



**Improving community resilience in the Hawke's Bay:  
A review of resilience research, and current public  
education, communication and resilience strategies**

J. Becker  
D. Paton

S. McBride

**GNS Science Report 2012/38  
March 2013**

## **BIBLIOGRAPHIC REFERENCE**

Becker, J.; McBride, S.; Paton, D. 2013. Improving community resilience in the Hawke's Bay: A review of resilience research, and current public education, communication and resilience strategies, *GNS Science Report 2012/38*. 72 p.

J. Becker, GNS Science, PO Box 30368, Lower Hutt  
S. McBride, GNS Science, PO Box 30368, Lower Hutt  
D. Paton, GNS Science, PO Box 30368, Lower Hutt

## CONTENTS

<b>EXECUTIVE SUMMARY</b> .....	<b>IV</b>
<b>KEYWORDS</b> .....	<b>V</b>
<b>1.0 INTRODUCTION</b> .....	<b>1</b>
1.1 Project .....	1
1.2 Summary of the Hawke's Bay context.....	2
1.2.1 Geography and population .....	2
1.2.2 Historic disasters in Hawke's Bay .....	2
1.2.3 Other issues in Hawke's Bay.....	3
1.3 Methodology .....	3
1.4 Outline of the report.....	3
<b>2.0 RESULTS</b> .....	<b>5</b>
2.1 Literature review of community resilience research .....	5
2.1.1 What is resilience? .....	5
2.1.2 Factors that influence resilience .....	5
2.1.3 Model of resilience .....	6
2.1.4 Resilience research in the Hawke's Bay .....	7
2.1.5 Recommendations for building resilience .....	7
2.1.6 Recommendations for future resilience practice and research.....	12
2.2 Review of communication and public education activities .....	13
2.2.1 Information gathering .....	13
2.2.2 Analysis of communication and public education activities.....	14
2.2.3 Recommendations for communication and public education.....	14
<b>3.0 RECOMMENDATIONS</b> .....	<b>15</b>
3.1 Establishment of a community resilience forum .....	15
3.2 Development of a coordinated strategy.....	15
3.3 Development of a work programme .....	15
3.3.1 Identification of specific activities in the work programme .....	16
3.3.2 Identification of research activity that supports the development of community resilience .....	17
3.3.3 Local versus national application .....	17
<b>4.0 ACKNOWLEDGEMENTS</b> .....	<b>19</b>
<b>5.0 REFERENCES</b> .....	<b>19</b>

## FIGURES

<b>Figure 2.1</b>	A model of community resilience (Paton, 2010). .....	6
-------------------	--	---

## TABLES

<b>Table 2.1</b>	Means and standard deviations of indicators measured in the Paton and Johnston (2008) study (N=255).....	7
<b>Table 2.2</b>	Factors or 'indicators' of resilience and specific recommendations for developing resilience in communities (adapted from Becker, et al., 2011). .....	8

## APPENDICES

<b>APPENDIX 1: RESILIENCE RESEARCH LITERATURE REVIEW .....</b>	<b>31</b>
A1.1 Introduction .....	31
A1.1.1 What is meant by resilience? .....	31
A1.1.2 Factors of resilience .....	32
A1.1.3 National and international models of resilience.....	40
A1.1.4 Resilience research in the Hawke’s Bay .....	41
A1.1.5 Recommendations for building resilience .....	45
A1.1.6 Future practice and research .....	52
<b>APPENDIX 2: REVIEW OF PUBLIC EDUCATION STRATEGIES (INCLUDING RESILIENCE-BUILDING ACTIVITIES) AND POLICY.....</b>	<b>55</b>
A2.1 Introduction .....	55
A2.2 Terms .....	55
A2.3 Purpose of review.....	56
A2.4 How the review was carried out .....	56
A2.5 Structure of Hawke’s Bay Public Education .....	56
A2.6 Public education and communication strategies in Hawke’s Bay Region.....	57
A2.7 How the review is depicted.....	58
A2.8 Community emergency planning.....	65
A2.9 Concluding comments about the review .....	65
A2.9.1 Predominant public education, communication, and resilience activities in Hawke’s Bay.....	65
A2.9.2 Roles and responsibilities.....	65
A2.9.3 Advantages in Hawke’s Bay.....	65
A2.9.4 What is working well and what is well covered .....	66
A2.9.5 Resilience factors or ‘indicators’ that are being addressed by the current activities .....	66
A2.9.6 Specific gaps in activities .....	67
<b>APPENDIX 3: NOTES FROM THE RESILIENCE WORKSHOP HELD ON 15 JUNE 2012.....</b>	<b>69</b>

## APPENDIX FIGURES

<b>Figure A 1.1</b>	A model of community resilience (Paton, 2010). .....	40
<b>Figure A 1.2</b>	An analysis of predictors of earthquake preparedness in Napier (Paton & Johnston, 2008). .....	43
<b>Figure A 1.3</b>	Predictors of preparedness for volcanic hazards in Auckland (Paton, 2007a).....	43
<b>Figure A 1.4</b>	Model applied to tsunami preparedness (Paton, et al., 2009). .....	44

## APPENDIX TABLES

<b>Table A 1.1</b>	Resilience exploration and modelling studies undertaken in the Hawke's Bay.....	42
<b>Table A 1.2</b>	Means and standard deviations of indicators measured in the Paton and Johnston (2008) study (N=255).....	44
<b>Table A 1.3</b>	Indicator variables measured in the Auckland resilience study, with their associated ranking (N=400).....	45
<b>Table A 1.4</b>	Factors or 'indicators' of resilience and specific recommendations for developing resilience in communities (adapted from Becker et al., 2011). .....	46
<b>Table A 2.1</b>	Review of select public education, communication and resilience strategies employed in the Hawke's Bay.....	59
<b>Table A 3.1</b>	Summary of notes from the resilience workshop held on 15 June 2012. ....	71

## EXECUTIVE SUMMARY

Resilience can be described as the ability of individuals and communities to adapt to a disaster situation ('adaptive capacity'). A significant amount of research has been undertaken to investigate what contributes to having an 'adaptive capacity' and how it can be developed in populations susceptible to experiencing suddenly-occurring, damaging hazard events. In Hawke's Bay alone there have been seven studies that have been undertaken to help understand resilience, and determine how resilience can be developed in individuals and communities.

GNS Science was engaged to undertake a review of resilience and current public education, communication, and resilience strategies in the Hawke's Bay. As part of this review they summarised the main factors that contribute to individual and community resilience, provided a 'state of the nation' report on resilience in Hawke's Bay, and provided recommendations for how to further develop resilience in the region. An evaluation was also undertaken of current activities that are already taking place that may contribute to resilience (e.g. communication, public education, engagement). Recommendations were provided on future potential activities that could be employed to build resilience, as well as on how these could be accommodated within organisational structures.

### ***Resilience review***

Findings of the review identified several individual, community and institutional factors that contribute to resilience both individually and collectively (community level). To build resilience the following areas should be targeted:

At an individual level work to:

- Develop people's problem solving skills (action coping)
- Increase their belief in the benefits of hazard mitigation (develop positive outcome expectancy)
- Increase their belief that what they can personally do will make a difference (reduce negative outcome expectancy)
- Develop people's belief that they can do something to mitigate the effects of a disaster (self-efficacy) and prompt thought and discussion about disasters (critical awareness), both of which assist in developing other factors.

At a community level work to:

- Encourage active involvement in community affairs and projects (community participation)
- Develop the community's ability to resolve collective issues (articulating problems).

At an institutional level work to:

- Develop an individual's ability to influence what happens in the community (empowerment)
- Develop the level of trust an individual has in different organisations (trust).

Previous research completed in Hawke's Bay with respect to these factors shows the existence of low to moderate levels of community resilience. Opportunities exist to increase

the resilience factors through communication and public education efforts, and other resilience-building activities.

### ***Communication and public education review***

In terms of communication and public education:

- A range of communication and public education projects have been run in Hawke's Bay in the past, offering sound messages about disasters and preparedness, and offering a range of innovative activities (e.g. "Get Ready, Get Thru the Vines", "Shortest Disaster Movie", volunteering).
- The predominant focus of these projects has been on what individuals should expect in terms of hazards, and how to prepare, thus influencing individually-focussed resilience factors such as self-efficacy, critical awareness, outcome expectancy and action coping. Any benefits from these approaches tend to be short lived and so alternatives are needed to promote sustained capability. The development of sustained capability represents a more cost effective approach to public education. Sustained capability is more likely when community level approaches are adopted. However, projects to date have had less of a focus on developing resilience factors at community and institutional levels.
- Many of these projects have been done with some level of isolation from other agencies within the region and with a lack of strategic oversight.

### ***Recommendations***

Given low to moderate levels of individual and community resilience in Hawke's Bay, and the limitations of current projects in building resilience, opportunities exist to:

1. Designate or create an appropriate forum to discuss resilience issues in a holistic way and make decisions about future resilience activities (e.g. could expand the remit of the existing regional Intercom Group to include discussions on resilience).
2. Empower the forum to develop a resilience strategy to direct how communication, public education and engagement activities will be undertaken to achieve resilience (including direction about the source and allocation of funding).
3. Develop a range of communication, public education, and engagement activities that will target the factors known to influence resilience. Such activities should be part of a coordinated work programme (ensuring alignment with existing relevant activities such as community development). A coordinated programme will afford opportunities for creating cost-effective approaches to developing sustained capability.
4. Develop a long term research strategy that allows measurement and monitoring of Hawke's Bay individual and community resilience over time (e.g. by undertaking surveys), to ensure that activities are effective in building resilience, and to identify changes that need to take place in communication and public education programmes.

## **KEYWORDS**

Hazards, disasters, resilience, public education, communications, Hawke's Bay, New Zealand





## 1.0 INTRODUCTION

Resilience can be described as the ability of individuals and communities to adapt to a disaster situation. Building an 'adaptive capacity' requires a range of individual, societal and institutional inputs (see Appendix A for a full discussion on the factors that influence resilience). Interest in developing resilience in communities is high; however, challenges remain about how to do so. While current traditional communication and public education programmes can be effective in raising awareness about disasters and preparedness, they are not always effective in developing resilience (Lindell & Whitney, 2000; Paton, Smith, & Johnston, 2005; Perry & Lindell, 2008). Consequently, there is a need to link research about what creates resilient communities to the development of practical resilience-building programmes.

### 1.1 PROJECT

A project entitled "Improving Community Resilience" was undertaken to better understand how resilience research can link to resilience-building activities in practice. This project was initiated by the Hawke's Bay Civil Defence Emergency Management Group, funded by the Ministry of Civil Defence and Emergency Management through the Resilience Collaborative Fund, and undertaken by GNS Science and partners<sup>1</sup>. The intent of the project was to review what contributes to resilience, assess whether current communication and public education approaches are effective in building resilience, and provide recommendations on how to improve approaches to developing and monitoring resilience. The project used the Hawke's Bay region as a case study.

Tasks for the project included:

1. Review current resilience research in the Hawke's Bay (and national/international research where applicable) to identify what factors influence resilience;
2. Review the communication and public education approaches in Hawke's Bay being utilised to develop resilience to disasters, including relevant overarching strategies/policies (linking with the national context where applicable);
3. Undertake an analysis of resilience research findings versus current communication and public education methods, and identify how effective these have been in developing community resilience.
4. Provide recommendations for improving future community resilience through the development of appropriate strategies/policies and the effective use of communication and public education.
5. Provide recommendations for future research that will enhance understanding of what contributes to resilience, enable understanding of the evolution of resilience, and assist with evaluating the effectiveness of future communication and public education programmes.

It was anticipated that the study would contribute to 'strategy development for hazard risk reduction' but would not be the development of a strategy itself.

---

<sup>1</sup> GNS Science Contract 111247111

## **1.2 SUMMARY OF THE HAWKE'S BAY CONTEXT**

The following sections provide an overview of the Hawke's Bay region and provide some context in terms of the geography, population, historical disasters, and hazards.

### **1.2.1 Geography and population**

Geographically, the Hawke's Bay region is on the east coast of the North Island. Covering 12,770 square kilometres, it accounts for 5 % of New Zealand's total land area.

Hawke's Bay region has approximately 155,000 residents, ranking it 9<sup>th</sup> in size out of the 16 regions within New Zealand, and making up 3.7 % of New Zealand's population. Females make up a slightly higher percentage of the population, with 5,000 more women than men. The population also skews slightly older than the New Zealand average of 36.8, with the average Hawke's Bay resident aged 37.5 years. Along with an older population, Hawke's Bay residents make slightly less than the average Kiwi income by 2,000 less per annum (Statistics New Zealand, 2011).

### **1.2.2 Historic disasters in Hawke's Bay**

Prior to the Christchurch Earthquake sequence, Hawke's Bay was the location of the most famous earthquake event in an urban area in New Zealand. The Hawke's Bay earthquake in 1931 was magnitude 7.8 and approximately 30 kilometres deep. Located 20 kilometres south from the epicentre was Napier, a city of more than 30,000 people. The city was essentially destroyed by the earthquake and resulting fire. A total of 256 people died (161 in Napier, 93 in Hastings and two in Wairoa) and the disaster cost millions of dollars to local infrastructure (Johnston & Pearce, 2007).

Today, the earthquake is commemorated with an 'Art Deco' week and associated events. With Art Deco Week and resulting celebrations of that time period, Napier and the surrounding area has demonstrated a clear 'sense of place' necessary for developing community resilience projects. Napier's recovery process over many years has now become a national and international model of best practice as it contributes to people's attachment to a locality or a sense of place.

While the earthquake is the most famous and damaging natural disaster to occur in Hawke's Bay, the history of the region includes cyclones, volcanic ash falls, flooding, tsunami and coastal erosion. Hawke's Bay's risk profile is such that it also has a high potential for future significant natural hazard events to occur. According to the Hawke's Bay Regional Council, the top hazards in Hawke's Bay include (Johnston & Pearce, 2007):

1. Earthquakes
2. Human pandemic/infectious diseases
3. Flooding/heavy rainfall
4. Fire involving hazardous substances
5. Electricity failure
6. Pests or diseases affecting agriculture, forestry or horticulture
7. Local tsunami
8. Rural wildfire
9. Hazardous chemical incident
10. Coastal erosion

The range and nature of hazards Hawke's Bay is exposed to makes for a compelling argument to have a comprehensive community resilience strategy and work programme to enhance people's ability to respond to disasters.

### **1.2.3 Other issues in Hawke's Bay**

Hawke's Bay's geographic isolation from other large urban areas (e.g. Wellington City is more than 300 kilometres away, Auckland is 331 kilometres) would compound any emergency response. Given there are only three major roads linking Hawke's Bay with other regions, two north and one south, rapid evacuation of the area could prove problematic, as could bringing emergency supplies into the affected areas. A combination of hazards and limited roading infrastructure means that Hawke's Bay residents may be without support for some time. Such potential for isolation heightens the need for building community resilience that allows communities to be self-adaptive to disaster situations.

## **1.3 METHODOLOGY**

The main methods used for the project included:

1. A review of literature related to resilience research (including Hawke's Bay, national and international literature);
2. A review of current communication and public education approaches being used in Hawke's Bay to build resilience. This review was undertaken by collating relevant documentation (e.g. brochures, messages, websites, strategy and policy documents), undertaking interviews with those involved in developing resilience (e.g. emergency managers), and holding a workshop with key stakeholders.
3. Use of a comparative approach to determine the effectiveness of current approaches in building resilience and to identify gaps where there is room for improvement. This was done by listing the current approaches in a table, identifying the aspects of resilience they were targeting, and undertaking a gap analysis to identify aspects of resilience that were not being addressed.

## **1.4 OUTLINE OF THE REPORT**

This report will first present a summary of the resilience review, followed by a summary of the communications and public education review. It will then provide a list of recommendations on how future resilience can be enhanced through use of appropriate communication, public education and other activities, and how policy/strategy can support this. Recommendations are also presented on how resilience can be monitored and evaluated over time.

Appendix A provides more detail on the resilience review, while Appendix B provides more details on the communication and public education review. Appendix C presents the results of workshops that were held with stakeholders.



## **2.0 RESULTS**

### **2.1 LITERATURE REVIEW OF COMMUNITY RESILIENCE RESEARCH**

Section 2.1 provides a summary of the results of the literature review on community resilience. The full literature review can be found in Appendix A.

GNS Science conducted a literature review of community resilience research. This included a review of seven resilience based studies in the Hawke's Bay since 1995 (Becker, 2012; McIvor & Paton, 2007; McIvor, Paton, & Johnston, 2009; Paton, 2008; Paton, Bajek, Okada, & McIvor, 2010; Paton & Johnston, 2008; Ronan, Johnston, & Paton, 2001) and national and international studies. The review was structured in the following way:

1. Outline what resilience is, in the context of past resilience modelling and measurement in the Hawke's Bay.
2. Describe key factors that have been tested to see whether they influence resilience
3. Outline a model of resilience that has been developed from both national and international data.
4. Describe past resilience research in the Hawke's Bay, including models developed from Hawke's Bay data, and describe the current status of resilience.
5. Outline generic recommendations for building resilience, based on past research
6. Outline recommendations for future resilience practice and research.

#### **2.1.1 What is resilience?**

Researchers have come to predominantly describe resilience as an 'adaptive capacity' held by individuals or communities (Berkes, 2007; De Terte, Becker, & Stephens, 2009; Klein, Nicholls, & Thomalla, 2003; Norris, Stevens, Pfefferbaum, Wyche, & Pfefferbaum, 2008; Paton, 2007a). Paton (2007a, p. 7) describes 'adaptive capacity' as society's "capability to draw upon its individual, collective and institutional resources and competencies to [anticipate,] cope with, adapt to, [recover from] and develop/learn from the demands, challenges and changes encountered before, during and after disaster" (see Appendix A for more detail).

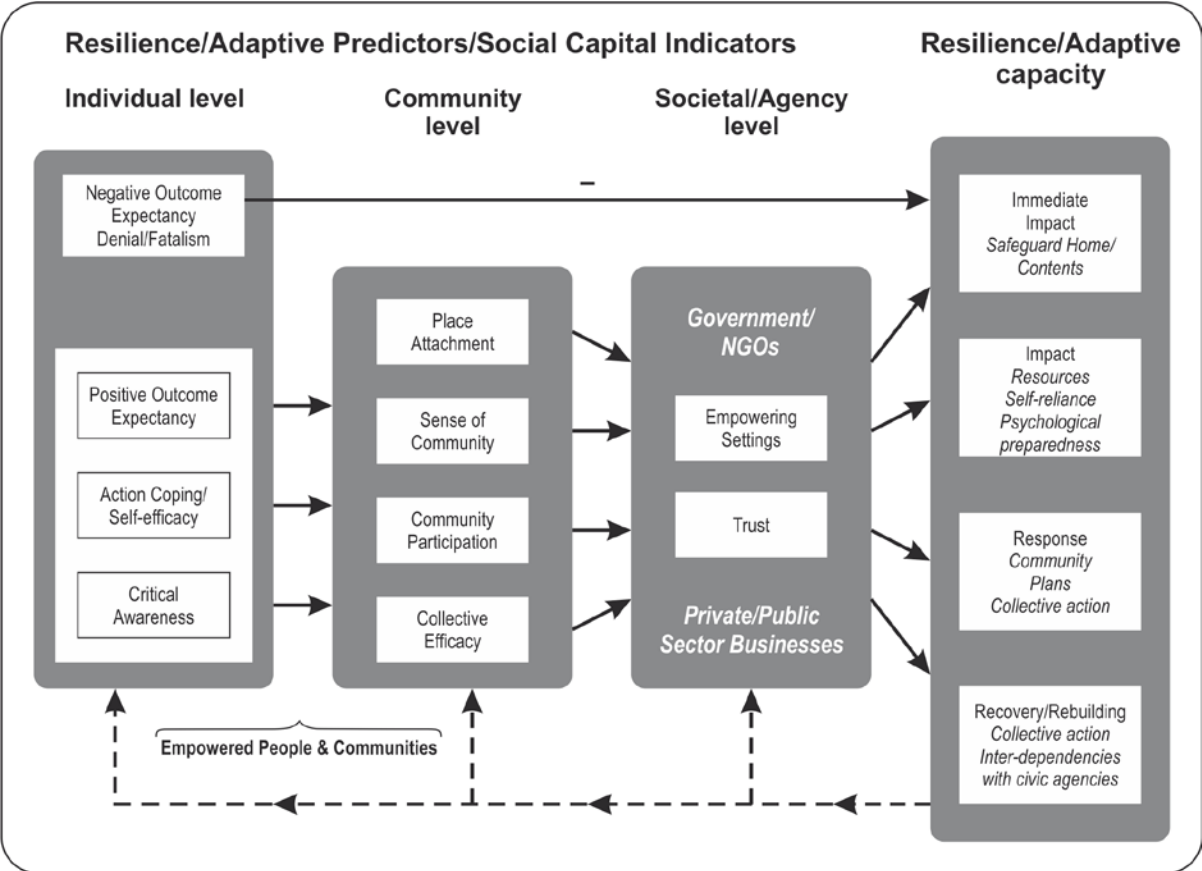
#### **2.1.2 Factors that influence resilience**

A number of factors interact to contribute to the development of resilience, and these are fully outlined in Appendix A. Factors found to be important in contributing to resilience include: individual/personal factors (e.g. self-efficacy, critical awareness, outcome expectancy, action coping, responsibility, planning); community factors (e.g. articulation of problems, community participation, sense of community, place attachment, collective efficacy, social responsibility); and societal/institutional factors (e.g. empowerment, trust) (e.g. Paton, 2005, 2006, 2007a; Paton, Bajek, et al., 2010; Paton, Johnston, Smith, & Millar, 2001; Paton, McClure, & Bürgelt, 2006; Paton, Millar, & Johnston, 2001; Paton, Parkes, Daly, & Smith, 2008; Paton, Smith, & Johnston, 2000).

Another influence on resilience is the fact the people and communities will be at differing levels of readiness to engage in capabilities that will facilitate resilience. For example, some may be interested in preparing but yet to complete the process, while others may be more comprehensively prepared. Different communication and outreach strategies will be required for these diverse groupings (Paton, In press).

