MARLBOROUGH REGIONAL RESILIENCE ANALYSIS

Marlborough Emergency Management Group
Te Rākau Whakamarumaru o Wairau

TE KOTAHI O TE TAUIHU
Charitable Trust

toa consulting

TABLE OF CONTENT

PROJECT INTRODUCTION

Introduction

Over the past ten years, the Marlborough Region has experienced numerous emergencies created by natural, biological, technological, and human hazards. These events include the 2013 Seddon earthquake, the 2016 Kaikōura earthquake, the 2019 COVID-19 Pandemic, and the 2021 and 2022 severe weather events.

The region's ability to get through these events has not only relied on the efforts of response organisations across the 4Rs (readiness, reduction, response, and recovery) but on levels of personal, whānau, organisational and community disaster resilience in Marlborough.

As noted by a project participant, individuals' 'resilience banks' in New Zealand are already in overdraft. It is important to note that aside from continuing to manage the implications and recovery from recent severe weather events, such as the result of the Marlborough Sounds Future Access Study, external factors such as the 'cost of living crisis' continue to draw down on personal, whānau, organisational and community disaster resilience in the region.

"...Resilience banks are already in overdraft..."

[Social resilience workshop participant]

Disaster resilience in New Zealand is guided by the National Disaster Resilience Strategy (NDRS), which outlines the vision and long-term goals for Civil Defence Emergency Management (CDEM) in New Zealand, and the objectives to be pursued to meet those goals. It sets out what the government expects in terms of a disaster-resilient New Zealand, and what we want to achieve over the next 10 years. The strategy came into effect on 10 April 2019 and replaces the previous National Civil Defence Emergency Management Strategy.

Marlborough Emergency Management (hereafter referred to as '**Marlborough EM**') has already been working to enhance resilience across the region, including (but not limited to) the projects listed below. The Marlborough EM however faces significant challenges in meeting the objectives of the NDRS in the context of other work required of the organisation.

A strategic approach is therefore required to identify how disaster resilience can be built in Marlborough considering community appetite, stakeholder needs, the ongoing work programme and the objectives of the NDRS.

This project aims to take a strategic approach to increasing the disaster resilience of individuals, whānau, communities and organisations in Marlborough.

The project sits across the priorities of the NDRS with particular emphasis on the more strategic objectives, including (but not limited to) objectives 1-6. The project has involved a wide range of stakeholders to inform future resilience activities including private organisations, response partners, geographic communities, and a community of interest.

The report which follows details the regional and local context of Marlborough and presents the results of stakeholder and community engagement with the aim of informing the development of a regional resilience development strategy and work programme.

Past and present community resilience activities in Marlborough:

- Working with local communities to develop Community Response Plans.
- Public education and engagement with local community groups for example church groups, non-for-profit organisations (e.g., Lions Clubs, Age concern) and clued-up kids.
- Supporting community-run events to increase community connectedness.
- Business continuity support in conjunction with Resilient Organisations.
- Outreach activities with large employers, RSE accommodation providers and disability service providers.

What is resilience?

This project has adopted the NDRS definition of resilience as:

"... the ability to anticipate and resist disruptive events, minimise adverse impacts, respond effectively, maintain or recover functionality, and adapt in a way that allows for learning and thriving."

The NDRS further summarises this definition:

"... it's about developing a wide zone of tolerance – the ability to remain effective across a range of future conditions."

Further to this definition, resilience can be viewed across environments or capitals (social, cultural, economic, built, and natural) and at individual, community, and societal levels.

Factors which contribute to resilience can also be nuanced, subjective and difficult to measure, influenced by factors, such as perception of risk, sense of place, beliefs, culture, social norms, social cohesion, power, marginalisation and cultural identity.

The following table (pg.6) summarises factors which enhance or contribute to resilience at the individual, community, and societal level. These are informed by several case studies into community perceptions of resilience following the 2011 Canterbury earthquake sequence and the 1999 and 2011 earthquakes in Turkey.

Overall, social connection and the availability of community infrastructure (organisations, marae, community leaders) that foster social connection are common factors which enhance individual and community resilience. Of note is that the resilience factors identified below mostly relate to the social environment, with fewer relating to either the economic, the built, or the natural environments.

Marlborough Sounds
Source: Pelorus Mail Boat

Case studies: What factors were attributed to [a] disaster resilient...

[identified by communities affected by the COVID-19 Pandemic, 2011 Canterbury earthquakes, and 1999 and 2011 Earthquakes in Turkey]

Individual

- Self-activation, self-sufficiency, self-responsibility and self-management[1]
- Wellbeing (incl. mental and spiritual wellbeing) of individuals and whānau[2]
- Attitude, outlook, physical mobility, sociability, and connectedness with others[1,4]
- Helping and supporting others[1]
- Having an outdoor lifestyle or have taken part in outdoor leadership or survival programmes or having survival skills[1,2]
- Those 'used to hardship', e.g., poverty [2,4]
- Being content with scarce resources[4]
- Involvement in voluntary organisations[1]
- Being a trade worker[1]
- Gender[4]
- Education[4]
- Religious faith[4]
- Having hazard risk awareness[4]
- Being prepared[4]
- Having disaster experience[4]
- Financial resources of individuals and/or families (incl. having insurance for catastrophes)[4]
- External support being available[8]
- Opportunities to connect with others, e.g., local events in accessible venues[8]

Iwi and Māori

- Māori Kaupapa[6,8] including:
  - Kotahitanga (unity)[6]
  - Aroha[8]
  - Whānau (family)[6]
  - Whakapapa (genealogy, family connectedness)[6]
  - Whanaunatanga (relationships)[6]
  - Whakawhanaunatanga (process of establishing relationships)[8]
  - Marae (community centres)[6]
  - Manaakitanga 6 (respect/ support/hospitality)[6]
  - Kaitiakitanga (guardianship)[6,10]
  - Kanohi-ki-te-kanohi or kanohi kitea approaches[7]
  - Māoritanga (drawing on the strength of being Māori)[8]
  - Personal and whanau history of need for self-sufficiency[7]
- Cultural acceptance and normalisation of 'upheaval' (e.g., in peace time to attend tangi)[7]
- Use of Rāhui (for example, during the COVID-19 pandemic Rāhui almost acted as a risk communication tool which helped reduce hazard exposure during the event. Individual communities used Rāhui, e.g., Murupara, and the government were perceived to use Rāhui during the level 4 lockdown)[9]
- Collective response and resilience efforts between Māori-led organisations and non-Māori[8]

**These factors are based on Māori values and cultural practises, however events such as the Canterbury Earthquakes in 2011 show their application have whole-of-community benefits across disaster resilience, response, and recovery.*

Community

- Self-activation, self-sufficiency, self-responsibility, and self-management[1]
- Social connectedness between individuals, whānau, neighbours, and a sense of community (connection established pre-earthquakes helped with sustaining connection through a long recovery)[1,2]
- Strong pre-existing community infrastructure e.g., community organisations, marae, local leaders[2,8]
- Extent of community infrastructure, personal property damage and accessibility[1,8]
- Community connectedness through formal pre-existing groups[1,8]
- In marae communities, whānau and whakapapa relationships were key[2].
- Community participation in disaster response and recovery2[,8]
- Consistency and stability in applying cultural values and practises in marae communities[2]
- Having disaster experience in the community[4]
- Social solidarity and mutual trust[4]
- Community engagement in official decisions[8]

Society

- External support from societal agencies, e.g., funding, practical support and advocacy[2]
- Exacerbation of existing hardships[2] (a barrier to resilience)
- Official agencies having strong links to the communities they serve[2]
- Collaboration in the development of official disaster plans in systems with communities to consider diverse needs[2]
- Collaboration between stakeholders in disaster risk management[4]
- Having an effective information dissemination network/system[4]
- Effective provision of post disaster aid and services[4]
- Provision of shelter and accommodation following an event[4]
- Having hazard risk awareness and preparedness[4]
- Having moral and cultural traditional values[4]
- Having financial resources for training programs and hazard mitigation[4]
- Earthquake resistant buildings and transportation networks[4]

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The governance of resilience

CDEM Groups are a consortium of local authorities, emergency services, lifeline utilities, welfare service agencies, local branches of government agencies, NGOs, and community groups.

Within each Group, several committees govern the strategic and operational direction of the Marlborough EM work programme, including resilience-building initiatives. These Groups work across the 4Rs (Reduction, Readiness, Response and Recovery) and activate in response outside of normal meeting arrangements to guide strategic, operational, and tactical activities. The **role of each committee** in building disaster resilience is explained below:

CDEM Joint Committee (JC)

The Joint Committee provides governance to Marlborough EM and holds the statutory responsibility for CDEM in its area. The Joint Committee therefore has the ultimate responsibility for ensuring that the local authority and communities are adequately prepared for disasters. This includes:

- Providing the strategic direction to Marlborough EM for building disaster resilience within the region.
- Ensuring Marlborough EM is appropriately resourced to deliver on its work programme, including resilience-building initiatives.

As Marlborough is a Unitary Authority, the Assets and Services Committee is utilised to fulfil the function of a Joint Committee for the region.

Coordinating Executive Group (CEG)

The Coordinating Executive Group comprises of senior representatives of local authorities and CDEM member organisations, and is responsible for the implementation, development, maintenance, and evaluation of the Marlborough EM Group Plan and work programme.

This includes ensuring Marlborough EM is working with communities to build resilience in the region through the objectives of the Group Plan and work programme, and as members of the CDEM Group committing resources to collaboratively deliver and support resilience-building initiatives.

Welfare Coordination Group (WCG)

The Marlborough Welfare Coordination Group is a collection of welfare agencies that work together to provide coordinated planning and delivery of welfare services in an emergency. Opportunities within the WCG to contribute to resilience initiatives include identifying collaboration opportunities and supporting the delivery of the CDEM work programme where possible.

Lifeline Utility Group (LUG)

Lifeline utilities are entities that provide infrastructure services to the community such as water, wastewater, transport, energy, and telecommunications.

The Marlborough Lifeline Utilities Group meets to exchange information about their risk management processes and their readiness and response arrangements. This includes understanding regional vulnerabilities and interdependencies. Hazard mitigation opportunities (resilience-building) that have a collective benefit may also be identified through the LUG.

Legislative levers

The following statutes are relevant to building disaster resilience in New Zealand. Other legislation such as the Resource Management Act (1991), Building Act (2004) and Local Government Act (2002) show links to disaster resilience, promoting sustainable management and development with the aim of providing for social, economic, cultural, and environmental wellbeing as well as health and safety[1].

National strategies and legislation

The CDEM Act 2022

The proposed
Emergency Management Bill

National Disaster Resilience Strategy (2019)

The **CDEM Act 2002** seeks to improve and promote the sustainable management of hazards in a way that contributes the social, economic, cultural and environmental wellbeing and safety of the public and also to the protection of property.

The ***proposed*** **Emergency Management Bill** seeks to:

- Improve the resilience of New Zealand's infrastructure and infrastructure services before, during, and after an emergency.
- Align with the National Disaster Resilience Strategy (NDRS) as secondary legislation.

The **NDRS**'s vision is "New Zealand is a disaster resilient nation that acts proactively to manage risks and build resilience in a way that contributes to the wellbeing and prosperity of all New Zealanders".

Central Government policies

National CDEM Plan 2015

Guide to the National CDEM Plan 2015

The **National Civil Defence Emergency Management Plan 2015** sets out the roles and responsibilities of everyone involved in reducing risks and preparing for, responding to and recovering from emergencies. This includes central and local government, lifeline utilities, emergency services and non-government organisations.

