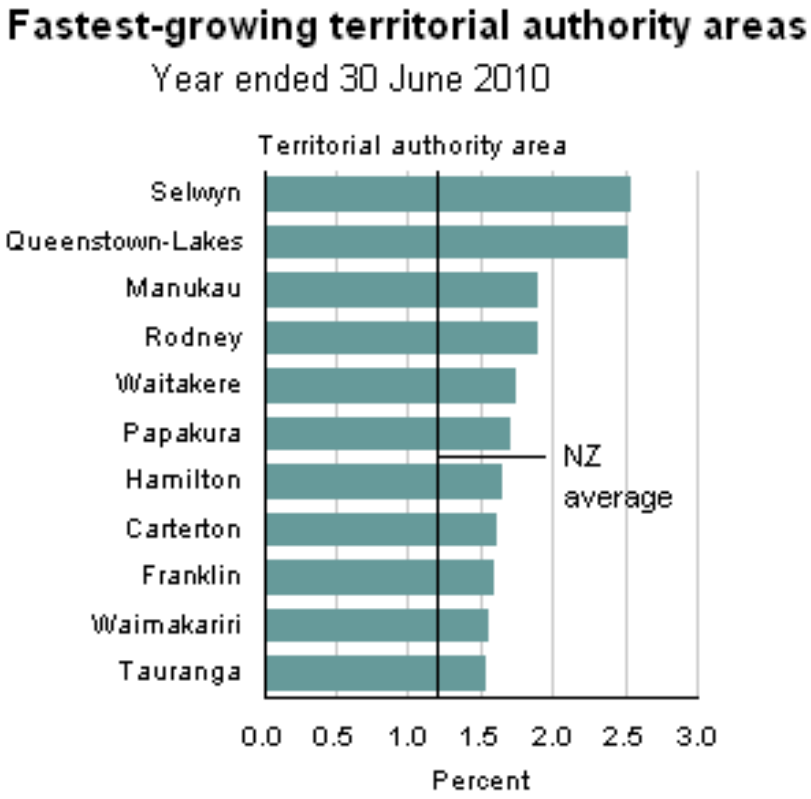
- Population loss 8900
- 3 years growth

Christchurch City Council

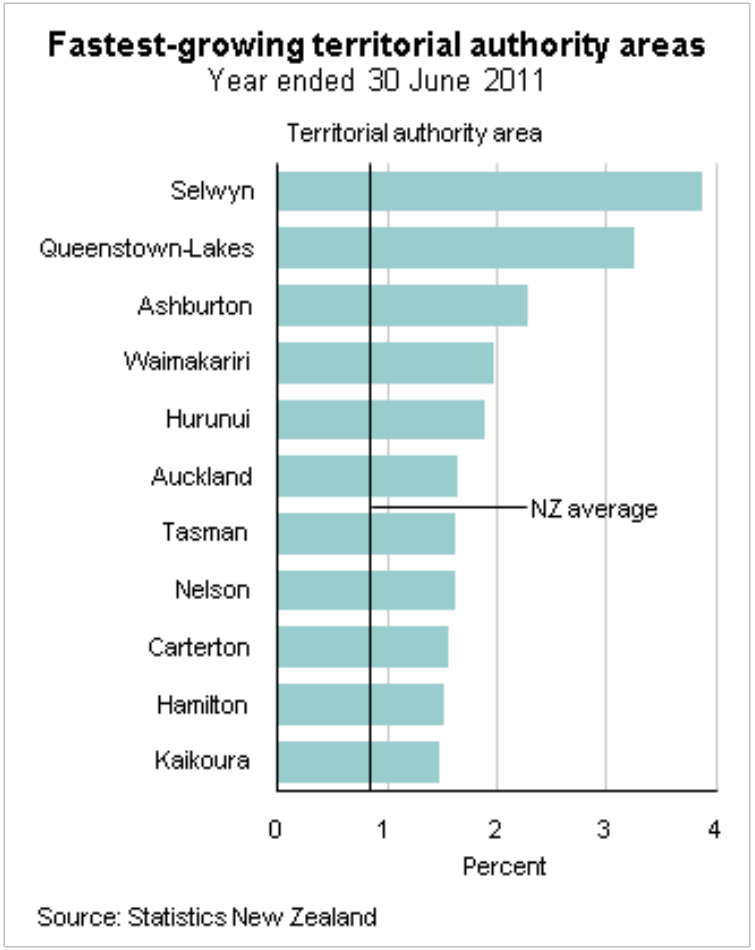
SNZ 30 June 2011 estimated Population - Surrounding Districts

Territorial authority area	At 30 June 2006	At 30 June 2010	At 30 June 2011 P	Average annual change, four years ended 30 June 2010 No	Average annual change, four years ended 30 June 2010 %	Population change, year ended 30 June 2011 P No	Population change, year ended 30 June 2011 P %
Hurunui	10,750	11,100	11,300	90	0.8	210	1.9
Waimakariri	44,100	47,600	48,600	900	2.0	940	2.0
Christchurch	361,800	376,700	367,700	3,700	1.0	-8,900	-2.4
Selwyn	35,000	39,600	41,100	1,200	3.1	1,500	3.9
Ashburton	28,000	29,400	30,100	350	1.2	670	2.3
Timaru	43,800	44,300	44,700	130	0.3	350	0.8

