



BIBLIOGRAPHIC REFERENCE

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ABSTRACT

The Wellington region has a history of tectonic movement and damaging earthquakes. Social research on Wellington's earthquake risk is limited, but has explored aspects of public education and issues around preparedness and resilience. As part of the Wellington 'It's Our Fault' project this document contains a listing of reports, papers and other material on social research on the earthquake risk in the Wellington region.

KEYWORDS

Earthquake, social impacts, Wellington.

1.0 INTRODUCTION

Wellington has a history of damaging earthquakes. The region is situated on and around active faults and is susceptible to earthquakes and the associated natural hazard events – tsunami, and landslips and flooding initiated by tectonic movement. The first accounts of Wellingtonians' experience of earthquake come from descriptions of the 1848 and 1855 earthquakes (Grapes 2000, McSaveney, 2007) which impacted the early settlement of Wellington.

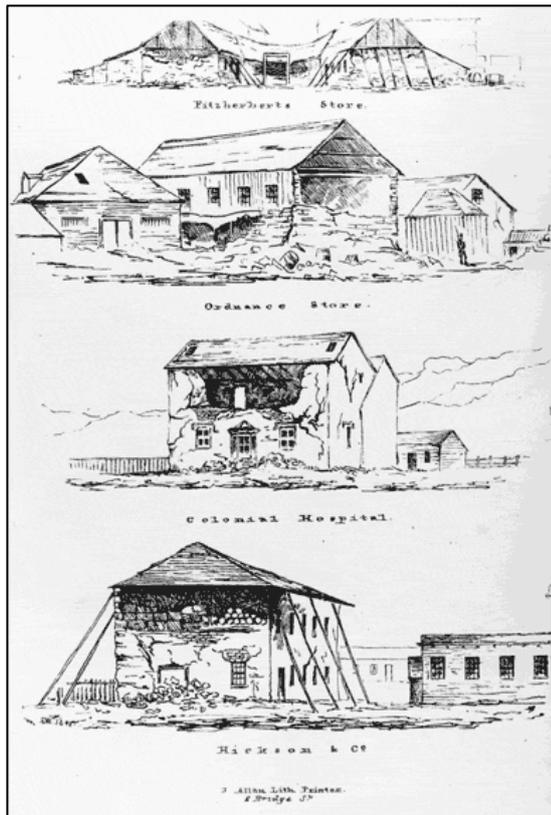


Figure 1 Sketches by Robert Park showing the damage to buildings sustained in the 1848 Wellington earthquake. Source: Alexander Turnbull Library.

The most recent significant earthquakes to affect Wellington were in 1942, with a magnitude 7.2 on 24 June, centred 80km to the north, followed by a magnitude 5.6 on 1 August and a magnitude 6.8 the next day. Although no loss of life occurred there was extensive damage, with the cumulative impacts of these events, resulting in damage to over 5,000 houses and 10,000 chimneys (McSaveney, 2007).

Social research on the earthquake risk in Wellington is limited. Several studies by government agencies, councils and other organisations have focused on measuring the effectiveness of public education initiatives (MCDEM, 2007-2009). Other researchers have explored general issues around preparedness and resilience, using Wellington as a case study (in part) for this work (e.g. Finnis, 2007; McClure, 2009).

The 4 R's to resilience – Reduction, Readiness, Response and Recovery – rely on pre-event planning and policy implementation to reduce social and economic impacts and to improve response and recovery to a natural hazard event. In New Zealand, Emergency Management has the lead role in identifying potential risks to life and property, in analysing and planning

for risk reduction, readiness, response and recovery, and in educating the public in self-help and response programmes (MCDEM, 2003). The references below show the depth and width of studies completed since the beginning of social science research in New Zealand. Schools, businesses and individuals have been surveyed, councils and lifelines groups have been studied, and media messages and public education programmes evaluated to find out what New Zealand does, and does not, know about preparing for and responding to a natural hazard disaster.

The individual works cited in Table 1 look at the topics of preparedness, readiness, business continuity, socio-economic factors, school and public education programmes, readiness/preparedness message delivery, disaster warning systems, travel patterns, business disruption, debris disposal, public confidence levels, and the psychological effects of disasters on communities.

In this report we bring together a list of reports, papers, articles and conference contributions on social science research for earthquakes in the Wellington region, and the associated potential effects on communities within the Wellington region.

2.0 METHOD

To gather all known sources of social science research on earthquakes in the Wellington region, a literature search was carried out using the following databases:

- GNS Bibliographic Database – an index of New Zealand geoscience literature indexing journal articles, reports, books excerpts, conference papers or abstracts, and maps
- New Zealand Science – index of New Zealand science and part of the Knowledge Basket
- FindNZArticles – index of information about New Zealand containing 3 sections – culture including arts and humanities, newspapers, science and technology
- INNZ – index of New Zealand periodicals
- KRIS – Kiwi Research Information Service, a gateway to the open-access research documents produced at universities, polytechnics, and other research institutions throughout New Zealand

All relevant publications have been included in Section 3.0 Table 1 with full references in Section 4.0. The draft of this document was distributed to key people in this field and any additional references identified have been added to Table 1.