Local Government plans and arrangements

CDEM Group Plans and local arrangements
e.g. Proposed Marlborough Environment Plan

Government agency operational plans

Non-Government agency operational plans

The **Marlborough CDEM Group Plan** is currently under review. The intention for the next iteration of the plan is to integrate the direction of the NDRS and resilience building activities across the Group Plan objectives.

Two chapters of the **Proposed Marlborough Environment Plan (PMEP)** are strongly linked to disaster resilience, being the 'Natural Hazards' and 'Climate Change' chapters. The PMEP outlines how Marlborough District Council is actively discouraging and controlling development in land vulnerable to significant flood or liquefaction, informed by the development of hazard overlays for these hazards. Four overarching objectives within the PMEP work to build community resilience to natural hazard events and climate change (Objectives 11.1, 11.2, 19.1, 19.2).

1 Saunders, W., & Becker, J. (2015). A discussion of resilience and sustainability: Land use planning recovery from the Canterbury earthquake sequence, New Zealand. *International Journal of Disaster Risk Reduction*, 14(1), 73-81, https://doi.org/10.1016/j.ijdrr.2015.01.013

Current and future influences on resilience

Climate change

It is predicted that over time the region will see increased mean air temperatures, leading to more droughts and increased wildfire risk. By 2040 it is expected that this increase could be as much as 1 degree Celsius.

The changing regional climate has already seen less rainfall occurring in coastal areas, particularly on the eastern coast. Inland areas will very likely see higher-intensity rainfall events in the future, particularly in the high country.

The impacts of climate change are already being observed within the marine environment. In the last several years New Zealand has suffered from marine heatwaves, with summer sea temperatures several degrees above normal, impacting Salmon farming within the Marlborough Sounds. Continued increased sea temperatures in future years are likely to significantly impact the aquaculture industry within the region.

Cost of living increases

Annual living costs are increasing within New Zealand. Many basic goods and services have seen large increases over the past several years, particularly following supply issues during the COVID-19 epidemic. Many more families within the region are utilising food banks, despite having a family member in full-time employment.

With wages not likely to increase at the same rate as the cost of living, there is a risk that many more living within the region will become reliant upon support to meet their everyday living costs. This may imply lower stocks of food and basic essentials in households, increasing the number and urgency of people requiring support with household goods and services during an emergency.

Increasing elderly population

Over a quarter of the population of the Marlborough region is over 65 years of age, which is amongst the highest level within New Zealand. This changing demographic means there will be an increased reliance upon public services for the everyday needs of this group. This may also contribute to a lack of workers to fill vacancies within the region, where labour shortages have already been observed within key industries.

Increasing tech reliance

Society is now hugely dependent upon technology to support our everyday lives. Smartphones have become critical to communication, particularly in younger demographics and traditional communication methods are now seen as obsolete. In addition, electric cars are increasing in numbers and huge investment is being seen within this sector. Many of the tech innovations that are currently part of everyday life are hugely dependent upon critical infrastructure and could easily see failures during events. There are opportunities to leverage advancing technologies when building resilience as well as a need to remind users that power and internet may not be available during an emergency.

Dependency upon single industries

The Marlborough region is hugely dependent upon two key industries for most of its employment; aquaculture and viticulture. Both these industries contribute to the regional tourism industry and could significantly suffer from future events. One in four people within the region are employed within the viticulture industry and associated services, so any impacts to this sector would see widespread financial impacts to not only the population, but also to local government. The lack of diversity within the region economically poses a significant future risk to resilience, particularly with both sectors likely to be impacted by climate change or significant emergency events such as flooding or pests.

Project methodology

To the authors knowledge, this is the first Regional Resilience Analysis project to be conducted by a CDEM Group in New Zealand. It has therefore been important to record the project methodology, should other CDEM Groups wish to undertake a similar project – a key principle of the Resilience Fund is to enable other CDEM Groups and organisations to benefit from Resilience Fund projects.

Project principles

This project has adopted the guiding principles of the NDRS:

- **Manaakitanga**: We respect and care for others.
- **Whanaungatanga, kotahitanga**: We nurture positive relationships and partnerships.
- **Kaitiakitanga, tūrangawaewae**: We guard and protect the places that are special to us.
- **Matauranga**: We value knowledge and understanding.
- **Tikanga**: Our customs and cultural practices are central to who we are.
- **Rangatiratanga**: We lead by example.

Step 1: Literature Review

A comprehensive literature review was used to gain a better understanding of disaster resilience in the Marlborough region. This literature review focussed on:

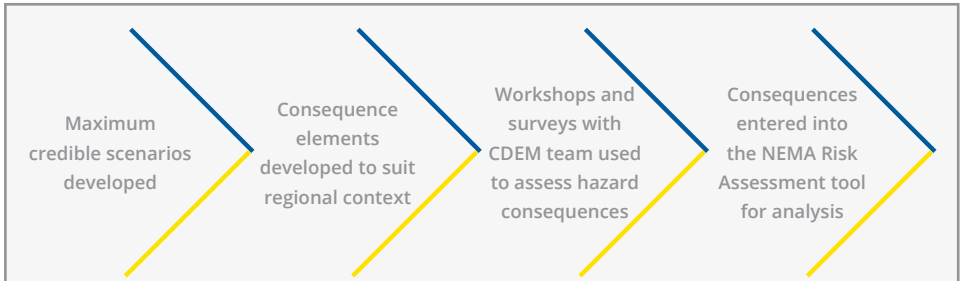
- Definitions of resilience and resilience factors/indicators.
- How resilience can be measured.
- Hazard research and accessibility to research in the region.
- Regional plans and policies relating to disaster resilience.
- Regional vulnerabilities, recent hazard impacts and key learnings.

Step 2: Regional hazard risk assessment

The second step in the project was to undertake a regional hazard risk assessment, following NEMA's Risk Assessment DGL [23/22] guidance. This assessment was used to gain a better understanding of how hazards impact the social, built, natural, and economic environments in Marlborough.

Following a consequence assessment of priority hazards (where there is a relatively high likelihood, hazard exposure and anticipated consequence), a hazard-agnostic approach was adopted to identify recurring consequences between the assessed hazards. The results of this analysis have helped to signpost areas where resilience building may address the consequences of multiple hazards.

It is Marlborough EM's intention to continue to refine the results of this assessment with its stakeholders as part of the Marlborough CDEM Group Plan review process (due to start mid-2023). This includes an assessment of the cultural consequences of disasters in Marlborough.



The risk assessment process (as per NEMA Risk Assessment DGL[23/22])

Step 3: Stakeholder interviews

Following the risk assessment, interviews with stakeholders across the built, economic, and natural environments were used to:

A) Understand what resilience looks like for key economic sectors and environments in Marlborough.

B) Verify hazard consequences from the risk assessment process (Step 2) with Subject Matter Experts (SMEs).

C) Identify collaboration opportunities and ideas for CDEM-led resilience initiatives.

D) Discuss resilience indicators.

Interview participants included:

- Fire and Emergency New Zealand
- Wine Marlborough
- NZ Wine
- Forestry sector representative
- Aquaculture representative
- Marlborough Lifelines Group
- Marlborough District Council
  - Building Control
  - Environmental monitoring
  - Planning and Consents
  - Marine Science
  - Assets/Three Waters
  - Economic development

In some cases interviews took place with one to two people and so the results, whilst indicative, cannot be assumed to be representative of entire sectors.

Representatives from the Agriculture, FMCG and Fuel sectors were unable to be formally interviewed during this stage of the project, however, their views and opinions were captured in subsequent workshops and meetings over the course of the project. Iwi were engaged through the Marae Emergency Management Forum.

Step 4: Social resilience workshop

Following the stakeholder interviews, a workshop with social sector agencies was held to understand what resilience looks like for the social environment in Marlborough, verify hazard consequences, develop resilience indicators, and identify collaboration opportunities. A key outcome of this workshop was the development of resilience goals for individuals and communities in Marlborough.

Participants at the workshop included a range of 'social environment' organisations, agencies, and NGOs:

- Marlborough EM office staff
- Te Kotahi o Te Tauihu Charitable Trust
- Mataawaka (Ki Te Tau Ihu Trust)
- Te Putahitanga o Te Waipounamu
- MSD
- MPI
- Marlborough Primary Health Organisation
- Oranga Tamariki
- Marlborough District Council staff and Councillor
- Red Cross
- Salvation Army
- Ministry of Education
- Ministry of Business, Innovation and Employment
- Te Whatu Ora – Nelson Marlborough
- NZ Police
- Farmside
- Department of Corrections
- Federated Farmers
- Top of the South Rural Support Trust
- Neighbourhood support

Whilst every endeavour was made to include all government agencies within this process, it is worth noting that many do not have a presence within the region. A number of key agencies have local offices in Nelson to provide services into the region.

Step 5: Engagement with Marlborough EM

Engagement with Marlborough EM occurred throughout the project, and included specific meetings with the purpose of discussing:

- The ideas proposed by stakeholders from the interview and workshop process.
- Past and current activities related to increasing disaster resilience in Marlborough.
- How this project will be embedded into the next iteration of the CDEM Group Plan.

Step 6: Iwi engagement

Iwi were engaged in the project through Dr Lorraine Eade, Pouwhakahaere Rauemi (Operations Manager) for Te Kotahi o Te Tauihu Charitable Trust, a collaboration of the eight iwi of Te Tauihu.

The Marae Emergency Management Forum was used to gain an understanding of cultural disaster resilience. Attendees were asked:

- What does a resilient whānau, hapū, and marae look like?
- What lessons can we take from the previous events and their impacts to guide future work with whānau, hapū, and marae in Te Tau Ihu to strengthen their resilience?
- What opportunities exist for Marlborough EM to work alongside marae to increase resilience?

Step 7: Targeted engagement with geographic communities

Targeted engagement with three geographic communities (Seddon, Linkwater, Rārangi) was used to gain a better understanding of what disaster resilience looks like for their community, and their ideas for what could increase disaster resilience at the individual, community, and regional scales.

Three communities were selected as part of this project due to time constraints, however further workshops in other areas are planned beyond this project. Communities were selected considering several factors including hazard vulnerability and previous CDEM engagement in the community.

The workshops lasting approximately 1.5 hours and included the following activities:

- Information about the project.
- An overview of hazards that can impact the community.
- A group activity – How have hazards impacted your community in the past?
- A carousel activity using resilience indicators – How resilient is your community to disasters?
- Room discussion – What does disaster resilience look like for your community?
- Group activity – What could the Civil Defence Group do to improve resilience?

Step 8: Targeted engagement with communities of interest

Targeted engagement with communities of interest is suggested as an area of future work to understand what disaster resilience looks like for communities of interest, where collaboration opportunities exist and ideas they have for increasing disaster resilience in their communities. Many communities of interest are engaged regularly through other parts of the Marlborough EM work programme. While it was not possible to engage with many of these communities during this process, this may be able to be achieved as part of the Group Plan review in 2023.

Youth, as a community of interest, were able to be engaged with during this project through the Marlborough Youth Trust and Marlborough Youth Council. The results of these interactions are integrated into the results of the report. Continued engagement with young people including rangatahi regarding disaster resilience is required in the future.

REGIONAL AND LOCAL CONTEXT

Recent hazard history

The Marlborough region has experienced several hazard events in recent years, including the COVID-19 Pandemic and several successive storm events. The recovery from some of these events remains ongoing, with the long-term impacts of COVID-19 and the 2022 August storm event still being felt in Marlborough communities. Please note the 2021 flash flooding in Blenheim CBD was responded to without activation of the Marlborough EM EOC.