**2.1.3 Model of resilience**

The individual, community and institutional factors described previously have been developed into an overall model of resilience (Figure 2.1). The model of resilience is a system, and interdependencies exist between the various factors as depicted on the diagram. More details about the model are discussed in Appendix A.



**Figure 2.1** A model of community resilience (Paton, 2010).

As well as contributing to the development of an overall model of resilience, the factors can be used as on-going measurable indicators of resilience within communities. To date, these indicators have been measured using quantitative surveys. When analysing the surveys it is possible to tell which are the most critical resilience factors (indicators) for each community, i.e. which of the personal, community and institutional factors are most strongly affecting resilience in that community (Becker et al., 2011). An understanding of the nature and level of current resilience factors in a community enables agencies to direct effort into enhancing factors that may not be present at high levels.

#### 2.1.4 Resilience research in the Hawke's Bay

Previous research studies show that current resilience in the Hawke's Bay is at low to moderate levels. For example, Paton and Johnston (2008) did a study on resilience to earthquakes in Napier and found the following levels of indicators, most of which are at low to moderate levels (Table 2.1)<sup>2</sup>.

**Table 2.1** Means and standard deviations of indicators measured in the Paton and Johnston (2008) study (N=255).

Indicator	Range	Mean	Standard Deviation
Negative outcome expectancy	4-20	9.21	2.78
Positive outcome expectancy	4-20	13.23	2.59
Community participation	5-20	13.52	3.61
Articulate problems	6-20	14.21	2.18
Empowerment	4-20	10.29	2.66
Trust	5-25	16.42	3.44
Intention to prepare	5-20	10.53	3.53

While this study did not give an individual ranking to each indicator (i.e. High, Medium, Low) other studies such as the Auckland resilience study (Paton 2007a) have, and potential exists to do this for Hawke's Bay data in the future (see Appendix A for further information). Given the moderate to low levels of the factors shown above, opportunities exist to develop the resilience factors through future public education efforts.

#### 2.1.5 Recommendations for building resilience

With respect to the factors/indicators, it is recommended that agencies work to develop the resilience factors in their communities in a holistic way. In short the following areas should be targeted (Becker, et al., 2011):-

At an individual level work to:

- Develop people's problem solving skills (action coping)
- Increase their belief in the benefits of hazard mitigation (develop positive outcome expectancy )
- Increase their belief that what they can personally do will make a difference (reduce negative outcome expectancy)
- Develop people's belief that they can do something to mitigate the effects of a disaster (self-efficacy) and prompt thought and discussion about disasters (critical awareness), both of which assist in developing other factors.

---

<sup>2</sup> In Paton (2007a, p. 26) "a ranking of low (L) reflects a mean score that was more than one standard deviation below the median; medium (M) reflects a high similarity between the mean and median values; and high (H) reflects a mean score more than one standard deviation above the median."



At a community level work to:

- Encourage active involvement in community affairs and projects (community participation)
- Develop the community's ability to resolve collective issues (articulating problems).

At an institutional level work to:

- Develop an individual's ability to influence what happens in the community (empowerment)
- Develop the level of trust an individual has in different organisations (trust).

More specific recommendations in developing the various resilient factors are outlined in Table 2.2.

**Table 2.2** Factors or 'indicators' of resilience and specific recommendations for developing resilience in communities (adapted from Becker, et al., 2011).

<b>Resilience factor/indicator</b>	<b>Recommendation for developing factors in communities</b>
<p><b>Self-efficacy</b>  <i>"I can do something to mitigate the effects of a disaster"</i></p>	<ul style="list-style-type: none"> <li>• Encourage people to personalise information</li> <li>• Provide practical information about 'how to prepare' and why it is effective and do so in small chunks rather than in large, comprehensive formats (e.g., booklets).</li> <li>• Start with easy to adopt items (e.g., emergency kits) and progressively introduce more complex/expensive items (e.g., structural changes to houses).</li> <li>• Develop separate strategies for owners and renters</li> </ul>
<p><b>Critical awareness</b>  <i>"Hazards are important, and I think and talk about hazards regularly"</i></p>	<ul style="list-style-type: none"> <li>• Encourage thought and discussion amongst community members through provision of appropriate forums and formats (e.g. community members to review hazard scenarios, community to share experiences of disasters, community leaders to lead discussions, discussion and participation through community group events, etc.).</li> <li>• Ensure that people start talking about the benefits of being prepared.</li> </ul>
<p><b>Positive outcome expectancy</b>  <i>"I can deal with hazards and as a result there will be a good outcome"</i></p>	<ul style="list-style-type: none"> <li>• Outline the complex nature of hazards, rather than focussing on damage and destruction.</li> <li>• Develop belief in people that mitigation for disasters can be effective.</li> <li>• Show that losses are avoidable, and ways people can practically avoid the loss.</li> <li>• Describe the immediate utility and/or benefits of mitigation.</li> <li>• Use comprehensive communication strategies to relay information, as well as participation and empowerment.</li> </ul>

<b>Resilience factor/indicator</b>	<b>Recommendation for developing factors in communities</b>
<p><b>Negative outcome expectancy</b>  <i>“Whatever I do I can’t make a difference”</i></p>	<ul style="list-style-type: none"> <li>• Reduce negative outcome expectancy by focussing on the realities of a disaster, rather than damage from an event being universal and total.</li> <li>• Show that the distribution of losses is not evenly spread (i.e. that more at risk or vulnerable communities are impacted more).</li> <li>• Show that people have control over disasters, i.e. that the choices they make over mitigation etc. can help them become more resilient to disasters.</li> <li>• Ensure communications are balanced (e.g. showing potential effects of a realistic disaster, but also showing how to cope).</li> <li>• Encourage people to think about what they might do to help the more vulnerable people in their neighbourhood/ community</li> </ul>
<p><b>Action coping</b>  <i>“I deal with problems by undertaking action directly (rather than worrying)”</i></p>	<ul style="list-style-type: none"> <li>• Include active problem solving as part of community education, participation and empowerment strategies.</li> <li>• Ask people to reflect on significant events in their past and on how they coped with these events.</li> </ul>
<p><b>Community participation</b>  <i>“I actively participate in community activities”</i></p>	<ul style="list-style-type: none"> <li>• Integrate any resilience-based Civil Defence Emergency Management (CDEM) work with community development planning and intervention.</li> <li>• Make use of existing groups to develop discussion and participation in hazard issues.</li> <li>• Encourage individual involvement in general community activities and functions.</li> <li>• Involve community leaders in resilience activities.</li> <li>• Identify, discuss and address salient issues within communities (these may be hazard-related or related to other issues e.g. crime).</li> <li>• Choose some hazard-related community-based activities to undertake (in association with other parts of the organisation of other agencies if necessary), e.g. hazard mapping exercises, community response planning, drills, door-knocking, emergency training.</li> <li>• Work with schools as part of an integrated community resilience-building programme.</li> </ul>
<p><b>Articulating problems</b>  <i>“I discuss and define problems, and help determine solutions for those problems”</i></p>	<ul style="list-style-type: none"> <li>• Make use of participation and empowerment strategies as vehicles for articulating problems.</li> <li>• Ensure participatory activities include a specific focus on defining problems related to hazards, and how the community might solve those problems.</li> <li>• Assist the community in defining their own problems and coming up with their own solutions, rather than doing it for them.</li> <li>• Choose activities to undertake that assist with articulating problems, e.g. directed discussions about what to prepare for and how to prepare (individually and as a community as a whole); developing response and/or evacuation plans, undertaking drills and exercises; undertaking their own evaluation of activities.</li> <li>• Involve community leaders in resilience activities, so that they can help the community discuss hazard problems and solutions.</li> </ul>

Resilience factor/indicator	Recommendation for developing factors in communities
<p><b>Empowerment</b>  <i>"I can call upon personal and external resources, and deal with issues that arise"</i></p>	<ul style="list-style-type: none"> <li>• Ensure community members have the ability to consider issues and implement solutions (e.g. by ensuring adequate resourcing is available, by building skills in individuals through training, by undertaking community development).</li> <li>• Integrate any resilience-based CDEM work with community development planning.</li> <li>• Ensure development is undertaken at all levels (individual, community, institutional).</li> <li>• Target at-risk groups.</li> <li>• Work with existing groups that have community influence.</li> <li>• Enable community-led risk reduction, rather than institution-led.</li> </ul>
<p><b>Social norms</b>  <i>"Other people think preparing is important, or are prepared, so I should too"</i></p>	<ul style="list-style-type: none"> <li>• Development of attitudinal and behavioural norms that support preparedness are influenced by: <ul style="list-style-type: none"> <li>○ participating in an interactive group situation or activity; being exposed to frequent information which stimulates critical awareness;</li> <li>○ active practice of hazards and preparedness activities;</li> <li>○ learning from an early age about hazards and preparedness and encouraging children to discuss school-based activities with their parents; and framing preparedness.</li> </ul> </li> </ul>
<p><b>Trust</b>  <i>"I trust individuals, groups and organisations"</i></p>	<ul style="list-style-type: none"> <li>• Ensure people have positive (empowering) experiences with providers of information to increase their trust in hazard and preparedness information when faced with uncertainty regarding potentially threatening events and their short and long term implications i.e. ensure information is accurate, clear, is available from multiple sources (e.g., CDEM sector, Ministry of Civil Defence and Emergency Management (MCDEM), District Health Board (DHB), community members, etc.), messages are consistent, and help people deal with their local issues, concerns and needs.</li> <li>• Build trust around hazard mitigation expenditure, and ensure a fair and just spread of hazard mitigation actions.</li> <li>• Make use of community participation and empowerment strategies to assess and meet local needs.</li> <li>• Build trust not only with respect to the CDEM sector, but also in terms of wider associated institutions (e.g. the public might not recognise the CDEM sector as a distinct entity from the councils, and therefore broader trust building may be required across councils).</li> </ul>
<p><b>Planning</b>  <i>"I know what I am likely to experience and can develop ways of responding"</i></p>	<ul style="list-style-type: none"> <li>• Ensure people can identify the implications hazard events will have for their community.</li> <li>• Facilitate people's ability to personalise the implications of hazard events and their consequences for them (e.g., impact on family, impact on livelihood).</li> <li>• Integrate with community participation (see above) to develop neighbourhood/community plans to accommodate diversity of needs and interests, develop plans and how they will be put into action should a hazard event occur.</li> </ul>

<b>Resilience factor/indicator</b>	<b>Recommendation for developing factors in communities</b>
<p><b>Personal responsibility</b></p> <p><i>“I understand my role in how risk will be managed and how it contributes to community safety”</i></p>	<ul style="list-style-type: none"> <li>• Develop the belief that people and emergency management and response agencies play complementary roles in preparedness and response.</li> <li>• Clearly identify and distinguish what agencies will do and what people and households should do to contribute to community safety.</li> </ul>
<p><b>Social responsibility</b></p> <p><i>“I know we are all in the same boat and need to develop ways we can respond”</i></p>	<ul style="list-style-type: none"> <li>• Identify hazard issues in terms of shared fate (i.e. it’s everybody’s problem).</li> <li>• Identify interdependencies between people and groups (e.g. need to be able to care for one another if cut off from normal resources, identifying more vulnerable members of the community and how their needs can be met).</li> <li>• Clearly identify and distinguish what agencies will do and what neighbourhoods/communities can do to contribute to community safety.</li> </ul>
<p><b>Sense of community</b></p> <p><i>“I will have to rely on other people and they will be relying on me”</i></p>	<ul style="list-style-type: none"> <li>• Identify hazard issues in terms of shared fate and the benefits of collective action to manage hazard events.</li> <li>• Encourage maintenance of interdependence by giving to and doing for others (e.g., in conjunction with community participation activities).</li> <li>• Encourage the perception that people are part of a larger, stable and dependable community.</li> <li>• Develop mechanisms such as Neighbourhood Emergency Response Teams.</li> </ul>
<p><b>Leadership</b></p> <p><i>“It is important to ensure that our actions are guided and coordinated by someone who knows our community”</i></p>	<ul style="list-style-type: none"> <li>• Identify people in neighbourhood/communities with general (e.g., management experience) and specific (e.g., skills such as building) leadership skills.</li> <li>• Identify from this list people willing to assume leadership responsibility to support planning and plan implementation (including skills such as planning, problem solving, decision making, conflict management).</li> <li>• Include issues such as leadership and succession planning (e.g. rotating leaders to deal with specific issues, minimising burnout during response and recovery).</li> </ul>
<p><b>Collective efficacy</b></p> <p><i>“We know how to work together to deal with issues that arise”</i></p>	<ul style="list-style-type: none"> <li>• Encourage identification of neighbourhood impacts and consequences and how these could be dealt with within group settings.</li> <li>• This may require facilitation and mentoring for groups that lack appropriate planning and problem solving skills.</li> <li>• Group meetings should be designed to integrate the provision of information/actions with the development of planning and problem solving skills in the group.</li> </ul>
<p><b>Place attachment</b></p> <p><i>“This is a great place to live and I want to do what I can to maintain my lifestyle here”</i></p>	<ul style="list-style-type: none"> <li>• Encourage a sense belonging in the physical location through identifying, for example, local (e.g., heritage, symbols such as art deco architecture) and natural amenities to increase people’s sense of emotional investment in their community. This, in turn, increases motivation to take action to prepare to sustain attachment.</li> </ul>

<b>Resilience factor/indicator</b>	<b>Recommendation for developing factors in communities</b>
<b>Experience</b> <i>"Being prepared helped me respond to a hazard event"</i>	<ul style="list-style-type: none"> <li>• If possible, identify people within communities that have had direct or indirect hazard experience and that can testify to the benefits/effectiveness of being prepared and able to take action.</li> <li>• Involve them in developing and delivering risk and preparedness messages/actions to increase the ability of other community members to identify with the issues identified.</li> </ul>
<b>Resourcing</b> <i>"We know who can do what in our community"</i>	<ul style="list-style-type: none"> <li>• Use participatory planning to identify the resources available within communities.</li> <li>• In conjunction with participatory planning, identify the additional resources communities will need to develop, implement and action plans.</li> <li>• Identify external (e.g. agency, community and government) sources communities can contact to discuss resource needs should a hazard event occur.</li> </ul>
Psychological preparedness <i>"Having thought about what I might experience helped me cope"</i>	<ul style="list-style-type: none"> <li>• Psychological preparedness is enhanced by helping people:               <ul style="list-style-type: none"> <li>○ to anticipate the anxiety and concerns that will arise (e.g., what makes an event threatening, what would happen if you had to evacuate and be temporarily re-settled; what would happen to your job?);</li> <li>○ to identify uncomfortable or distressing thoughts and emotions that may cause further anxiety; and</li> <li>○ to find ways of managing the responses so that one's coping capacity remains as effective as possible (this step can be integrated with the developing of coping and planning discussed above).</li> </ul> </li> </ul>

### 2.1.6 Recommendations for future resilience practice and research

The CDEM Group should ensure that the resilience factors that have been identified are incorporated into future communication and public education programmes/strategies. Table 2.2 has outlined some suggestions on how this could be achieved. A comprehensive public education programme should include a variety of activities (e.g. effective messaging, community meetings, scenario-building, school and work activities, drills and exercises, training, etc.) to target and build the different resilience factors and to account for the differing stages of readiness that members of the public are at.

Given that resilience develops over time and needs to be sustained, the resilient factors should be measured in an on-going way (e.g. by undertaking surveys) to understand how resilient a community is at a current time and place, to indicate where resources need to be focused to develop resilience, to measure whether resilience is improving over time, to evaluate the success of educational initiatives, and to provide guidance on how to improve future education and engagement strategies. Such survey measurement could take place in particular chosen communities every few years or so (e.g. three years), with different sets of communities being surveyed every year.

Some areas still require further research in order to fully understand key influences on resilience and how the resilient factors interact. The CDEM group could consider developing a work programme that incorporates work that includes exploring the role of psychological

preparedness; developing practical guidelines for intervention; and investigating organisational issues that arise in relation to strategic planning, training and practices that can support sustained resilience development strategies.

## **2.2 REVIEW OF COMMUNICATION AND PUBLIC EDUCATION ACTIVITIES**

Section 2.2 provides a summary of the review of communication and public education activities. The full review can be found in Appendix B.

A review of communication and public education activities was undertaken to ascertain what activities were currently being employed to build resilience, and to assess how successful these have been in doing so. The review was structured in the following way:

1. Gather information about current communication and public education activities for the review, including relevant strategies and policies (via documentation, interviews and a workshop).
2. Analyse current communication and public education activities in a general sense, as well as how effective these activities have been in developing factors known to be important to resilience.
3. Provide recommendations on how communication and public education can be improved to assist in the development of resilient communities (including links with policy/strategy).

### **2.2.1 Information gathering**

The communication and public education review was undertaken using a multi-faceted approach. First, interviews were conducted with relevant parties involved in developing resilience. A researcher from GNS Science visited Hawke's Bay for three days in May 2012 and interviewed a number of emergency management officers, communication staff and associated professionals working for partner organisations. This component of the review was designed to provide an overall picture of communication, public education and resilience-focussed initiatives and to identify relationships that worked well, along with issues that required more attention or modification.

Second, an audit of communication and public education initiatives was also undertaken, which included websites, schools programmes, collateral materials<sup>3</sup>, brochures, volunteer recruitment initiatives, evacuation drills and media management. The initiatives considered in the audit are detailed in Table A 2.1, Appendix 2.

The third component of the review was a workshop (15 June 2012) facilitated by Julia Becker and Sara McBride to assist with developing a strategy to build resilience in Hawke's Bay. The workshop included a presentation by Dr. Becker regarding the resilience research. The workshop concluded with exercises regarding the Hawke's Bay CDEM Group projects and how the resilience indicators could be used to strengthen elements of current initiatives as well as focus on new potential projects. Notes from the workshop summary can be found in Appendix C.

---

<sup>3</sup> Any items which are printed or created for marketing key messages.

## **2.2.2 Analysis of communication and public education activities**

In summary, the review found that Hawke's Bay has undertaken many innovative projects both past and current. Such projects include the online hazard game, community evacuation activities, innovative collateral material and other activities. Despite the innovative nature of much of the work, it could benefit from better coordination. Given the amount of advertising and marketing in today's environment, consistency, simplicity and repetition of message are critical to the success of behaviour change using traditional communication methods (Mileti & Darlington, 1995, 1997). Better coordination would also allow all entities to benefit from activities that are noted to work well. The Group should consider updating their current strategy, or developing a new strategy to reflect a coordinated approach to communication and public education that is focussed on building resilience.

A comparative assessment was made between the communication and public education activities being undertaken, and the resilience factors they are potentially targeting, to determine what aspects of resilience are being developed and which may need more focussed attention (see Table A 2.1, Appendix 2). In terms of the development of resilience, current communication and public education activities are likely to be having an impact on individually-focussed factors such as self-efficacy, critical awareness, outcome expectancy, and promoting action coping. Factors such as community participation, articulation of problems, sense of community, attachment to place, collective efficacy, empowerment and trust, are less influenced by current communication and public education initiatives, and thus remain areas where specific targeting is required. Developing ways to enhance psychological preparedness should also be factored into any future resilience programmes.

## **2.2.3 Recommendations for communication and public education**

In considering how communication and public education can enhance resilience two key recommendations are evident.

1. A coordinated strategy should be developed to reflect the focus of communication and public education on building individual and community resilience.
2. The strategy should take note of what has been found in research to be effective in building resilience (e.g. the resilience factors), and ensure that provision is made for incorporating any recommendations from research into work plans.

The following section (3.0) describes more specific guidance on how a strategy might be developed and implemented.

### **3.0 RECOMMENDATIONS**

The literature review of resilience research found that a number of individual, community and societal/institutional factors contribute to creating resilient communities. In Hawke's Bay these factors are present at low-moderate levels (Paton and Johnston, 2008). The communications and public education review found that not all of the factors that influence resilience are being effectively targeted by current communication and education approaches. It was suggested that the development of a coordinated strategy and work plan that focuses on building the factors known to influence resilience would be beneficial. This section (3.0) gives specific guidance on how such a strategy could be achieved and how it might look.

#### **3.1 ESTABLISHMENT OF A COMMUNITY RESILIENCE FORUM**

A community resilience forum should be formed to direct public communication and education activities toward the end goal of resilience building. This may involve expanding an existing groups' remit (e.g. the Intercom group could become a community resilience forum), or the establishment of a completely new grouping. Membership of the group should mirror the Coordinating Executive Group (CEG) membership in terms of agencies represented, and could also include volunteer and community development organisations.

#### **3.2 DEVELOPMENT OF A COORDINATED STRATEGY**

The community resilience forum will need to draft a founding document such as Terms of Reference (ToR) and a multi-year (e.g. five year) strategy for the Hawke's Bay region. Ideally, this should be managed by workshop and successive meetings. One person in the committee could be chosen to manage this process to ensure a completed document. The completed draft should be sent to the Coordinating Executive Group and the Joint Committee for ratification and acceptance by all CDEM supporting organisations.

#### **3.3 DEVELOPMENT OF A WORK PROGRAMME**

After the strategy is completed and ratified by the Joint Committee, a work programme focussing on developing resilience should be drafted. The work programme could be developed from the 'ground-up' with Territorial Authorities (TA) and other member organisations of the resilience forum contributing ideas on resilience-building initiatives that may work in their communities, and bringing these to the forum for discussion and subsequent development of a coordinated work plan. A coordinated work plan would allow good ideas to be shared, consistency to be followed across the region (e.g. in terms of messages given or activities undertaken), avoid unnecessary duplication of effort, and ensure human and financial resources are used efficiently. It is also important to ensure that coordination occurs across sectors, so that other relevant resilient-building activities (e.g. community development) are incorporated into the programme in a holistic way.

As part of a coordinated approach, resilience forum members should pool resources, financial and human, to ensure long term support of the strategy and work programme. A funding model should be developed and agreed upon by member agencies to ensure sustainability of the strategy and work programme.



Within the community resilience forum it would be ideal to have one person appointed to manage the work programme to ensure responsibility for delivery. Management and accountability should be determined by the participating agencies to ensure cooperation and support for this role.