Table 1 Social research on earthquake risk in Wellington: 1848 to 2010.

Year	Nature of Study	Key Findings	Reference
2010	Earthquake hazard: Wellington .	Earthquake hazards Fact Sheet. Wellington: Greater Wellington Regional Council.	GWRC, 2010
2010	Post-earthquake sheltering needs: how loss of structures and services affects decision making for evacuation.	For a major Wellington earthquake event decisions about evacuation will occur after event impact. A model framework for calculating evacuation numbers and sheltering requirements is proposed based on a variety of damage and non-damage related factors that contribute to evacuation decision making. A household's decision on whether to evacuate or shelter in place is based on a range of factors and the outputs from this model will assist those tasked with planning for readiness, response and recovery.	Wright and Johnston, 2010
2010	Are we prepared?	Preparedness levels in Wellington Wellington Region Civil Defence Emergency Management Group commissioned telephone surveys in 2010, 2007, 2006, 2005, 2004 among a random cross-section of residents to gather information that helps quantify the region's level of preparedness for a major civil defence emergency. This report contains data from the 2010 survey.	Peter Glenn Research, 2010
2010	An investigation of the relationship between socio-economic status and hazards-preparedness in intermediate school children.	Overall, lower decile schools tended to be the least informed and the least prepared for dealing with hazards, suggesting that a school's decile ranking may be a key indicator in hazards education and preparedness. These findings are consistent with previous studies (e.g., Hango, 2007) and demonstrate the relationship between Special Education Services (SES) and educational outcomes, in this case, hazards education outcomes.	Tarrant and Johnston, 2010
2010	Preparedness to cope with hazards – schoolchildren.	The study investigated the perceptions, knowledge and preparedness needed to cope in a range of natural hazard scenarios, with particular attention given to earthquakes and tsunamis. The school children had a realistic understanding of the likelihood of earthquakes and tsunami occurring in the Wellington region, and the large	Tarrant and Johnston, 2010

Year	Nature of Study	Key Findings	Reference
		<p>majority understood the causes of earthquake and tsunami, and knew best practice in the event of these two hazards.</p> <p>However, about 20 percent of the children were often fearful of earthquakes and tsunami.</p> <p>Only a minority of children discuss with their parents what they learn about hazards at school, and family preparedness rates were low for dealing with an emergency event.</p> <p>Results suggest that future hazards programmes in schools include emotional-coping components, and hazards related homework exercises to encourage the flow-on effect of school-learning to the home and wider community.</p>	
2010	A Geographical Analysis of Hazardscape of Wellington Region: Influences on Intra-regional Response.	Theorises the concept of 'Hazardscape', and assesses its influences on local response of people and administration in Wellington Region. The research is interdisciplinary in nature and looks for both physical and social causes of hazards along with all responses in different forms of adjustments and adaptations for hazard mitigation, preparedness, real time response and recovery. It is based on the hypothesis that whereas integrated planning has aimed for uniform response, Hazardscape introduces variations in local response.	Khan, 2010
2010	An Experimental Investigation of Authoritative Sources of Information and Evacuation Order Characteristics on the Likelihood of Evacuation in a Simulated Flood Event.	Looks at the influence of the presenter in a mock television evacuation order on people inside and outside the evacuation area. The presenter's level of authority and message did not affect the likelihood of evacuation. Participants indicated they would place the greatest level of trust in evacuation information from the highest role within civil Defence, followed by local Police. Three quarters of shadow evacuation was due to participants incorrectly including themselves in the evacuation zone. The remaining quarter reported higher levels of concern about their safety, travel and ability to travel.	Lamb, Walton, Mora, and Thomas, 2010
2010	An earthquake emergency response and evacuation	Observation of an earthquake response and evacuation exercise in a Wellington	Johnston, Tarrant, Tipler, Coomer,