2013 Seddon earthquakes (Cook Straight and Lake Grassmere)

2016 Kaikōura earthquakes

2019 COVID-19 Pandemic

2020 Drought

2021 July: Storm event
October: Storm event (flash flooding in Blenheim CBD)

2022 February Storm event
August: Storm event

Recent hazard history is important to consider when engaging with communities as it can influence risk perception, appetite for engagement, and prioritisation of resilience initiatives. The psychosocial impacts of disasters can impact communities long after they have occurred.

A road damaged in the 2016 Kaikoura earthquake.
Source: Tonkin + Taylor - Copyright: Tonkin + Taylor 2017

Flooding of the Wairau river - July 2021.
Source: Facebook / Marlborough District Council

Risk profile

The social and cultural environment

Environment profile

- The resident population of Marlborough is 51,900 (2022). Blenheim is the main population centre in Marlborough (29,280), followed by Picton (4,790) and Renwick (2,580). There are many small, isolated communities and people throughout the Marlborough Sounds and inland valleys such as in the Awatere Valley.
- In the 2018 Census, 13% of the population in Marlborough identified as Māori.
- After English (97.5%), the next most common language spoken in Marlborough is Māori, spoken by 2.4% people. Te Tau Ihu (top of the South) iwi are Ngati Apa, Ngati Koata, Ngati Kuia, Ngati Rarua, Ngati Toa Rangitira, Ngati Tama, Rangitane and Te Atiawa, while Ngai Tahu is tangata whenua iwi for east coastal Marlborough. The iwi that make up Te Tau Ihu each have a marae.
- In the 2018 census, 22% of the total population was aged 65 or over, equating to a total of 10,548 people. These demographics are expected to continue to grow. National statistics indicate that about 13% of people live on their own in New Zealand. This equates to approximately 1,371 people aged over 65 years in Marlborough.
- The regional population is boosted with domestic and international visitors every year; ferries and cruise ships can add significantly to the population of Picton.
- Significant numbers of overseas labourers (principally from Vanuatu and Thailand) work in the vineyards throughout the year.

Awatere Valley
Source: New Zealand Geographic (nzgeo.com)

Vulnerabilities

- Picton and the Marlborough Sounds have a significantly higher proportion (30.5%) of people aged 65 years and older compared with New Zealand (16.4%). The elderly population can have more complex needs (health or mobility) and these may have to be met in different ways during an emergency.
- There is currently a housing shortage in the region impacting residents and businesses trying to attract workers to the region. For example, aged residential care providers have trouble recruiting staff to cater for the growing elderly population due to housing shortages.
- The dispersed nature of the region's population means that communities can become isolated for long time periods, often more than the timeframes used in traditional guidance for disaster preparedness.
- Visitors to the region may not have local hazard awareness or be fluent in English.
- Most medical facilities are central to Blenheim, meaning that in an emergency a lot of communities can become disconnected from services.
- Emergency service facilities in Canvastown, Havelock, Picton, Rārangi and Renwick are located in flood hazard and/or tsunami inundation zones.

Impacts of previous disasters

The following social impacts of previous disasters impacting the region were identified through workshops, stakeholder interviews and community engagement during this project (this list is not exhaustive):

- Large increases in the need for social services, new cohorts of need, and increased dependence on social agencies.
- Impact on housing stock availability in the region.
- Social isolation, particularly within the elderly population (the elderly can take longer to reconnect and reestablish their daily life routines when faced with disruption).
- Disruption to community connections and lack of socialisation (due to loss of telecommunication and road access sometimes on a long-term basis – e.g., the Marlborough Sounds).
- Resentment.
- Fear of the disaster occurring again.
- Awareness gained of how to get through the crisis.
- Increased social cohesion in the community.
- Immediate to short-term increase in preparedness and risk awareness.
- Loss of identity through job loss or destruction of industry.
- Income changes and losses.
- Increased physical and psychosocial vulnerability in isolated communities.
- Increases in family harm during the COVID-19 pandemic.
- Pre-existing social problems and inequities enhanced by the disaster.
- Mahinga Kai impacted by rāhui.
- Both positive and negative impacts on safety, law, and order.
- Lowered school attendance.
- Temporary and permanent relocation of whānau out of the affected area.
- Decreased access to health services, impacting long-term health outcomes.
- Increased stress and anxiety.

The economic environment

Environment profile

- Economic growth in Marlborough has averaged 2.5% pa over the last 10 years compared with an average of 3.0% pa in the national economy. In 2022, goods-producing industries (including manufacturing, agriculture, forestry & fishing industries) accounted for the largest proportion of GDP (36.1%) in the region which was approximately double that of the national economy (18.5%).
- The 'Beverage and Tobacco Product Manufacturing' industry is the largest in the Marlborough region accounting for 15.7% of the total GDP. Marlborough is the largest wine-producing region at 29,415ha/71% of New Zealand's total producing area.
- In 2022, regional employment growth was 0.8%, compared to national employment growth of 3%. Between 2012 and 2022, the 'Construction', 'Administrative and Support Services' and 'Health Care and Social Assistance' industries created the most jobs.
- Total tourism expenditure in Marlborough was $188 million during the year to December 2022 and accounts for 3.7% of the region's GDP.

Vulnerabilities

- Marlborough grape growers and wine companies produce approximately 80% of New Zealand's wine – hazards impacting the sector not only impact the regional economy through business, tourism, and employment impacts but can also have flow-on impacts to the national economy.
- A plant pest/disease outbreak in the region has the potential to significantly impact monoculture crops in Marlborough. Similarly, a marine pest could have significant impacts on the aquaculture industry in Marlborough – another significant employer.
- Primary industries in the region rely on being able to export their products to New Zealand and international markets – disruption to critical links including SH6 between Blenheim and Nelson significantly impacts the regional economy.
- Many communities in Marlborough do not have diverse economies, relying on a single industry to keep the town operating. For example, the town of Havelock relies on the aquaculture industry and in Ōkiwi Bay businesses rely on tourism.
- Many smaller communities in Marlborough rely on road connections to Blenheim for work. Impacts on connections can result in personal financial losses.

Impacts of previous disasters

The following economic impacts of previous disasters impacting the region were identified through workshops, stakeholder interviews, and community engagement during this project (this list is not exhaustive).

- Supply chain disruption (damage to Centre Port) following the 2016 Kaikōura earthquakes created challenges for the wine industry and demonstrated how critical the SH6 link was to the industry.
- Flood events have impacted vineyards through lost crops, debris damage and loss of access due to landslides.
- Flooding in August 2022 impacted the aquaculture industry through road closures, shutdown of factories (couldn't access crop to harvest), and disruption to the spat supply chain from the North Island.
- In the Marlborough COVID-19 Economic Impact Survey (2021), 58% of businesses in the region stated the COVID-19 situation had an overall negative impact on them (including 7% who reported a threat to survival). 'Less customers, sales and/or demand' (735) was the most cited negative impact on businesses.
- Following the 2016 Kaikōura earthquakes the coastal pāua fishery was closed, which led to some job losses in the local industry. Many farms faced significant disruption.

The built environment

Environment profile

- Marlborough has 18,912 occupied private dwellings and 3,237 unoccupied dwellings, many of which are baches and holiday homes (2018 census)
- 58.1% of homes are owned or partly owned (2018).
- 84.1% of households in occupied private dwellings have access to the internet. 90.6% have access to a cell phone/mobile phone (2018).
- Port Marlborough is the South Island terminal port for New Zealand's inter-island passenger and freight ferries. The Port is naturally deep, and Waimahara Wharf at Shakespeare Bay can accommodate cargo vessels up to 13.5m draft and cruise ships up to 320m long.
- The region has three State Highways:
  - SH6 connects Blenheim with Nelson.
  - SH1 from Picton connects the region with the Canterbury region.
  - SH63 through the Wairau Valley provides an alternate route through to the Nelson-Tasman region.
- The regional airport is co-located with the RNZAF Base Woodbourne (the Air Force's training support base), 8km west of Blenheim.
- There are thirty earthquake-prone buildings in Blenheim.

Vulnerabilities

- There is low resilience in the electricity network between Havelock and Rai Valley. Hazard events occurring in Nelson impacting telecommunication sites may also impact telecommunications in Marlborough.
- SH6 is a *critical* link for the aquaculture and viticulture industries exporting products out through Nelson Port (a bottleneck for the export of products from Marlborough). The route is also essential for FMCG and fuel transport – the only other alternative route to Nelson is a long detour (SH63).
- SH1 (south) is a key fuel supply and FMCG route which is vulnerable to landslide and rockfall. SH1 (north) is shadowed by the main trunk rail line – both are critical links for commercial freight (mostly timber) and travellers departing from Picton.
- Blenheim town centre and the Riverlands Industrial area are vulnerable to liquefaction.
- Sewage systems operated by MDC rely largely on gravity – any land subsidence or uplift is likely to impact the operation of these systems.
- Many communities in Marlborough only have one supermarket or convenience store servicing the area. Pressure on small local suppliers will arise if there is an emergency during peak holiday seasons or where visitors are stranded.
- Community water supplies operate in several parts of Marlborough, e.g., Rai Valley, Rārangi, Ōkiwi Bay. These can be vulnerable to loss of electricity which is needed to operate bore pumps.

Impacts of previous disasters

- The following built environment impacts of previous disasters impacting the region were identified through workshops, stakeholder interviews and community engagement during this project (this list is not exhaustive).
- Roading throughout the region including the Marlborough Sounds and Rai Valley was significantly damaged during the February and August 2022 storm events. Surface water flooding impacted roading in areas of flat topography. SH1 closures due to flooding have isolated communities (e.g., Seddon) and disrupted freight travelling to Port Marlborough.
- Roading was also damaged due to surface cracks, landslides, and underslip damage following the 2013 Seddon earthquake and the 2016 Kaikōura earthquake. The closure of SH1 between Ohau Point and Clarence on the coast south of Seddon affected the lives of many communities.
- Buildings in Seddon were damaged in the 2013 Seddon earthquake, some of which were later demolished. Wine storage tanks and in some cases associated infrastructure were also damaged in the earthquakes. Following the 2016 Kaikōura earthquakes, approximately 20% of the wine storage tank capacity in the region was impacted. Significant advances in resilience in the wine industry have been made following these events.
- More than 150 homes in Marlborough and Nelson were red-stickered following the August 2022 storm event.
- The Halem Dam suffered severe cracking causing the evacuation of downstream properties in the 2013 Seddon earthquakes. Bell's dam near Seddon also suffered cracking damage.
- Liquefaction was observed north and east of Blenheim along the Wairau River following the 2016 Kaikōura earthquakes damaging stopbanks, vineyards and bridges.
- Settlements southeast of Blenheim were the worst impacted by the loss of utilities following the 2016 Kaikōura earthquakes. Community-operated water schemes in Ward required significant assistance from MDC.

A badly damaged house in Seddon following the 2013 earthquake. Source: pic.twitter.com/PpQzONVaVs

The natural environment

Environment profile

- Marlborough covers around 3.9% of the country's total land area. Its land area of 1.05 million hectares is almost matched by its marine area of 725,000 hectares.
- The region's coastline extends for over 1,750 km, most of which makes up the Marlborough Sounds.
- The region is one of New Zealand's sunniest regions – warm, dry, and settled weather predominates in summer.
- Native forest, scrub and tussock still cover over 40% of the region – most of the river flats have been cleared of native vegetation and are now used agriculturally. Nearly 30% of the region has been converted to pasture with the majority used to graze sheep and beef.
- The three largest rivers in the region are the Te Hoiere/Pelorus in the northwest, the Wairau River in the central part of the region and the Awatere River in the south. The Wairau River has the largest catchment and cumulatively the largest flow of all rivers in Marlborough, spanning the region from the mountains of the St Arnaud Range in the west to the Pacific Ocean in the East.