Christchurch City Council



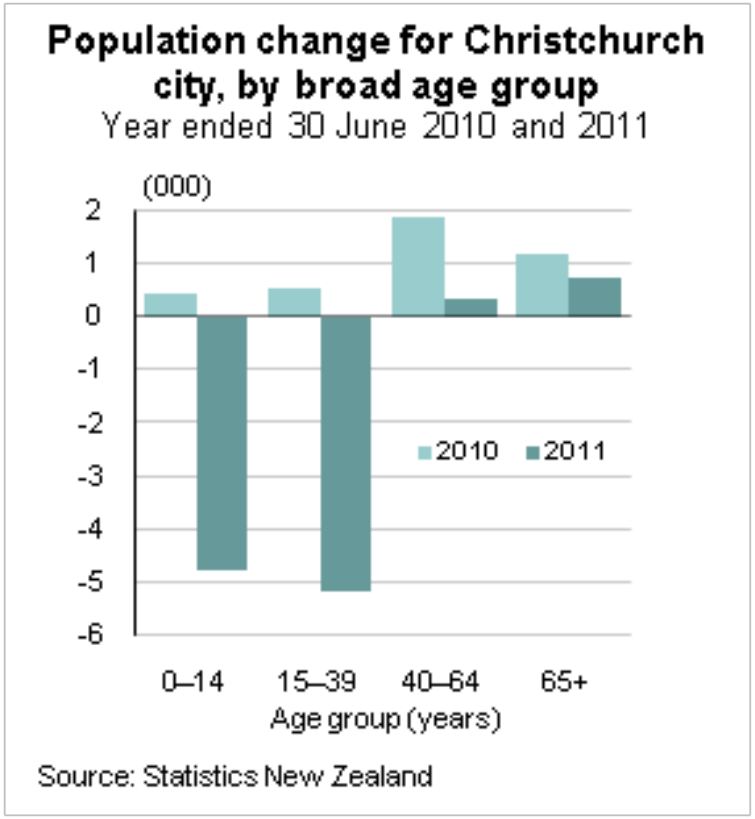
Source: Statistics New Zealand



Source: Statistics New Zealand

Christchurch City Council

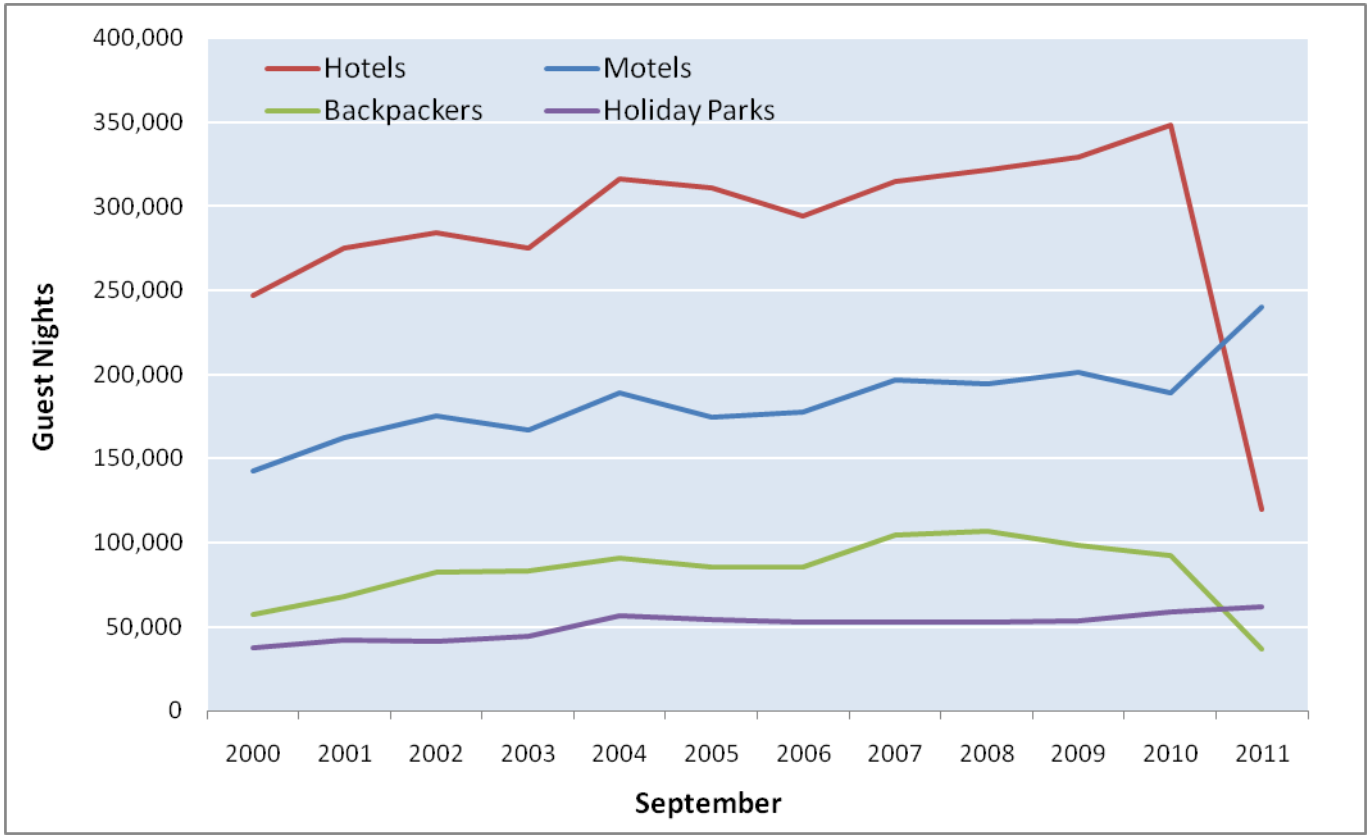
Who has left Christchurch



Young people and families

Christchurch City Council

Visitor Loss



33% loss Compared with September 2010

Hotels -66%

Motels +28%

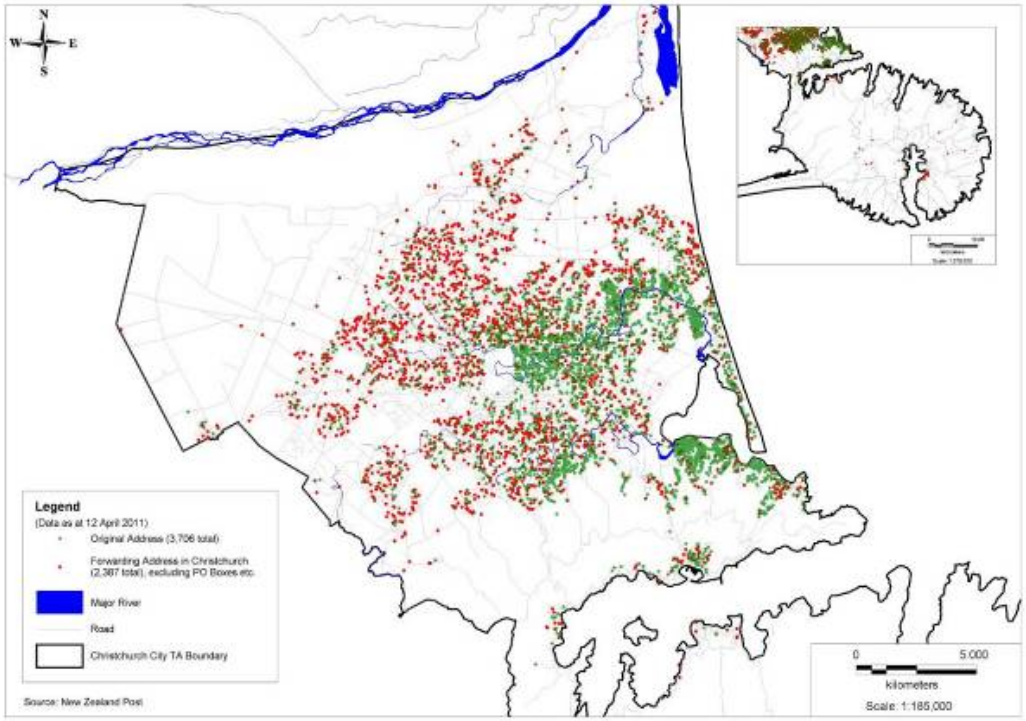
Backpackers -60%

230,000 fewer guest nights in Sept 2011 (7,700 fewer people staying in City per day)

- A guest night is equivalent to one guest spending one night at an establishment. For example, a motel with 15 guests spending two nights would report provision of 30 guest nights of accommodation.

Christchurch City Council

Movement within the City



We have no direct measures of what has happened but some indicator sets give us some idea