### **3.3.1 Identification of specific activities in the work programme**

As part of the work programme, a range of activities should be identified and/or developed to target the factors known to influence resilience, and to account for the differing stages of readiness that members of the public are at. In particular efforts should be focussed on:-

At an individual level:

- Develop people's problem solving skills (action coping)
- Increase their belief in the benefits of hazard mitigation (develop positive outcome expectancy)
- Increase their belief that what they can personally do will make a difference (reduce negative outcome expectancy)
- Develop people's belief that they can do something to mitigate the effects of a disaster (self-efficacy) and prompt though and discussion about disasters (critical awareness), both of which assist in developing other factors.

At a community level:

- Encourage active involvement in community affairs and projects (community participation)
- Develop the community's ability to resolve collective issues (articulating problems).

At an institutional level:

- Develop an individual's ability to influence what happens in the community (empowerment)
- Develop the level of trust an individual has in different organisations (trust).

The resilience forum could run a series of workshops to assist with identifying relevant communication and public education activities that would develop the above factors (in parallel with the aforementioned discussions at TA, organisations and forum level). These workshops could be designed as "stand-alone" events, or linked in with the existing activities of agencies involved in the resilience forum. It is suggested that the workshops could focus on two key areas:

- Developing relevant and consistent messages that will contribute to resilience building (e.g. to build self-efficacy; reduce negative outcome expectancy, enhance positive outcome-expectancy, build psychological resilience)

- Exploring how community engagement and participation should take place, deciding upon the nature of this engagement (e.g. CDEM-based or based through other agencies or groups; type of participation such as discussion groups or exercises), and exploring the linkages between engagement and other factors (e.g. how community participation can be used to get people to articulate problems and find solutions to hazard issues; how can participation be used to prompt people to undertake action coping). Examples of other successful projects (e.g. bushfire engagement in Australia) could help guide the design of relevant engagement programmes for Hawke's Bay (Paton, Frandsen, Sakariassen, & Killalea, 2012).

### **3.3.2 Identification of research activity that supports the development of community resilience**

As part of the work programme the resilience forum should seek to identify research activity that supports the development of community resilience.

In the first instance, research can be used to evaluate the success of any communication and public education activities undertaken by members of the forum. The known factors that influence resilience can be used as 'indicators'. These indicators can be measured over time (e.g. through use of surveys) to track changes in resilience and to measure the success of communication and public education efforts. The forum should consider how they wish resilience to be measured and monitored over time, and how this activity might be funded. Monitoring could be undertaken as specific activity overseen by the resilience forum, or potential also exists to tap into existing monitoring processes used by partner organisations.

The forum should also consider how lesser known aspects of resilience should be addressed, and decide whether and how these need to be incorporated into future work programmes (for example, further research could help understand the role of psychological preparedness in resilience; contribute to the development of practical guidelines for intervention; help understand organisational issues that arise in relation to strategic planning, training and practices).

### **3.3.3 Local versus national application**

When developing their strategy and work programme, the resilience forum should ensure that the national context is considered and accounted for. For example, it is recommended that the Get Ready, Get Thru campaign and design be kept as the main brand to assist with consistency of messaging and higher retention of information by the general public.



## 4.0 ACKNOWLEDGEMENTS

We would first like to thank Nigel Simpson from the Hawke's Bay CDEM Group who initiated the "Improving Community Resilience" project and assisted us in the process of our research. We would also like to give our thanks to all the staff who took time to be involved in the public education and communications review, and who attended the workshop on 15 June 2012. This report was formally reviewed by Michele Daly, GNS Science; David Johnston, GNS Science and Massey University; and Maureen Coomer, GNS Science. The report was also presented to the Hawke's Bay CDEM Group and Coordinating Executive Group/Joint Committee on 23 July 2012 and has benefitted from the input of staff involved in these forums.

## 5.0 REFERENCES

- Armaş, I. (2006). Earthquake risk perception in Bucharest, Romania. *Risk Analysis*, 26(5), 1223-1234.
- Asgary, A., & Willis, K. G. (1997). Household behaviour in response to earthquake risk: An assessment of alternative theories. *Disasters*, 21(4), 354-365.
- Ballantyne, K. E., Paton, D., Johnston, D., Kozuch, M., & Daly, M. (2000). *Information on volcanic and earthquake hazards: The impact on awareness and preparation*: Institute of Geological & Nuclear Sciences Limited.
- Barata, I. A., Llovera, I., Ward, M., Miele, D., Sama, A., Falitz, S., et al. (2004). Are there differences between households with children and without children regarding the degree of household preparedness for a disaster such as fire, flood, earthquake, blackout or devastating act such as a terrorist attack in the community? *Annals of Emergency Medicine*, 44(4), S24-S25.
- Becker, J. S. (2012). *Increasing Household Preparedness for Earthquakes: Understanding how individuals make meaning of earthquake information and how this relates to preparedness. A thesis presented in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Psychology* Massey University, Wellington.
- Becker, J. S., Johnston, D., Daly, M., Paton, D., Mamula-Seadon, L., Petersen, J., et al. (2011). *Building community resilience to disasters: A practical guide for the emergency management sector*. Lower Hutt.
- Becker, J. S., Paton, D., Johnston, D. M., & Ronan, K. R. (2012). A model of household preparedness for earthquakes: How individuals make meaning of earthquake information and how this influences preparedness. *Natural Hazards*, 64(1), 107–137.
- Bennett, P., & Murphy, S. (1997). *Psychology and Health Promotion*. Buckingham: Open University Press.
- Berkes, F. (2007). Understanding uncertainty and reducing vulnerability: Lessons from resilience thinking. *Natural Hazards*, 41, 283-295.
- Bishop, B., Paton, D., Syme, G., & Hancarrow, B. (2000). Coping with environmental degradation: Salination as a community stressor. *Network*, 12, 1-15.

- Blessman, J., Skupski, J., Jamil, M., Jamil, H., Bassett, D., Wabeke, R., et al. (2007). Barriers to at-home-preparedness in public health employees: Implications for disaster preparedness training. *Journal of Occupational and Environmental Medicine*, 49(3), 318-326.
- Burger, J. M., & Palmer, M. L. (1992). Changes in and generalization of unrealistic optimism following experiences with stressful events: Reactions to the 1989 California Earthquake. *Personality and Social Psychology Bulletin*, 18(1), 39-43.
- Carter-Pokras, O., Zambrana, R. E., Mora, S. E., & Aaby, K. A. (2007). Emergency preparedness: Knowledge and perceptions of Latin American immigrants. *Journal of Health Care for the Poor and Underserved*, 18(2), 465-481.
- Clark, L. V., Veneziano, L., & Atwood, D. (1993). Situational and dispositional determinants of cognitive and affective reactions to the New Madrid earthquake prediction. *International Journal of Mass Emergencies and Disasters*, 11(3), 323-335.
- Cowan, J., McClure, J., & Wilson, M. (2002). What a difference a year makes: how immediate and anniversary media reports influence judgements about earthquakes. *Asian Journal of Social Psychology*, 5, 169-185.
- Davis, M. S. (1989). Living along the fault line: An update on earthquake awareness and preparedness in Southern California. *Urban Resources*, 5(4), 8-14.
- De Terte, I., Becker, J., & Stephens, C. (2009). An integrated model for understanding and developing resilience in the face of adverse events. *Journal of Pacific Rim Psychology*, 3(1), 20-26.
- Dooley, D., Catalano, R., Mishra, S., & Serxner, S. (1992). Earthquake preparedness - predictors in a community survey. *Journal of Applied Social Psychology*, 22(6), 451-470.
- Duval, T. S., & Mulilis, J.-P. (1999). A person-relative-to-event (PrE) approach to negative threat appeals and earthquake preparedness: A field study. *Journal Of Applied Social Psychology*, 29(3), 495-516.
- Earle, T. C. (2004). Thinking aloud about trust: A protocol analysis of trust in risk management. *Risk Analysis*, 24, 169-183.
- Edwards, M. L. (1993). Social location and self-protective behavior: Implications for earthquake preparedness. *International Journal of Mass Emergencies and Disasters*, 11(3), 293-303.
- Endo, R., & Nielsen, J. (1979). Social responses to natural hazard predictions. *Western Sociological Review*, 10(1), 59-69.
- Farley, J. E. (1998). *Earthquake fears, predictions, and preparations in Mid-America*. Carbondale and Edwardsville: Southern Illinois University Press.
- Farley, J. E., Barlow, H. D., Finkelstein, M. S., & Riley, L. (1993). Earthquake hysteria, before and after: A survey and follow-up on public response to the Browning Forecast. *International Journal of Mass Emergencies and Disasters*, 11(3), 305-321.

- Flynn, J., Slovic, P., Mertz, C. K., & Carlisle, C. (1999). Public support for earthquake risk mitigation in Portland, Oregon. *Risk Analysis*, 19(2), 205-216.
- Garcia, E. M. (1989). Earthquake preparedness in California: a survey of Irvine residents. *Urban Resources*, 5(4), 15-19.
- Heller, K., Alexander, D. B., Gatz, M., Knight, B. G., & Rose, T. (2005). Social and personal factors as predictors of earthquake preparation: The role of support provision, network discussion, negative affect, age, and education. *Journal Of Applied Social Psychology*, 35(2), 399-422.
- Helweg-Larsen, M. (1999). (The lack of) optimistic biases in response to the 1994 Northridge Earthquake: The role of personal experience. *Basic and Applied Social Psychology*, 21(2), 119-129.
- Hummon, D. M. (1992). Community attachment: Local sentiment and sense of place. In I. Altman & S. M. Low (Eds.), *Place attachment*. New York: Plenum Press.
- Jackson, E. L. (1977). Public response to earthquake hazard. *California Geology*, 30, 278-280.
- Jackson, E. L. (1981). Response to earthquake hazard - The west coast of North America. *Environment and Behavior*, 13(4), 387-416.
- Jackson, E. L., & Mukerjee, T. (1974). Human adjustment to the earthquake hazard of San Francisco, California. In G. F. White (Ed.), *Natural hazards: Local, national, global* (pp. 160-166). New York: Oxford University Press.
- Jakes, P. J., Kruger, L., Monroe, M., Nelson, K., & Sturtevant, V. (2007). Improving wildfire preparedness: Lessons from communities across the U.S. *Human Ecology Review*, 14(2), 188-197.
- Johnston, D., Bebbington, M. S., Lai, C.-D., Houghton, B. F., & Paton, D. (1999). Volcanic hazards perceptions: Comparative shifts in knowledge and risk. *Disaster Prevention and Management*, 8(2), 118-126.
- Johnston, D., Karanci, A. N., Arikan, M., & Nosek, B. A. (2006). *Residential retrofitting in Istanbul, Turkey. Social and economic considerations. Paper No. 602*. Paper presented at the 8th National Conference on Earthquake Engineering, San Francisco, CA.
- Johnston, D., & Pearce, L. (Eds.). (2007). *Hazards in Hawke's Bay* (2nd ed.). Napier: Hawke's Bay Regional Council.
- Johnston, D. M., Becker, J. S., McClure, J., Paton, D., McBride, S., Wright, K., et al. (Submitted). Community understanding of, and preparedness for, earthquake and tsunami risk in Wellington, New Zealand *Cities at Risk: Living with Perils in the 21st Century. Risk Perceptions and Behaviours*.
- Johnston, D. M., Leonard, G. S., Bell, R., Stewart, C., Hickman, M., Thomson, J., et al. (2003). *Tabulated results of the 2003 national coastal community survey. Institute of Geological & Nuclear Sciences science report 2003/35*. . Lower Hutt: Institute of Geological & Nuclear Sciences. .

- Karanci, A. N., & Aksit, B. (2000). Building disaster-resistant communities: Lessons learned from past earthquakes in Turkey and suggestions for the future. *International Journal of Mass Emergencies and Disasters*, 18(3), 403 - 416.
- Karanci, A. N., Aksit, B., & Dirik, G. (2005). Impact of a community disaster awareness training program in Turkey: Does it influence hazard-related cognitions and preparedness behaviors? *Social Behavior and Personality*, 33(3), 243-258.
- Karanci, A. N., & Askit, B. (1999). Strengthening community participation in disaster management by strengthening governmental and non-governmental organisations and networks. A case study from Dinar and Bursa (Turkey). *Australian Journal of Emergency Management*, 13(4), 35-39.
- Kiecolt, K. J., & Nigg, J. M. (1982). Mobility and perceptions of a hazardous environment. *Environment and Behavior*, 14(2), 131-154.
- Klein, R. J. T., Nicholls, R. J., & Thomalla, F. (2003). Resilience to natural hazards: How useful is this concept? *Environmental Hazards*, 5, 35-45.
- Kunreuther, H., Ginsberg, R., Miller, L., Sagi, P., Slovic, P., Borcan, B., et al. (1978). *Disaster insurance protection: Public policy lessons*. New York: John Wiley.
- Lindell, M. K., Arlikatti, S., & Prater, C. S. (2009). Why people do what they do to protect against earthquake risk: Perceptions of hazard adjustment attributes. *Risk Analysis*, 29(8), 1072-1088.
- Lindell, M. K., & Perry, R. W. (2011). The Protective Action Decision Model: Theoretical modifications and additional evidence. *Risk Analysis*.
- Lindell, M. K., & Prater, C. S. (2000). Household adoption of seismic hazard adjustments: A comparison of residents in two states. *International Journal of Mass Emergencies and Disasters*, 18(2), 317 - 338.
- Lindell, M. K., & Prater, C. S. (2002). Risk area residents' perceptions and adoption of seismic hazard adjustments. *Journal of Applied Social Psychology*, 32(11), 2377-2392.
- Lindell, M. K., & Prater, C. S. (2003). Assessing community impacts of natural disasters. *Natural Hazards Review*, 4(4), 176-185.
- Lindell, M. K., & Whitney, D. J. (2000). Correlates of household seismic hazard adjustment adoption. *Risk Analysis*, 20(1), 13-25.
- Lion, R., Meertens, R. M., & Bot, I. (2002). Priorities in information desire about unknown risks. *Risk Analysis*, 22, 765-776.
- Low, S. M., & Altman, I. (1992). Place Attachment. . In S. M. Low & I. Altman (Eds.). New York: Plenum Press.
- Maeda, Y., & Miyahara, M. (2003). Determinants of trust in industry, government, and citizen's groups in Japan. *Risk Analysis*, 23(2), 303-310.
- McClure, J. (1998). Psychology of perception of risk. *NZ Science Review*, 55(1-2), 20-24.

- McClure, J., Allen, M. W., & Walkey, F. (2001). Countering fatalism: Causal information in news reports affects judgments about earthquake damage. *Basic and Applied Social Psychology, 23*(2), 109-121.
- McClure, J., Sutton, R. M., & Sibley, C. G. (2007). Listening to reporters or engineers? How instance-based messages about building design affect earthquake fatalism. *Journal of Applied Social Psychology, 37*(9), 1956-1973.
- McClure, J., Sutton, R. M., & Wilson, M. (2007). How information about building design influences causal attributions for earthquake damage. *Asian Journal of Social Psychology, 10*(4), 233-242.
- McClure, J., Walkey, F., & Allen, M. (1999). When earthquake damage is seen as preventable: Attributions, locus of control and attitudes to risk. *Applied Psychology, 48*(2), 239-256.
- McIvor, D., & Paton, D. (2007). Preparing for natural hazards: Normative and attitudinal influences. *Disaster Prevention and Management, 16*(1), 79-88.
- McIvor, D., Paton, D., & Johnston, D. (2009). Modelling community preparation for natural hazards: Understanding hazard cognitions. *Journal of Pacific Rim Psychology, 3*(2), 39-46.
- Meichenbaum, D. (1986). Stress inoculation training for coping with stressors. *The Clinical Psychologist, 49*, 4-7.
- Meichenbaum, D. (2007). Stress Inoculation Training: A preventative and treatment approach. In P. M. Lehrer, R. L. Woolfolk & W. S. Sime (Eds.), *Principles and Practice of Stress Management* (3rd ed., pp. 3-40). New York, NY: Guilford Press.
- Mileti, D. S., & Darlington, J. D. (1995). Societal response to revised earthquake probabilities in the San Francisco Bay area. *International Journal of Mass Emergencies and Disasters, 13*(2), 119-145.
- Mileti, D. S., & Darlington, J. D. (1997). The role of searching in shaping reactions to earthquake risk information. *Social Problems, 44*(1), 89-103.
- Mileti, D. S., & Fitzpatrick, C. (1992). The causal sequence of risk communication in the Parkfield Earthquake prediction experiment. *Risk Analysis, 12*(3), 393-400.
- Mileti, D. S., & Fitzpatrick, C. (1993). *The great earthquake experiment: Risk communication and public action*. Boulder, CO: Westview Press.
- Mileti, D. S., & O'Brien, P. W. (1992). Warnings during disaster: Normalizing communicated risk. *Social Problems, 39*(1), 40-57.
- Ministry of Civil Defence & Emergency Management. (2010). *Hawke's Bay Civil Defence Emergency Management Capability Assessment Report. August 2010*.
- Morrissey, S. A., & Reser, J. P. (2003). Evaluating the effectiveness of psychological preparedness advice in community cyclone preparedness materials. *The Australian Journal of Emergency Management, 18*(2), 46-61.



- Morrissey, S. A., & Reser, J. P. (2007). Natural disasters, climate change and mental health considerations for rural Australia. *Australian Journal of Rural Health, 15*, 120-125.
- Mulilis, J.-P., & Duval, T. S. (1995). Negative threat appeals and earthquake preparedness: A Person-relative-to-Event (PrE) model of coping with threat. *Journal of Applied Social Psychology, 25*(15), 1319-1339.
- Mulilis, J.-P., & Duval, T. S. (1997). The PrE model of coping and tornado preparedness: Moderating effects of responsibility. *Journal of Applied Social Psychology, 27*(19), 1750-1765.
- Mulilis, J.-P., Duval, T. S., & Lippa, R. (1990). The effects of a large destructive local earthquake on earthquake preparedness as assessed by an earthquake preparedness scale. *Natural Hazards, 3*(4), 357-371.
- Mulilis, J.-P., Duval, T. S., & Rogers, R. (2003). The effect of a swarm of local tornados on tornado preparedness: A quasi-comparable cohort investigation. *Journal of Applied Social Psychology, 33*(8), 1716-1725.
- Mulilis, J.-P., & Lippa, R. (1990). Behavioral change in earthquake preparedness due to negative threat appeals: A test of protection motivation theory. *Journal Of Applied Social Psychology, 20*(8, Pt 1), 619-638.
- Nguyen, L. H., Shen, H. K., Ershoff, D., Afifi, A. A., & Bourque, L. B. (2006). Exploring the causal relationship between exposure to the 1994 Northridge earthquake and pre- and post-earthquake preparedness activities. *Earthquake Spectra, 22*(3), 569-587.
- Norris, F. H., Stevens, S. P., Pfefferbaum, B., Wyche, K. F., & Pfefferbaum, R. L. (2008). Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. *American Journal of Community Psychology, 41*(1-2), 127-150.
- Ozdemir, O., & Yilmaz, C. (2011). Factors affecting risk mitigation revisited: The case of earthquake in Turkey. *Journal of Risk Research, 14*(1), 17-46.
- Palm, R. (1995). The Roepke lecture in economic geography. Catastrophic earthquake insurance: Patterns of adoption. *Economic Geography, 71*(2), 119-131.
- Palm, R., & Hodgson, M. E. (1992). *After a California earthquake: Attitude and behavior change*. Chicago: The University of Chicago Press.
- Palm, R., Hodgson, M. E., Blanchard, R. D., & Lyons., D. (1990). *Earthquake insurance in California*. Boulder, Co: Westview.
- Paradise, T. R. (2005). Perception of earthquake risk in Agadir, Morocco: A case study from a Muslim community. *Environmental Hazards, 6*(3), 167-180.
- Paradise, T. R. (2006). Perception of seismic risk in a Muslim city. *Journal of North African Studies, 11*(3), 243-262.
- Paton, D. (2003). Disaster preparedness: A social-cognitive perspective. *Disaster Prevention and Management, 12* (3), 210 - 216.

- Paton, D. (2005). *Community resilience: Integrating hazard management and community engagement*. Paper presented at the Proceedings of the International Conference on Engaging communities, Brisbane 14 - 17 August 2005.
- Paton, D. (2006). Disaster resilience: Integrating individual, community, institutional and environment perspectives. In P. D. & D. Johnston (Eds.), *Disaster resilience. An integrated approach* (pp. 305-319). Springfield, IL: Charles C. Thomas.
- Paton, D. (2007a). *Measuring and monitoring resilience in Auckland*. Lower Hutt: GNS Science.
- Paton, D. (2007b). Preparing for natural hazards: The role of community trust. *Disaster Prevention and Management*, 16(3), 370-379.
- Paton, D. (2008). Risk communication and natural hazard mitigation: How trust influences its effectiveness. *International Journal of Global Environmental Issues*, 8(1-2), 2-16.
- Paton, D. (2010). *Adaptive capacity/resilience model: Summary of PGSF research*. Wellington: Joint Centre for Disaster Research, Massey University.
- Paton, D. (2012). *MCDEM Christchurch Community Resilience Project Report: Part 1*. Wellington.
- Paton, D. (In press). Facilitating community readiness for forest fire: Lessons from Portugal and Australia. In F. Tedim (Ed.), *Os Incendios e as Comunidades Locais*. Portugal: Livro de Amaranite.
- Paton, D., Bajek, R., Okada, N., & McIvor, D. (2010). Predicting community earthquake preparedness: A cross-cultural comparison of Japan and New Zealand. *Natural Hazards*, 54(3), 765-781.
- Paton, D., & Bishop, B. (1996). Disasters and Communities: Promoting psychosocial wellbeing. In P. D. & N. Long (Eds.), *Psychological Aspects of Disaster: Impact, coping and intervention* (pp. 255-268). Palmerston North: Dunmore Press.
- Paton, D., Bürgelt, P. T., & Prior, T. (2008). Living with Bushfire Risk: Social and environmental influences on preparedness. *Australian Journal of Emergency Management*, 23, 41-48.
- Paton, D., Frandsen, M., & Johnston, D. (2010). Confronting an Unfamiliar Hazard: Tsunami preparedness in Tasmania. *Australian Journal of Emergency Management*, 25, 31-37.
- Paton, D., Frandsen, M., Sakariassen, K., & Killalea, D. (2012). *Engagement for bushfire warnings and community preparedness*. Launceston.
- Paton, D., Frandsen, M., & Tedim, F. (2011). Community preparedness for forest fire: Facilitating community engagement. In F. Pedrosa & D. Paton (Eds.), *A Dimensao Humana dos Incendios Florestais*. Porto, Portugal: Estrategias Criativas.
- Paton, D., Houghton, B. F., Gregg, C. E., Gill, D. A., Ritchie, L. A., McIvor, D., et al. (2008). Managing tsunami risk in coastal communities: Identifying predictors of preparedness. *The Australian Journal of Emergency Management*, 23(1), 4 - 9.