Vulnerabilities

- The Marlborough region is prone to wildfire due to its climate and vegetation cover.
- Low-energy marine environments (such as the inner Marlborough Sounds) are less resilient than open ocean environments as sediment and debris are washed away slowly.
- With climate change there is likely to be an increase in the frequency and severity of storm events – sea temperatures in the Cook Straight have already risen impacting fisheries through changing viable commercial growing areas and creating conditions favourable to new marine pests (e.g., the parchment worm, *Chaetopterus*)
- Aquifers used by communities such as Rārangi are susceptible to saltwater intrusion, uplift, and pollution through hazard events (and the impacts of climate change).

Impacts of previous disasters

The following natural environment impacts of previous disasters impacting the region were identified through workshops, stakeholder interviews and community engagement during this project (this list is not exhaustive).

- Significant natural areas near Seddon have been impacted in the past by wildfires.
- Following the August 2022 storm event, significant silt deposition occurred in marine environments. In previous events, the Havelock Channel (a key route for fishing vessels and the mussel industry) has been impacted by sedimentation and needed to be dredged. Havelock is a critical point for travel and barging operations, as much of the Pelorus is not accessible by road.
- Coastal uplift in the Kaikōura 2016 earthquake impacted inter-tidal marine ecosystems on the region's eastern coastline.

Marlborough hazardscape

The NEMA Risk Assessment DLG [22/23] was used to identify the consequences of priority hazards across the four environments (Social – Built – Economic – Natural).

The following hazards have been assessed during this process using maximum credible scenarios:

- Earthquake – local fault
- Tsunami – local source
- Alpine Fault earthquake
- Animal disease
- Flood
- Human Pandemic
- Terrorism
- Snowfall
- Mass fatality transport accident
- Aquatic pest
- Fuel supply failure
- Plant pest/disease
- Dam break
- Tsunami – distant source
- Cyber attack
- Wildfire
- Tornado
- Severe weather - thunderstorms
- Water supply failure
- Marine transport incident
- Drought
- Civil unrest
- Severe weather - wind
- Extreme temperatures
- Fire (urban)
- Hazardous substances

Hazard and consequence analysis has enabled this project to identify areas where targeted efforts may enhance individual, community and regional disaster resilience.

Analysis has included the identification of high to very high-risk hazard consequences across *all* assessed hazards, and the relative level of consequence each assessed hazard poses to the region.

In addition to signposting target areas for future resilience initiatives, this analysis will support the prioritisation of disaster resilience initiatives and project ideas suggested throughout this report.

The results of the risk assessment will be reviewed and verified with CDEM partner agencies during the Group Plan review process. Assessment of the consequences of hazards within the Māori/Iwi environment will be imperative to ensuring the Group Plan is informed by a complete and robust risk assessment.

High consequence hazards

Hazards are listed below according to their level of risk – no hazards were assessed to be a critical ('extreme') risk. The level of risk is determined by the likelihood of hazard occurrence and the consequences of the hazard across elements within the four environments.

Earthquakes, tsunamis, and pests/diseases impacting the primary sector make up the majority of 'very high' to 'high' risks for Marlborough. This indicates that targeted resilience initiatives for these hazards may be good value when working to increase disaster resilience. The relative consequence levels for an Alpine Fault event, rated as a 'very high' risk, are discussed further.

'Very high' risk hazards

- Alpine Fault earthquake

'High' risk hazards

- Earthquake – local fault
- Hikurangi subduction zone earthquake and tsunami
- Animal Disease
- Aquatic Pest
- Plant Pest / disease
- Flood
- Human Pandemic
- Drought

'Medium' risk hazards

- Hazardous substance event
- Cyber-attack
- Extreme temperatures
- Fire (urban)
- Fuel supply failure
- Severe weather – Wind
- Severe weather – Thunderstorms
- Snowfall
- Wildfire
- Terrorism

'Low' risk hazards

- Civil Unrest
- Marine transport incident
- Tornado
- Tsunami – Distant source
- Water supply failure
- Dam failure
- Mass transport accident

Consequences of an Alpine fault earthquake

Social environment

The cascading impacts of an Alpine fault earthquake are anticipated to have a significant impact on injuries, illness, and fatalities in Marlborough. Accessibility to health services is anticipated to reduce due to communities becoming isolated, potentially exacerbating injuries and illness, leading to negative health outcomes. Due to the nature and extent of the emergency is it also anticipated there will be significant psychosocial impacts and societal impacts. Major to extreme consequences are also expected for the welfare and education sectors and community and local government services.

Built environment

Within the built environment, moderate damage to building stock (residential, commercial, industrial, community facilities) is expected – especially for earthquake-prone or older buildings which have not been strengthened post the 2013 Seddon and 2016 Kaikōura earthquakes. Major impacts are expected for Three Waters services, electricity, fuel distribution and the regional flood scheme. Extreme impacts are expected to occur to the roading network, such as to SH1, which is a critical lifeline used for importing fuel into the region from Christchurch.

Economic environment

Individuals are expected to face significant economic losses in this event, and major losses for businesses, commercial entities and industries are also expected. Extreme economic loss is anticipated for local government. Major impacts for the horticultural sector and the tourism sector are expected – impacts on the viticulture industry have a strong dependence on the time of year that the event occurs. Key concerns in the viticulture industry are if the event coincides with processing the vintage in January, the liquefaction-prone soils vineyards commonly occupy, and being able to import and export materials via SH6. Because of the anticipated impact on dominant industries in the region, major impacts on the employment/job sector and local and regional economic drivers are expected.

Natural environment

In the natural environment, major impacts are expected on freshwater quality due to potential river aggradation and continual debris flows that are likely to occur for years, impacting the dissolved oxygen levels and turbidity of rivers, low energy receiving environments and their ecosystems.

The Alpine Fault
Source: AF8 https://af8.org.nz/explore-the-science#alpine-fault

Please note: The consequences of Alpine Fault earthquake are very similar to those of a Hikurangi subduction zone earthquake and tsunami and Wairau Fault rupture.

Consequences of ‘high’ to ‘very high’ risk

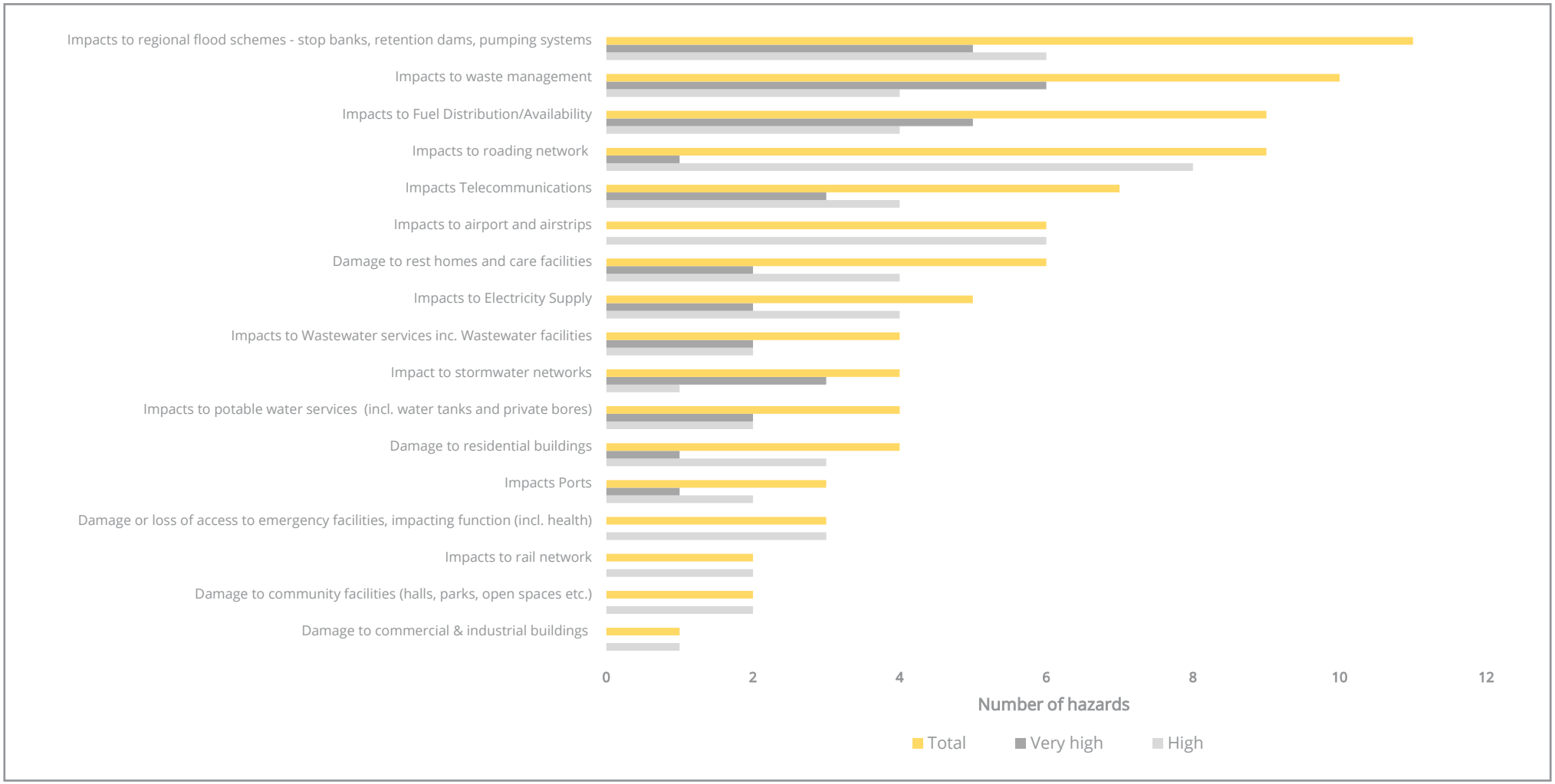
The figures below show the relative level of risk for assessed consequences across all hazards. Understanding elements which pose the highest risk may help to target resilience initiatives in Marlborough.

Elements appearing at ‘high’ or ‘very high’ risk level in the social environment

* Denotes elements that have only been assessed within workshops against a small number of hazards

Analysis within the social environment shows that ‘injuries and illness’ and ‘temporary populations’ have the highest level of risk across all hazards. Targeted national education campaigns regarding life safety actions and how to stay safe in emergencies are supported by Marlborough EM and may help to reduce this risk. Education campaigns that reach tourists, seasonal workers and other temporary populations may also support resilience. Proactively working to foster social wellbeing and connectedness after an emergency may also have significant benefits in some communities.