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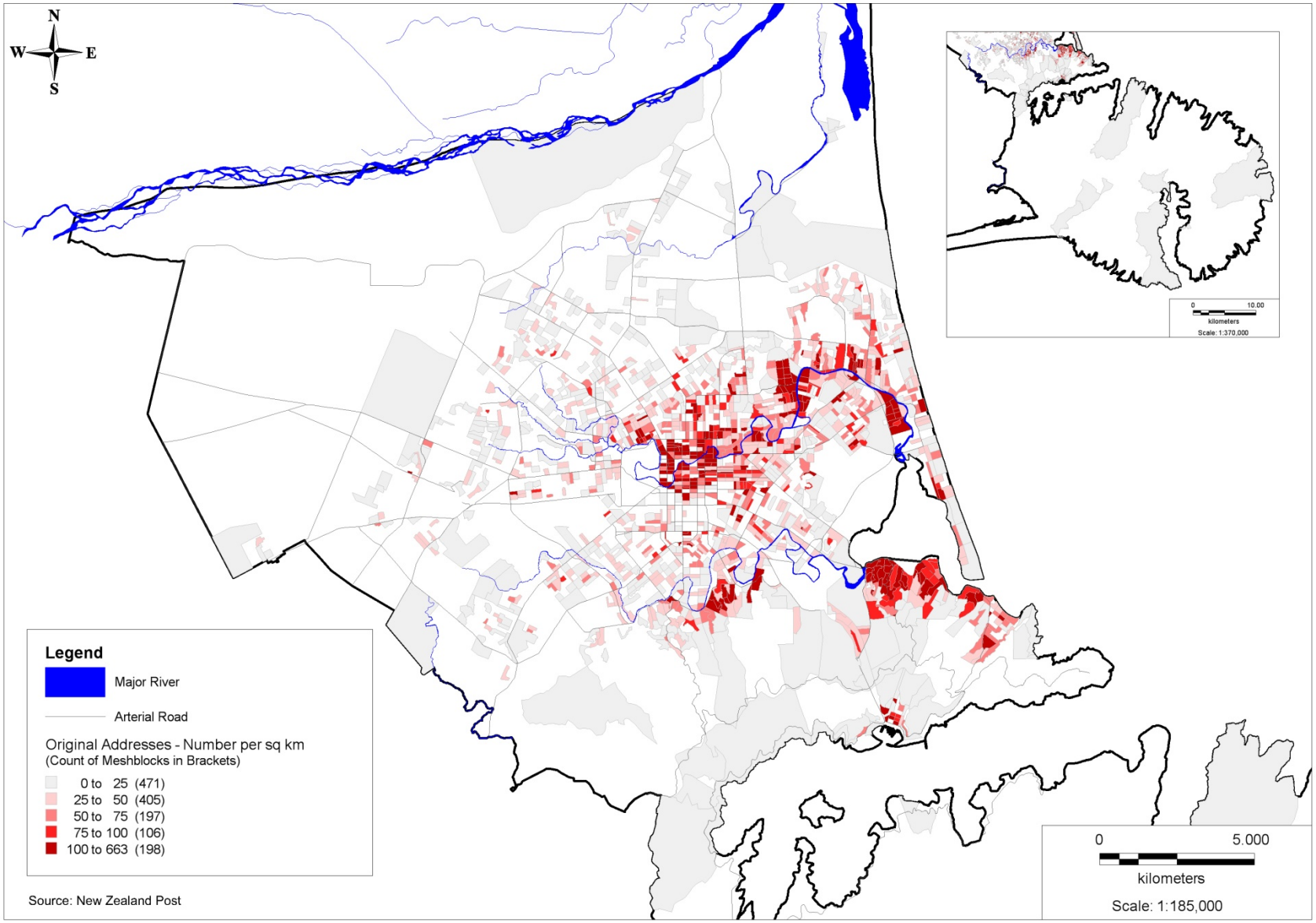
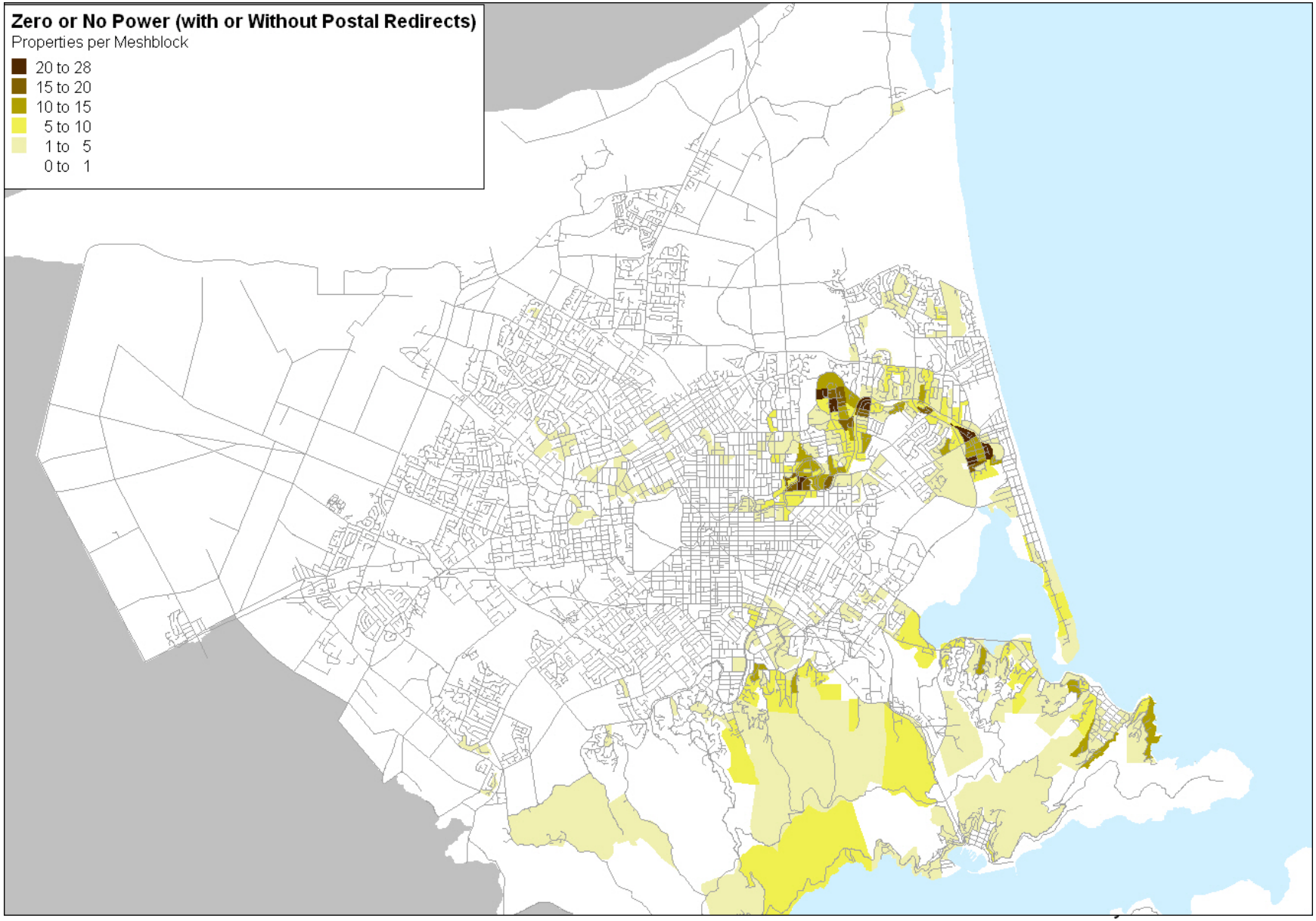
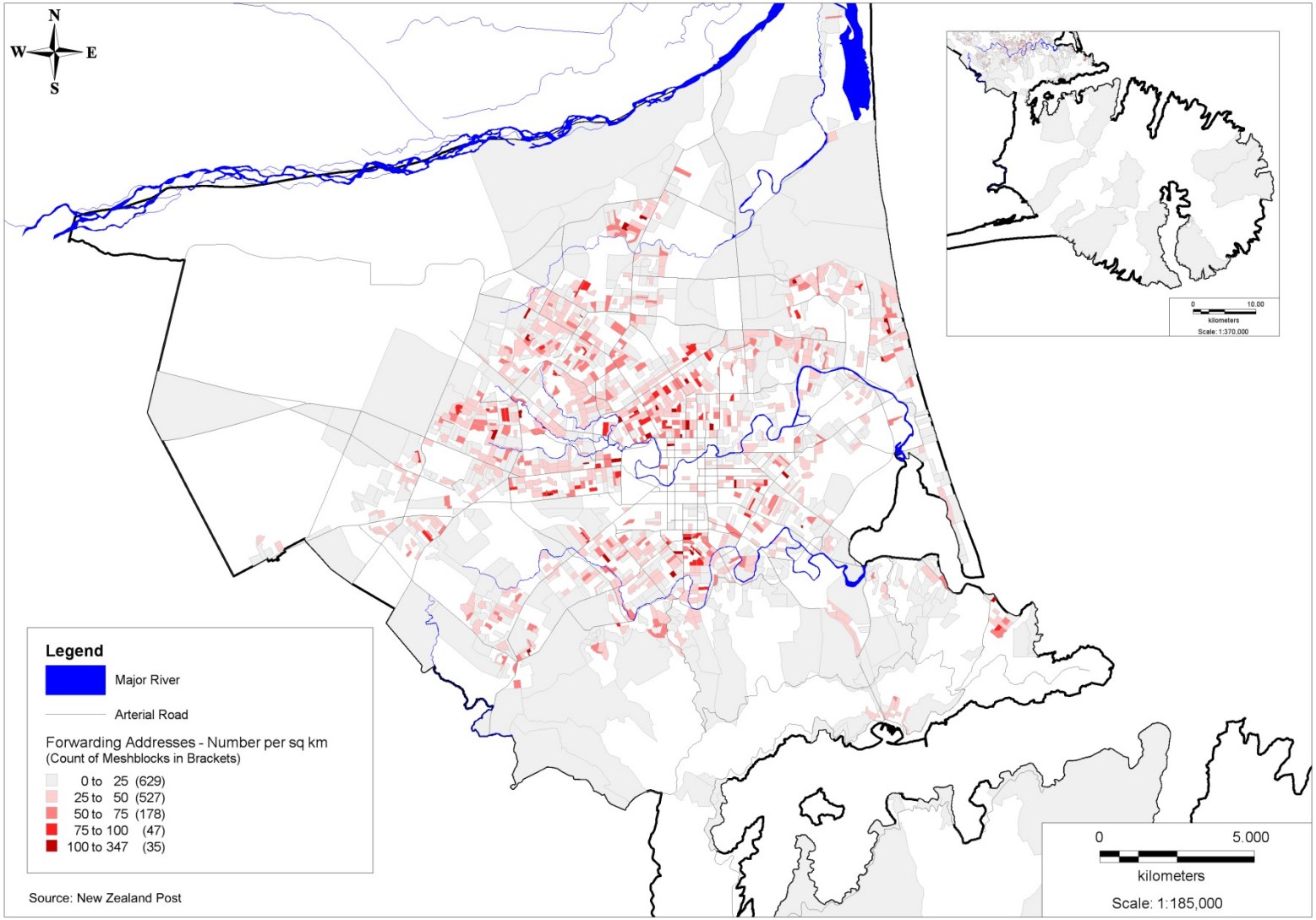
Original Address (NZ Post to12 April)



Possible Vacancies in Red, Orange and White Zone (Aug-Sept)



Location of Forwarding Addresses (NZ Post)