- Paton, D., Houghton, B. F., Gregg, C. E., Mclvor, D., Johnston, D. M., Bürgelt, P., et al. (2009). Managing tsunami risk: Social context influences on preparedness. *Journal of Pacific Rim Psychology*, 3(1), 27-37.
- Paton, D., & Johnston, D. (Eds.). (2006). *Disaster Resilience. An Integrated Approach*. Springfield, Illinois: Charles C. Thomas.
- Paton, D., Johnston, D., Smith, L., & Millar, M. (2001). Responding to hazard effects: Promoting resilience and adjustment adoption. *Australian Journal of Emergency Management, Autumn 2001*, 47-52.
- Paton, D., & Johnston, D. M. (2008). A means-end chain theory analysis of hazard cognitions and preparedness., *GNS Science report 2008/19*. Lower Hutt: GNS Science.
- Paton, D., Johnston, D. M., Bebbington, M. S., Lai, C.-D., & Houghton, B. F. (2001). Direct and vicarious experience of volcanic hazards: Implications for risk preception and adjustment adoption. *Australian Journal of Emergency Management*, 15(4), 58-63.
- Paton, D., Kelly, G., Bürgelt, P. T., & Doherty, M. (2006). Preparing for bushfires: Understanding intentions. *Disaster Prevention and Management*, 15(4), 566-575.
- Paton, D., & McClure, J. (In prep). *Preparing for Disaster: Building household and community capacity*. . Springfield, Ill.: Charles C. Thomas.
- Paton, D., McClure, J., & Bürgelt, P. T. (2006). Natural hazard resilience: The role of individual and household preparedness. In D. Paton & D. Johnston (Eds.), *Disaster resilience: An integrated approach* (pp. 105-124). Springfield, IL: Charles C. Thomas.
- Paton, D., Millar, M., & Johnston, D. (2001). Community resilience to volcanic hazard consequences. *Natural Hazards*, 24, 157-169.
- Paton, D., Parkes, B., Daly, M., & Smith, L. (2008). Fighting the flu: Developing sustained community resilience and preparedness. *Health promotion practice*, 9(4 Suppl), 45S-53S.
- Paton, D., Sagala, S., Okada, N., Jang, L.-J., Burgelt, P., & Gregg, C. E. (2010). Making sense of natural hazard mitigation: Personal, social and cultural influences *Environmental Hazards*, 9, 183-196.
- Paton, D., Smith, L., Daly, M., & Johnston, D. (2008). Risk perception and volcanic hazard mitigation: Individual and social perspectives. *Journal of Volcanology and Geothermal Research*, 172(3-4), 179-188.
- Paton, D., Smith, L., & Johnston, D. (2005). When good intentions turn bad: Promoting natural hazard preparedness. *The Australian Journal of Emergency Management*, 20(1), 25-30.
- Paton, D., Smith, L., Johnston, D., Johnston, M., & Ronan, K. (2003). *Developing a model to predict the adoption of natural hazard risk reduction and preparatory adjustments: EQC Research Project No. 01-479*.
- Paton, D., Smith, L., & Johnston, D. M. (2000). Volcanic hazards: Risk perception and preparedness. *New Zealand Journal of Psychology*, 29(2), 86-91.

- Paton, D., & Wright, L. (2008). Preparing for bushfires: The public education challenges facing fire agencies. In J. Handmer & K. Haynes (Eds.), *Community Bushfire Safety* (pp. 117-128). Canberra: CSIRO Publishing.
- Perry, R. W., & Lindell, M. K. (2008). Volcanic risk perception and adjustment in a multi-hazard environment. *Journal of Volcanology and Geothermal Research*, 172(3-4), 170-178.
- Poortinga, W., & Pidgeon, N. F. (2004). Trust, the asymmetry principle, and the role of prior beliefs. *Risk Analysis*, 24, 1475-1486.
- Prior, T., & Paton, D. (2008). Understanding the context: The value of community engagement in bushfire risk communication and education. Observations following the East Coast Tasmania bushfires of December 2006. *Australasian Journal of Disaster and Trauma Studies*, 2008(2), <http://www.massey.ac.nz/~trauma/issues/2008-2002/prior.htm>.
- Ronan, K. R., Johnston, D. M., & Paton, D. (2001). *Communities' understanding of earthquake risk in the Hawke's Bay and Manawatu-Wanganui regions, New Zealand, Paper No. 1.03.01*. Paper presented at the NZSEE 2001 Conference.
- Rosenbaum, M. (1990). *Learned Resourcefulness: On coping skills, self-control, and adaptive behavior*. New York, NY: Springer Publishing.
- Russell, L. A., Goltz, J. D., & Bourque, L. B. (1995). Preparedness and hazard mitigation actions before and after two earthquakes. *Environment and Behavior*, 27(6), 744-770.
- Rüstemli, A., & Karanci, A. N. (1999). Correlates of earthquake cognitions and preparedness behavior in a victimized population. *Journal of Social Psychology*, 139(1), 91-101.
- Şakioroğlu, M., & Karanci, A. N. (2008). *Positive outcomes of 1999 Duzce earthquake. A thesis proposal submitted to the graduate school of social sciences of Middle East Technical University: Department of Psychology, Middle East Technical University*.
- Schwarzer, R. (2001). Social-cognitive factors in changing health-related behaviours. *Current Directions in Psychological Science*, 10, 47-51.
- Showalter, P. S. (1993). Prognostication of doom: An earthquake prediction's effect on four small communities. *International Journal of Mass Emergencies and Disasters*, 11(3), 279-292.
- Siegel, J. M., Shoaf, K. I., Afifi, A. A., & Bourque, L. B. (2003). Surviving two disasters: Does reaction to the first predict response to the second? *Environment and Behavior*, 35(5), 637-654.
- Solberg, C., Rossetto, T., & Joffe, H. (2010). The social psychology of seismic hazard adjustment: Re-evaluating the international literature. *Natural Hazards and Earth System Science*, 10(8), 1663-1677.
- Statistics New Zealand. (2011). Statistics for Hawke's Bay. from <http://www.stats.govt.nz/>
- Tanaka, K. (2005). The impact of disaster education on public preparation and mitigation for earthquakes: A cross-country comparison between Fukui, Japan and the San Francisco Bay Area, California, USA. *Applied Geography*, 25(3), 201-225.

- Turner, R. H. (1983). Waiting for disaster: Changing reactions to earthquake forecasts in Southern California. *International Journal of Mass Emergencies and Disasters*, 1(2), 307-334.
- Turner, R. H., Nigg, J. M., & Heller-Paz, D. (1986). *Waiting for disaster: Earthquake watch in California*. Berkeley: University of California Press.

## **APPENDICES**



## **APPENDIX 1: RESILIENCE RESEARCH LITERATURE REVIEW**

### **A1.1 INTRODUCTION**

Appendix 1 presents the results of a literature review of resilience research. Briefly, the literature review will:

1. Outline what resilience is, in the context of past resilience modelling and measurement in the Hawke's Bay.
2. Describe key factors that have been tested to see whether they influence resilience.
3. Outline a model of resilience that has been developed from both national and international data.
4. Describe past resilience research in the Hawke's Bay, including models developed from Hawke's Bay data, and the current status of resilience.
5. Outline generic recommendations for building resilience, based on past research.
6. Outline recommendations for future resilience practice and research.

#### **A1.1.1 What is meant by resilience?**

Researchers have come to predominantly describe resilience as an 'adaptive capacity' held by individuals or communities (Berkes, 2007; De Terte, et al., 2009; Klein, et al., 2003; Norris, et al., 2008; Paton, 2007a). Paton (2007a, p. 7) describes 'adaptive capacity' as society's "capability to draw upon its individual, collective and institutional resources and competencies to [anticipate,] cope with, adapt to, [recover from] and develop from the demands, challenges and changes encountered before, during and after disaster".

The concept of resilience is broad, and it requires a range of individual, societal and institutional inputs to create a resilient society. Thus while being physically and mentally prepared for a disaster forms one part of resilience (i.e. 'preparedness'), it will not solely create a resilient society. Likewise while communications about being prepared and resilient are important, when alone without other supporting inputs it will not ensure a resilient society (Becker, et al., 2011). Developing a resilient society requires taking a more comprehensive view.

In this context, resilience can be defined as comprising four general components (Paton & Johnston, 2006). Firstly, communities, their members, businesses and societal institutions must possess the resources (e.g., household emergency plans, business continuity plans) required to ensure, as far as possible, their safety and the continuity of core functions in a context defined by disruption from hazards consequences (e.g., ground shaking, volcanic ash fall, flood inundation) that can disrupt societal functions. Secondly, they must possess the competencies (e.g., self-efficacy, community competence, trained staff, disaster management procedures) required to mobilize, organize and use these resources to confront the problems encountered and adapt to the reality created by hazard activity. Thirdly, the planning and development strategies used to facilitate resilience must include mechanisms designed to integrate the resources available at each level to ensure the existence of a coherent societal capacity, and one capable of realising the potential to capitalize on opportunities for change, growth and the enhancement of quality of life. Finally, strategies adopted must be designed to ensure the sustained availability of these resources and the



competencies required to use them over time and against a background of hazard quiescence and changing community membership, needs, goals and functions.

Understanding how interdependencies between people, their communities, and societal institutions and organisations influence adaptive capacity thus becomes important. That is, it is necessary to describe resilience, or adaptive capacity, at several, interdependent, levels. For example, the ability of a community to adapt to adverse or challenging circumstances and recover using its own resources requires that attention be directed to safeguarding the physical integrity of the built environment (e.g., land use planning, design standards, building codes, lifeline engineering, retrofitting buildings).

At another level, resilience can be conceptualised as a social resource (e.g., facilitating community members' commitment to reduction and readiness activities) whose existence is sustained by ensuring an equitable distribution of the costs and benefits associated with hazard reduction and readiness activities. Resilience also comprises a behavioural level concerned with encouraging the sustained adoption of preparatory adjustments and the ability to respond to and adapt to adverse hazard effects. It must also encompass the social, cultural and environmental contexts within which societal activities occur. The latter includes ensuring economic, business and administrative continuity (including emergency management and social institutions), and promoting heritage and environmental sustainability.

The benefits of enhancing resilience include increased self-reliance during disaster response and recovery, decreases in recovery time, better community response to warnings, lower casualty numbers, reduced damage, increased business survival, reduction of psychosocial problems, and reduction of overall economic costs (Becker, et al., 2011).

### **A1.1.2 Factors of resilience**

A significant amount of research has been undertaken to define what factors are important in helping make up a resilient society. An outline of these tested factors is described under the following sub-headings.

#### **A1.1.2.1 Self-efficacy**

*"I can do something to mitigate the effects of a disaster"* (Becker, et al., 2011)

Self-efficacy is an individual's belief that they can do something to control the outcome of a disaster. People with a higher level of self-efficacy are more likely to get prepared for disasters and believe that they will be able to respond effectively in a disaster situation (Becker, 2012; Cowan, McClure, & Wilson, 2002; Duval & Mulilis, 1999; Lindell & Prater, 2002; Lindell & Whitney, 2000; McClure, Allen, & Walkey, 2001; McClure, Sutton, & Sibley, 2007; McClure, Sutton, & Wilson, 2007; McClure, Walkey, & Allen, 1999; Mulilis & Duval, 1995; Rüstemli & Karanci, 1999; Şakıoroğlu & Karanci, 2008). Self-efficacy is linked closely with outcome expectancy (Paton, 2003, 2007a; Paton, et al., 2005). It also links with community participation, as it has been found that those involved in general community activities have higher levels of self-efficacy indicating that participation helps build self-efficacy (Bishop, Paton, Syme, & Hancarrow, 2000; Lindell & Whitney, 2000; Paton, et al., 2000).

### **A1.1.2.2 Collective efficacy**

*“Together we can do something to mitigate the effects of a disaster”*

Collective efficacy or the belief that collectively a community can do something to control the outcome of an disaster has also been shown to influence preparedness by building a feeling of empowerment community members to take action (McIvor, et al., 2009; Paton, 2007b; Paton, Bajek, et al., 2010; Paton, Frandsen, & Tedim, 2011; Paton et al., 2008; Paton et al., 2009; Paton et al., 2010). Collective efficacy is itself influenced by self-efficacy (Paton, Bajek, et al., 2010).

### **A1.1.2.3 Outcome expectancy**

Outcome expectancy is the perception of whether undertaking a specific action will actually mitigate the threat from a disaster (also known as response efficacy in the literature). Outcome expectancy has an influence on whether individuals will get prepared for a disaster or not (Davis, 1989; Farley, Barlow, Finkelstein, & Riley, 1993; Garcia, 1989; Lindell & Whitney, 2000; McIvor & Paton, 2007; McIvor, et al., 2009; Mullis & Duval, 1995; Mullis & Lippa, 1990; Paton, 2003; Paton, Bajek, et al., 2010; Paton & Johnston, 2008; Paton, Sagala, et al., 2010; Paton, et al., 2005; Paton, Smith, Johnston, Johnston, & Ronan, 2003; Şakioroğlu & Karanci, 2008). People who hold a positive outcome expectancy (i.e. *“I can deal with hazards and as a result there will be a good outcome”*) are more likely to undertake preparedness actions than those who hold a negative outcome expectancy (i.e. *“Whatever I do I can’t make a difference”*) (Becker, et al., 2011; Paton, Bajek, et al., 2010; Paton & Johnston, 2008; Paton, Sagala, et al., 2010). Positive outcome expectancy can be enhanced by encouraging higher levels of discussion and developing people’s understanding of hazard issues; by developing people’s perceptions that disaster losses are selective and avoidable (e.g. by undertaking practical preparedness measures), rather than uncontrollable; and by showing that being prepared has a widespread benefit that transcends disasters themselves (Becker, et al., 2011; Paton, 2007a). Negative outcome expectancy can be reduced by showing people that damage from an event is not universal and total, and that people can have some control over disasters (Becker, et al., 2011).

### **A1.1.2.4 Critical awareness**

*“Hazards are important, and I think and talk about hazards regularly”* (Becker, et al., 2011)

Critical awareness, or the extent to which people perceive hazards are important enough to think and talk about them regularly with others, has been found in many studies to have an influence on people’s perception of risk from disasters and preparedness (Lindell & Perry, 2011; Lindell & Prater, 2000; McIvor & Paton, 2007; Mileti & Darlington, 1995, 1997; Mileti & Fitzpatrick, 1992, 1993; Paton, 2003, 2007a; Paton, Kelly, Bürgelt, & Doherty, 2006; Paton, McClure, et al., 2006; Paton, et al., 2005; Paton, et al., 2003). The more frequent the thoughts and discussion, the better people’s understanding of hazards often are (McIvor & Paton, 2007; Paton, 2003, 2007a; Paton, McClure, et al., 2006; Paton, et al., 2005), and the more reminders there are about the threat that needs to be addressed (Lindell & Prater, 2000). Discussion, however, can also lead to people not preparing, particularly if the discussion is not directed in a positive way towards preparing (Becker, 2012; Paton, McClure, et al., 2006; Paton, et al., 2005). Critical awareness can be influenced by people’s attitudes and beliefs, and social norms (Becker, et al., 2011).

#### **A1.1.2.5 Action coping**

*“I deal with problems by undertaking action directly (rather than worrying)”* (Becker, et al., 2011)

Problem-focussed coping (i.e. dealing directly with a problem by taking action), rather than emotion-focussed coping (i.e. worrying about a problem), has been found to predict resilient responses to disaster issues (Duval & Mulilis, 1999; Lindell & Prater, 2003; Lindell & Whitney, 2000; Paton, 2003; Paton, Millar, et al., 2001). Action coping is a form of problem-focussed coping and has been found to have an influence on people’s intentions to get prepared for disasters (McIvor & Paton, 2007; Paton, Kelly, et al., 2006; Paton, et al., 2003). Self-efficacy can have an influence on to degree of problem-focussed coping that takes place (Bennett & Murphy, 1997).

#### **A1.1.2.6 Leadership**

Analyses of community resilience following the Victorian bushfires in 2009 and the Christchurch earthquake have identified emergent community leadership as an important predictor of resilience and adaptation (Paton, 2012). Leaders were generally those that brought experience of competencies (e.g., planning, problem solving and conflict management) or had specific skills (e.g., building) that provided direction for community members. Leaders also added legitimacy to community groups and provided them with a source that could liaise with government and businesses. This is an under-researched area that needs to be considered in future research.

#### **A1.1.2.7 Community participation**

*“I actively participate in community activities”* (Becker, et al., 2011)

Community participation in both hazards and preparedness issues and other community activities has been identified as being a key influence on getting prepared for disasters (Heller, Alexander, Gatz, Knight, & Rose, 2005; McIvor, et al., 2009; Paton, 2008; Paton, Bajek, et al., 2010; Paton, et al., 2011; Paton, Houghton, et al., 2008; Paton, et al., 2009; Paton, Parkes, et al., 2008; Paton, Sagala, et al., 2010; Paton, Smith, Daly, & Johnston, 2008). Community participation helps people find out new information, learn new skills, connect with others, personally buy-in to issues and problems, be actively involved in solving problems, and build a sense of pride (Becker, et al., 2011). It also represents the context in which people formulate their risk beliefs and make decisions about what to do to manage their risk when they have to make decisions under conditions of uncertainty (Earle, 2004; Lion, Meertens, & Bot, 2002; Poortinga & Pidgeon, 2004). Community participation serves as a linking process that integrates the individual level with the community level.

#### **A1.1.2.8 Articulation of problems**

*“I discuss and define problems, and help determine solutions for those problems”* (Becker, et al., 2011)

The articulation of problems has an influence on whether people develop intentions to prepare for hazards (McIvor, et al., 2009; Paton, 2007b, 2008; Paton, Bajek, et al., 2010; Paton, Sagala, et al., 2010; Paton, Smith, et al., 2008). The articulation of problems relates to people’s ability to discuss and describe community issues and problems, and define solutions to those problems (Becker, et al., 2011). In a disaster related context, people need to be able to define the types of problems that might arise in a disaster, and identify solutions

to those problems. The articulation of problems links with other factors such as critical awareness, trust, community participation and empowerment. Articulation of problems must be targeted specifically in resilience building programmes, as even though community participation is important in helping articulation take place, participation alone will not automatically lead to a capacity to articulate problems (Paton, 2007a). Articulation of problems plays a pivotal role in determining the quality of interaction between communities and the agencies and institutions they rely on for resources and information. It reflects an ability to define needs and to formulate them as questions that can be directed to others. It is a fundamental characteristic of an empowered community.

#### **A1.1.2.9 Planning**

Planning increases the likelihood of people taking action to deal with environmental threats (Schwarzer, 2001). The term 'planning' refers to individuals and communities making plans to respond to emergencies. Resilience is increased when people and communities can develop detailed action plans including the when, where, and how certain goals will be enacted (Paton, Frandsen, & Johnston, 2010).

#### **A1.1.2.10 Place attachment**

Collective behaviour to deal with environmental hazards can be influenced by people's sense of attachment to place (Jakes, Kruger, Monroe, Nelson, & Sturtevant, 2007; Paton, Bürgelt, & Prior, 2008). Hummon (1992) and Low and Altman (1992) described how place attachment, which reflects the degree of embeddedness of individuals within their social-ecological environments, results in people having an emotional investment in their community and this, in turn, increases motivation to protect that investment. This increases their capacity to co-exist with natural processes and facilitates adaptive capacity through more effective management of environmental risk.

#### **A1.1.2.11 Empowerment**

*"I can call upon personal and external resources, and deal with issues that arise"* (Becker, et al., 2011)

Empowerment has been found to have a bearing on whether people decide to prepare for disasters (McIvor, et al., 2009; Paton, 2007b, 2008; Paton, Bajek, et al., 2010; Paton, Sagala, et al., 2010; Paton, Smith, et al., 2008). Empowerment is described by Paton (2007a) as "citizens' capacity to gain mastery over their affairs and to deal with issues and opportunities using intrinsic resources". Empowerment is essential to helping people feel they are capable of getting prepared for a disaster, and helping feel they are able to respond to a disaster when it occurs. Empowerment is influenced by, or influences, other factors such as critical awareness, outcome expectancy, self-efficacy, sense of community and response efficacy (Becker, et al., 2011). With respect to developing resilience, two elements combine to influence the prevailing level of empowerment. These are empowered people and empowering settings. These play complementary roles in resilience. Factors such as community participation, collective efficacy, problem articulation and planning competencies describe empowered people and communities. Empowerment reflects the quality of reciprocal relationships between community members and between community members and societal institutions. It thus represents a mechanism that links communities and agencies. Empowerment ensures that people, communities and risk management agencies play complementary roles in risk management. The quality of these relationships will define the degree to which responsibility for action is devolved to community members and will,

consequently, influence the level of trust that exists between community members and civic emergency planning agencies.

#### **A1.1.2.12 Trust**

*"I trust individuals, groups and organisations"* (Becker, et al., 2011)

Having trust in individuals or agencies connected to hazard management is important for motivating people to prepare for disasters (D. Johnston, Karanci, Arikan, & Nosek, 2006; Karanci & Askit, 1999; Maeda & Miyahara, 2003; Mclvor, et al., 2009; Paton, 2008; Paton, Bajek, et al., 2010; Rüstemli & Karanci, 1999). It is particularly important when people have to make decisions under conditions of uncertainty. It has been found that people are more likely to prepare if they trust the source that hazard and preparedness information has come from (Paton, 2007a, 2007b; Paton, McClure, et al., 2006). Levels of risk acceptance and people's willingness to take responsibility for their own safety is increased, and decisions to take steps to actively manage their risk more likely, if people believe that their relationship with formal agencies is fair and empowering (e.g., agencies are perceived as trustworthy, as acting in the interest of community members) (Lion, et al., 2002; Paton & Bishop, 1996; Poortinga & Pidgeon, 2004). When this relationship is not perceived as fair, the consequence is a loss of trust in the agency (i.e., the source of information). People will also be more supportive of agencies managing hazards if they trust the way they manage risk (Paton, McClure, et al., 2006). Trust is influenced by a person's prior experiences (both of disasters and dealings with institutions), situational factors, and personal dispositional factors (Paton, 2007a, 2007b).