Elements appearing at 'high' or 'very high' risk level in the built environment

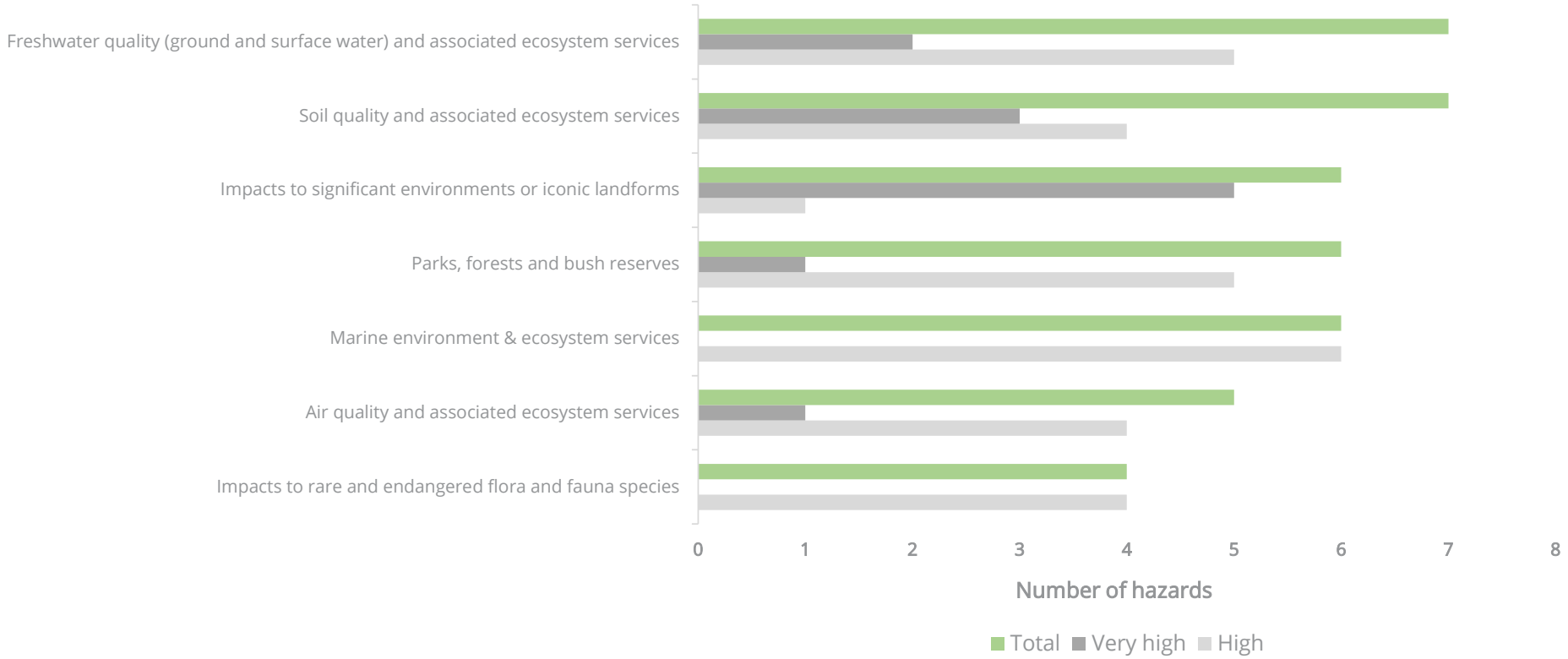


In the built environment, impacts to regional flood schemes, waste management and roading within the built environment are the most significant across all hazards. Investment in the resilience of regional flood schemes, development of waste and debris management plans and investment in the resilience of current/ future roading, or scoping alternative access options into communities likely to be isolated, may help to build resilience in this space.

Elements appearing at ‘high’ or ‘very high’ risk level in the economic environment

Direct losses to individuals within the economic environment came out as the highest risk. Continuing to promote the availability of help through MSD emergency finance options during response and application to the Mayoral Relief Fund may help to support direct losses to individuals.

Elements appearing at 'high' or 'very high' risk level in the natural environment



Within the natural environment, the highest risk was attributed to the marine environment and freshwater quality. The importance of protecting waterways and bodies (including lakes, oceans, springs, and rivers) in peacetime, and during response and recovery to emergencies cannot be understated, as these are both a taonga (treasure) and mauri (life force). Additionally, impacts to the marine environment are directly linked to impacts to the aquaculture industry.

Community hazardscape

Marlborough is known for its isolated pockets of communities and towns. Towns and communities with the highest populations have been assessed for their hazard exposure to add further context to this project and future resilience initiatives. All of Marlborough is exposed to earthquake shaking, severe weather events (high wind, tornado, thunderstorms, extreme temperatures, drought), wildfire risk, water supply failure, mass transport accidents, and biological threats (infectious human disease, animal pest/disease, plant pest/disease).

● Hazard applies to community
●* Town indirectly impacted by hazard through isolation

Hazard	Ōkiwi Bay	Rai Valley	Canvastown	Havelock	Kenepuru and Central Te Hoiere/ Pelorus Sound	Picton and Waikawa	Rārangi	Tuamarina, Spring Creek and Grovetown	Blenheim	Renwick	Wairau Valley	Seddon and Awatere	Ward and Flaxbourne
Natural hazards													
Earthquakes (near and distal)	●	●	●	●	●	●	●	●	●	●	●	●	●
Tsunami (local, regional, and distant source)	●			●	●	●	●	●					
Flooding (fluvial)	●*	●	●	●*		●	●	●	●	●	●	●*	
Severe weather events	●	●	●	●	●	●	●	●	●	●	●	●	●
Snowfall											●	●	
Drought	●	●	●	●	●	●	●	●	●	●	●	●	●
Wildfire	●	●	●	●	●	●	●	●	●	●	●	●	●
Biological hazards													
Infectious human disease	●	●	●	●	●	●	●	●	●	●	●	●	●
Plant pest/disease	●	●	●	●	●	●	●	●	●	●	●	●	●
Animal pest/disease	●	●	●	●	●	●	●	●	●	●	●	●	●
Aquatic pest/disease	●			●	●	●	●						
Technological and human hazards													
Water supply failure/contamination	●	●	●	●	●	●	●	●	●	●	●	●	●
Dam break/failure						●			●		●		
Mass fatality transport accident	●	●	●	●	●	●	●	●	●	●	●	●	●
Major maritime incident				●			●						
Hazardous substance event	●	●	●	●	●	●	●	●	●	●	●	●	●
Fire (built environment)	●	●	●	●	●	●	●	●	●	●	●	●	●
Civil unrest									●				
Terrorism						●			●				
Cyber-attack	●	●	●	●	●	●	●	●	●	●	●	●	●

Marlborough Sounds Future Access Study (Stantec)

Severe weather events in 2021 and 2022 closed roads in the Marlborough Sounds leaving people with limited or no access for prolonged periods and in some cases with no feasible, safe, long-term alternative access.

Marlborough District Council embarked on the Marlborough Sounds Future Access Study, managed by Stantec, to support the case for funding safe and resilient long-term access solutions for the Marlborough Sounds, both for itself and to obtain funding assistance from Waka Kotahi.

The study looks at five geographical areas, recognising their distinct access issues:

- Rai Valley to Te Aumiti / French Pass
- Te Hoiere / Pelorus
- Kenepuru
- Queen Charlotte Drive, including Anakiwa Road
- Te Whanganui / Port Underwood

Although 'emerging preferred options' have been provided to the public, it is likely to be 2024 before the Marlborough District Council will consult with all of Marlborough on the proposed options and costs through a special consultative process or in the Long Term Plan before making a final decision.

In the context of this project and the result of the Marlborough Sounds Future Access Study, it is recommended that the future results of the Stantec study are looked at through a resilience lens of:

- How does improved or reduced access impact readiness, response and recovery outcomes in the areas impacted?
- How does improved or reduced access impact individual and community resilience in the areas impacted?
- Where resilience, response and/or recovery outcomes are impacted, are there resilience initiatives (education, engagement, provision of resources) that can help improve response and recovery outcomes and individual/community resilience?

Queen Charlotte Drive, Marlborough
Source: dangeoursroads.org

PROJECT RESULTS

Regional resilience goals and proposed initiatives

The following section outlines the Group's:

- Resilience goals at the individual, community, and regional scales (across the four environments), and,
- Proposed regional disaster resilience initiatives.

Resilience goals and proposed initiatives are based on collated feedback from stakeholder interviews and meetings, outcomes from the Social Resilience workshop, and in some cases community workshop outcomes where the same initiatives were suggested.

It is important to note that resilience is not 'static' nor does it have a 'end' state. Any progress towards the resilience goals below will enhance disaster resilience for individuals and communities in Marlborough and lead to better response outcomes. Goals are included to guide resilience efforts and initiatives rather than representing a checklist of actions and criteria needed for the region to be resilient.

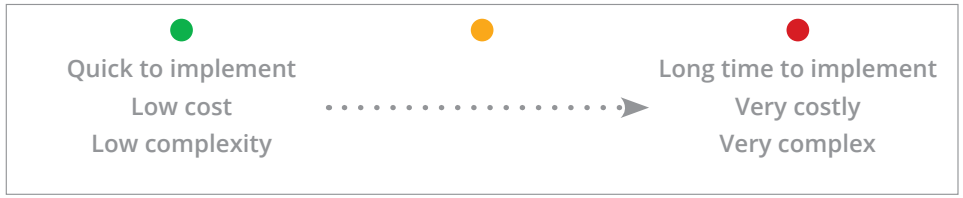
Some of the initiatives listed below build on current work undertaken by Marlborough EM to increase disaster resilience (e.g., public education campaigns and engagement with vulnerable communities). These are not solely the responsibility of Marlborough EM, or in some cases highlight areas where collaboration and coordination with Marlborough EM's partners and stakeholders can deliver good outcomes for disaster resilience in the region.

The initiatives are structured according to the three themes and relevant objectives of the NDRS to show how initiatives can contribute to meeting the objectives of the NDRS at a regional level. Where no initiatives were suggested relating to a particular NDRS objective, the objective has been omitted from the section.

The three themes of the NDRS are:

1. Managing risks.
2. Effective response to and recovery from emergencies.
3. Enabling, empowering, and supporting community resilience.

Initiatives are further categorised using a traffic light system in terms of time, cost, and complexity to aid prioritisation.



Marlborough's resilience goals

A disaster resilient individual in Marlborough...

- Has hazard literacy:
  - Is aware of natural hazards that can impact their property and community.
  - Knows and takes the right life safety actions to keep themselves safe in a hazard event.
  - Has a flexible plan for their situation and is proactive in implementing it (e.g., stores extra water and food, medication) – preparedness is their normal.
- May have already experienced and/or been affected by a disaster or adversity.
- Has access to a kete of resources, including money.
- Knows their faith, cultural or personal beliefs.
- Knows where IT intersects in their life and can be non-dependent.
- Knows where to find information and/or links to information about hazards and preparedness.
- Has strong and diverse connections/relationships in their community (family, general community, faith, culture)
- Knows, or has an ability to know, who is in their community including the skills and resources they have.
- Has access to health and wellbeing services, e.g., GP, mental health, welfare.
- Interacts with their community before an emergency (Kanohi ki te kanohi/face-to-face).
- Has the ability to bounce back mentally following an emergency.
- Takes personal responsibility and plays their part in collective responsibility for individual and community wellbeing during an emergency.
- Has a willingness to help and ask for help (and knows how to access it/who to contact)
- Has some form of leadership that can support coordination across multiple levels – whānau, household, and community.

A disaster resilient community in Marlborough...

- Knows its hazard vulnerability.
- Has a community plan:
  - Which enables early response actions/'self-help' before external assistance arrives
  - With provisions for the two-way sharing of information between the regional response and the community response
  - Which identifies the locations of vulnerable persons (e.g., the medically compromised)
  - Which includes the resources available in the community, e.g., generators, BBQs.
  - With contingencies
  - Which community members are trained and resourced to implement.
  - That is owned by the community.
- Has community leadership – leaders and capability.
- Has social cohesion
- Has pre-existing communication channels e.g., newsletters and events, regular hui.
- Has a strong communications and telecommunications network, e.g., access to Starlink.
- Has already been through a disaster and/or adversity and learnt from it.
- Has resilient above and below ground infrastructure.
- Has access to health and wellbeing services.
- Is proactive rather than reactive and makes disaster resilience a collective priority.
- Has access to a diverse range of resources – e.g., equipment, food, water, monetary, skilled persons.
- Mahi Tahi, Nau mai haere mai: Is willing to share and distribute resources within the community.
- Has a known focal point(s) in the community used for gathering and sharing information (e.g., a community hall).
- Is connected and regularly gets together.
- Has multiple access options (roads/boats/helipads) and access to transportation, e.g., wharves and boats in the Marlborough Sounds.