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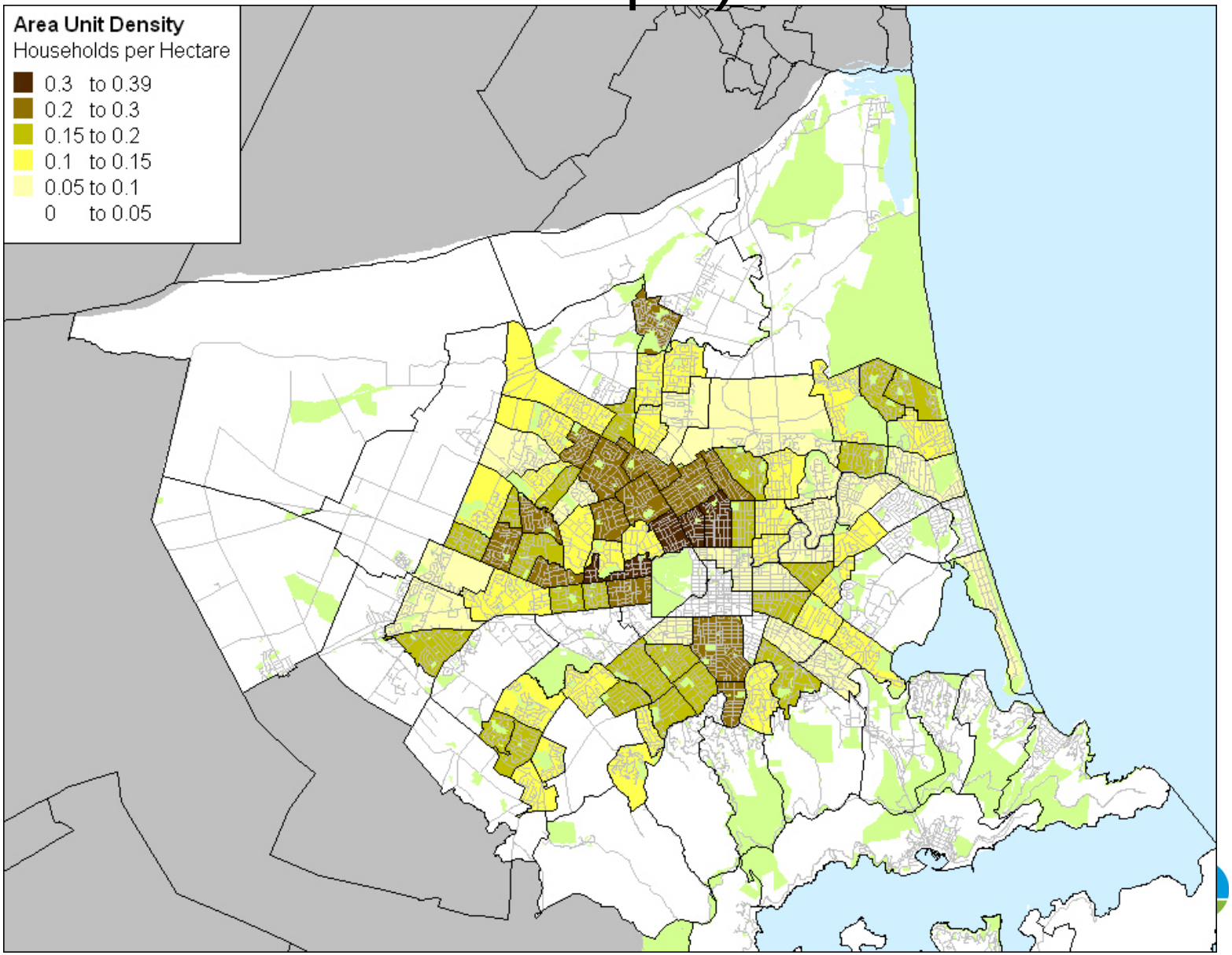
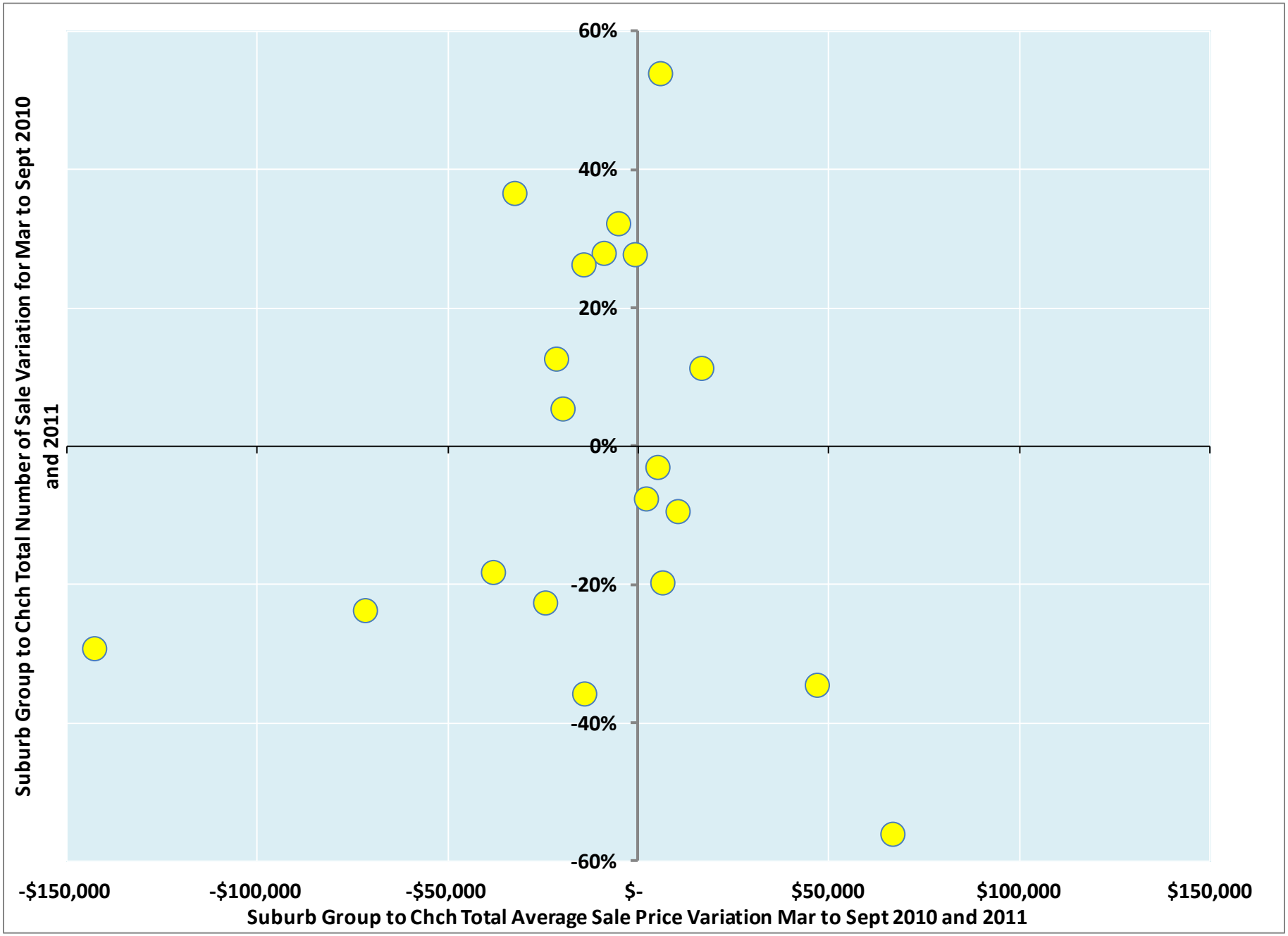
Location of Forwarding Addresses (NZ Post to 12 April)

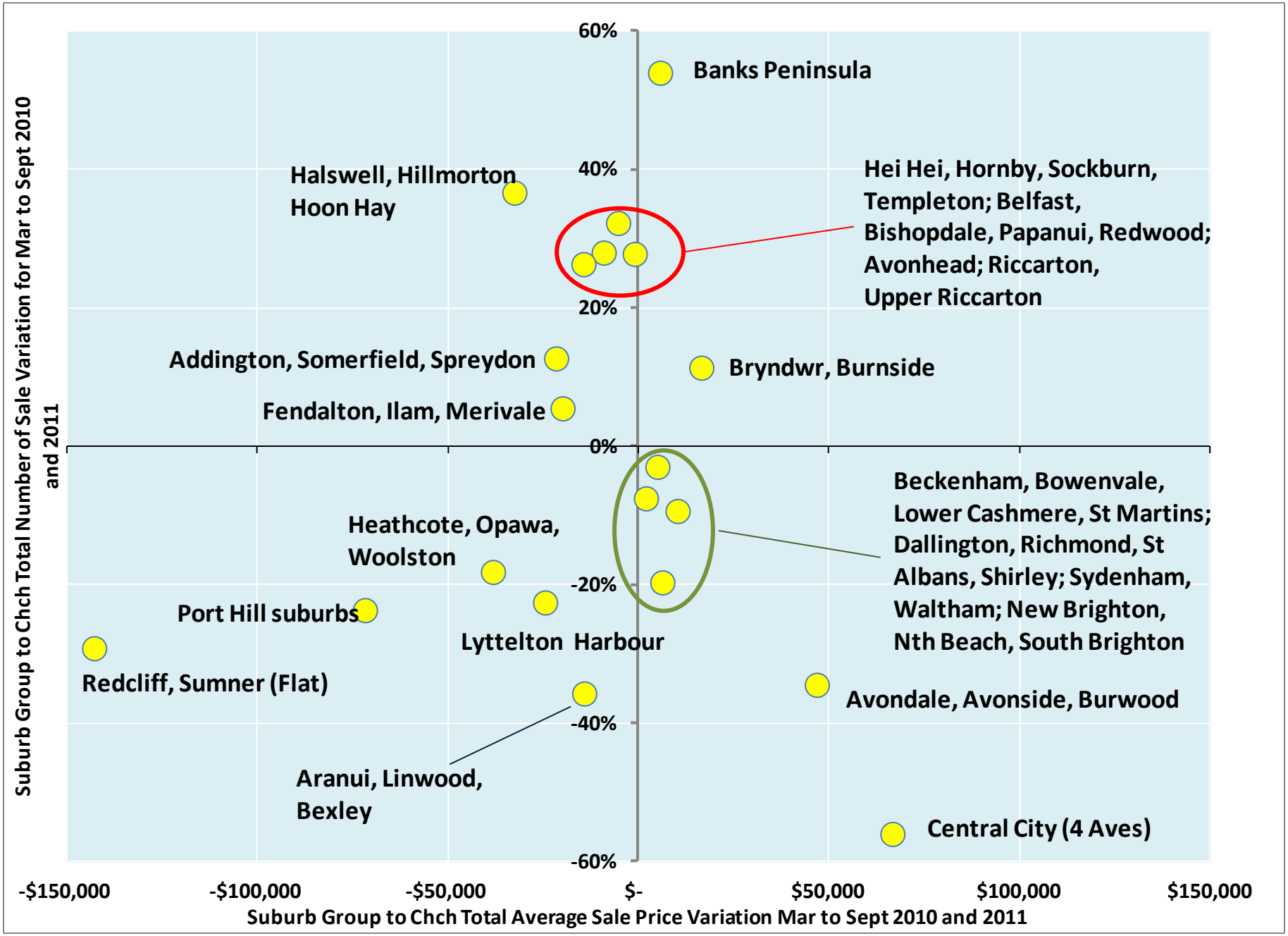


Residential house sales as an indicator of locational preferences

- Compared number of sales per REINZ suburb groupings
- Mar – Sept 2011 with same period in 2010
- Adjusted to take into account whole of City movement (ie Chch average sale +$13,000, number of sales -24%)
- Plotted % change in number of sales and difference in average sale price on the x and y axis.
- Centre point (0,0) total Christchurch