#### **A1.1.2.13 Sense of community**

'Sense of community', or feelings of belonging and attachment for people and places, has had mixed results in resilience research. Some studies have found a link with 'sense of community' to the disaster preparedness process (Bishop, et al., 2000; Paton, et al., 2011; Paton, Kelly, et al., 2006; Prior & Paton, 2008) and others have found no significant relationship (Paton, Millar, et al., 2001; Paton, et al., 2005). Such differences in study results may be related to the differing contexts that the studies have taken place in. Becker (2012) found that the concept of 'sense of community' was found to link with community participation, whereby individuals who felt a sense of community were more likely to participate with respect to hazard-related issues. Despite mixed results, on analysis of the research it would appear that 'sense of community' does have a part to play in building resilient communities.

#### **A1.1.2.14 Social norms**

Several researchers have found that people may be more likely to prepare if they observe or believe that others have prepared (Farley, 1998; Mileti & Darlington, 1997; Mileti & Fitzpatrick, 1992). This suggests that societal norms have a part to play in disaster preparedness (Solberg, Rossetto, & Joffe, 2010). Mclvor and Paton (2007) looked specifically at subjective norms and found that positive subjective norms had an indirect influence on intentions to prepare, mediated by outcome expectancy. Positive subjective norms also linked with having a positive attitude toward preparing. Becker (2012) also found that norms have an influence on the disaster information interpretation and preparedness process, with predominant normative belief being that preparedness was not normal or a widespread activity, hindering preparedness taking place. Becker (2012) suggests that the development of helpful attitudinal and behavioural norms was best influenced by:

participating in an interactive group situation or activity; being exposed to frequent information which stimulated critical awareness; active practice of hazards and preparedness activities; learning from an early age about hazards and preparedness; and framing preparedness in a way that makes it more applicable to people's daily lives and current normative beliefs.

#### **A1.1.2.15 Personal responsibility**

Research has found that people who feel a personal responsibility to prepare for disasters are more likely to undertake actual preparedness (Garcia, 1989; Jackson, 1977, 1981; Mullis & Duval, 1995, 1997; Perry & Lindell, 2008). People who ascribe control of a problem to other institutions, such as local or central government, may be less likely to undertake preparedness actions because they believe the problem is being addressed by those institutions (Ballantyne, Paton, Johnston, Kozuch, & Daly, 2000; Jackson, 1981; Lindell & Whitney, 2000; Paton, et al., 2000).

#### **A1.1.2.16 Responsibility for others**

Researchers have identified that people who feel of a sense of social responsibility for others may be more motivated to prepare for disasters (Becker, 2012; McIvor, et al., 2009), or may be more supportive of mitigation programmes (Flynn, Slovic, Mertz, & Carlisle, 1999). The importance of sense of responsibility can also be observed indirectly in other studies that have found getting prepared linked to having children or dependents in a household (Barata et al., 2004; Dooley, Catalano, Mishra, & Serxner, 1992; Edwards, 1993; Russell, Goltz, & Bourque, 1995; Turner, Nigg, & Heller-Paz, 1986).

#### **A1.1.2.17 Emotions and feelings**

In terms of feelings, research has found that anxiety in particular can have an influence on the preparedness process. This influence can be either positive or negative depending on the context (Paton, et al., 2005; Paton, et al., 2003). In some cases anxiety has been found to reduce the likelihood that people will prepare for disasters (McClure, 1998; Paton, et al., 2005; Paton, et al., 2003), and is often linked with denial and fatalism. In contrast, other studies suggest that anxiety (reflected in worry, fear or concern about future disasters) can directly influence and motivate preparedness (Dooley, et al., 1992; Heller, et al., 2005; Karanci & Aksit, 2000; Karanci, Aksit, & Dirik, 2005; Kiecolt & Nigg, 1982; Rüstemli & Karanci, 1999; Showalter, 1993; Siegel, Shoaf, Afifi, & Bourque, 2003; Turner, 1983). Paton et al. (2005; 2003) found that different levels of anxiety can create a different response (i.e. very high levels of anxiety may be a hindrance to the preparedness process, while lower levels may be helpful).

#### **A1.1.2.18 Previous experience**

Previous experience of both disasters and other adverse events has an impact on a wide range of aspects related to resilience including influencing risk perception (e.g. Clark, Veneziano, & Atwood, 1993; Dooley, et al., 1992; Jackson & Mukerjee, 1974; Karanci & Askit, 1999; Lindell & Prater, 2000; Palm & Hodgson, 1992); critical awareness (Lindell & Prater, 2000, 2003; Turner, et al., 1986); beliefs about hazards and preparedness, e.g. can contribute to normalisation (Mileti & O'Brien, 1992) and optimistic biases (Burger & Palmer, 1992; Helweg-Larsen, 1999); self-efficacy (Mullis, Duval, & Rogers, 2003), concern and anxiety (Dooley, et al., 1992; Heller, et al., 2005; Rüstemli & Karanci, 1999; Siegel, et al.,

2003); and actual preparedness (e.g. Farley, 1998; Lindell & Prater, 2002; Mulilis, Duval, & Lippa, 1990).

#### **A1.1.2.19 Demographic characteristics**

Demographic characteristics (such as gender, income, education, length of time in neighbourhood, marital status, family-make-up, ethnic make-up) have variable impacts on whether people prepare for disasters, with some particular demographics correlating with preparedness depending on the study (e.g. Armaş, 2006; Dooley, et al., 1992; Edwards, 1993; Endo & Nielsen, 1979; Farley, et al., 1993; Karanci, et al., 2005; Lindell, Arlikatti, & Prater, 2009; Lindell & Prater, 2000; Mileti & Darlington, 1997; Mileti & O'Brien, 1992; Ozdemir & Yilmaz, 2011; Paradise, 2005, 2006; Russell, et al., 1995; Tanaka, 2005). Other studies show no influence of measured demographics at all (Asgary & Willis, 1997; Nguyen, Shen, Ershoff, Afifi, & Bourque, 2006; Palm, 1995; Palm, Hodgson, Blanchard, & Lyons., 1990). Because there are no strong correlations between demographics and the preparedness process, these are not actively used in current resilience measurement and modelling. The differences observed reflect the fact that people differ in the presence or absence of the social and psychological factors discussed earlier. This highlights the importance of assessing and developing social and psychological predictors rather than focusing on demographics. Demographic characteristics do influence tangible factors such as resource availability.

#### **A1.1.2.20 Resource issues**

Resource factors contribute to whether people prepare or not for disasters. For example, the cost of preparedness measures may hinder some people in getting prepared (Blessman et al., 2007; Kunreuther et al., 1978; Mileti & Darlington, 1995; Palm, et al., 1990). Cost-benefit issues are also relevant. Even when believing in the benefits of preparing, some people will delay action because they interpret the low frequency of occurrence of hazard events as creating a significant cost benefit imbalance (high immediate costs and no certainty of return on that investment). This type of decision making becomes more likely the further into the future people assume the next event will occur (e.g., a literal interpretation of a 50 year or 100 year event). A lack of time available to undertake preparedness has also been identified as a barrier to action, especially with respect to undertaking more complex actions like making a plan (Blessman, et al., 2007; Carter-Pokras, Zambrana, Mora, & Aaby, 2007). At a wider community level, a lack of resources may also limit the effectiveness of getting prepared for a disaster (D. Johnston, et al., 2006; Lindell & Whitney, 2000; Palm & Hodgson, 1992; Paton, 2006).

#### **A1.1.2.21 Psychological preparedness and resilience**

A need for psychological preparedness was evident in accounts of experiences of the Christchurch earthquake, particularly in relation to dealing with aftershocks and prolonged periods of dealing with physical, social and psychological demands. In addition to its inclusion in future resilience readiness planning, there is scope for its use in the recovery phase in relation to experiences such as aftershocks in future events. Public education and community outreach can also examine ways of integrating physical, social and psychological preparedness. The inclusion of psychological preparedness in risk management requires consideration being given to several issues. Prominent issues here include considering the nature of psychological preparedness, its relation to other aspects of preparedness, and expanding the stages in which psychological preparedness needs to be considered to include pre-disaster, disaster and post-event stages.

With regard to the pre-event stage, psychological intervention could be beneficial with regard to managing the anxiety that has often been identified as an impediment to people deciding not to prepare (Morrissey & Reser, 2003; Paton, et al., 2005). In addition to ensuring the provision of counselling and therapeutic intervention for depression and posttraumatic stress, a need to consider post-event psychological preparedness derives from the fact that people may face (e.g., exposure to socio-legal processes such as litigation, public inquiries) and media coverage that may persist for months or years. People may benefit from preparation to deal with the blame processes (e.g., self and other blame, counterfactual thinking) that can affect well-being in this context and that can be divisive in community settings. Ascertaining whether this would be beneficial and determining how, when and by whom it should be provided is an issue for future research.

Psychological preparedness is not about eliminating people's vulnerability to adverse emotional and stress reactions. Rather, it is intended to help people understand how and why they react as they do and to assist them to develop the capacities to manage stress over time. Morrissey and Reser (2003) discuss psychological preparedness as possessing three essential elements. These are: to anticipate the anxiety and concerns that will arise; to identify uncomfortable or distressing thoughts and emotions that may cause further anxiety; and to find ways of managing the responses so that one's coping capacity remains as effective as possible. Procedures such as stress inoculation training and learned resourcefulness represent strategies that could be used to promote psychological preparedness (Meichenbaum, 1986, 2007; Morrissey & Reser, 2003; Morrissey & Reser, 2007; Rosenbaum, 1990).

Psychological preparedness is a function of the degree to which people possess the competencies and capacities (e.g. knowledge, planning/anticipation, recognition, thinking, feeling, decision making and the management of one's own thoughts, feelings and actions) that influence their capacity to comprehend and understand, predict, recognize and manage the emotional correlates of anticipating and facing challenging circumstances. Psychological preparedness can be enhanced through direct and vicarious experience with emergency situations and scenarios. Being better able to anticipate what they may encounter enhances people's ability to predict, respond to and exercise control over challenging circumstances and to manage and recover from the associated stress.

In addition to seeing psychological preparedness as a separate area for development, it is also pertinent to consider how psychological readiness and other aspects of hazard preparedness can be integrated. The rationale for exploring this possibility lies with the role predictability and control play in managing stress.

For example, rather than just providing people with information about preparing, explaining the relationship between hazard characteristics, preparedness measures and how and why they are effective could help people develop a greater sense of predictability and control (Paton & Wright, 2008). Engagement-based approaches to community outreach that build relationships between neighbours and community members can assist both the development of a sense of collective control and facilitate the development of social support (e.g., informational, tangible, emotional, and belongingness support) which can make beneficial contributions to psychological preparedness before, during and after hazard events. Doing so can also contribute to developing a sense of shared (social) responsibility for managing risk.



### A1.1.3 National and international models of resilience

A significant amount of research has been undertaken to develop a model of resilience that can aid our understanding of what makes up resilience, and how resilience can be measured (e.g. Paton, 2005, 2006, 2007a; Paton, Bajek, et al., 2010; Paton, Johnston, Smith, et al., 2001; Paton, McClure, et al., 2006; Paton, Millar, et al., 2001; Paton, Parkes, et al., 2008; Paton, et al., 2000). The findings for this research can be applied by agencies to help with developing and measuring resilience within communities.

The research has identified that many of the individual, community and institutional factors described previously can be used as indicators of resilience. These indicators have been developed into an overall model of resilience (Figure A1.1). The indicators can be grouped into three broad areas (as summarised in Becker, et al., 2011):

1. **Making a difference**, where people need to know that the small things they can do can make a difference for themselves, their families and their neighbours;
2. **Participation and empowerment**, where communities are directly involved in identifying their risks and determining solutions for themselves;
3. **Leadership and trust**, where communities are supported by institutions who encourage community led initiatives and where mutual trust and respect exist.

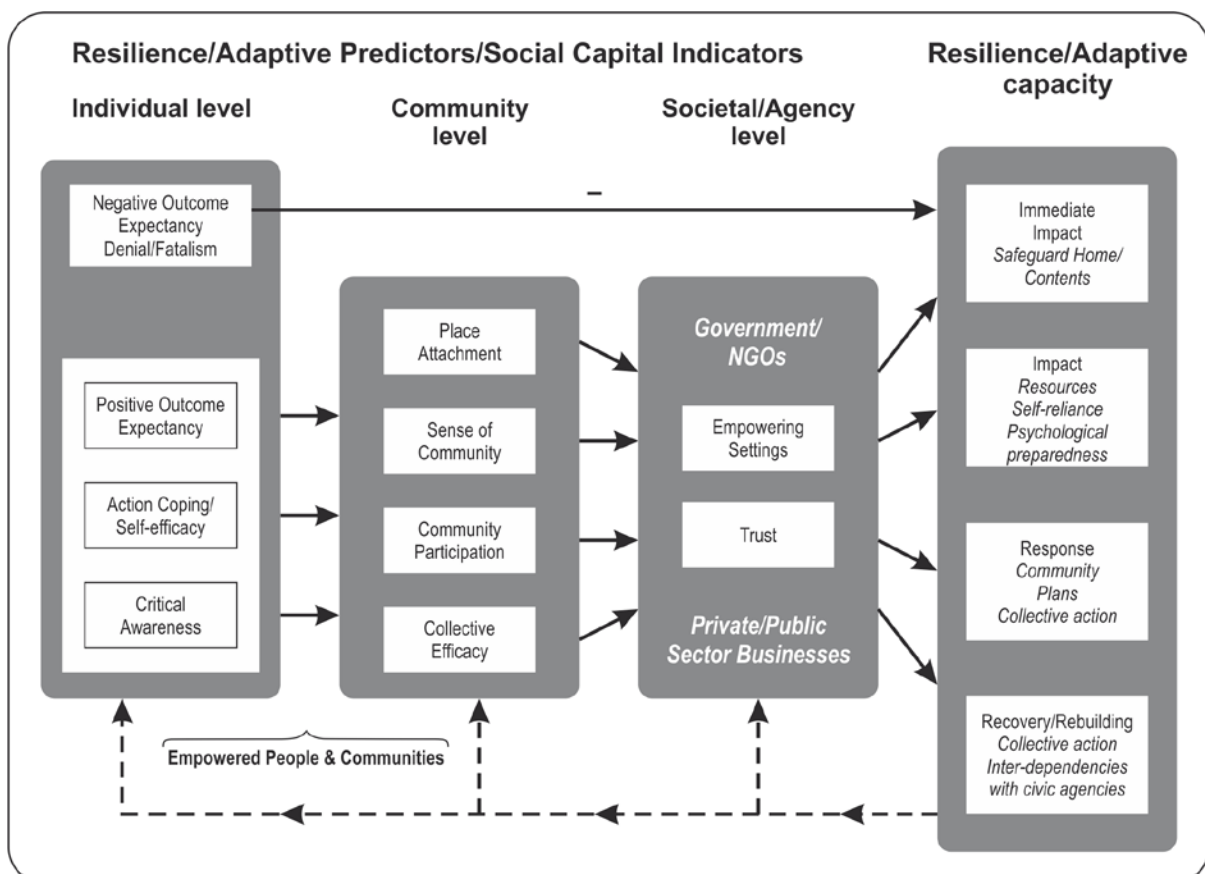


Figure A 1.1 A model of community resilience (Paton, 2010).

As well as contributing to the development of an overall model of resilience, many of the factors described in the first section can also be used as on-going measurable indicators of resilience within communities. To date these indicators have been measured using quantitative surveys. When analysing the surveys it is possible to tell which are the most critical resilience factors (indicators) for each community, i.e. which of the personal, community and institutional factors are most strongly affecting resilience in that community (Becker, et al., 2011). An understanding of the nature and level of current resilience factors in a community enables agencies to direct effort into enhancing factors that may not be present at high levels.

Based on the current research, indicators that have the most influence on resilience and that should potentially be measured in an on-going way include (Becker, et al., 2011):

- **Individual indicators**
  - Self-efficacy
  - Positive outcome expectancy
  - Negative outcome expectancy
  - Critical awareness
  - Action coping
  - Planning
  - Responsibility
- **Community indicators**
  - Community participation
  - Articulating problems
  - Leadership
  - Collective efficacy
  - Social responsibility
  - Place attachment
- **Institutional indicators**
  - Community empowerment
  - Trust

It must be noted that the model of resilience is a system, and that there are interdependencies between the factors/indicators (Figure A1.1). Measurement of resilience, and agency interventions to develop resilient factors in communities, must be undertaken holistically with all factors targeted in the both the measurement and development processes (Becker, et al., 2011). Long term measurement of the indicators is also advised as intervention programmes will cause resilience to evolve over time, and it is only through measurement of all the indicators that agencies will know which elements of resilience are growing and which need to be further targeted.

#### **A1.1.4 Resilience research in the Hawke's Bay**

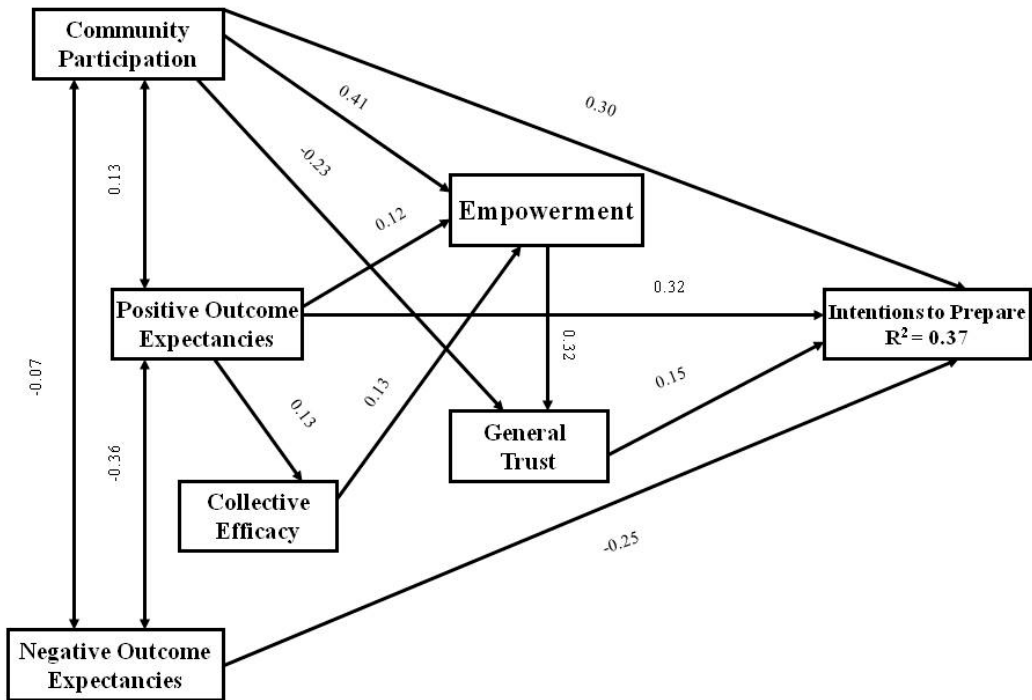
Since 1995, seven resilience studies have been undertaken in the Hawke's Bay region to explore, measure and model resilience (i.e. volcanic, earthquake and tsunami) (Becker, 2012; D. Johnston, Bebbington, Lai, Houghton, & Paton, 1999; D. M. Johnston et al., 2003; McIvor & Paton, 2007; McIvor, et al., 2009; Paton, 2008; Paton, Bajek, et al., 2010; Paton & Johnston, 2008; Paton, Johnston, Bebbington, Lai, & Houghton, 2001; Paton, Sagala, et al., 2010; Paton, et al., 2005; Paton, et al., 2003; Ronan, et al., 2001). Five of the studies have had a quantitative component and two of the studies a qualitative component (Table A 1.1).