Year	Nature of Study	Key Findings	Reference
	exercise in a New Zealand school: a case study report.	<p>primary school. Modifications and issues for best practice were identified and included.</p> <p>Key findings include: frequent, well learned emergency practices will help staff and pupils react well in an emergency and that having well practiced plans in place send a message to the community that their children are safe at the school.</p>	Pedersen and Garside, 2010
2009	Planning for tsunami evacuations: The case of the Marine education centre, Wellington, New Zealand.	<p>A review of the application for the Marine Education Centre at Te Raekaihau Point and discussion around the Environment Courts decision on evaluation planning for coastal facilities.</p> <p>The Environment Court agreed that there needed to be specific planning for evacuation of staff and visitors to tsunami at-risk facilities. This is significant for future applicants seeking resource consents for the establishment and operation of public facilities in areas susceptible to natural hazards, in that an evacuation plan is a necessary consideration of public safety.</p>	Garside, Johnston, Saunders and Leonard, 2009
2009	Framing effects on preparation intentions: Distinguishing actions and outcomes.	<p>Whether people's intentions to prepare for earthquakes were influenced more by positive or negative framing of the messages.</p> <p>The findings indicate negatively framed messaging is more likely to influence people to prepare for an earthquake, and negative framing of outcomes is likely to increase preventive actions in relation to natural hazards.</p> <p>Intentions to undertake both general and specific preparation were higher with negatively framed outcomes than positive outcomes. With specific actions, negative outcomes led to higher intentions to prepare when the action frame was positive (i.e. being well prepared).</p>	McClure, White, and Sibley, 2009
2009	Disposal of debris following urban earthquakes: Guiding the development of comprehensive pre-event plans.	Guidelines and procedures in place to manage disaster debris assists in the timely and efficient removal of debris, and assist with the appropriate recycling and/or disposal to appropriate locations. Inefficient or poorly planned responses can impose additional	Johnston, Dolan, Saunders, van Schalkwyk, Killeen, Cousins, Glavovic, Brown and McIntyre, 2009

Year	Nature of Study	Key Findings	Reference
		social, economic and environmental burden on an already impacted community.	
2009	Survival Confidence of New Zealanders in outdoors and post-earthquake situations.	<p>Survey of 233 New Zealanders and 130 people from overseas on their preparedness and confidence at performing tasks post-earthquake and in the bush.</p> <p>Participants compared their abilities to those of the average person from their own country:</p> <ul style="list-style-type: none"> - in the bush scenario, 67% of New Zealanders and 69% of those from overseas showed an optimism bias by rating themselves better than average - in the earthquake scenario 72% of New Zealanders and only 33% of those from overseas showed this bias. The difference in confidence between scenarios can be explained by the likelihood of having experienced the scenario examined, and it is suggested that New Zealanders may be overconfident in their abilities in a scenario they have not experienced. 	Smith and Walton, 2009
2009	Returning to work after the big one: Predicting staff priorities in a dual role agency.	<p>Study of the return to work behaviour of 190 staff in a local government organisation after a hypothetical earthquake scenario Attitudes and interdependencies between individuals and departments were examined using questionnaires, SNA and multidimensional scaling.</p> <p>An individual's overall responsibility in the organization affected their attitudes to returning to work the most, while dependents had less effect on the decision to return than expected. Staff were more motivated to return for their colleagues and the community, rather than economic or organisational, reasons.</p>	Smith and Walton, 2009
2009	Travel Behaviours Following the 2007 Gisborne Earthquake: Evidence for the Use of Simulation in	Simulated post-earthquake travel behaviour for Wellington scenarios. The study examines likely vehicle abandonment during post-earthquake	Lamb and Walton, 2009

Year	Nature of Study	Key Findings	Reference
	Earthquake Research.	<p>travel. The effects of social influence and trip distance were examined.</p> <p>A variety of factors motivate post-earthquake travel, not just to return home. Walking was the preferred means of travel up to 6.25kms and driving at greater distances. Thirty-two percent of participants chose to drive as far as possible before abandoning their cars and participants who saw other people abandoning their vehicles were more likely to abandon theirs.</p>	
2009	Rational Chaos: human and traffic behaviour in earthquake events.	<p>This research examines New Zealanders' needs for information and mobility after a natural hazard event, and how these can be met to promote recovery. It is generally conceded that panic behaviour after an emergency is unusual, that individual behaviour is rational and goal-directed. Despite this, there is evidence that the collective rationality of society is lost in the disaster scenarios. It is argued that we should not underestimate how dependent individuals are on various elements of modern society. Reliance on media, communications, and the ability to easily travel greater distances by modern personal transportation modes makes us less able to coordinate ourselves well as individuals and small groups after an emergency event. From the results of four research projects, some insights are shown into New Zealanders' likely reactions to a major earthquake or landslide.</p>	Walton, Lamb and Smith, 2009
2009	Framework for economic impact assessment of earthquakes disruption to Wellington metropolitan lifelines.	<p>This project developed a framework for measuring the business interruption losses from lifeline disruption after a rupture of the Wellington fault line.</p>	Sanderson and Norman, 2009
2009	Ministry of Civil Defence & Emergency Management Campaign Monitoring Research 2009.	<p>MCDEM's "Get thru" campaign continues to be very effective. New Zealanders who have taken steps to prepare in the last 12 months were mainly prompted by advertisements they saw/heard/read (29%).</p> <p>– Four out of five New Zealanders who have seen the ads (80%) have been prompted to think or take action to prepare for a disaster (up from 74% in 2008).</p>	Colmar Brunton for Ministry of Civil Defence and Emergency Management