Christchurch City Council


60%
40%
20%
0%
-20%
-40%
-60%
-$150,000
-$100,000
-$50,000
$-
$50,000
$100,000
$150,000
Suburb Group to Chch Total Average Sale Price Variation Mar to Sept 2010 and 2011
Suburb Group to Chch Total Number of Sale Variation for Mar to Sept 2010 and 2011


Suburb Group to Chch Total Number of Sale Variation for Mar to Sept 2010 and 2011
60%
40%
20%
0%
-20%
-40%
-60%
-$150,000
-$100,000
-$50,000
$-
$50,000
$100,000
$150,000
Suburb Group to Chch Total Average Sale Price Variation Mar to Sept 2010 and 2011
Banks Peninsula
Halswell, Hillmorton
Hoon Hay
Hei Hei, Hornby, Sockburn,
Templeton; Belfast,
Bishopdale, Papanui, Redwood;
Avonhead; Riccarton,
Upper Riccarton
Addington, Somerfield, Spreydon
Bryndwr, Burnside
Fendalton, Ilam, Merivale
Beckenham, Bowenvale,
Lower Cashmere, St Martins;
Dallington, Richmond, St
Albans, Shirley; Sydenham,
Waltham; New Brighton,
Nth Beach, South Brighton
Heathcote, Opawa,
Woolston
Port Hill suburbs
Lyttelton Harbour
Redcliff, Sumner (Flat)
Avondale, Avonside, Burwood
Aranui, Linwood,
Bexley
Central City (4 Aves)

Part 2: Future growth

Christchurch City Council

The Sapere report in April note that:

- *"A number of researchers concluded that disasters have the impact of accelerating pre-existing population trends, which suggests in the case of Christchurch that growth can be expected to at least partly counterbalance any permanent loss of population"*

And suggests that:

- *"In one or two years it is likely that the total population of Christchurch will be slightly smaller than it might have been if there had been no one off out-migration to temporary interrupt growth. But it is also likely that population growth will continue at least at the pre-existing trajectory. Growth may even be enhanced to some extent, if there is an in-migration of construction workers"*

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"Disasters in history – A review" by Westpac Back 8th of July 2011 (http://www.wib.westpac.co.nz/web/content/pdfs/Disasters_in_History)

Primarily looked at the economic impacts of natural disasters in order to consider the economic impacts of the Christchurch earthquakes.

In summary they found:

- *While major earthquakes can cause enormous destruction, they don't tend to disrupt developed economies for long.*
- *They usually prompt significant rebuilding, with attendant increases in prices and wages.*
- *The long –run impact on growth is unclear. While there is some evidence that disasters accelerate existing economic decline, there is no consistent impact (positive or negative) on the prospects of already growing regions (eg Christchurch).*
- *Population losses after disasters depend on the degree of local damage. Most people return to habitable areas, and those who move don't tend to move far.*
- *They also note that "Christchurch was a growing and economically viable city before the quake, and has no serious rival as the South Island's main urban centre"*

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Future Household growth in the UDS area – possible futures

- **Rapid Recovery**. This is a very positive scenario, which would see the rebuild activity attracting permanent residents at a scale which would compensate for the post-earthquake loss of population. The UDS area and Christchurch would recover by 2021 to the Medium-High growth projection identified in pre-earthquake projections;
- **Quick Recovery**. This is also a positive scenario, which would see recovery to the pre-earthquake growth trend within 5 years. There would be some population loss, and slow growth until 2016, followed by recovery to the Medium-High growth trend from 2017 (parallel to UDS projection);
- **Moderate Recovery**. This scenario allows for initial loss, followed by slow growth over the 10 years to 2021. From 2022, the growth trend would recover to the Medium-High trend (parallel to UDS projection).
- **Slow Recovery**. This scenario allows for initial loss immediately following the earthquakes, and some further loss in Christchurch City over the next years, to 2016. For the 2017-21 period, there would be slow recovery, before a return to the Medium-High trend (parallel to UDS projection) from 2022.

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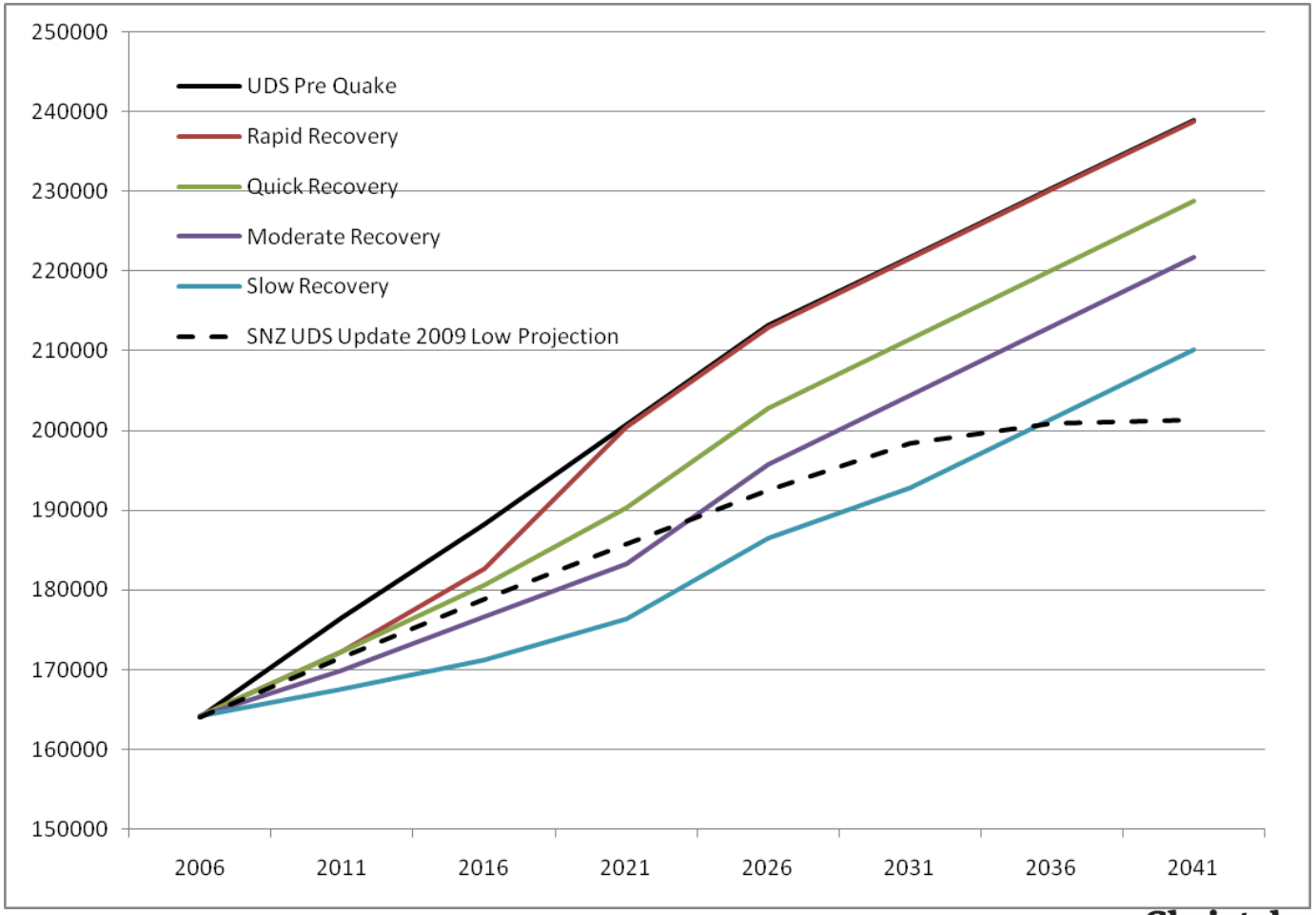
Future Household growth in the UDS area – possible futures