**Table A 1.1** Resilience exploration and modelling studies undertaken in the Hawke's Bay.

	<b>Year/s study undertaken</b>	<b>Reference/s</b>
Hastings survey <ul style="list-style-type: none"> <li>• Volcanic study</li> <li>• Quantitative survey</li> </ul>	1995	(D. Johnston, et al., 1999; Paton, Millar, et al., 2001)
Napier, Hastings, Wairoa, Waipawa earthquake study (two studies, one in 1999 and one in 2003) <ul style="list-style-type: none"> <li>• Earthquakes</li> <li>• Quantitative survey</li> </ul>	1999 and 2003	(Ronan, et al., 2001)
EQC earthquake survey (Project 01-479) <ul style="list-style-type: none"> <li>• Earthquakes</li> <li>• Quantitative survey</li> </ul>	2001	(Paton, et al., 2005; Paton, et al., 2003)
Napier (Westshore) Coastal communities study 2003 – National Coastal Survey <ul style="list-style-type: none"> <li>• Coastal issues and tsunami</li> <li>• Quantitative survey</li> </ul>	2003	(D. M. Johnston, et al., 2003)
Napier (flat, Westshore) resilience study (EQC) <ul style="list-style-type: none"> <li>• Earthquakes</li> <li>• Quantitative survey and qualitative interviews</li> </ul>	2006	(McIvor & Paton, 2007; McIvor, et al., 2009; Paton, Bajek, et al., 2010; Paton & Johnston, 2008; Paton, Sagala, et al., 2010)
Napier (flat) earthquake preparedness/resilience study <ul style="list-style-type: none"> <li>• Earthquakes</li> <li>• Qualitative interviews</li> </ul>	2008	(Becker, 2012; Becker, Paton, Johnston, & Ronan, 2012)

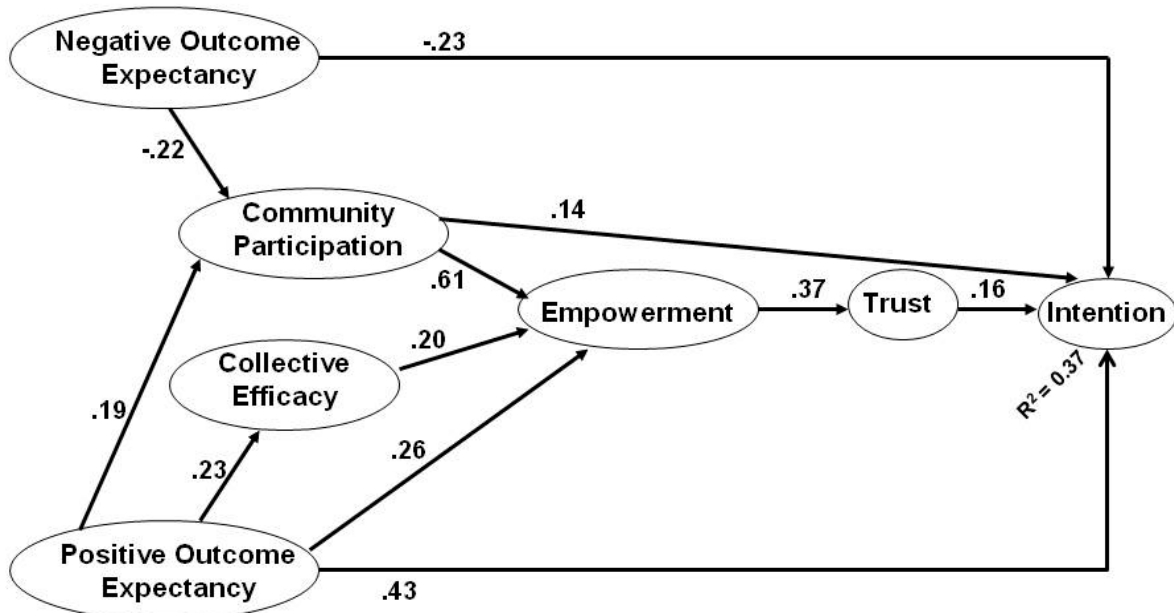
The quantitative studies have predominantly had a focus on identifying indicators that constitute a model of resilience. The Hawke's Bay data concurs with the national and international studies described above, and show that factors such as self-efficacy, critical awareness, anxiety, negative and positive outcome expectancy, community participation, action coping, articulation of problems, collective efficacy, empowerment and trust are important aspects of resilience (McIvor & Paton, 2007; Paton, Bajek, et al., 2010; Paton & Johnston, 2008; Paton, Sagala, et al., 2010).

Figure A 1.2 illustrates an analysis of predictors of earthquake preparedness in Napier (Paton & Johnston, 2008). It demonstrates the point made above regarding the interdependencies between the variables introduced earlier. This could provide the foundation for future work that will include additional variables identified more recently. More recent work has identified a need to include variables such as, for example, responsibility, shared responsibility, and planning. These are likely to have a significant influence on the development of people's resilience and enhance the quality of relationships between communities and civic agencies.



**Figure A 1.2** An analysis of predictors of earthquake preparedness in Napier (Paton & Johnston, 2008).

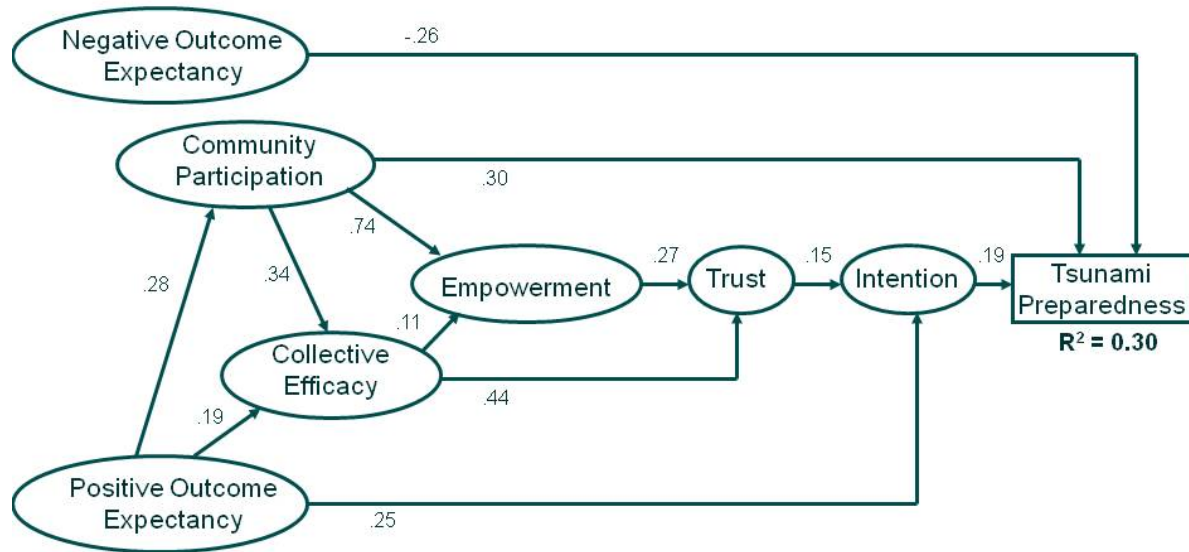
It is important, from a civic planning perspective, that the validity of the models used to direct resilience planning are valid and can offer an evidence-based foundation for Regional planning. This can be done by demonstrating that the model is applicable across different hazards and in different locations. Figure A 1.3 below describes a comparable analysis from Auckland for volcanic hazards (Paton, 2007a).



**Figure A 1.3** Predictors of preparedness for volcanic hazards in Auckland (Paton, 2007a).

The high level of consistency between these analyses (demonstrates applicability for two hazards present in the Hawke’s Bay hazard-scape and applies to different populations) confers upon this model a capacity to be used to inform resilience planning and development. While not conducted in New Zealand, the applicability of the model for tsunami

resilience development is evident from a study in the US (Paton, et al., 2009). This is depicted below in Figure A 1.4.



**Figure A 1.4** Model applied to tsunami preparedness (Paton, et al., 2009).

The research has also allowed data to be collected to see what the actual levels of factors are at in communities. Table A 1.2 shows means and standard deviations of the indicators measured in the Paton and Johnston (2008) report, where residents in Napier were surveyed. All variables were present at low or low-to-moderate variables, indicating considerable scope for the further development of the factors in communities.

**Table A 1.2** Means and standard deviations of indicators measured in the Paton and Johnston (2008) study (N=255).

Indicator	Range	Mean	Standard Deviation
Negative outcome expectancy	4-20	9.21	2.78
Positive outcome expectancy	4-20	13.23	2.59
Community participation	5-20	13.52	3.61
Articulate problems	6-20	14.21	2.18
Empowerment	4-20	10.29	2.66
Trust	5-25	16.42	3.44
Intention to prepare	5-20	10.53	3.53

The Auckland Region CDEM Group undertook a resilience study (Paton, 2007a) and gave a ranking for each of the indicators as low, medium or high (see Table A 1.3). This was done by comparing the mean and median values. The report states that (Paton, 2007a, p. 26) “a ranking of low (L) reflects a mean score that was more than one standard deviation below the median; medium (M) reflects a high similarity between the mean and median values; and high (H) reflects a mean score more than one standard deviation above the median.”

**Table A 1.3** Indicator variables measured in the Auckland resilience study, with their associated ranking (N=400).

Indicator	Range	Mean	Standard Deviation	Ranking
Intention to prepare	5-15	7.63	2.79	L
Action coping	4-20	15.63	3.06	H
Negative outcome expectancy	4-20	10.87	3.20	M
Positive outcome expectancy	3-15	9.35	2.61	M
Community participation	5-20	11.97	3.49	M
Articulating problems	4-20	14.70	2.36	H
Empowerment	4-20	11.51	3.33	M
Trust	5-25	16.72	3.83	M

The qualitative studies have allowed a more detailed understanding of the dynamics of resilience in the Hawke's Bay. McIvor et al.'s (2009) work in Napier has helped confirm that the resilience model is valid, but that also some aspects of it could be revised. For example, new measures of salience, distrust and social responsibility could be included in the model. More detailed analyses could also be undertaken of the relationship between personal beliefs (e.g. positive outcome expectancy) and community participation, and more detailed analyses of the relationship between the perceived relevance of information and empowerment. Qualitative research undertaken by Becker (2012) has also highlighted the importance of a number of factors additional to current models that may need to be considered in future measurement and intervention strategies (e.g. specific beliefs, emotions and feelings, responsibility for others, social norms, people's prior experiences).

#### **A1.1.5 Recommendations for building resilience**

With respect to the factors/indicators, it is recommended that agencies work to develop the resilient factors in their communities in a holistic way. In short the following areas should be targeted (Becker, et al., 2011):-

At an individual level work to:

- Develop people's problem solving skills (action coping)
- Increase their belief in the benefits of hazard mitigation (develop positive outcome expectancy )
- Increase their belief that what they can personally do will make a difference (reduce negative outcome expectancy)
- Develop people's belief that they can do something to mitigate the effects of a disaster (self-efficacy) and prompt thought and discussion about disasters (critical awareness), both of which assist in developing other factors.

At a community level work to:

- Encourage active involvement in community affairs and projects (community participation)
- Develop the community's ability to resolve collective issues (articulating problems).

At an institutional level work to:

- Develop an individual's ability to influence what happens in the community (empowerment)
- Develop the level of trust an individual has in different organisations (trust).

More specific recommendations in developing the various resilient factors are outlined in Table A 1.4. This table represents a summary of key suggestions; more detail can be found in Becker et al., (2011).

**Table A 1.4** Factors or 'indicators' of resilience and specific recommendations for developing resilience in communities (adapted from Becker et al., 2011).

<b>Resilient factor/indicator</b>	<b>Recommendation for developing factors in communities</b>
<p><b>Self-efficacy</b>  <i>"I can do something to mitigate the effects of a disaster"</i></p>	<ul style="list-style-type: none"> <li>• Encourage people to personalise information.</li> <li>• Provide practical information about 'how to prepare' and why it is effective and do so in small chunks rather than in large, comprehensive formats (e.g., booklets).</li> <li>• Start with easy to adopt items (e.g., emergency kits) and progressively introduce more complex/expensive items (e.g., structural changes to houses).</li> <li>• Develop separate strategies for owners and renters.</li> </ul>
<p><b>Critical awareness</b>  <i>"Hazards are important, and I think and talk about hazards regularly"</i></p>	<ul style="list-style-type: none"> <li>• Encourage thought and discussion amongst community members through provision of appropriate forums and formats (e.g. community members to review hazard scenarios, community to share experiences of disasters, community leaders to lead discussions, discussion and participation through community group events, etc.).</li> <li>• Ensure that people start talking about the benefits of being prepared.</li> </ul>
<p><b>Positive outcome expectancy</b>  <i>"I can deal with hazards and as a result there will be a good outcome"</i></p>	<ul style="list-style-type: none"> <li>• Outline the complex nature of hazards, rather than focussing on damage and destruction.</li> <li>• Develop belief in people that mitigation for disasters can be effective.</li> <li>• Show that losses are avoidable, and ways people can practically avoid the loss.</li> <li>• Describe the immediate utility and/or benefits of mitigation.</li> <li>• Use comprehensive communication strategies to relay information, as well as participation and empowerment.</li> </ul>

<b>Resilient factor/indicator</b>	<b>Recommendation for developing factors in communities</b>
<p><b>Negative outcome expectancy</b>  <i>"Whatever I do I can't make a difference"</i></p>	<ul style="list-style-type: none"> <li>• Reduce NOE by focussing on the realities of a disaster, rather than damage from an event being universal and total.</li> <li>• Show that the distribution of losses is not evenly spread (i.e. that more at risk or vulnerable communities are impacted more).</li> <li>• Show that people have control over disasters, i.e. that the choices they make over mitigation etc. can help them become more resilient to disasters.</li> <li>• Ensure communications are balanced (e.g. showing potential effects of a realistic disaster, but also showing how to cope).</li> <li>• Encourage people to think about what they might do to help the more vulnerable people in their neighbourhood/ community.</li> </ul>
<p><b>Action Coping</b>  <i>"I deal with problems by undertaking action directly (rather than worrying)"</i></p>	<ul style="list-style-type: none"> <li>• Include active problem solving as part of community education, participation and empowerment strategies.</li> <li>• Ask people to reflect on significant events in their past and how they coped with these events</li> </ul>
<p><b>Community participation</b>  <i>"I actively participate in community activities"</i></p>	<ul style="list-style-type: none"> <li>• Integrate any resilience-based CDEM work with community development planning and intervention.</li> <li>• Make use of existing groups to develop discussion and participation in hazard issues.</li> <li>• Encourage individual involvement in general community activities and functions.</li> <li>• Involve community leaders in resilience activities.</li> <li>• Identify, discuss and address salient issues within communities (these may be hazard-related or related to other issues e.g. crime).</li> <li>• Choose some hazard-related community-based activities to undertake (in association with other parts of the organisation or other agencies if necessary), e.g. hazard mapping exercises, community response planning, drills, door-knocking, emergency training.</li> <li>• Work with schools as part of an integrated community resilience-building programme.</li> </ul>
<p><b>Articulating problems</b>  <i>"I discuss and define problems, and help determine solutions for those problems"</i></p>	<ul style="list-style-type: none"> <li>• Make use of participation and empowerment strategies as vehicles for articulating problems.</li> <li>• Ensure participatory activities include a specific focus on defining problems related to hazards, and how the community might solve those problems.</li> <li>• Assist the community in defining their own problems and coming up with their own solutions, rather than doing it for them.</li> <li>• Choose activities to undertake that assist with articulating problems, e.g. directed discussions about what to prepare for and how to prepare (individually and as a community as a whole); developing response and/or evacuation plans, undertaking drills and exercises; undertaking their own evaluation of activities.</li> <li>• Involve community leaders in resilience activities, so that they can help the community discuss hazard problems and solutions.</li> </ul>



<b>Resilient factor/indicator</b>	<b>Recommendation for developing factors in communities</b>
<p><b>Empowerment</b>  <i>"I can call upon personal and external resources, and deal with issues that arise"</i></p>	<ul style="list-style-type: none"> <li>• Ensure community members have the ability to consider issues and implement solutions (e.g. by ensuring adequate resourcing is available, by building skills in individuals through training, by undertaking community development).</li> <li>• Integrate any resilience-based CDEM work with community development planning.</li> <li>• Ensure development is undertaken at all levels (individual, community, institutional).</li> <li>• Target at-risk groups.</li> <li>• Work with existing groups that have community influence.</li> <li>• Enable community-led risk reduction, rather than institution-led.</li> </ul>
<p><b>Social Norms</b>  <i>"Other people think preparing is important, or are prepared, so I should too"</i></p>	<ul style="list-style-type: none"> <li>• Development of attitudinal and behavioural norms that support preparedness are influenced by: <ul style="list-style-type: none"> <li>○ participating in an interactive group situation or activity; being exposed to frequent information which stimulated critical awareness;</li> <li>○ active practice of hazards and preparedness activities;</li> <li>○ learning from an early age about hazards and preparedness and encouraging children to discuss school-based activities with their parents; and framing preparedness</li> </ul> </li> </ul>
<p><b>Trust</b>  <i>"I trust individuals, groups and organisations"</i></p>	<ul style="list-style-type: none"> <li>• Ensure people have positive (empowering) experiences with providers of information to increase their trust in hazard and preparedness information when faced with uncertainty regarding potentially threatening events and their short and long term implications i.e. ensure information is accurate, clear, is available from multiple sources (e.g., CDEM sector, MCDEM, DHB, community members, etc.), messages are consistent, and help people deal with their local issues, concerns and needs.</li> <li>• Build trust around hazard mitigation expenditure, and ensure a fair and just spread of hazard mitigation actions.</li> <li>• Make use of community participation and empowerment strategies to assess and meet local needs.</li> <li>• Build trust not only with respect to the CDEM sector, but also in terms of wider associated institutions (e.g. the public might not recognise the CDEM sector as a distinct entity from the councils, and therefore broader trust building may be required across councils).</li> </ul>
<p><b>Planning</b>  <i>"I know what I am likely to experience and can develop ways of responding"</i></p>	<ul style="list-style-type: none"> <li>• Ensure people can identify the implications hazard events will have for their community.</li> <li>• Facilitate people's ability to personalise the implications of hazard events and their consequences for them (e.g., impact on family, impact on livelihood).</li> <li>• Integrate with community participation (see above) to develop neighbourhood/community plans to accommodate diversity of needs and interests, develop plans and how they will be put into action should a hazard event occur.</li> </ul>

<b>Resilient factor/indicator</b>	<b>Recommendation for developing factors in communities</b>
<p><b>Personal responsibility</b></p> <p><i>“I understand my role in how risk will be managed and how it contributes to community safety”</i></p>	<ul style="list-style-type: none"> <li>• Develop the belief that people and emergency management and response agencies play complementary roles in preparedness and response.</li> <li>• Clearly identify and distinguish what agencies will do, and what people and households should do to contribute to community safety.</li> </ul>
<p><b>Social responsibility</b></p> <p><i>“I know we are all in the same boat and need to develop ways we can respond”</i></p>	<ul style="list-style-type: none"> <li>• Identify hazard issues in terms of shared fate (i.e., it's everybody's problem).</li> <li>• Identify interdependencies between people and groups (e.g., need to be able to care for one another if cut off from normal resources, identifying more vulnerable members of the community and how their needs can be met).</li> <li>• Clearly identify and distinguish what agencies will do and what neighbourhoods/communities can do to contribute to community safety.</li> </ul>
<p><b>Sense of community</b></p> <p><i>“I will have to rely on other people and they will be relying on me”</i></p>	<ul style="list-style-type: none"> <li>• Identify hazard issues in terms of shared fate and the benefits of collective action to manage hazard events.</li> <li>• Encourage maintenance of interdependence by giving to and doing for others (e.g., in conjunction with community participation activities).</li> <li>• Encourage perception that people are part of a larger, stable and dependable community.</li> <li>• Develop mechanisms such as Neighbourhood Emergency Response Teams.</li> </ul>
<p><b>Leadership</b></p> <p><i>“It is important to ensure that our actions are guided and coordinated by someone who knows our community”</i></p>	<ul style="list-style-type: none"> <li>• Identify people with neighbourhood/community with general (e.g., management experience) and specific (e.g., skills such as building) leadership skills.</li> <li>• Identify from this list people willing to assume leadership responsibility to support planning and plan implementation (including skills such as planning, problem solving, decision making, conflict management).</li> <li>• Include issues such as leadership and succession planning (e.g., rotating leaders to deal with specific issues, minimising burnout during response and recovery).</li> </ul>
<p><b>Collective efficacy</b></p> <p><i>“We know how to work together to deal with issues that arise”</i></p>	<ul style="list-style-type: none"> <li>• Encourage identification of neighbourhood impacts and consequences and how these could be dealt with within group settings.</li> <li>• This may require facilitation and mentoring for groups that lack appropriate planning and problem solving skills.</li> <li>• Group meetings should be designed to integrate the provision of information/actions with the development of planning and problem solving skills in the group.</li> </ul>
<p><b>Place attachment</b></p> <p><i>“This is a great place to live and I want to do what I can to maintain my lifestyle here”</i></p>	<ul style="list-style-type: none"> <li>• Encourage a sense belonging in the physical location through identifying, for example, local (e.g., heritage, symbols such as art deco architecture) and natural amenities to increase people's sense of emotional investment in their community. This, in turn, increases motivation to take action to prepare to sustain attachment.</li> </ul>

<b>Resilient factor/indicator</b>	<b>Recommendation for developing factors in communities</b>
<b>Experience</b> <i>"Being prepared helped me respond to a hazard event"</i>	<ul style="list-style-type: none"> <li>• If possible, identify people within communities that have had direct or indirect hazard experience and that can testify to the benefits/effectiveness of being prepared and able to take action.</li> <li>• Involve them in developing and delivering risk and preparedness messages/actions to increase the ability of other community members to identify with the issues identified.</li> </ul>
<b>Resourcing</b> <i>"We know who can do what in our community"</i>	<ul style="list-style-type: none"> <li>• Use participatory planning to identify the resources available within communities.</li> <li>• In conjunction with participatory planning, identify the additional resources communities will need to develop, implement and action plans.</li> <li>• Identify external (e.g., agency, community and government) sources communities can contact to discuss resource needs should a hazard event occur.</li> </ul>
<b>Psychological preparedness</b> <i>"Having thought about what I might experience helped me cope"</i>	<ul style="list-style-type: none"> <li>• Psychological preparedness is enhanced by helping people: <ul style="list-style-type: none"> <li>○ to anticipate the anxiety and concerns that will arise (e.g., what makes an event threatening, what would happen if you had to evacuate and be temporarily re-settled; what would happen to your job?);</li> <li>○ to identify uncomfortable or distressing thoughts and emotions that may cause further anxiety; and</li> <li>○ to find ways of managing the responses so that one's coping capacity remains as effective as possible (this step can be integrated with the developing of coping and planning discussed above).</li> </ul> </li> </ul>

Recent work has identified that resilience planning must accommodate the fact that people and communities are not all at the same level of readiness to engage in the development of the capacities that will facilitate sustained resilience. This work has focused on the need to develop a range of intervention strategies (Paton, In press).

Thus people are, at any one time, at different stages of willingness or readiness to develop competencies and knowledge. Some have decided not to act. Others may be interested in preparing, but have yet to commence this process (labelled here as 'pre-contemplators' – they have yet to engage in the preparedness process). Of those who are preparing, some have adopted only a few measures (labelled 'contemplators' – they are thinking about preparing more than acting) while some are more comprehensively prepared (labelled 'action' group – they are actively preparing). The fact that it is possible to differentiate people with regard to their position within a continuum from 'not prepared' to 'very prepared' has implications for the development of risk communication and outreach strategies. For example, for people in the 'decide not to act' group, strategies must focus on getting them to a point where they are motivated to think about preparing. The work discussed here point to a role for managing negative outcome expectancy in order to achieve this goal.

Negative outcome expectancy reflects people's assumptions that because it is not possible to prevent hazard events occurring (e.g., they result from uncontrollable natural causes) their consequences (e.g., house collapse) are also uncontrollable, and so they believe taking action is futile. The reality is that while the hazard event is uncontrollable, its consequences

can be influenced by actions people can perform to enhance the ability of their house to mitigate the risk. Consequently, public outreach should assist people to differentiate between the uncontrollable event (i.e., earthquake) and the controllable consequences (e.g., how effects of ground shaking can be mitigated by specific actions) (Paton & Wright, 2008).