Year	Nature of Study	Key Findings	Reference
2009	Building community resilience through community-based education programmes.	The design of hazard education programmes should be integrated with community development initiatives and will be more effective than stand alone, one off programmes. School education programmes need to be one of the centrepieces of a sustained, community-based effort.	Johnston, Finnis, Becker, Leonard, Saunders, Wright, Paton and Ronan, 2009
2008	Earthquake and Tsunami Losses from Major Earthquakes Affecting the Wellington Region.	The results showed that the Wellington Fault earthquake still represents a reasonable benchmark for risk assessment purposes, with the combined earthquake and tsunami losses generated for four key earthquake scenarios either adding little to the Wellington event itself, or accumulating to significantly less than that earthquake on a stand-alone basis.	Cousins, Power, Destegul, King, 2008
2008	Developing an effective tsunami warning system: lessons from the 1960 Chile earthquake tsunami for New Zealand coastal communities.	Since 2004, the renewed focus on tsunami has built on a range of improvements in emergency management policies and practices, and the lessons identified from the event paved the way for a number of new initiatives to get underway to enhance New Zealand's tsunami warning capacity and capability.	Johnston, Pettersson, Downes, Paton, Leonard, Pishief and Bell, 2008
2008	Ministry of Civil Defence & Emergency Management Campaign Monitoring Research – June 2008.	Awareness of the advertising remains high and the advertisements continue to be effective at getting people to either think about taking action, or taking action to be more prepared.	Colmar Brunton for Ministry of Civil Defence and Emergency Management
2008	Travel Behaviours Following the 2007 Gisborne Earthquake: Evidence for the Use of Simulation in Earthquake Research.	Travel behaviours were examined following the December 20, 2007, magnitude 6.8 earthquake in Gisborne. People away from their homes were five times more likely to travel than those at home. Official warning not to travel, long trip distances, dangerous conditions, and the possibility of traffic jams did not decrease the likelihood of travel. People stayed at home only if they had no reason to travel.	Lamb and Walton, 2008
2008	Predictors of two types of earthquake preparation: survival activities and mitigation activities.	When demographic factors were taken into account, risk-taking tendency predicted earthquake preparation in general and survival actions in particular, but not mitigation actions. In contrast, locus of control predicted mitigation actions. These findings	Spittal, McClure, Siegert and Walkey, 2008

Year	Nature of Study	Key Findings	Reference
		extend existing theories and show the value of measuring mitigation actions as well as survival actions.	
2008	Emergency management in schools: Wellington survey. Lower Hutt: GNS Science. <i>GNS Science report 2008/04</i> . 28 p.	A study looking at current emergency management teaching, resources and exercises within schools, and how they are used for Emergency Management education and preparedness. The majority of schools in the study area have some awareness of preparedness issues. The level of awareness depends on the individual school - ranges from some that are fully prepared for a disaster scenario to some that just have fire drills.	Coomer, Johnston, Edmonson, Monks, Pedersen and Rodger, 2008
2007	Listening to reporters or engineers? How instance-based messages about building design affect earthquake fatalism.	Role of earthquake information in influencing peoples judgements about future damage. Presenting citizens with detailed information about why poorly constructed building are damaged in earthquakes versus more typical "news" items can increase their belief that damage can be prevented by appropriate mitigation actions.	McClure, Sutton, and Sibley 2007
2007	An experimental investigation of the influence of media type on individual perceptions of the severity of earthquake events.	While radio was the most preferred media source prior to viewing, television was found to cause the largest increase in perceptions of severity. Viewing all media sources significantly increased perceptions of severity compared with only viewing the initial earthquake simulation video. Relative damage estimates indicated that participants' believed the earthquake was centred on their home.	Walton, Lamb, and Dravitzki 2007
2007	Risk perceptions, preparedness, and hazards education participation of Porirua school children.	Master's Thesis to assess schoolchildren's perceived risks, awareness levels, and home-based preparedness measures from natural hazards and the influence of hazard education programmes.	Tipler, 2007
2007	Where two plates meet: Earthquakes .	Review of impacts of the c. 15 th century, 1848, 1855 and 1942 earthquakes in Wellington. Account of the social and environmental impacts of the earthquakes. The 1942 Wellington earthquakes caused extensive damage resulting to over 5000 houses and 10,000 chimneys.	McSaveney, 2007