0 years

5 years

10 years

15 years

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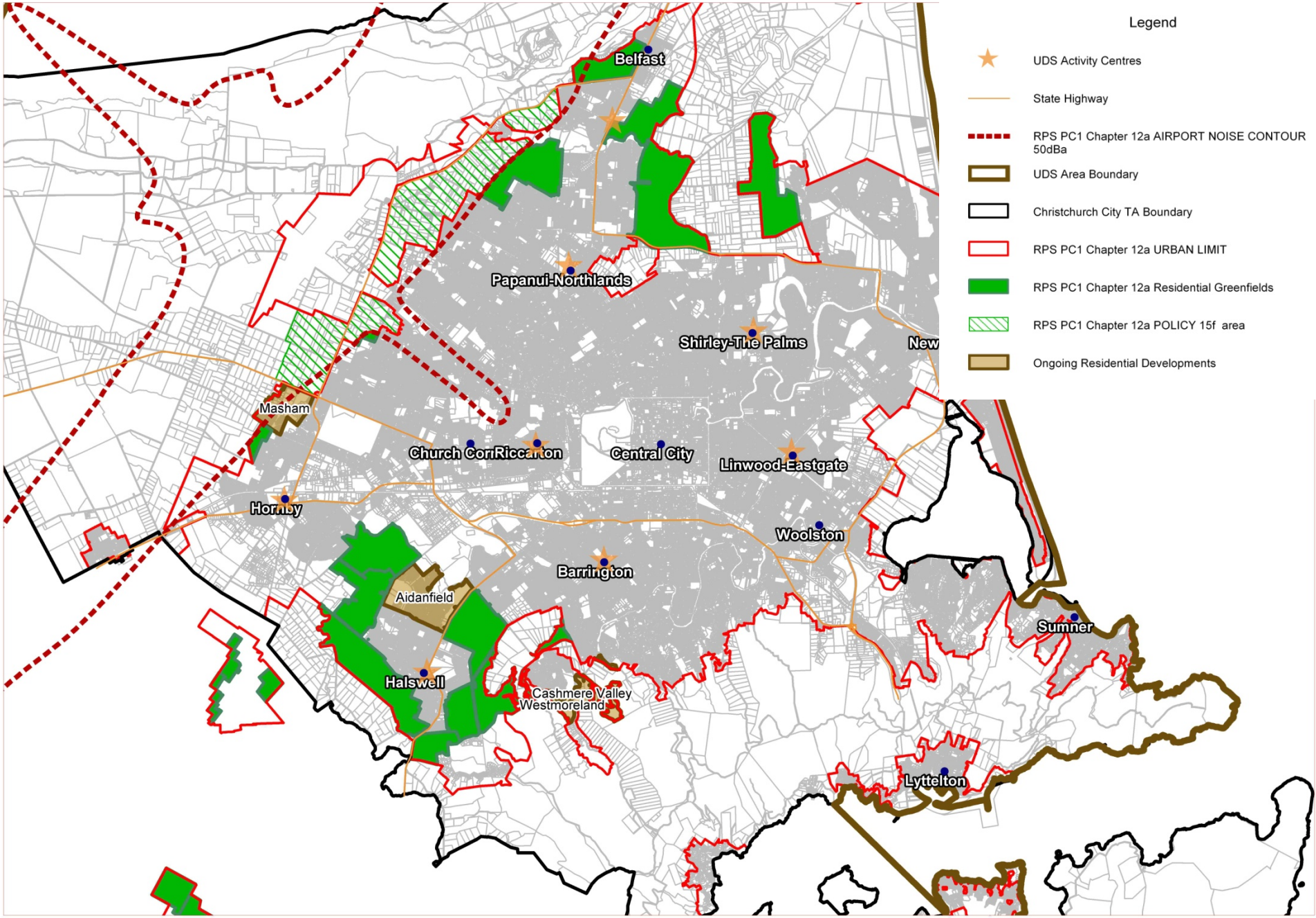
Location of future growth in Christchurch



Complicating factors

- Insurance paying rent for 6200 HH (govt assistance 350 HH)
- Red zone retreat
- Temporary housing for rebuild (?? max 7000 HH peak)
- Housing accommodation for temporary / construction workforce – (Amy and Brian ?? 5-10,000 HH peak)

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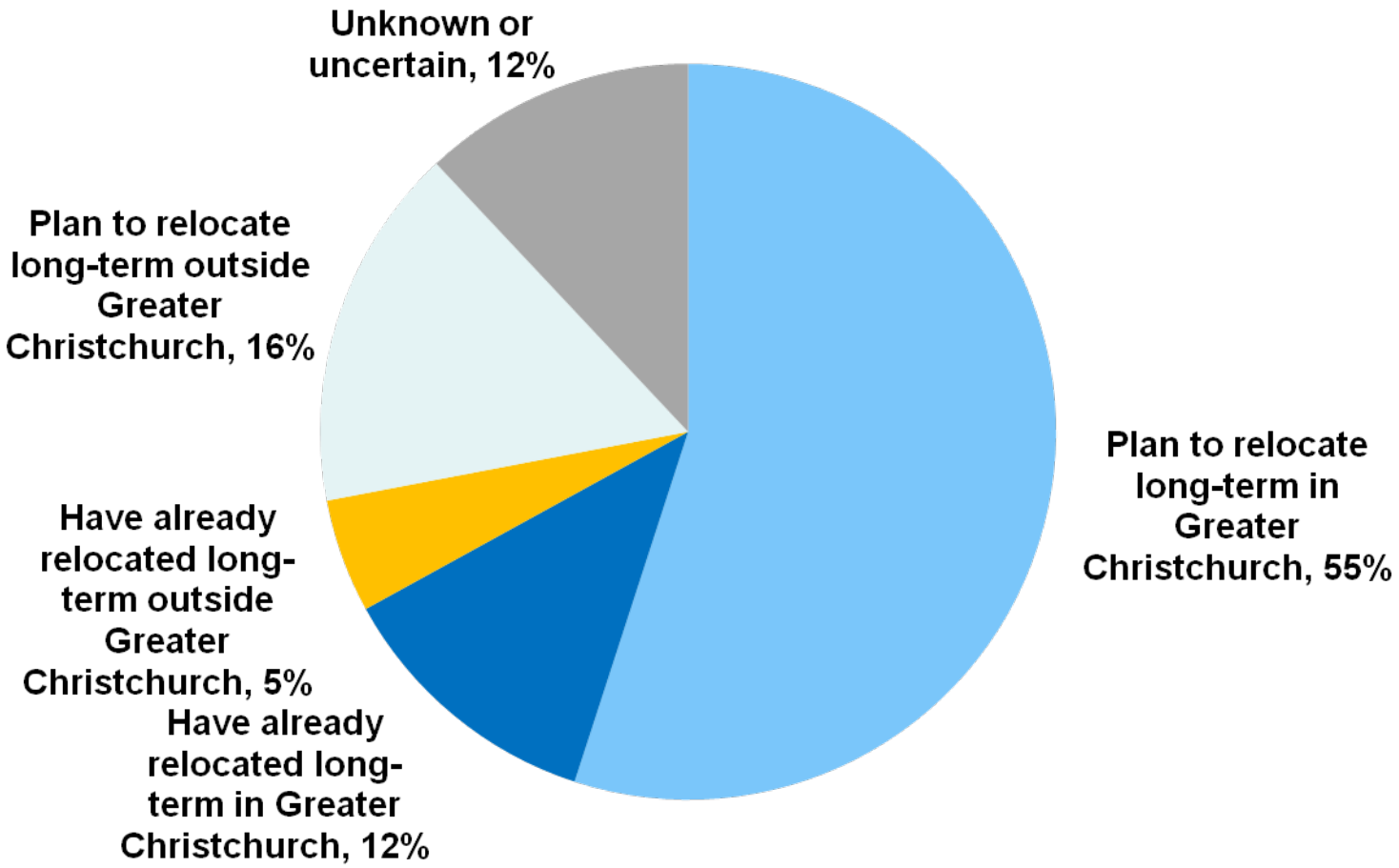
Future Intentions of Red Zone Households



Base : Red Zone Households (n=2939)

Source: CERA Red Zone Survey

Christchurch City Council

Total demand for long-term Accommodation in Christchurch by Location (CERA Red Zone Survey)

	Total demand n=1974
Christchurch City (net)	**66%**
Central city within the four avenues	<1%
Eastern Suburbs :	26%
Central Suburbs :	7%
North West Suburbs	3%
Central North Suburbs	3%
Port Hills	<1%
Cashmere	1%
Halswell	5%
Western Suburbs	3%
Northern Suburbs	15%
Banks Peninsula	<1%
Other	<1%
Waimakariri District (net)	**23%**
Kaiapoi	10%
Rangiora	6%
Woodend/Pegasus	3%
Other (e.g. Cust, Loburn, Ohoka, Oxford, Sefton, Swannanoa, Waikuku)	4%
Selwyn (net)	**5%**
Rolleston	2%
Lincoln	<1%
Other (e.g. Darfield, Leeston, Prebbleton, Sheffield, Springfield)	3%
Don't know	6%

Estimating Labour Demand for the Canterbury Rebuild

Brian Cosgriff and Amy McNaughton

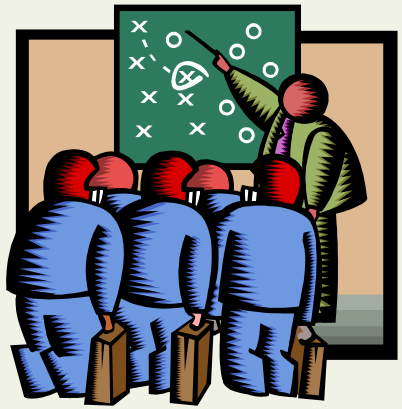
(Department of Labour and Canterbury Development Corporation)

Department of Labour
TE TARI MAHI

cdc
Leading Economic Development for the Christchurch City Council

Why?

- To ensure the rebuild is not held up by lack of skills
  - Forward planning
    - Training
    - Immigration
    - Co-ordination between government, private sector



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The Model

- Extension of the Economic Futures Model
- Developed by Market Economics through two FRST Programmes
- Developed to address different implications associated with natural hazards
- Applied nationally and internationally

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Basic Workings…

- Demand driven input-output framework
- Inputs include
  - Population growth
  - Exports
  - Productivity

- Model calculate output required to meet demand
  - Value Added
  - Employment

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Inputs…

Outputs….