A disaster resilient built environment in Marlborough...

- Has buildings which don't endanger people through meeting or exceeding the building code and the application of land use planning for natural hazards.
- The future development and expansion of the built environment is carefully considered to reduce exposure to the adverse impacts of natural hazards.
- Can continue to function or adapt to the impacts of climate change.
- Has critical lifeline infrastructure which continues to provide service to customers, albeit potentially reduced, during and after hazard events.
  - All lifeline utility services have access to fuel, their infrastructure, and resource (specialists, labour, and materials) necessary to get Marlborough moving.
  - The region retains functionality of priority roads following an emergency to enable the movement of people, goods, and services in and out of the region and South Island.
  - The telecommunications network has diversity and resilience built into structures (roads, bridges) which carry telecommunication equipment. The electricity network is maintained and easily accessible in peacetime and emergencies, enabling repair or refuelling of back-up generator sites following emergencies.
  - Three waters have the staff and infrastructure to provide high-quality water after an event, and the ability to be able to dispose of sewerage and solid waste as the event progresses.
  - Has resilient marine infrastructure for isolated communities in the Sounds.

A disaster resilient economic environment in Marlborough is where...

- Losses to individuals, business and local government are minimised through appropriate levels of insurance.
- Individual livelihoods and businesses, where disrupted by a natural hazard event, are supported with funding from central government.
- Businesses work as a cooperative and support one another following a natural hazard event.
- Businesses are aware of the hazards that can impact them and have planned for potential disruption.
- Businesses can continue to move workforce, resources, and product following a natural hazard event (supply chain disruption is minimised).
- Businesses can continue to function (or adapt to) the adverse impacts of climate change.
- Lessons are identified and learned following hazard events.

A disaster resilient natural environment in Marlborough is where...

- Environmental health is prioritised before and during a hazard event to improve its ability to recover.
- The environment is monitored after natural hazard events to understand how it has been adversely impacted.
- Response agencies look for opportunities to engage with environmental agencies and organisations in readiness, response, and recovery (e.g., MDC Environmental teams, Department of Conservation, Fish & Game, Maritime NZ Oiled Wildlife Response Team).
- Consenting and compliance mechanisms are used to avoid, remedy or mitigate adverse effects of response and recovery activities on the environment.
- Response agencies are educated as to the intricate, holistic, and interconnected relationship between mana whenua and the natural world and its resources.
- The people of Marlborough care about the environment and engage in protection of their environment.
- Natural features such as marshlands, dunes and wetland systems which reduce the impact of natural hazards on communities are protected.

Proposed regional disaster resilience initiatives

Managing risks

Objective 1: Identify and understand risk scenarios (including the components of hazard, exposure, vulnerability, and capacity), and use this knowledge to inform decision making.

Marlborough EM is a member of the AF8 Alpine Fault Magnitude 8 project which commenced in July 2016. As part of this project, a hazard scenario for a magnitude 8 earthquake was developed and workshopped in Marlborough (and the other six South Island CDEM Groups) to further understand the vulnerability of Marlborough and the consequences of such an event. A response plan (the AF8 'SAFER' framework) was developed as an output of this project and educational roadshows promoting the hazard continue to occur across the South Island.

An initial risk assessment conducted as part of this project has developed a series of maximum credible hazard scenarios for Marlborough. The consequences of these hazards have been assessed at a high-level, and further consultation with Marlborough EM partners to ground truth the results will be conducted as part of the Group Plan Review (2023). The risk assessment has been supported by hazard research already undertaken in the region, including a number of liquefaction, seismic, tsunami risk (level 2 modelling), climate change and landslide studies.

Regional initiative	Time	Cost	Complexity
a. Advance flood modelling (factoring climate change) to inform BCP planning for businesses likely to be impacted by large future floods. This initiative could be part-funded by at-risk industries (e.g., vineyard owners).	🔴	🔴	🔴
b. Hold a multi-agency workshop to verify the consequences of maximum credible hazard scenarios developed as part of the risk assessment process.	🟢	🟢	🟢

Objective 2: Put in place organisational structures and identify necessary processes – including being informed by community perspectives – to understand and act on reducing risks.

Regional initiative	Time	Cost	Complexity
c. Continue community workshops (See 'Community Case Studies' section of report) to understand community perspectives of how emergencies impact them, and their ideas for building resilience in their communities.	🟠	🟢	🟢

Objective 3: Build risk awareness, risk literacy, and risk management capability, including the ability to assess risk.

Regional initiative	Time	Cost	Complexity
d. Improve availability of hazard research and information including hazard consequences of maximum credible hazard scenarios (This could include further development of the MDC SmartMaps platform)	🟠	🟠	🟠
e. Continue to host hazard awareness talks and educational sessions to increase hazard literacy, e.g., AF8 Roadshow	🟠	🟢	🟢

Objective 5: Ensure development and investment practices, particularly in the built and natural environments, are risk-aware, taking care not to create any unnecessary or unacceptable new risk.

The Proposed Marlborough Environment Plan (PMEP) utilises the Resource Management Act 1991 to restrict or limit development in flood hazard areas, areas vulnerable to liquefaction, coastal hazard zones, and sites near fault lines. There are currently no restrictions placed on landowners or developers in areas modelled to be susceptible to tsunami inundation. Other pieces of legislation are utilised by MDC address liquefaction and seismic risk, such as the Building Act (2004).

Regional initiative	Time	Cost	Complexity
f. Education of hazard consequences for elected officials at MDC to support implementation of risk reduction activities.	●	●	●
g. Group office staff to occasionally work from MDC offices to foster connectedness and identify collaboration opportunities/projects of interest.	●	●	●

Objective 6: Understand the economic impact of disaster and disruption, and the need for investment in resilience; identify and develop financial mechanisms that support resilience activities.

Following the failure of wine tanks in the 2016 Kaikōura earthquakes, many wineries in Marlborough introduced new, seismically robust tank systems to prevent future loss in an earthquake event. Larger businesses, such as nationally or internationally owned wine companies, may employ risk management specialists who prepare for business disruption. Not all businesses have the capacity and ability to do this however and need support to develop Business Continuity Plans (BCPs).

Regional initiative	Time	Cost	Complexity
h. CDEM support/guidance on BCP planning utilising maximum credible scenarios for primary sector groups, and businesses in the Blenheim town centre and Riverlands Industrial area.	●	●	●
i. Education for businesses and/or key economic sectors regarding 'what to expect' from CDEM in a response, e.g., 'Emergency Response 101'.	●	●	●

Effective response to and recovery from emergencies

Objective 8: Build the relationship between emergency management organisations and iwi/groups representing Māori, to ensure greater recognition, understanding, and integration of iwi/Māori perspectives and tikanga in emergency management.

Please refer to opportunities outlined in the section 'Opportunities to developing disaster resilience with iwi, hapū and marae'.

Objective 11: Build the capability and capacity of the emergency management workforce for response and recovery

Regional initiative	Time	Cost	Complexity
j. Continue to provide/facilitate CIMS training and desktop exercises for primary sectors organisations/entities.	🟠	🟠	🟢
k. Incorporate targeted environmental monitoring during the response and recovery phase of emergency events.	🟠	🟠	🟢

Objective 12: Improve the information and intelligence system that supports decision-making in emergencies to enable informed, timely, and consistent decisions by stakeholders and the public.

Regional initiative	Time	Cost	Complexity
l. Investigate the resilience of regional telemetry sites to loss of power and telecommunications.	🟠	🟠	🟠
m. Develop a Marlborough Lifelines Restoration Plan which prioritises lifeline restoration and highlights critical interdependencies (output could be a restoration tool).	🟠	🟠	🟠
n. Progress initiatives through the Primary Sector Network which fosters connectedness, including: • Ensure fuel planning includes the primary sector. • The development of reconnaissance plans for the primary sector which capture information required by CDEM and Primary Sector entities with the intention of quickly informing levels of central Government support required in an emergency. • Consider working with the primary sectors to develop a tool to survey primary sector businesses impacted by an event (not duplicating current initiatives in the sector, with the intention of streamlining contact between response agencies and affected businesses in an emergency (e.g., use of the Survey 123 tool). Data sharing agreements/MOU may need to be developed as part of this initiative. • Formalising relationships between industry groups and CDEM.	🟠 🟠 🟠 🟢	🟢 🟢 🟠 🟢	🟠 🟠 🟠 🟢

Enabling, empowering, and supporting community resilience

Objective 13: Enable and empower individuals, households, organisations, and businesses to build their resilience, paying particular attention to those people and groups who may be disproportionately affected by disasters.

The emergency preparedness survey (2022) in Marlborough found that:

- 83% of people who responded (226) said they are aware of emergencies that can affect Marlborough.
- 78% of people who responded (210) said they have supplies to last three days or more.
- 41% had enough food for more than a week.
- 27% had enough water for more than a week.
- Friends/neighbours and community social media channels had equal weighting with council website and council social media channels in terms of where the public goes to get information from in an emergency.

Regional initiative	Time	Cost	Complexity
o. Develop public education campaigns regarding: • Taking the right actions in a hazard event for individuals, business owners and visitors (incl. RSE workers) in the region. • What different placards mean for building owners, and how to report issues such as water leaks to MDC in an emergency. • Emergency preparedness, including how preparedness levels need to differ across region (up to a week of supplies in Blenheim and Picton vs. up to 10 days in remote areas).	🟠	🟠	🟢
p. Encourage youth involvement in community planning and preparation	🟠	🟠	🟢

Regional initiative	Time	Cost	Complexity
q. Further develop content for Marlborough EM so it is easy to use and informative regarding hazard consequences and preparedness.	🟠	🔴	🟠
r. Work with tour operators and accommodation providers to ensure visitors to the region are aware of hazards and life safety actions that need to be taken in an emergency.	🟠	🟠	🟢
s. Advocate for the development of an information guide with tips on increasing disaster resilience of buildings and how you can exceed the building code to create a more resilient building.	🟠	🟠	🟠
t. Identify and support funding opportunities for communities to increase the resilience of their community 'focal points', e.g., adding generator plugs to halls.	🟢	🟢	🟢

Objective 14: Cultivate an environment for social connectedness which promotes a culture of mutual help; embed a collective impact approach to building community resilience.

Regional initiative	Time	Cost	Complexity
u. Continue to utilise existing social gatherings within communities or other agencies community events as a forum for providing hazard and preparedness education.	🟢	🟢	🟢
v. Host community gatherings with the purpose of fostering connection and relationship building.	🟢	🟠	🟢
w. Ensure printed copies of response plans and preparedness collateral are available at community hubs – e.g., I-Site, local fire stations.	🟢	🟢	🟢
x. Start a quarterly community emergency preparedness forum where community leaders can come together with Marlborough EM to strengthen ties. This may also be used to connect with communities in an emergency.	🟠	🟢	🟢

Opportunities to develop disaster resilience with iwi, hapū and marae

The proposed Emergency Management Bill (currently open to public submissions until 03/11/23) is intended to replace the Civil Defence Emergency Management Act 2002 which provides powers for managing emergencies at local, regional, and national levels. Among other updates, the bill aims to recognise and enhance the role of Māori in emergency management at all levels – local, regional, national, and across strategic planning and operational activity.