Year	Nature of Study	Key Findings	Reference
2007	How information about building design influences causal attributions for earthquake damage.	These findings show that mechanism (design) information does influence judgments about damage in earthquakes and, by implication, other hazards. Participants attributed damage to building design more strongly and rated the damage as being more preventable when scenarios referred to the poor building design.	McClure, Sutton and Wilson, 2007
2007	School and community based hazards education and links to disaster-resilient communities.	Children are especially vulnerable to the effects of disasters. Schools are communities in themselves, and are key groups within geographic communities through which hazard education initiatives can be carried out.	Finnis, Johnston, Becker, Ronan and Paton, 2007
2007	Ministry of Civil Defence & Emergency Management Campaign Monitoring Research – June 2007.	Public awareness of the Civil Defence advertising remains high (66%). Ads continue to be effective at getting people to think or take action. Only 24% have done nothing after seeing the ads.	Ministry of Civil Defence and Emergency Management, 2007
2007	Final Report on Exercise Capital Quake 06.	Key exercise observations include: while strategic short-term solutions for access into the Wellington region were developed during the exercise, specific planning needs to be undertaken. MCDEM in conjunction with the Domestic and External Security Group and CDEM groups needs to establish pre-programme response actions.	Ministry of Civil Defence and Emergency Management, 2007
2006	Using action plans to increase voluntary actions that reduce earthquake damage.	For both immediate and long-term consequences, companies reported thinking more about life and adoption of survival actions than mitigation actions. The findings show that use of action plans doesn't enhance hazard preparedness.	McClure, Fischer, Hunt and Charleston, 2007
2006	Community-based public education initiatives.	A review of community-based public education programmes identified key factors for successful community-based public education programmes.	Finnis, 2007
2006	The Earthquake Readiness Scale: The development of a valid and reliable unifactorial measure of earthquake readiness.	Studies of Wellington residents showed that 23 items measuring different aspects of earthquake preparation could be combined into a reliable, valid, unifactorial scale. This scale should have use in multivariate studies of earthquake preparation.	Spittal, Walkey, McClure, Sieger and Ballantyne, 2006

Year	Nature of Study	Key Findings	Reference
2006	Wellington Area Earthquake Casualty Estimation – 2006 Update.	Estimates arising from a 7.5 magnitude earthquake at two different times: 11am on a workday and 2am. At 11am the mean number of death is estimated at 600, and at 2am the number is estimated to be 200.	Cousins, Spence and So, 2006
2006	Ministry of Civil Defence and Emergency Management Campaign Monitoring Research – June 2006. This was the benchmark survey used to measure the attitudes and behaviours of New Zealanders around civil emergencies.	New Zealanders have incomplete knowledge of disasters and their effects and incomplete levels of preparedness for disasters. While New Zealanders' may have some knowledge of what to do, they have not fully thought through the impact.	Ministry of Civil Defence and Emergency Management, 2006
2005	Understanding the Vulnerability of Organisations.	Businesses, or more generically organisations, play key roles within our society. They have the responsibility for managing, maintaining and operating our infrastructure, creating our economy, and providing employment and essential goods and services for our communities. The ability of key organisations to continue to function in the face of sudden crises, such as that presented by earthquakes, will have a large influence on the length of time that essential services are unavailable, and on the suffering and duration of recovery for the community as a whole.	Dalziell, 2005
2005	Review of tsunami preparedness in New Zealand, including specific measure for Wellington.	There are varying levels of knowledge and levels on tsunami preparedness in the public and Emergency Management agencies.	Webb, 2005
2005	Individuals' response to natural hazard events.	Some preparedness for natural disasters takes the form of building regulations and other legislation, but regulations need to be complemented by individuals own preparation. Despite the risk of huge losses from earthquakes, many individuals and businesses do not prepare. It is useful to clarify psychological and social factors that contribute to a failure to prepare for earthquakes, and to show how we can overcome these obstacles.	McClure, Johnston and Paton, 2005
2005	Plate Tectonics.	Preliminary thoughts on the need to plan for the 'great Wellington earthquake', the direction of city planning today, current earthquake hazard mitigation measures in place, and some of the factors that might be	McKay, 2005