Application to Earthquakes

- Damage data fed into the model:
  - Different work streams
  - Cost of damage
- Categories mapped to construction workers
- Model calculates flow-ons to wider economy, demand by occupation through time
- Business as Usual subtracted from total demand to get Earthquake effect
- Different scenarios run
  - Level of Damage
  - Start Date
  - Length of time

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Basic Results

- Early runs show 30,000 additional construction workers required at peak demand
  - Likely to change with further modelling
- Key occupations include:
  - Builders
  - Plasterers
  - Painters
  - Concreters
  - General Labourers

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Next steps

- Incorporating insurance data to improve inputs
- Running different time scenarios
- Initial results to be published next month (Employment Opportunities in Canterbury, Department of Labour, CDC)
- On-going runs as required

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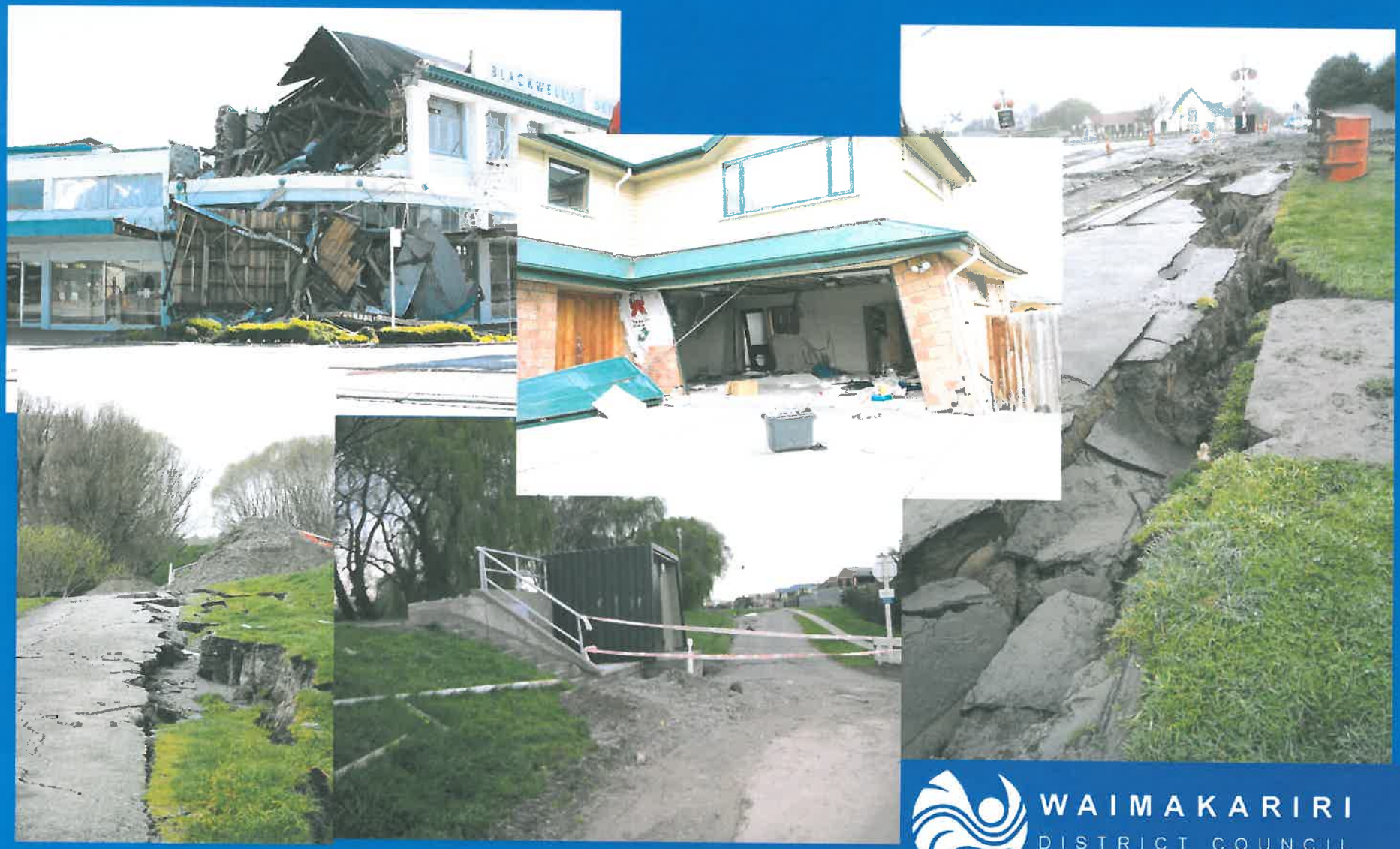
KAIAPOI – where to from here?



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Key dates

- 4 September 2010
- Under CD emergency – 10 days and recovery begins
- 1st and 2nd week December – 6 community meetings
- 22 February – Christchurch devastated and Kaiapoi remediation meetings cancelled
- 22 March – remediation meetings to explain recovery plan begin
- Early June – Government puts everything on hold
- August Pines/Kairaki and Kaiaipoi "Red Zone" announcements
- August/September – combined CERA/WDC community meetings

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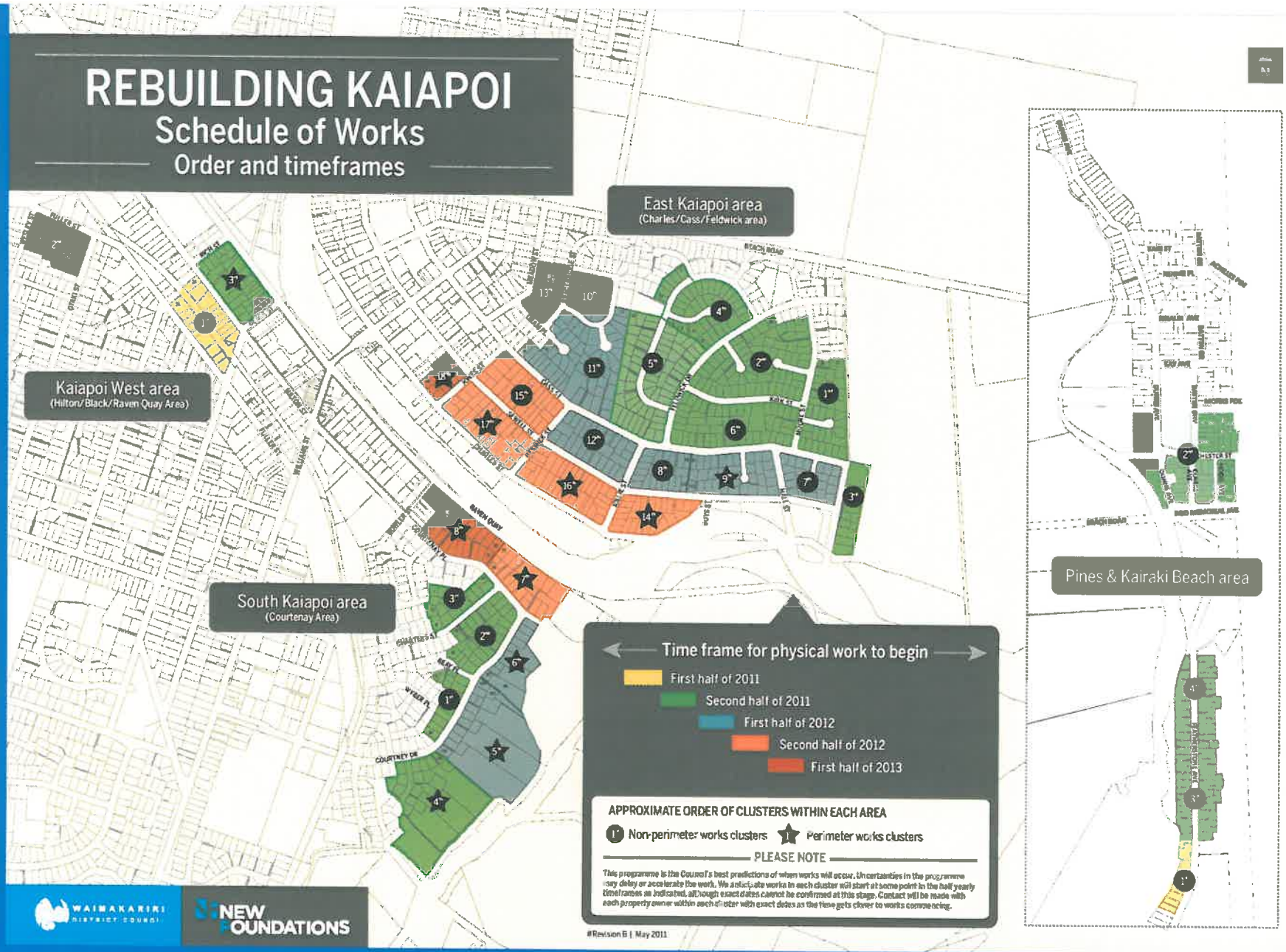
REBUILDING KAIAPOI