One way of achieving this outcome involves presenting images of houses in close proximity to one another that illustrate how damaged/destroyed houses can occur alongside or nearby those less or undamaged. Faced with this contrast, people find it difficult to attribute loss and damage to houses from 'uncontrollable' events. The fact that some houses survived raises the possibility that factors over which people have control (e.g., building characteristics) can make a difference to their survival. Reducing negative outcome expectancy will not, however, automatically motivate preparing. For this to occur, strategies are required to get people to start preparing.

Getting people started involves developing strategies that focus on moving people progressively through the pre-contemplation and contemplation stages until they are at the action stage and are committed to preparing. Some examples of strategies that can be used to assist this process are described below.

For those in the pre-contemplation category, the goal is to get people to start preparing. The general lack of comprehensive knowledge of hazards held by members of this group can make it counter-productive to provide them with information about the hazards and their consequences. Providing those at this stage in the preparedness process with information about their vulnerability and the intensity of events that could occur can increase anxiety and prevent them progressing their preparedness. The alternative is to gradually increase people's perceived susceptibility and vulnerability by inviting them to personalise the issues for themselves (Paton & McClure, In prep). For example, ask them to first identify how an earthquake might impact on them, their family and their livelihood and then encourage them to seek information to deal with issues they have identified. This way people generate beliefs about their vulnerability and its implications for themselves. This increases people's risk acceptance and develops some level of commitment to moving the preparedness process forward.

Another strategy is to provide information on what people in similar circumstances to themselves have done. At this level, the community outreach and engagement component of a risk management strategy can facilitate people's ability to formulate solutions to the issues they have identified. These activities help them develop their self-efficacy and positive outcome expectancy (POE) beliefs and help sow the seeds for moving to more advanced levels of preparedness.

An important predictor of POE is the level of people's understanding of the relationship between disaster effects and their mitigation. As this increases, the more likely people are to believe that damage can be prevented (Paton & McClure, In prep). The likelihood of adoption can be increased by explicitly illustrating and explaining how specific disaster effects (e.g., ground shaking) can be mitigated by specific house design features. This approach also benefits from presenting information about the relationship between house characteristics and reducing risk sourced from (similar) communities that have experienced and successfully survived disaster events as a result of adopting the kinds of protective measures described above (Paton & Wright, 2008). Engaging people in this way helps moves them to the contemplation stage.

With regard to people who are interested in preparing, but who are in the contemplation stage, preparing can be facilitated by providing them with additional, specific information on their vulnerability and the severity of event they could experience. Having developed positive outcome expectancy beliefs in the earlier stage reduces the likelihood of this information over whelming them. By increasing their hazard knowledge and explaining explicitly how preparation and protective measures contribute to safety, their positive outcome expectancy and the likelihood of their adopting preparedness and protective measures is increased (Paton & McClure, In prep). It is also appropriate at this stage to encourage discussion of risk and risk management in community settings. These activities increase the likelihood of people developing comprehensive preparedness plans and their willingness to put them into practice.

For those in the 'Action' group, the goal is to facilitate sustained adoption. This can be done by continuing to provide information and discussion in ways that contribute to the continued development of hazard knowledge, positive outcome expectancy and the benefits of preparing, self-efficacy, and community action, and empowerment. People's level of commitment to preparing allows for the use of more advanced public outreach techniques. These include proving examples of comprehensive preparedness, demonstrations of how to implement actions and how they work, and property assessments.

People in the action stage are also well placed to contribute to public outreach and engagement strategies that can assist those in the earlier stages of preparedness. This can be accomplished using techniques such as collaborative learning and peer tutoring in community and neighbourhood settings and working with community leaders to create empowering settings in which public outreach strategies can be applied (Paton & McClure, In prep). Additional techniques at this stage include conferences, design meetings, workshops, seminars, consultative liaison committees, and public forums to discuss new and future issues.

#### **A1.1.6 Future practice and research**

The review on community resilience research shows that there a number of individual, community and societal/institutional factors that exist that can influence resilience, which can be represented as an overall model of resilience. These factors need to be considered and accounted for when developing public education programmes, to ensure that such programmes are effective. A comprehensive public education programme should include a variety of activities (e.g. effective messaging, community meetings, scenario-building, school and work activities, drills and exercises, training, etc.) to target and build the different resilience factors and to account for the differing stages of readiness that members of the public are at.

A model of resilience has been developed and validated for Hawke's Bay – future work can expand the model to incorporate additional variables known to have a significant impact on resilience to develop a more comprehensive framework for evidence-based planning, assessment and intervention.

Little work has been done on intervention design and planning for developing sustained resilience. The final section above outlined what is known about the need to plan intervention in ways that accommodate people and communities at different levels of readiness. Additional work is required to translate this into a set of practical guidelines.

The importance of psychological preparedness has emerged from recent events in Christchurch. More work is needed to identify how to develop this and how to link it with other types of preparedness.

A need to move from relatively passive information-dissemination-based approaches to developing resilience to those incorporating community engagement and community development principles is evident. Recent work on engagement-based intervention has identified a need to include an agency perspective here. Future work can examine the organisational issues that arise in relation to strategic planning, training and practices that can support sustained resilience development strategies.



## **APPENDIX 2: REVIEW OF PUBLIC EDUCATION STRATEGIES (INCLUDING RESILIENCE-BUILDING ACTIVITIES) AND POLICY**

### **A2.1 INTRODUCTION**

A review was performed in June 2012 to understand how CDEM agencies in the Hawke's Bay region approach communication and public education, and to identify what gaps exist within the current initiatives using the community resilience framework.

Traditional communication and public education is often perceived as being a starting point regarding building resilience. Brochures, posters, pens, and other collateral material are often perceived by emergency managers and communications staff as essential tools in preparing the public for emergencies. While these projects and products certainly have a place in communicating messages, these items often only raise awareness but do not lead to changes in personal or community preparedness or resilience. This is reflected in research, which shows that even if awareness is high, people are often slow to prepare for emergencies (Ballantyne, et al., 2000).

A broader approach to building community resilience appears to have a much higher success rate for preparing people for emergencies than traditional public education alone (D. M. Johnston et al., Submitted). As discussed in the review of community resilience research (Appendix A), while communication and messaging are important, there are also a number of other factors that influence resilience such as community participation, empowerment, and trust.

Given the range of influences on resilience, this review will consider activities that are being undertaken in terms of traditional communication and public education, as well as broader activities that contribute to resilience.

### **A2.2 TERMS**

In this review, a number of terms will be used that may be unfamiliar. Here is a list of the definition of terms:

- **Public education:** public education is defined, for the purpose of this review, as more traditional methods of communication including working with schools, marketing, media, and collateral material.
- **Collateral material:** any items which are printed or created for marketing key messages. Examples: pens, posters, shopping bags with printed information or logos regarding civil defence.
- **Community resilience:** see Appendix A.
- **Social media:** outlets such as Facebook, Twitter, Bebo and other ways of communicating information quickly online.



### **A2.3 PURPOSE OF REVIEW**

This review is a gap analysis to better understand how traditional public education campaigns in the Hawke's Bay region are managed and how these initiatives can be better aligned to achieve community resilience outcomes. Without understanding the historical and current context of the communication techniques used in Hawke's Bay, any new community resilience project could be simply "recreating the wheel" and potentially a waste of important resources.

### **A2.4 HOW THE REVIEW WAS CARRIED OUT**

This review, while not exhaustive, is a good indicator of the most current or recent past activities coordinated by the various councils involved. There was an audit of most of the communication materials produced by CDEM Group/Hawke's Bay Regional Council and the four territorial authorities within the region. A series of interviews were undertaken, and materials and documentation were collected to be analysed.

Included in the review is the use of the Get Ready, Get Thru National Campaign managed by the Ministry of Civil Defence & Emergency Management, as well as "What's the Plan, Stan", the educational resource for schools regarding hazards and emergency preparedness. Hawke's Bay region appears to have a good uptake of these programmes, with most of the projects and items including those key messages, themes and design elements.

### **A2.5 STRUCTURE OF HAWKE'S BAY PUBLIC EDUCATION**

The Intercom Group is responsible for managing the public information component of emergency management (i.e. crisis communication). The Intercom Group is facilitated by the Group Public Information Manager (PIM), who at the time of writing this report was a staff member of the Hawke's Bay Regional Council. The Group PIM uses the structure of the Intercom Group to liaise with professional communications staff from a range of organisations to ensure that relationships, protocols and communication lines are in place before an event occurs. The Intercom group meets approximately once every three months or, in some instances, more or less frequently depending on current events and needs, to discuss communication issues regarding emergency response. The InterCom group was operational during the 2011 flooding event. The grouping has proved to be a successful partnership. Because the InterCom's role is seen to be related mostly to crisis communication, public education about hazards and preparedness is not seen as its primary role. However, some InterCom staff do have input into the development of more general public education material.

General public education regarding hazards and preparedness takes place at both a regional (i.e. Hawke's Bay Regional Council, Hawke's Bay CDEM Group) and local level (Territorial Authority). The Regional Council and CDEM Groups' approach to communications regarding CDEM issues is based in mass communications, council produced publications, and the National Get Ready Week. Public education 'materials' have been developed by the HBRC and CDEM Group for use at the regional and local level (e.g. posters, pens, booklets, advertisements, competitions, website).

At the TA level there is a great deal of public education activity that takes place, with each district following its own unique approach. While some use of regional resources does take place, individual TAs in the past tend to have predominantly developed and run their own

messages and programs in an attempt to build a prepared and resilient public. Opportunities exist to better coordinate public education materials, messages and activities from a regional through to a local level, and between TAs themselves. Such a coordinated approach would build on the good relationships that already exist within the region. A review undertaken as part of the “Hawke's Bay Civil Defence Emergency Management Capability Assessment Report” (Ministry of Civil Defence & Emergency Management, 2010) has also noted that better coordination of activities would be of value to the region.

## **A2.6 PUBLIC EDUCATION AND COMMUNICATION STRATEGIES IN HAWKE’S BAY REGION**

The Hawke’s Bay CDEM Group has a communications strategy which was created approximately 10 years ago. The communications strategy has the following objectives (Ministry of Civil Defence & Emergency Management, 2010):

- “Increased public awareness about hazards in Hawke’s Bay, the consequences and the practical steps people can take to improve safety;
- Increased public understanding of the role of the HBCDEM Group, who it involves (including volunteers), who it collaborates with and how it works in the community before, during and after an emergency”.

The strategy makes provision for addressing advertising materials (e.g. radio, print advertising, and telephone directory), the CDEM Group website, branding, community engagement, and specific campaigns (e.g. Get Ready Week, the Shortest Disaster Movie).

The communications strategy was endorsed by the Joint Committee 6 years ago, and a funding policy was set, whereby TAs contribute to the budget based on a ratio-per head charge, and HBRC staff contribute their time in-kind (although some expenses have ended up being covered by the CDEM Group budget).

The strategy is routinely revised to ensure it remains current, and is “re-set” for each current year. However, a full review of the strategy has not been undertaken for a number of years. Consequently, the strategy still reflects a predominantly “mass communications” approach, and opportunities exist for extending the strategy to incorporate a greater variety of approaches and activities that can contribute to building resilience. Additionally the budget attached to the communications plan has not been revised since the development of the plan, and also needs to be reviewed.

In addition to the CDEM Group communication strategy, other organisations also have in-house strategies. The HBRC has a recently created a draft communications strategy/plan in March 2012 that sets out the HBRC communications team role alongside the CDEM communications strategy (i.e. how they contribute and what they do). The focus of the HBRC strategy/plan is around raising community awareness of risk and generating better preparedness for emergencies. The plan has three key messages:

- A disaster can happen at any time. Hawke’s Bay is most vulnerable to earthquakes, floods and tsunami.
- You need to know what to do and be prepared to cope in an emergency for up to three days.
- Look in the Yellow Pages inside cover for basic information or [www.hbemergency.govt.nz](http://www.hbemergency.govt.nz)

Further, the plan states that it is taking a strategic approach to achieve long term goals of the 4Rs whilst maintaining agility for new events and/or opportunities.

The plan outlines target audiences, which include the general public, school children, media, councillors, HBRC staff and the emergency management officers. Included in the plan is a list of risks which include:

- Information inconsistent between groups (assumption is that this means the TAs and the CDEM group)
- Too little information or lacking detail
- Information that is too technical or difficult to understand

There is a list of activities in the plan which includes hazards publications, media stories, utilising the Regional Council's publication "Our Place" for civil defence information, and the Get Ready Week .

The Regional Council's communications manager confirmed that a member of his staff had also received communications plans from each of the TAs regarding public education activities. For example, Napier City Council has a communication strategy focussed on its public education work programme. It is focused on recruitment of volunteers, siren evacuation and creation of collateral materials.

## **A2.7 HOW THE REVIEW IS DEPICTED**

Below (Table A 2.1) is a chart that outlines different communication, public education and resilience initiatives managed by the Hawke's Bay CDEM Group, Hawke's Bay Regional Council, territorial authority or a supporting agency. An outline of the initiative is given along with the resilience factor it likely targets.

**Table A 2.1** Review of select public education, communication and resilience strategies employed in the Hawke's Bay.

Activity	Type	Producer of resource/activity	Description	Key Messages/Themes	Target Audience	Resilience Factors <sup>4</sup>
Action/Reaction Computer Game	Interactive Web based Game	Hawke's Bay CDEM Group/ Hawke's Bay Regional Council	This computer simulation teaches the user about historical events in Hawke's Bay (1931, 1932 earthquakes, Cyclone Bola and floods), general hazard information for Hawke's Bay and how to respond to specific hazards like floods, ash fall, earthquakes and other scenarios. The game has three basic levels and the questions become more difficult as the player moves up a level. The last part of the game has specific preparedness messages for the home.  The game has been played by people all around New Zealand and has a broader popularity than just the Hawke's Bay region.	<ul style="list-style-type: none"> <li>Hazards specific to Hawke's Bay (flooding, earthquakes, volcanic ash, cyclones)</li> <li>How to respond to certain hazards such as not wading in flood waters, covering your mouth and eyes during a volcanic ash event, going indoors during cyclones.</li> <li>Preparedness messages include the "three days of food and water", looking at the back page of the Yellow Pages and a mention of the Get Ready, Get Thru campaign</li> </ul>	School children	Self-efficacy Critical awareness Outcome expectancy <sup>5</sup> Personal responsibility Promotes action coping (but does not have any interactive activities related to action coping)
The 2011 Shortest Disaster Movie Ever Competition	Online Movie Competition	Hawke's Bay CDEM Group/ Hawke's Bay Regional Council	This was a competition run by the Hawke's Bay CDEM Group to commemorate the Napier 1931 earthquake. The competition encouraged students to create a short movie about various disasters that could be experienced in the region. Topics included tsunami, floods and earthquakes.  The top videos were highlighted on the CDEM Group's website with a note that there will be another competition held in 2013. Students used dramatizations and live action capture methods for the filming. Students also worked with their communities to create the videos.	<ul style="list-style-type: none"> <li>Key themes were: what to do in an earthquake (drop, cover and hold) and what items people needed in case of emergencies. These included torches, food, and water for three days.</li> <li>The videos are streamed from YouTube.</li> </ul>	School children	Critical awareness Self-efficacy Outcome expectancy Articulating problems Promotes action coping (but does not have any interactive activities related to action coping) Community participation
CDEM Group Website	Website	Hawke's Bay CDEM Group/ Hawke's Bay Regional Council	The website is a fairly comprehensive information portal for hazards in Hawke's Bay, preparedness information, how to volunteer, emergency management/CDEM group structure, the Group Plan and social media linkages.  This website is fairly new and modern with navigation that is straight forward. It is easy to find information .	The Hazard information includes the Top 10 hazards in Hawke's Bay region and historical information regarding these hazards.  There is a comprehensive five step program on how to prepare for emergencies which includes: <ul style="list-style-type: none"> <li>Find out what could happen. Look under <a href="#">Hazards Information</a> for what to do in each type of emergency.</li> <li>Create a Household Emergency Plan. Look on the national <a href="#">Get Thru</a> website for a guide.</li> <li>Complete a Household Emergency Checklist Print off a checklist from the <a href="#">Get Thru</a> website.</li> <li>Have a Getaway Kit Look on the <a href="#">Get Thru</a> website for contents.</li> <li>Practice and maintain your plan with your family</li> </ul>	General public	Self-efficacy Critical awareness Positive Outcome expectancy Promotes action coping (but does not have any interactive activities related to action coping) Suggests how people might be able to participate, but is not considered participation in itself.

<sup>4</sup> These are suggested resilience factors built by the current activities, based on what is known from the research. More detailed discussion, research and analysis is required to adequately assess the true impact of the activities on the resilience factors.

<sup>5</sup> The general term "outcome expectancy" has been used as opposed to "positive outcome expectancy" or "Negative outcome expectancy" as more analysis would be required to identify which the activities might target.

Activity	Type	Producer of resource/activity	Description	Key Messages/Themes	Target Audience	Resilience Factors <sup>4</sup>
Hazards in Hawke's Bay	Book	Hawke's Bay Regional Council/CDEM Group	The book is a thorough account of various hazards in Hawke's Bay. At 64 pages long, it is a complete treatise on 12 different hazards in Hawke's Bay region. The book, first completed in 1999, has had two printings, with the most recent in 2007. A number of experts were consulted regarding this book. It includes information from the "Fix, Fasten, Forget" campaign managed by EQC, a section on risk management, the Get Ready, Get Thru household emergency checklist, a list of websites to find more information and a bibliography.	<p>This book focuses on the top hazards of the Hawke's Bay area which include:</p> <ul style="list-style-type: none"> <li>• <a href="#">Earthquake (includes liquefaction)</a></li> <li>• <a href="#">Human pandemic / infectious diseases</a></li> <li>• <a href="#">Flooding / heavy rainfall</a></li> <li>• <a href="#">Fire involving hazardous substances</a></li> <li>• <a href="#">Electricity failure</a></li> <li>• <a href="#">Pests or diseases affecting agriculture, forestry, or horticultural</a></li> <li>• <a href="#">Local Tsunami</a></li> <li>• <a href="#">Rural Wildfire</a></li> <li>• Hazardous chemical incident (release of fumes)</li> <li>• <a href="#">Coastal Erosion</a></li> </ul> <p>Each specific hazard section includes information regarding the actions people can take prior, during and after a specific hazard event, including pandemics and earthquakes.</p>	General Public	<p>Critical awareness</p> <p>Self-efficacy</p> <p>Outcome expectancy</p> <p>Promotes action coping (but does not have any interactive activities related to action coping)</p>
Wairoa District Council Website	Website	Wairoa District Council	<p>A link to the webpages for CDEM is located on the home page of the web, in the right hand column. Users need to click on the CD graphic and are sent to a page regarding Civil Defence issues.</p> <p>The page outlines what Wairoa's TA responsibilities are, CD staff and what they do (both paid and unpaid), and then there is a link to the CDEM Group's webpage to find out more. There is also a link to the Get Ready, Get Thru website to find out how to prepare for emergencies and a list of other documents relating to issues like food safety, Civil Defence sectors, flooding issues, and storing water for emergencies.</p>	Basic information refers most information back to the CDEM Group Website or the Get Ready, Get Thru website. There are contact details in the information section for the EMO.	General public	Refer to factors listed under the CDEM Group website or MCDEM Get Ready, Get Thru Campaign.
Central Hawke's Bay website	Website	Central Hawke's Bay District	<p>Civil Defence information appears as a part of the upper navigation bar on the right side. Three areas emerge when you click on the CD area: safety information, natural disasters and emergency services.</p> <p>The safety information is a series of four links, linking to: the Land Transport Safety Authority, Maritime New Zealand, New Zealand Food Safety Authority, Occupational Safety and Health Services.</p> <p>The natural disasters tab includes four paragraphs regarding how natural disasters occur anywhere in New Zealand and concludes that it is best to be prepared at all times. There is a link to MCDEM's website and to the Ministry of Agriculture and Forestry website.</p> <p>The final tab is about emergency services. This page links to 111 services, hospital information, fire, police, ambulance, civil defence and rural fire. There is no explanation regarding the difference between fire and rural fire services.</p>	<p>Basic information refers to the MCDEM website and has a list of emergency services contact number. This website does not use the resources of the Hawke's Bay CDEM Group and specific, local hazard information is not available.</p> <p>This website is mostly links to where people can get more information rather than providing that information for users.</p>	Residents	Refer to factors listed under the CDEM Group website or MCDEM Get Ready, Get Thru campaign.