Year	Nature of Study	Key Findings	Reference
		<p>taken into account in the post-disaster planning of the city.</p> <p>New Zealand local and regional councils should consider hazard mitigation and risk avoidance in our urban planning and design.</p>	
2005	Societal impact and response to the 1855 earthquake.	<p>The 1855 earthquake of January 23rd with its numerous and protracted aftershocks occurred at a time of important social and political tensions in New Zealand, and particularly in Wellington where the greatest damage was sustained. Evidence from mostly contemporary accounts shows that many people, particularly politicians, were acutely aware of the negative effect that a second large earthquake in seven years would have on prospective immigrants and also on Wellington's aspirations of becoming the seat of Government. The damaging effects of the earthquake had to be downplayed. The future of the settlement depended on it.</p>	Grapes, 2005
2005	Optimistic bias in relation to preparedness for earthquakes.	<p>Examined unrealistic optimism bias: individuals thinking that they are better prepared for earthquakes than others.</p> <p>Wellington citizens have the unrealistic optimism bias of thinking that they are better prepared for earthquakes than others.</p>	Spittal, McClure, Siegert and Walkey, 2005
2003	Demographic and Psychological Factors and Preparation for Earthquakes.	<p>The present investigation aimed to examine the relationships between different dimensions of personality and earthquake preparation in a large sample of Wellington residents using psychometrically sound measures. Measures of locus of control, risk, and earthquake preparation were first evaluated in a series of studies using both university students and Wellington residents.</p> <p>The results showed that locus of control, risk precaution, home ownership, and length of residence were significant predictors of earthquake preparation. Moreover, people exhibited evidence of unrealistic optimism.</p>	Spittal, 2003
2003	Tabulated results of the 2003 national coastal community survey (M).	There are varying levels of knowledge and levels of tsunami preparedness in the public in the Wellington Region.	Johnston, Leonard, Bell, Stewart, Hickman,

Year	Nature of Study	Key Findings	Reference
			Thomson, Kerr and Glassey, 2003
2003	Earthquake preparedness in Wellington homes.	This paper presents the methodology and findings of two earthquake preparedness pilot surveys conducted in parallel and compares their results with those from previous surveys. The first survey, a door-to-door audit of 100 homes in Wellington City, ascertained the extent to which householders had seismically restrained tall furniture and other chattels. In the second and parallel survey, 50 homes located in the same suburbs as the door-to door audit were telephoned. An adult occupant was questioned about what mitigation actions had been taken.	Charleson, Cook and Bowering, 2003
2002	What a difference a year makes: How immediate and anniversary media reports influence judgements about earthquakes.	The influence of immediate and anniversary media reports on judgements about earthquakes. Research suggests that the content of newspaper and television reports about natural disasters, such as earthquakes, affects people's fatalistic judgments about these disasters. These study findings have clear implications for the way the media and civic education programmes present information on earthquakes and other disasters.	Cowan, McClure and Wilson, 2002
2002	A night of terror: Wairarapa's 1942 earthquake.	An account of the 1942 Wairarapa earthquake using eye-witness accounts and extensive oral histories. The earthquakes are recreated in an account of the impacts of the 1942 Wairarapa earthquake on Wellington.	McLaren, 2002
2002	The Spheres of Control scale: the identification of a clear replicable three-factor structure.	Study to compare the factor structure of the original SOC scale with that of a revised version of the scale. A satisfactory level of stability between studies and a satisfactory level of internal consistency within the scales was found.	Spittal, Siegert, McClure and Walkey, 2002
2002	Project Phoenix: preparing to respond to a major earthquake in Wellington.	The exercises simulated the gathering, transport, and distribution of supplies and personnel in the critical period after the event. The exercise programme was also being linked to USAR and health initiatives to establish and test coordination systems. Phoenix was also providing a catalyst for revisiting the existing guidelines for exercise	O'Kane, 2002

Year	Nature of Study	Key Findings	Reference
		development. The exercise highlighted critical issues such as roading access, emergency water, communications, reconnaissance, public information and air support.	
2001	Countering fatalism: Causal information in news reports affects judgments about earthquake damage.	Examined the effect of different patterns of earthquake damage on participants' judgments of the cause of the damage. Participants attributed generalised damage to the earthquake but attributed distinctive damage more to the building design.	McClure, Allen and Walkey, 2001
2000	Magnitude Eight Plus: New Zealand's Biggest Earthquake. An account of the 1855 Wairarapa earthquake.	An account of the impacts of the 1855 Wairarapa earthquake on Wellington which includes personal accounts from different sources as well as illustrations to show how Wellington's landscape was transformed. Also included are newspaper reports from the time, and a report investigating the level of damage.	Grapes, 2000
2000	Integrated and interactive risk assessment platform for Wellington, New Zealand.	The Integrated Risk Assessment Programme is designed to use Geographic Information Systems to illustrate various aspects of hazard impacts, with the twin goals of enhanced communication of risk and greater precision in the formulation of policy options. This project provides a more holistic view of the consequence of various approaches to hazards. The Integrated Risk Assessment is a powerful tool to support the building of resilient communities. However, it must be oriented around real needs of those who are trying to bring about change.	Cousins, Heron, Jensen, Kozuch and Savage, 2000
2000	Hazards & society.	Planning for an earthquake crisis in New Zealand: field trip to the Wellington Fault	GNS Science, 2000
1999	Perception of earthquake risk and the preparation for earthquakes in New Zealand.	Recommendations from the research include providing people with preparation information that gives them some sense of control but is easy to carry out. However, different groups of people are likely to respond to messages in different, and sometimes	Dew, 1999