Māori already play an important role in Aotearoa New Zealand's emergency management system, including in Marlborough. The Te Kotahi o Te Tauihu Charitable Trust is currently engaged in Marlborough EM's work programmes across the four Rs, fulfils the Iwi/Māori Regional Coordinator and Iwi/Māori function during response and recovery and has representation on the Coordinating Executive Committee (since 2017). Additionally, the Te Kotahi o Te Tauihu Charitable Trust has developed the Te Tahuihu o Te Waka-a-maūi Emergency Management Strategy (2022-2027). The strategy puts whānau at the centre and aims to strengthen and develop a consistent approach to civil defence responses across Te Tauihu (Marlborough, Nelson, Tasman).

Through discussion with several members of the Marae Emergency Management Team (chaired by the Te Kotahi o Te Tauihu Charitable Trust), the following opportunities for Marlborough EM to further develop disaster resilience with iwi, hapū, and marae have been identified:

- Provide technical input and support as required. Opportunities may include:
  - Providing technical input when Marae Preparedness Plans are being updated.
  - Communicating the latest hazard research (e.g., from the AF8 programme), preparedness information and information about hazard consequences.
  - Providing input into discussions about how marae can support one another across the rohe during an emergency, for example developing contingency plans for when certain marae cannot open to provide welfare support, or when there are not enough leaders available to run operations from a marae during an emergency.
- Identify gaps in the reach of current disaster education programmes and education opportunities for rangatahi and kaumātua.
- Work with Te Kotahi o Te Tauihu to understand which cultural events are appropriate for CDEM to go to and promote disaster preparedness.
- Provide marae with a suite of short desktop exercises that can be used to test emergency plans and procedures.
- Understand the resources marae may need to support a significant welfare response (e.g., extra mattresses, generators, chillers, etc.).
- Support improved funding coordination at the regional and national level for building disaster resilience for whānau, hapū, and marae.
- Continue to include iwi representation on Mayoral Relief steering groups to encourage Māori applications for funding.
- Continuing to work in partnership to identify further collaboration opportunities through annual work programmes and the Group Plan review process.
- Continue to maintain and build relationships to enable co-leadership and support to Māori communities in the ECC during emergencies. For example, during COVID-19 there was better engagement with Māori when people could identify with/or know the person they were talking to – this was crucial to ensuring whānau received the right support.

Emergency Management Bill

In addition to the recommendations above, the Emergency Management Bill includes the following requirements:

- The Bill introduces a requirement to include Māori members on both the Emergency Management Committees (formally Joint Committees) and Emergency Management Co-ordinating Executives (formally Coordinating Executive Groups).
- The Bill requires Emergency Management Committees to collaborate with Māori and iwi in the development of local emergency management plans.

Partner agency collaboration opportunities

The following highlights where there may be collaboration opportunities to build disaster resilience, working with partner agencies and organisations.

Holistic Natural Hazard Risk Assessment (MDC)

This project will conduct a holistic risk assessment, looking at the consequences of natural hazards (including climate change) for Marlborough communities. Information from the assessment will be presented to communities to gain perspective on their concerns, what they would like to do about the identified hazard consequences and resilience. The project will utilise the MfE DAP process and Treasury Living Standards Framework.

Collaboration opportunities:

- There is an opportunity for Marlborough EM to feed into the risk assessment process and support the project with tools from the NEMA Risk Assessment Guidance [DGL 23/22].
- There is an opportunity for Marlborough EM to attend community meetings to promote hazard preparedness and answer any other CDEM or hazard-related queries from the public.
- Project outcomes may be able to be integrated into the work programme if appropriate.

Fire and Emergency New Zealand

As part of its readiness and recovery function, Fire and Emergency NZ undertakes activities across the region to reduce risk and enhance community readiness. As an emergency service, it is a key partner of Marlborough EM.

Collaboration opportunities:

- Fire and Emergency NZ has a wide reach into communities that may be more impacted in an emergency. There is an opportunity for Marlborough EM and Fire and Emergency NZ to leverage each other's relationships in response or to promote readiness for emergencies. Communities currently engaged by Fire and Emergency NZ in the region include (but are not limited to):
    - RSE managers and workers
    - Elderly (via church groups, friendship groups and Age Concern)
    - St John
    - Nurse Maude
    - Red Cross
    - Māori Wardens
- Having visibility into each other's community engagement calendars may create an opportunity to attend meetings and/or promote and support each other's preparedness messaging.
- Learn from and implement elements of the Ahi Kura programme approach in the CDEM context. For example, if a small emergency occurs, use the opportunity to engage with youth/target audiences on preparedness and hazard consequences.

Community case studies: resilience opportunities

A series of community workshops were held in three test locations (Seddon, Linkwater, and Rarangi) to gain the community's perspective on how disasters have impacted them in the past, their level of disaster resilience and ideas they had for improving disaster resilience both in their community and the region. Where all three communities suggested similar resilience-building initiatives these have been included in the 'Proposed regional disaster resilience initiatives' section of this report.

Participants at the Seddon community workshop on 22 August 2023

The purpose of the community workshops was to gain the community's perspective, rather than local or central government's, on how to build disaster resilience for their community. The project wanted to empower communities to self-determine how their resilience can be increased.

Outcomes from these workshops included:

1. Ideas for targeted resilience building initiatives, some of which can be taken up by the community with support from Marlborough EM or other agencies as required.
2. Perspective gained by Marlborough EM as to how the communities are, and continue to be, impacted by emergencies through a community-led holistic consequence analysis exercise (taking an all-hazard approach).
3. Guidance from the community as to the hazards which concern them the most, which can inform hazard education initiatives and collaboration opportunities in the community between response agencies.

It is Marlborough EM's intention to hold these workshops in other communities to continue to gain insight into the public's perspective on disaster resilience.

The results of the community workshops are detailed in the sections that follow.

Seddon

Seddon is a small town south of the Awatere River on State Highway 1. The town's population (552 [2018]) is boosted substantially by seasonal workers employed to work in the vineyards of the Awatere Valley. Hazards which could significantly impact Seddon include plant pest/disease, earthquake shaking, wildfire, and flooding which can cut off access to the town. The Seddon community workshop was held on the 22nd of August 2023 at the Awatere Memorial Hall. The workshop attracted 15 attendees of varying demographic and lasted approximately 1.5 hours. The following questions were asked to the participants.

Activity: How have disasters (earthquakes, COVID-19 pandemic, flooding, etc.) impacted your community in the past?

Social impacts

- Disrupted sleep, e.g., slept outside/brazier.
- Afraid to be in own home e.g., anxiety.
- Cut off/stuck.
- Fight or flight response.
- Panic.
- Communication – cell phone coverage cut, satellite preferred. Need for local radio and alternate communications.
- People moved here [Seddon] following the Christchurch earthquakes and then moved back or elsewhere after they experienced disasters in Seddon.
- Behavioural change required, e.g., keep on top of medication and supplies.
- Disrupted medical appointments.
- During COVID-19 the seasonal workers couldn't get home.
- Disruption to freight and post including essential supplies.
- Support networks created – RSC workers.
- School disruption/social contact lost.
- Lack of knowledge/resources for mental health (immediate and delayed health issues).
- Events have brought neighbours together.
- Reduced access to Blenheim and access to services – medical help, fire brigade, food.

Impacts to the natural environment

- Coast rose and blocked stream mouths. Coastal rise impacted pāua and crayfish.
- Impacts to fisheries.
- Impacts to the dam and creek.
- Subterranean layer at salt works cracked.
- Fires from trains in the dry season.

Economic impacts

- Not a lot of impact.
- Did create extra work e.g., building industry/wineries.
- Businesses rely on the road traffic in Seddon.
- Local cafes fed road workers.
- Very reliant on SH1 for trucking transport (Redwood + Taylors no good).
- Access to markets for farmers was limited.
- Wet weather during salt harvest meant no harvest in 2023.
- COVID/Earthquakes affected the harvest of grapes.
- Border closures impacted worker availability.
- Disruptions to freight and export.
- Harvest/stock.
- Unable to work – financial stress and mental stress.

Impacts to the built environment

- Roads closed SH1/Awatere.
- SH1 between Awatere River and Dashwood closes during big floods.
- Chimneys, bridge approaches damaged changed. Damage to brick homes.
- Power outage surprisingly short time - 24hrs. Lines company reacted quickly.
- Hard getting resources into the community.
- Businesses closed.
- Red stickered homes
- Bridge damage.
- Seddon water not affected by 'quake but Ward supply destroyed.
- Fires have burnt areas of natural significance.

Activity: What are the top three hazards which affect Seddon the most?

Group 1	Group 2	Group 3	Group 4
1. Earthquake	1. Fire/Drought	1. Grape pest/disease	1. Fire/drought
2. Fire	2. Earthquakes	2. Quakes	2. Earthquake
3. Rain/Storm	3. Shutting SH1/ local roads due to flooding and crashes	3. Fires	3. High winds/storms
		4. Drought	

Activity: How resilient is Seddon?

A series of resilience indicators were developed across the four environments. Indicators were developed using a mix of research regarding resilience factors and indicators as summarised in Becker et. al (2013)[1], elements from the NEMA Risk Assessment DGL, and information from stakeholder interviews.

Participants were asked to consider how these indicators related to their community and to individually mark on the sheet what that meant for their community's level of disaster resilience. The participants were encouraged to edit or add to the indicators if they didn't work for their community – commentary from the participants is added to the table in *italic* and lines are used to show the spread of scoring by participants.

The purpose of the assessment was to understand how the community views their level of resilience, to see where the biggest gains can be made when building resilience, and to help ground truth the results of the regional hazard risk assessment with the community – it is not to provide a 'score' or to grade the community. Scoring is subjective and no doubt influenced by factors such as prior experiences in disasters and risk perception.

1 Becker, J., & Paton, D., & McBride, S. (2013). Improving community resilience in the Hawke's Bay : a review of resilience research, and current public education, communication, and resilience strategies.

Social environment

Indicator	Low	Medium	High
Degree of community connection/cohesiveness. Considers: • Presence of and participation in community networks and groups. • Community communication networks, e.g., Facebook pages, newsletters, regular hui			
Presence of focal points in community, e.g., halls *(swimming pools, schools)*. Access to- and availability of- health and wellbeing services. Considers access to: • Emergency services • Community organisations/volunteer services *(We need more people)* • Fast moving consumer goods.			
Dependency / concentrations of vulnerable groups in community – refugee centre, aged care, or residential care facilities for the disabled. *(RSE, semi-permanent residents at campground, schools/pre-schools, groups are available to help IF we know who needs help)*			

Built environment

Indicator	Low	Medium	High
Community vulnerability to lifeline infrastructure loss (communications, energy, transport, and water). Considers: • Impact of past events • Alternate/back-up lifelines in community			
Transport access to the community. Considers: • Number of access routes and their vulnerability *(SH1 – Main Access, 3 passes)* • Impact of past events and restoration timeframes			
Number of buildings and housing at risk from flooding, liquefaction, or tsunami. Considers: • Presence of earthquake prone buildings in community • Strengthening work undertaken following previous hazard events *(Not much of a problem, not many affected by tsunami, or liquefaction)*			

Economic environment

Indicator	Low	Medium	High
Diversity of local economy. Considers reliance on sectors exposed to hazard events.			
Historic economic losses and impacts in community.			
Degree of collaboration *(and community)* shown between businesses to keep operating through past events.			
Household ability to cope with economic disruption. Considers: • Deprivation levels in community • Flexibility of key sectors to work from home/ other locations			

Natural environment

Indicator	Low	Medium	High
Presence of rare and endangered flora and fauna species, susceptible to hazards.			
Ability of community to adapt to the impacts of climate change.			