Activity	Type	Producer of resource/activity	Description	Key Messages/Themes	Target Audience	Resilience Factors <sup>4</sup>
Napier City Council CDEM Volunteer Pack	Folder with Get Ready, Get Thru information Volunteer Handbook Application Forms Volunteer Brochure Vacancy Page	Napier City Council	<p>These packs were created recently and have a lot of useful information, both for prospective volunteers but also for residents in general. The Volunteer Handbook is a very thorough reference guide about health and safety issues volunteers may face, preparing for disasters and the roles and responsibilities of individual volunteers.</p> <p>The brochure is a smaller version of the handbook, with more generic information regarding the importance of volunteering and what it takes to become a CDEM volunteer.</p> <p>The application form is straight forward and easy to fill out. The vacancy page outlines specific available roles so prospective volunteers understand which roles they may wish to apply for.</p>	<p>Basic preparedness information</p> <p>Volunteer information</p> <p>Training information and health and safety guidelines.</p>	Prospective volunteers	<p>Self-efficacy</p> <p>Critical awareness</p> <p>Action coping</p> <p>Community participation</p> <p>Empowerment</p>
Napier City Council Website	Webpages	Napier City Council	<p>There are several ways to link to the Civil Defence webpages including a navigation tab on the left and a CD symbol on the right. The tab has seven links underneath the main tab.</p> <p>The website is fairly exhaustive when it comes to information regarding CD. There is a response area, where people can find out what the current situation is. Along with the response information, there is also historical hazard information</p> <p>There are multiple documents attached to the webpage, including the Get Ready, Get Thru checklist, brochure, Yellow Pages advert and the Hawke's Bay Region water storage brochure.</p> <p>There are seven hazards listed which are:</p> <ul style="list-style-type: none"> <li>• Volcanic</li> <li>• Tsunami</li> <li>• Pandemic</li> <li>• Earthquake</li> <li>• Flooding</li> <li>• Electricity Failure</li> <li>• Hazardous substances</li> </ul> <p>The Hazard Information is a rehash of what is on the HB CDEM Website but with some minor edits.</p> <p>There is a "Are you Prepared" section which provides advice on how to prepare at home. Evacuations, radio stations for emergency information and other civil defence related information.</p> <p>A section labelled Civil Defence Centres lists the centres, their locations, and an aerial photograph of the area. There is also a note at the side of each centre indicating the status of each location e.g. closed.</p> <p>There is also an extensive section regarding the public alerting system that indicates what kind of systems are in place.</p> <p>The list of links includes the Hawke's Bay CDEM Group website but is incorrectly labelled: Hawke's Bay Emergency.</p>	<p>This website is a very complete and thorough compilation of CDEM issues and information. The hazard sections are significant and include multiple scenarios. The volunteering section provides a good overview of responsibilities and roles for that group.</p> <p>Each section is fairly well laid out. It is easy to find out information with this layout.</p> <p>One drawback is that there are few linkages to the Group website and the graphics, while somewhat reflective of CDEM, is limited to the Napier City branding.</p>	General Public	<p>Self-efficacy</p> <p>Critical awareness</p> <p>Outcome expectancy</p> <p>Promotes action coping</p> <p>Promotes community participation</p>

Activity	Type	Producer of resource/activity	Description	Key Messages/Themes	Target Audience	Resilience Factors <sup>4</sup>
Hastings District Council Website	Webpages	Hastings District Council	There are no links on the home page directly related to CDEM. There is a link at the bottom of the page for emergencies. There is also a tab on the front navigation bar that is "Services". That page has a link at the bottom under emergencies. That information includes fire/rural fire and CDEM issues. On the CDEM webpage is some information about the CDEM management for the district and some links to the Group website and other related agencies like the MetService, GeoNet, Maritime New Zealand, Get Ready, Get Thru, GNS Science and What's the Plan Stan.	This website, while easy to navigate, is very light on information regarding CDEM issues. There are no main links from the home page to the CDEM section and very little information overall. This may be because the HB CDEM Group website is sufficiently thorough.	General Public	Refer to factors listed under the CDEM Group website or MCDEM Get Ready, Get Thru Campaign.
Writing Pad	Writing Pad	Napier City Council	This pad has basic information regarding where to find information about emergencies on the internet and the radio.	Website and Radio Information	General public	Critical awareness
Bookmarks	Bookmarks	Napier City Council	These bookmarks are colourful and designed using the What's the Plan, Stan? Graphic design scheme. The bookmarks provide good generic hazard information for students. The EMO mentioned that these were very popular, more popular than she had anticipated.	Hazard information from What's the Plan, Stan? Campaign. Specifically focused on earthquakes, storms, tsunami and flooding. Includes basic preparedness messages	School children	Self-efficacy Critical awareness
Personal Information Card	Card	Napier City Council	These cards, when folded up are credit card sized and fit nicely into a wallet. The information here is fairly comprehensive and includes a mini emergency response plan, contact information, text information, radio and other important response information.	Emergency contact, text information, emergency plan and other important response information	General public	Promotes action coping
Evacuation Drills (Get Ready, Get Thru the Vines, Napier City)	Tsunami Evacuation drill	Napier City Council, Hastings District Council	This event started in December 2009. Along with the evacuation, information booths were set up at the local school regarding how to prepare for emergencies. A similar drill is held every year in Napier. A survey is taken at that time by organisers to determine the effectiveness of their campaign.	Tsunami evacuation drill and public education.	People living near tsunami risk zones.	Self-efficacy Critical awareness Outcome expectancy Action coping Community participation Articulating problems Empowerment
Flyers/Posters	Posters	CDEM Group/ HBRC/Local	These have been created sporadically depending on budget and initiatives. These include flags for CD projects.	Get Ready, Get Thru branding. Can be used as event identifiers	General public	Critical awareness
Car plastic bags	Car plastic bags	Hastings District Council	This bag has information regarding emergency radio stations on the exterior and the Get Ready, Get Thru logo. The other side has "Keep Hastings Beautiful" information.	Emergency radio information	General public	Critical awareness
MCDEM What's the Plan, Stan	Education resource	National	This education resource was released in 2006. The resource includes a binder with DVDs and other activities that teachers can use to engage with students.	The guide includes: <ul style="list-style-type: none"> <li>unit plans, activities and ideas to increase students' confidence in emergency planning and practice</li> <li>fact sheets about different types of disasters</li> <li>simulation and practice activities that involve the school and community agencies</li> <li>information about the roles of principals, Boards of Trustees and the community agencies</li> <li>templates for the activities and suggested resources including books and websites.</li> <li>DVDs</li> </ul>	School children	Self-efficacy Critical awareness Action coping Community participation

Activity	Type	Producer of resource/activity	Description	Key Messages/Themes	Target Audience	Resilience Factors <sup>4</sup>
MCDEM Get Ready, Get Thru (Get Ready, Get Thru Week)	National public education campaign	National	<p>Every year a Get Ready, Get Thru week is held, and the CDEM Group develop a plan on how they will approach the week. Shake Out will be the focus for 2012's Get Ready, Get Thru week. Media articles are planned and the CDEM group are planning on meeting to discuss other opportunities regarding this campaign. The Get Ready, Get Thru Campaign began in 2006.</p> <p>The Get Ready Get Thru television, radio and online campaign focuses on raising awareness of the hazards in New Zealand and increasing the levels of preparedness to cope with disasters when they happen. The key message is that individuals and families can take some simple steps to be prepared to look after themselves and their families so they are better able to deal with the impact and recover quickly.</p> <p>This campaign focuses very much on the 'what to do' and 'how to prepare' rather than hazard specific information. Recently, a "drop, cover, hold" video campaign was produced but this was more response focused rather than hazard information.</p> <p>Local and regional campaigns align every year to support this national week. Collateral material includes shopping bags and other items. Radio campaigns are run in support of this initiative, usually facilitated by the CDEM Group.</p>	<p>Get Ready, Get Thru messages. This messaging includes:</p> <ul style="list-style-type: none"> <li>• "This could happen in New Zealand";</li> <li>• "If you've seen the news, you know why you should be prepared";</li> <li>• "In a major disaster there could be too many people affected and not enough rescuers";</li> <li>• "You could be at work, you could be anywhere when disaster strikes."</li> <li>• "No power, no phones... in a disaster, would you get thru?"</li> <li>• "Chris and his family have survived a major disaster because he and his family knew what to do and they were ready".</li> <li>• ShakeOut Drill.</li> </ul>	General public	<p>Get Ready Get Thru Campaign:</p> <ul style="list-style-type: none"> <li>Self-efficacy</li> <li>Critical awareness</li> <li>Outcome expectancy</li> <li>Promotes action coping</li> </ul> <p>ShakeOut drill (as above but including):</p> <ul style="list-style-type: none"> <li>Action coping</li> <li>Community participation</li> <li>Empowerment</li> </ul>
CDEM Group Pens	Pen (with pull out paper)	Hawke's Bay CDEM Group	<ul style="list-style-type: none"> <li>• This pen has a small flyer that can be pulled out. The messages include:</li> <li>• Disasters can happen at any time and that you could be anywhere. You need to be able to look after yourself in emergencies.</li> <li>• To enable you to Get Ready to Get Thru, you should have: <ul style="list-style-type: none"> <li>○ A household plan</li> <li>○ Food and water for three days</li> <li>○ Radio, torch and other essential items</li> </ul> </li> </ul> <p>There is then contact information for the Hawke's Bay Regional Council.</p>	Basic Get Ready, Get Thru themes. The wording is "you" focused, appealing to the individual preparedness level rather than a community or family level.	General Public	<ul style="list-style-type: none"> <li>Self-efficacy</li> <li>Critical awareness</li> <li>Personal responsibility</li> <li>Promotes action coping</li> </ul>
Yellow Pages	One page in the Yellow Pages	Hawke's Bay CDEM Group/ Hawke's Bay Regional Council	Advertisement from MCDEM	This advert includes national hazard information, evacuation information and how to prepare for emergencies. This is a national advert so no local information is given.		<ul style="list-style-type: none"> <li>Self-efficacy</li> <li>Critical awareness</li> <li>Promotes action coping</li> </ul>
Radio	Radio advertising	Hawke's Bay CDEM Group/ Hawke's Bay Regional Council	Various messages (e.g. advocating preparedness, or advertising relevant events)	Get Ready, Get Thru themes. Promotion of events.	General public	<ul style="list-style-type: none"> <li>Self-efficacy</li> <li>Critical awareness</li> <li>Promotes action coping</li> </ul>





## **A2.8 COMMUNITY EMERGENCY PLANNING**

Community Emergency Planning involves engaging with the community to determine emergency evacuation and response prior to events. This type of community engagement is becoming increasingly popular in the Hawke's Bay region. Hastings District Council has been working in on this kind of engagement for approximately two years and has had good levels of engagement with the community. Community Emergency Planning is still relatively new to emergency management, with MCDEM beginning to promote its use over the last year.

## **A2.9 CONCLUDING COMMENTS ABOUT THE REVIEW**

### **A2.9.1 Predominant public education, communication, and resilience activities in Hawke's Bay**

Currently the major focus of resources appears to be on developing marketing collateral, mass communication initiatives, evacuation drills, and volunteer recruitment. This has shifted from a more hazards based focus within the regional council to a local level. The local TA level appears to have strengthened over time with the regional council activities continuing with few linkages, other than basic branding.

### **A2.9.2 Roles and responsibilities**

There appears to be a clear understanding currently of the Regional Council's communications teams and the local authority responsibility. The Regional Council team linking with the CDEM Group is responsible for mass communications regarding larger initiatives including National Disaster Awareness Week, and during emergencies. The local authorities are responsible for local initiatives like volunteer recruitment, local evacuation drills and community based projects.

The approach of having one regional body overseeing communication, and local bodies undertaking local activities, has seen some success, especially with respect to sharing of communication resources. However, a number of local public education and community based resilience projects have been done in isolation from other geographic areas, and a more coordinated approach with respect to local projects would be beneficial both in terms of cost and sharing of ideas. Some TAs have complete public education strategies and plans whilst others are struggling. This can create inconsistencies in message delivery and design which could be confusing to members of the public. Coordination would assist with effective planning and public education. Individual relationships amongst the EMOs are positive and as a consequence there is a good basis to increase this coordination. Current plans and strategies should be reviewed to see how a better coordinated effort can be created.

### **A2.9.3 Advantages in Hawke's Bay**

Hawke's Bay has several key advantages that will be crucial for the future success of any community resilience project:

- The region has a memorable and historical earthquake event which damaged large parts of the region in the 1930s. This earthquake and the resulting Art Deco architecture have made Napier City famous throughout New Zealand and internationally. By shifting the negative consequences of the earthquake into an opportunity for celebrating the unique attributes of the area, Napier and Hawke's Bay have a 'sense of place' vital to building community resilience.

- The region has experienced significant floods last year and an armed siege in 2009, in which CDEM played an integral part. Due to the high rate of emergency events, Hawke's Bay CDEM Group has very well trained and competent emergency managers, both at the local and regional level. This small group of individuals has been working diligently to "get the word out" regarding preparing for emergencies.
- From the interviews of external agencies, it is clear that the CDEM Group has the support of other agencies outside the TAs and Regional Council to perform region wide community resilience projects.
- From a research perspective, the Hawke's Bay region also has historical data regarding levels of community resilience and this data provides an excellent research platform from which projects can be monitored and evaluated for effectiveness.

#### **A2.9.4 What is working well and what is well covered**

A number of initiatives undertaken as part of current public education, communications and resilience-building are well covered:

- Web initiatives from the CDEM Group and Napier City are thorough regarding content. The other districts would benefit from more information, even if this information is mirrored on the Hawke' Bay CDEM Group website. While this might be duplication of effort in some instances, many web users do not like to "click" through to other websites.
- Hazards information is comprehensive and accessible. The Hazard Analyst at the Hawke's Bay Regional Council has been very diligent and has taken a strategic approach to understanding and communicating hazards to the general public. Her plan is based on a 10 year overarching structure that has been followed strictly. The only issue with the hazards information is that work could be done to make some information more digestible and easier for members of the public to obtain. It would be recommended that the flow of hazard information through to communication and participatory activities are aligned as a part of a greater strategy.
- Collateral Material. With pens, posters, bookmarks, emergency contact cards and other printed material, there appears to be a good amount of marketing items available in Hawke's Bay. These items have a good consistency of design and messaging that crosses the TA borders and could be used throughout the region. Basic preparedness and hazards information appears to be well covered in these approaches.
- Volunteers are an important component for some of the TAs. These programmes appear to be quite successful and media campaigns regarding recruitment of volunteers had good coverage.

#### **A2.9.5 Resilience factors or 'indicators' that are being addressed by the current activities**

Current CDEM initiatives are predominantly focused on giving sound messages to the community about what to expect in terms of hazard events in Hawke's Bay and how to prepare. These initiatives are likely to be predominantly influencing factors such as self-efficacy, critical awareness, outcome expectancy, and promoting action coping.

While some activities do take place which influence the remaining factors, these are less common place. Areas that require further attention in future include ensuring significant levels of community participation, providing forums at which people can talk about and solve

problems, building a sense of community and attachment to place, developing collective efficacy, ensuring community members are empowered to prepare and respond, and building trust. Developing ways to enhance psychological preparedness should also be factored into any future resilience programmes.

Resilience measurements for Hawke's Bay reflect the above observations (see Appendix A for details of the measurements). As most factors are only recorded at low-moderate levels, the implications are that the current public education programme is only targeting a narrow range of factors.

#### **A2.9.6 Specific gaps in activities**

There appears to be no initiatives or materials to address business preparedness or continuity. This is not an uncommon gap among many CDEM public education campaigns because there are no national resources on business continuity planning to support small to medium businesses or large corporations. Businesses are a fundamental component of communities and have unique needs in emergencies. Initiatives in this space would be helpful in addressing this gap.

On undertaking the review the main activities that were mentioned included those related specifically to CDEM. Other activities undertaken by other organisations that may be considered useful in building resilience (e.g. DHB activities) were not usually highlighted by staff working in the CDEM sector. It is possible that, while important, these activities are not currently considered part of CDEM resilience-building, and that opportunities exist for making partnerships with other organisations that also have a focus on resilience. In particular, there is no wider strategy on how CDEM will work with other relevant sectors or how messages can be incorporated within other organisations' communications. For instance, utilising the Safer City initiative or working closer with the Hawke's Bay District Health Board or the Ministry of Social Development to incorporate emergency preparedness messages within current related campaigns e.g. pandemic or flu communications might be another way to disseminate information.

Community engagement and working with more community based agencies like the Ministry of Social Development at a grass roots level could be a good initiative. Those organisations that specialise in community development could be consulted on best practice in Hawke's Bay regarding development and delivery of services.

Aligning CDEM key messages and activities with large events in the region would also be a good opportunity to build community resilience. The Napier Art Deco week would be an ideal event for the CDEM group to assist in getting key messages regarding earthquake preparedness into discussion amongst festival goers.

With respect to tourist information, there appears to be little or no outreach when it comes to educating tourists regarding the various risks in Hawke's Bay region. Tourism is an important component of the economy in the region and it would be beneficial to liaise with tourist operators to develop a strategy to assist in educating tourists.



### **APPENDIX 3: NOTES FROM THE RESILIENCE WORKSHOP HELD ON 15 JUNE 2012**

The format of the workshop was based on presentations regarding resilience research, by Dr. Julia Becker. After this, facilitated break out group sessions discussed projects that were already being undertaken by groups, including councils, that led to heightened resilience and then the groups discussed potential future projects. Table A 3.1 provides a summary of notes from the resilience workshop.



**Table A 3.1** Summary of notes from the resilience workshop held on 15 June 2012.

Group	Key Messages	Initiatives	Factors Addressed	Measurement and Evaluation	Issues outside structure
1.		<ol style="list-style-type: none"> <li>Building resilience through increasing numbers of trained community volunteers</li> <li>Develop a close working relations with community groups: <ul style="list-style-type: none"> <li>Retirement Villages</li> <li>Deaf Association</li> <li>Emergency Services</li> <li>Council Dept</li> <li>Neighbourhood Support</li> </ul> </li> <li>Producing a 'how to' guide to simplify the message: a dummies guide to being prepared</li> <li>Coordinating a network of support organisations to enable lower socio economic groups to become more resilient during early stages of an emergency.</li> <li>Siren testing at change to daylight saving with a survey.</li> <li>Annual event including an open day. Fire, Police, Coastguard and other emergency services invited.</li> </ol>	<ol style="list-style-type: none"> <li>Public education on the importance of preparedness</li> <li>Managing people's expectations in the wake of a disaster</li> <li>Developing a level of trust within a community</li> </ol>	<ol style="list-style-type: none"> <li>Annual council survey, includes satisfaction levels of CD organisation</li> <li>Siren survey</li> <li>Feedback on webpages on issues involved CD</li> <li>Phone calls received, both good and bad</li> <li>Councils quarterly reporting</li> </ol>	<ol style="list-style-type: none"> <li>More information on hazards</li> <li>Where to find information on hazards</li> <li>What more could be done with a greater level of resources.</li> </ol>
2.	<ol style="list-style-type: none"> <li>Our community needs to be prepared: <ul style="list-style-type: none"> <li>Get Ready, Get Thru</li> <li>Business continuity</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>Focussed set of consistent messages</li> <li>Identify the community groups/business groups which can deliver the message</li> <li>Quantify what's in it for them</li> <li>Taking advantage of opportunities to promote the message</li> <li>Trained volunteers to deliver appropriate messages</li> <li>Develop sustainable and resourced programmes of public education outcomes.</li> </ol>	<ol style="list-style-type: none"> <li>Evaluate the audience and tailor the messages to tem</li> <li>Identify ways to measure success</li> </ol>		
3.		<ol style="list-style-type: none"> <li>Mahunga Tsunami Evacuation Mapping (positive outcomes)</li> <li>Education at junior level in schools (priority?)</li> <li>Community groups</li> <li>Evacuation planning</li> <li>Community Development Planning</li> <li>Business Continuity plans for SMEs, MLEs, sole traders</li> <li>Working with other emergency services and community leadership.</li> <li>Working in community events: Lake to Lighthouse, Wairoa A and P Show</li> </ol>		<p>Wairoa District Council Annual survey Word of mouth LTP consultation</p>	
4.		<ol style="list-style-type: none"> <li>Schools: engagement, education and evacuation planning</li> <li>Early Childhood Education Planning</li> <li>Community response planning</li> <li>Volunteer Engagement</li> <li>Rural Fire Volunteers</li> <li>Community Groups</li> <li>Safer Communities</li> <li>Relationship with Taiwhenua</li> <li>Neighbourhood Support</li> <li>Community patrols</li> </ol>			



Community Resilience Projects	Activity	Indicator	Measurement	Gaps	
1.	1. Community Response Planning	<ul style="list-style-type: none"> <li>• Self-efficacy</li> <li>• Critical awareness</li> <li>• Positive outcome expectancy</li> <li>• Negative Outcome Expectancy</li> <li>• Action Coping</li> <li>• Community participation</li> <li>• Articulating problems</li> <li>• Empowerment</li> <li>• Social norms</li> <li>• Trust</li> </ul>	<ul style="list-style-type: none"> <li>• Surveys</li> <li>• Level of engagement and participation</li> <li>• Observations</li> </ul>	<ul style="list-style-type: none"> <li>• Consistency is necessary however local strengths and unique skillsets and community needs should be taken into account.</li> <li>• A consistent tool to report and measure success for all projects involved.</li> </ul>	
	1. ECE 2. Schools	All above indicators	<ul style="list-style-type: none"> <li>• Levels of engagement</li> <li>• Observations</li> </ul>	<ul style="list-style-type: none"> <li>• Develop measurements of progress</li> </ul>	
	1. Safer Communities	As above All factors/indicators	<ul style="list-style-type: none"> <li>• Agency measures e.g. Police</li> </ul>		
2.	1. Communication: <ul style="list-style-type: none"> <li>• Radios</li> <li>• Website</li> <li>• Talks/Visits</li> <li>• Presentations/Displays</li> <li>• Newspapers (ads, media, editorial)</li> <li>• Collateral material</li> <li>• Community engagement</li> <li>• Get Ready, Get Thru Campaign</li> </ul>	Self-efficacy Empowerment Critical awareness Negative Outcome Expectancy Action Coping Community Participation Articulating problems Empowerment	<ul style="list-style-type: none"> <li>• Exercises</li> <li>• Surveys</li> <li>• Shakeout</li> <li>• Annual Plan input</li> <li>• District Plan</li> </ul>	Inputs: <ul style="list-style-type: none"> <li>• Research</li> <li>• Hazard Awareness</li> <li>• Enquiry</li> </ul>	
3.	1. Strategy buy-in and agreement by CEG and joint committee 2. Public education 3. Consistent engagement strategy with business. 4. More cohesive and partnership based approach with other organisations and councils. 5. Develop community response planning		Indicators: Volunteers/engagement School/class visits ‘Outcome’ achievement vs. output? Priority community engagement – community response plan uptake Surveys Colmar Brunton research-national comparison and regional Safer communities programmes “Shortest ever disaster movie” Use/promo of What’s the Plan, Stan?		



[www.gns.cri.nz](http://www.gns.cri.nz)

#### Principal Location

1 Fairway Drive  
Avalon  
PO Box 30368  
Lower Hutt  
New Zealand  
T +64-4-570 1444  
F +64-4-570 4600

#### Other Locations

Dunedin Research Centre  
764 Cumberland Street  
Private Bag 1930  
Dunedin  
New Zealand  
T +64-3-477 4050  
F +64-3-477 5232

Wairakei Research Centre  
114 Karetoto Road  
Wairakei  
Private Bag 2000, Taupo  
New Zealand  
T +64-7-374 8211  
F +64-7-374 8199

National Isotope Centre  
30 Gracefield Road  
PO Box 31312  
Lower Hutt  
New Zealand  
T +64-4-570 1444  
F +64-4-570 4657