Year	Nature of Study	Key Findings	Reference
		opposing, ways. Scientists need to consider ways of having some control over the presentation of their research in the media, as the sensational treatment of research may be undermining the credibility of scientists.	
1999	When earthquake damage is seen as preventable: Attributions, locus of control and attitudes to risk.	Clarified the relation between different cognitive and personality factors and preparation. No relationship was found between judgements of the likelihood of a major earthquake and precautionary measures adopted.	McClure, Walkey and Allen, 1999
1997	The effect of increased earthquake knowledge on perceived preventability of earthquake damage.	There is support for the hypothesis that changes in perceived preventability occur when specific targeted information is introduced. Prior earthquake knowledge correlated with earthquake preparation, but perceived preventability did not relate to prior knowledge or preparation for earthquakes.	Hurnen and McClure, 1997
1995	Atlas of isoseismal maps of New Zealand earthquakes.	Atlas of isoseismal maps, including those that have affected Wellington.	Downes, 1995
1995	Wellington After the 'Quake: The Challenge of Rebuilding Cities	The publication contains the proceedings of an international workshop held in Wellington in March 1995. It outlines the basis for planning recovery by identifying the problems sure to be faced and by indicating possible solutions based on world and New Zealand experience.	Compiled by Geoff Gregory, 1995
1995	The significance of Wellington being the capital in a disaster. In: Wellington After the 'Quake pg 15.	Wellington is likely to experience severe earthquakes. Permanent removal of the central government is possible depending upon the scale of destruction. It would be irresponsible to reinstate government functions to Wellington without a cost recovery analysis.	Roberts In: Gregory, 1995
1995	Organisation, government and legislation: Who coordinates recovery? In: Wellington After the 'Quake pg 23.	Recovery should be the initial responsibility of the affected community. A framework has been established and a dialogue started with all essential players, including central to enable the rebuilding of Wellington to take place in an environment of cooperation and coordination.	Rolfe and Britton In: Gregory, 1995

Year	Nature of Study	Key Findings	Reference
1995	Planning for reconstruction: Opportunities and constraints facing Wellington. In: Wellington After the 'Quake pg 47.	The paper describes the reconstruction opportunities and constraints facing Wellington after a major earthquake. To take best advantage of rebuilding opportunities the region should have a reconstruction plan in place before an earthquake occurs.	French In: Gregory, 1995
1995	Keeping catastrophic change in context. In: Wellington After the 'Quake pg 55.	This paper examines the opportunities that are found between destruction and renewal after a major quake. A calamity can be seen as an opportunity to start again.	McDonald In: Gregory, 1995
1995	The economic impact of earthquake disasters. In: Wellington After the 'Quake pg 65.	Earthquakes cause physical destruction; however, subtle losses such as loss of critical facilities produce supply disturbances. A method for estimating these losses is discussed and applied to the 1995 Kobe and the coming Wellington earthquakes.	Cochrane In: Gregory 1995
1995	Assessment of resources required for reinstatement. In: Wellington After the 'Quake pg 111.	This paper describes the assessment of the costs of repairing damaged buildings and infrastructure and then presents an analysis of the materials, plant and labour needed for reconstruction. The total resources likely to be needed for full reinstatement after a major earthquake are presented as a starting point for assessing the implications for timing, availability and supply and demand.	Hopkins In: Gregory, 1995
1995	Disaster recovery needs	Needs highlighted by the 'Wellington after the Quake' conference. Based on long-term recovery including recovery of communities and restoration of facilities, organisations, and amenities of their normal surroundings.	Gregory, 1995
1995	The logistics of importing materials to the Wellington region, housing the workforce and construction bases. In: Wellington After the 'Quake pg 145.	This paper examines the logistics of resourcing the labour, plant and materials to reconstruct Wellington's damaged infrastructure and to house the regular work force as well as the temporary emergency force. The paper recommends the creation of a resource register for supply to the Wellington region in spite of a severely damaged infrastructure.	Christianson In: Gregory, 1995
1995	Current planning and construction law: The	This paper draws on the views of local professional advisers, territorial	Feast