Schedule of Works

Order and timeframes



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NEW FOUNDATIONS

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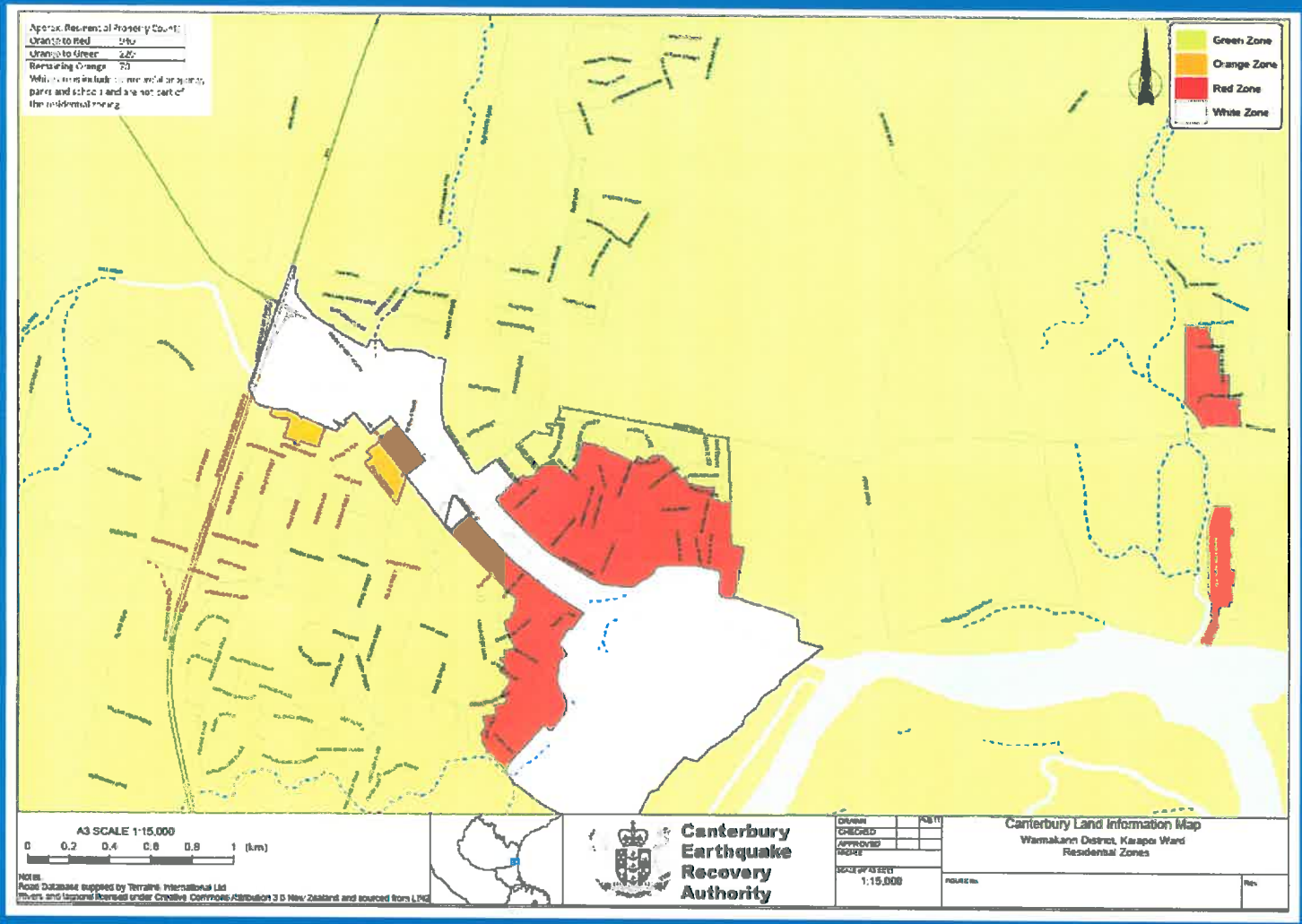
Kaiapoi and Pines/Kairaki "Red Zones"



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2011 Intentions Survey – key findings

- Who did we hear from?
  - High percentage of households with older people (40%)
  - High percentage of households with two people (48%)
  - Percentage of households with children/teens (31%) similar to 2006 Census
  - Percentage of children/teens (24%) slightly lower than 27% at 2006 Census
  - Missing from relative perspective – all adult households with people under 60 years of age
  - Difficult to reach people in rental accommodation

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Making plans

- Of the 392 respondents:
  - 30% (116) had made plans for their next home
  - 7% (26) planned to rent accommodation for the foreseeable future
  - 52% (204) had no firm plans for their next home
- Households with firm plans:
  - 54 (39%) of 140 household with all member 60 years and over
  - 40 (44%) of 91 households with adults under 60 years
  - 54 (50%) of 109 households with children/teenagers

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DISTRICT COUNCIL

Where to move to?

- Of those who had made plans 85 indicated where they were planning to move to:
  - 45 were going to remain in Kaiapoi (14 of these people were building a new home at Sovereign Palms)
  - 22 were going to move to another location in the greater Christchurch area or Waimakariri District
- Of those who were moving away from greater Christchurch:
  - Hurunui District (7), Ashburton (6), Northern S.I. (2), Waimate (1), Dunedin (1) North Island (1)
- Of those who had not made plans
  - 68% (137) indicated that Kaiapoi was their first or only choice
  - 26% (67) did not indicate a preference

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DISTRICT COUNCIL

Paying the price

- Price bracket respondents would begin to look at:
  - 29% (114) $300,000 or less
  - 17% (66) $300,001 - $ 350,000
  - 11% (46) $350,001 - $400,000
  - 12% (49) $400,001 or more
- Of those who would start looking for properties of $300,000 or less 54% (61) were households with all members 60 years and over
- Major concern – the need to take on another mortgage or increase the amount of mortgage
- Older people – whether they would be able to get a mortgage

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Time to move

- When respondents area likely to move:
  - 15% (58) had already moved
  - 8% (33) within 6 months
  - 14% (56) within 12 months
  - 13% (52) within 18 months
  - 37% (143) did not know
- Likely to need temporary accommodation:
  - 36% (144) very likely/quite likely
  - Included 27 households that had already moved away from the property they were at on 4 September

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What did we learn?

- Many households living under very difficult conditions including a relatively high number of older people
- The retreat from the "red zones" will be slow
- Some will have difficulty finding a home in their price range
- Those with special needs and/or disabilities will be facing substantial difficulties finding suitable accommodation

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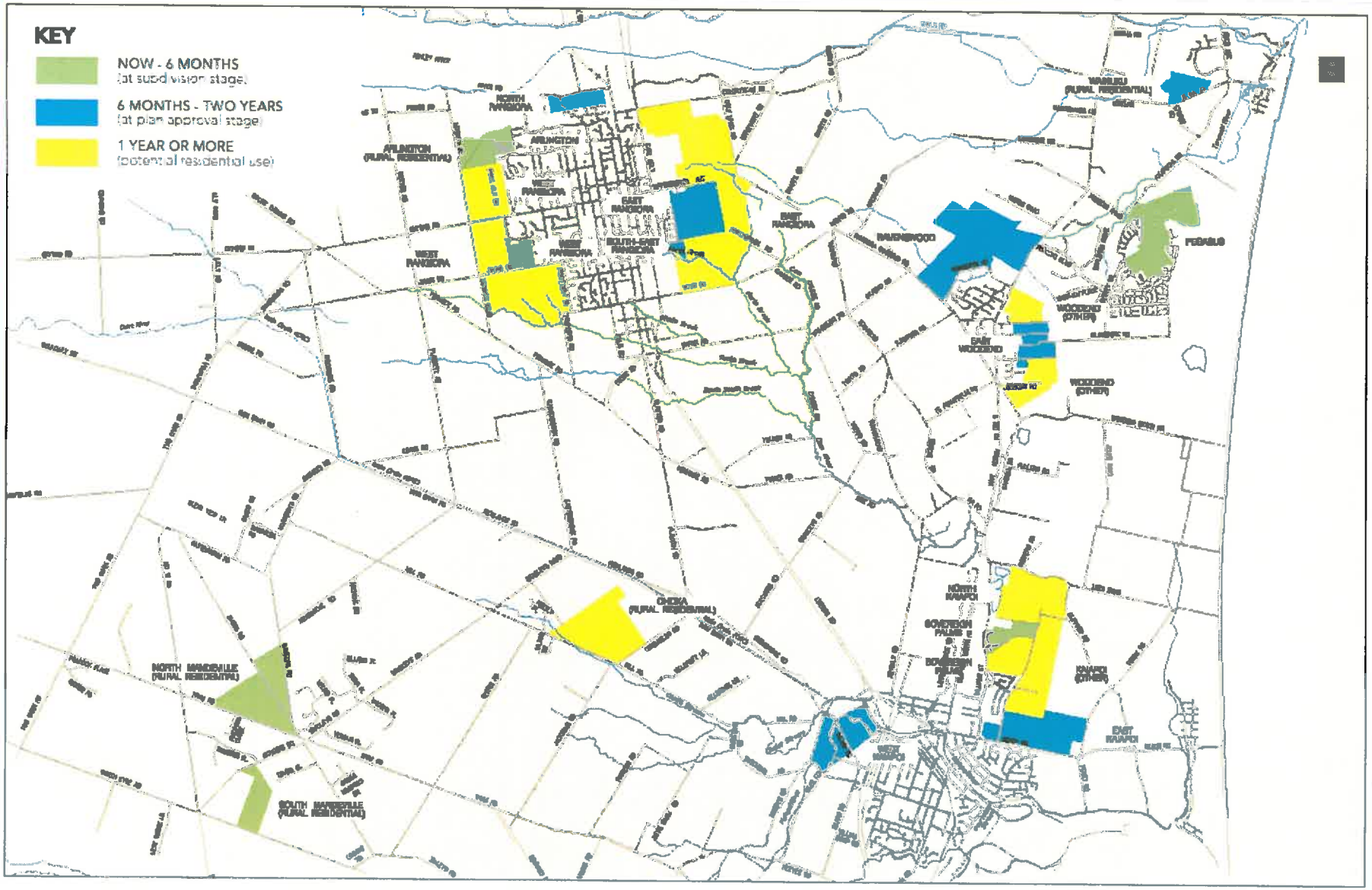

EASTERN WAIMAKARIRI DISTRICT

LIKELY RESIDENTIAL AVAILABILITY

WAIMAKARIRI
DISTRICT COUNCIL

www.gns.cri.nz

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