Year	Nature of Study	Key Findings	Reference
	practical consequences for rebuilding Wellington after the quake. In: Wellington After the 'Quake p 161.	<p>authority officers and construction industry members who will together be required to rebuild a city devastated by an earthquake. The effectiveness of the legislation to regulate the reconstruction process in the event of a natural disaster is assessed.</p> <p>The paper concludes Wellington has taken steps to ensure its long-term recovery process is underway, there is still more work to be done in this area. The fact Wellington has started means we are in a better position to control the rebuilding of the city, socially, physically and economically, when disaster does strike.</p>	In: Gregory, 1995
1995	Coordination and accessibility of post-disaster counselling and support services. In: Wellington After the 'Quake pg 183.	<p>In Wellington city, a process to ensure that services will continue to be provided after a large-scale emergency has already begun. This paper discusses this process in the light of the population base of Wellington and the existing coordination and accessibility of counselling and community services within the city.</p> <p>After a disaster there will be demands that are likely to exhaust existing physical and human resources. The community's recovery process requires prior planning that is comprehensible and flexible.</p>	Scott In: Gregory, 1995
1995	Handling risk and claims after catastrophe – An engineer's perspective. In: Wellington After the 'Quake pg 217.	The effects of the future great Wellington earthquake can be dramatically reduced if the insurance industry takes an active part in future loss control and in assessing and controlling its own risk. This can be achieved by loss control and intelligent risk management and underwriting by the insurance industry based on international experience of earthquake losses.	Yanev In: Gregory, 1995
1995	Reinsurance – Its contribution to risk assessment and disaster management. In: Wellington After the 'Quake pg 255	<p>This paper discusses how reinsurers could handle the aftermath of a Wellington earthquake. The Wellington scenario is compared to the latest international loss experiences.</p> <p>The paper concludes that the New Zealand insurance market will be able to cope with the demands of providing an adequate cover of the earthquake risk.</p>	Schaad In: Gregory, 1995

Year	Nature of Study	Key Findings	Reference
1995	The role of the finance industry. In: Wellington After the 'Quake p 263.	This paper examines the implication of the Wellington disaster for the financial system nationally and internationally. Attention is given to what the Reserve Bank and Government might do to stabilise and resuscitate the local economy.	Holmes In: Gregory, 1995
1995	Earthquake Risk Assessment Study.	Rebuilding after an earthquake – earthquake hazard analysis.	Davey and Shephard, 1995
1994	Reducing community vulnerability to earthquakes: the value of lifelines studies.	Lifelines studies take natural hazard information and through various processes identify mitigation and preparedness measures that can be undertaken by utility operators. The overall objective is to reduce both damage levels and the time taken by lifelines organisations to restore their usual level of service following a major earthquake. This saving in time translates directly into a saving for the community as a result of reduced disruption to homes, offices and industry.	Brunsdon, 1994
1993	Lifelines in Earthquakes: Wellington Case Study.	This project identified a series of possible mitigation measures that operators of lifelines could undertake to reduce the risk from a major earthquake. The concepts of interdependence and critical areas were also identified: interdependence relates to the effect of the outage of one utility service (e.g. power) on the time taken by another to recover (e.g. water supply requiring power for pumping). Of greater significance however beyond the technical content was the heightened awareness of this work created by this project amongst utility services providers both in Wellington and elsewhere in New Zealand.	Hopkins, Lumsden and Norton, 1993
1991	Civil Defence survey of Schools.	Preparedness survey.	Upper Hutt City Council (unpublished report located at the Ministry of Civil Defence)
1991	Exercise Our Fault.	Describes 'Our Fault' Civil Defence exercise, in which a major earthquake was simulated in Wellington.	Lipski, 1991

Year	Nature of Study	Key Findings	Reference
1990	How Civil Defence can improve the preparedness of Wellington citizens for a major earthquake: A marketing plan.	A study on marketing the delivery of earthquake readiness programmes in Wellington. It suggested that the responsibility for operational disaster coordination and marketing earthquake preparedness be separated.	Fraser and Hansen, 1990
1989	The 1942 Wairarapa earthquakes.	Paper discusses the 1942 Wairarapa earthquakes seismology.	Webb, 1989
1988	Planning for geological hazards in Wellington.	Legislation and planning issues around the Wellington fault.	Fellows, 1988
1983	Earthquake occurrence, experience and appraisal in Wellington, New Zealand.	A study of Newlands residents' understanding of earthquake risk. Residents denied or were uncertain of future earthquake occurrences and tended to minimize or feel personal exclusion from possible future damage.	Simpson-Housley and Curtis, 1983
1978	Personality and the perception of earthquake hazard.	A study of Newlands residents' understanding of earthquake risk and the role of personality variables in determining perceptions of natural hazards. The study clearly indicated the importance of personality variables in determining perceptions of earthquake risk.	Simpson-Housley and Bradshaw, 1978
1976	The influence of locus of control and repression-sensitization on perception of natural hazards.	A PhD study on the role of personality variables in determining perceptions of natural hazards. Personality variables are important in determining perceptions of earthquake risk.	Simpson-Housley, 1976
1945	Damage to buildings in the City of Wellington by earthquake, 1942.	Structural damage to Wellington buildings was extensive and there was more damage to Wellington buildings than Wairarapa buildings.	Aked, 1945

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