- **Communication/collateral**
  - Get on the same page regarding official information – what we should do in an emergency.
  - Ensure communication is clear.
  - Develop a booklet that landlords can give to tenants, welcoming them to Seddon and including disaster preparedness information e.g., volunteer orgs, community groups, hazard vulnerabilities (initiative suggested twice).
  - A CDEM Booklet.
  - Mailbox drops.
  - Sponsor a community noticeboard which is a dedicated place for people to put notices/swaps/childcare (one for each side of the rail tracks).
  - Look at how we can communicate effectively in our community.
  - Put the Community Response Plan booklets at the Information Centre for people who want a printed copy.
  - Have groups working together positively with the same message, common goals, and working within the community.
- **Community resources and skills**
  - Put a flood gauge just north of Seddon on SH1 showing flood depth on the road to enable early road closures and prevent stuck vehicles.
  - Understand who has medical knowledge in the community.
  - Use the foodshare for defrosted freezers in an emergency.
  - Identify who has backup generators, solar power and Starlink in the community.
  - Law and Order/Police/Community Head/Authority in the community
  - Directory of resources / Community directory for Seddon, e.g., newsletter type.
- **Plans and arrangements**
  - Get contractors to touch base with Recognised Seasonal Employer (RSE) workers when disasters happen.
  - Develop a plan for when the grocery store runs out of food (if Seddon is isolated).
  - Rural health hub visits to the community (initiative suggested twice).
- **Other**
  - Re-instate rural community groups.
  - Get more people involved in CDEM.
  - Establish programmes that support RSE workers and new residents in Seddon to integrate into the community.

Seddon workshop results

The Seddon community have been through several recent and significant hazard events which have impacted (and in some cases, continue to impact) the community across all four environments (social, built, natural and economic). The hazards which most concern workshop participants were wildfire, drought, and earthquake. Future hazard education and reduction initiatives in these areas, collaborating with Fire and Emergency NZ, MPI and programmes such as AF8 are therefore likely to support resilience in Seddon.

Seddon can be easily isolated, with limited access routes in and out of the settlement –flooding north of Seddon on SH1 often closes the road, impacting freight and commuting. An initiative to put a flood gauge on the road was suggested at the workshop to inform road users and road closures. As the settlement can be isolated, workshop participants also suggested several planning initiatives relating to food supply and identifying skilled personnel (e.g., medical professionals) which may be able to be integrated into future Community Response Planning. Access to- and availability of- health and wellbeing services was marked by participants as having low resilience – there are no permanent medical facilities in the community.

Several initiatives were suggested relating to communications and the distribution of collateral such as booklets and guides. The local I-site was mentioned as a potential location to keep printed material to ensure it's distributed to those who do not have access to internet or want printed copies.

Participants determined that there was relatively low building resilience in Seddon when compared to the regional hazard risk assessment results where past strengthening work following the Seddon earthquakes in 2013 was considered across a range of hazards. Promotion of EQC messaging and guidance on strengthening buildings may therefore be appropriate for this community.

Linkwater

Queen Charlotte and Pelorus Sounds. Hazards which could significantly impact Linkwater include severe weather, earthquake shaking, and wildfire. Although not directly impacted by tsunami the community can become isolated.

The Linkwater community workshop was held on the 23rd of August 2023 at the Linkwater Memorial Hall. The workshop attracted 14 attendees from Linkwater and surrounding areas, lasting for approximately 1.5 hours. The following questions were asked to the participants.

Activity: How have disasters (earthquakes, COVID-19 pandemic, flooding, etc.) impacted your community in the past?

Social impacts

- No sporting events.
- School closures and loss of school community whilst closed.
- No access to medical services or medicines.
- No mail delivery or postal services – emergency supplies disrupted.
- Cost of living increases due to all the problems.
- No access to farm animals by farmers, causing stress to the animals and farmer.
- Brought some communities closer together.
- Ambulances won't come to the area.
- Makes people more anxious/ obnoxious.
- Rain anxiety.
- People look to blame things or people for hazard impacts.
- Has made some people withdraw.
- Children impacted by not seeing friends at school.

Impacts to the natural environment

- Waterways changed/washouts.
- Sedimentation to estuaries – smothering of shellfish with silt.
- Erosion/slips/loss of habitat.
- Forestry slash.
- Birdlife patterns changed.
- Debris.
- Rabbits are back.
- Landslides onto private property.
- Debris under bridges.
- Visual impacts of slip scarring.
- Increase in pests (ungulates) due to disruption to pest management.

Economic impacts

- Disrupted access for tankers to dairy farms.
- Disrupted access to forestry and dry stock farms.
- Farmers unable to farm.
- Unable to farm Aquaculture due to silt.
- Loss of courier services.
- Trapped tourists/Loss of tourists/tourists not keen to travel on Queen Charlotte Drive.
- Tourist marketing/advertising misconceptions as area still in state of repair.
- Longer travel time to access facilities and services at a greater personal cost (fuel, time).
- Overall loss of custom for outlets, but changes in spending habits observed (more people buying essentials from local store).
- Some businesses have profited from the adversity.
- Real estate values impacted.
- Insurance cost increase.
- Reduced access to Outward Bound for students and reduced access to normal activity sites.
- Can't get to work.
- Can't access banking when in need of cash.
- No access to tradespeople.

Impacts to the built environment

- Service disruption to roading infrastructure, no road maintenance.
- No water (private and community supplies impacted).
- Loss of power to cell phone tower meant loss of telecommunications.
- Tsunami could mean loss of jetties and earthquakes could make septic tanks inoperable.

Activity: What are the top three hazards which affect Linkwater the most?

Group 1	Group 2	Group 3
1. Flooding	1. Flooding/storms/ winds	1. Earthquake
2. Fire	2. Earthquakes	2. Storm events
3. Earthquake	3. Fires	3. Fire

Activity: How resilient is Linkwater?

A series of resilience indicators were developed across the four environments. Indicators were developed using a mix of research regarding resilience factors and indicators as summarised in Becker et. al (2013)[1], elements from the NEMA Risk Assessment DGL, and information from stakeholder interviews.

Participants were asked to consider how these indicators related to their community and to individually mark on the sheet what that meant for their community's level of disaster resilience. The participants were encouraged to edit or add to the indicators if they didn't work for their community – commentary from the participants is added to the table in *italic* and lines are used to show the spread of scoring by participants.

The purpose of the assessment was to understand how the community views their level of resilience, to see where the biggest gains can be made when building resilience, and to help ground truth the results of the regional hazard risk assessment with the community – it is not to provide a 'score' or to grade the community. Scoring is subjective and no doubt influenced by factors such as prior experiences in disasters and risk perception.

1 Becker, J., & Paton, D., & McBride, S. (2013). Improving community resilience in the Hawke's Bay : a review of resilience research, and current public education, communication, and resilience strategies.

Social environment

Indicator	Low	Medium	High
Degree of community connection/cohesiveness. Considers: • Presence of and participation in community networks and groups. • Community communication networks, e.g., Facebook pages, newsletters, regular hui			
Presence of focal points in community, e.g., halls *(Hall, Pub, School, Outward Bound, School, Holiday Park)*. Access to- and availability of- health and wellbeing services. Considers access to: • Emergency services • Community organisations/volunteer services. • Fast moving consumer goods.			
Dependency / concentrations of vulnerable groups in community – refugee centre, aged care, or residential care facilities for the disabled.			

Economic environment

Indicator	Low	Medium	High
Diversity of local economy. Considers reliance on sectors exposed to hazard events.			
Historic economic losses and impacts in community. *(High sales of residential properties now to holidaymakers – less residents)*			
Degree of collaboration shown between businesses to keep operating through past events. *(Local contractor prepared to help. Should be involved first up)*			
Household ability to cope with economic disruption. Considers: • Deprivation levels in community • Flexibility of key sectors to work from home/ other locations			

Built environment

Indicator	Low	Medium	High
Community vulnerability to lifeline infrastructure loss (communications, energy, transport, and water). Considers: • Impact of past events • Alternate/back-up lifelines in community			
Transport access to the community. Considers: • Number of access routes and their vulnerability • Impact of past events and restoration timeframes			
Number of buildings and housing at risk from flooding, liquefaction, or tsunami. Considers: • Presence of earthquake prone buildings in community • Strengthening work undertaken following previous hazard events			

Natural environment

Indicator	Low	Medium	High
Presence of rare and endangered flora and fauna species, susceptible to hazards.			
Ability of community to adapt to the impacts of climate change.			

- **Facilities and resources**
  - CDEM could give us some resource (i.e., generator, blankets, emergency pod) to allow hall to become an Emergency Hub.
  - Could wire the hall to allow generator connection.
  - Ask that the Hall is our key community hub.
  - Install a basic solar system and battery for the hall.
- **Response**
  - Provide manpower (e.g., other volunteer fire groups when volunteers are not available).
  - Get the community plan made by the community updated.
  - Synthesise an intelligence summary at CDEM of Linkwater's risks/ resources/capabilities.
  - Support ERT and advertise its existence.
- **Communication**
  - More information (clear communication) – newsletters, Facebook pages.
  - Provide reliable contacts in an emergency – say what is happening so there is NO double up.
  - Provide communication methods (not a telephone tree) so people know what resources we have/what to do, e.g., on use an app like Antenno.
  - Sort out VHF/Base radio connection for community so ERT, Fire and Emergency NZ etc., can coordinate and communicate with each Bay.
  - Connect the isolated/separate communities in the area so isolated communities know their 'neighbours'.
- **Hazard education**
  - Incentivise people to come be educated about disasters e.g., host at the pub with a free beer!
  - Education as to what to do in a major forest fire.
- **Roading and infrastructure**
  - Clearing culverts/drains or put in bigger drains. Replace corrugated culverts with plastic.
  - Reinstating a road maintenance 'man' with a shovel!
  - Clear debris under bridges.

Linkwater workshop results

The Linkwater community continues to be affected by the 2022 August severe weather event which significantly impacted the local roading network and traffic volumes through the community, including tourists. The hazards which concerned workshop participants the most were severe weather, earthquakes, and fire. Wildfire education was proposed by the community as a specific resilience building initiative, and so future collaboration with Fire and Emergency NZ in the community may be appropriate. Due to the distance some need to travel to attend community workshops and events, incentives were suggested to increase attendance.

The Linkwater settlement is one of many isolated communities in the Marlborough Sounds, and a key takeaway from the workshop was the importance of Marlborough EM facilitating the connection of neighbouring 'pockets' so that each other's resources and skills can be used in a future emergency. Resourcing the local hall to become a community hub and communicate easily with Marlborough EM in an emergency was another key theme which emerged, suggestions included use of Starlink technology or VHF radio. Providing a means of easily connecting the community in an emergency was another suggestion – it was thought this could be done through an app (e.g., Antenno) or platform like a Facebook community page.

When assessing their level of resilience, there was a large spread in scoring across most indicators. This could be due to the different communities represented at the meeting or differing opinions. Much like Seddon, the Linkwater community has reduced access to medical facilities and services in an emergency. The use of 'fly-in' teams to assess and treat those with medical needs may therefore be a future response consideration for these easily isolated communities, as utilised during the response to Cyclone Gabrielle in Hawke's Bay (2023).

Rārangi

Rārangi is a small town (population 672, 2018 census), approximately 15 minutes' drive north-east of Blenheim on the open coast of Cloudy Bay. Hazards which can significantly impact Rārangi include tsunami, earthquakes and flooding.

The Rārangi community workshop was held on the 24th of August 2023 at the Rārangi Hall. The workshop attracted 11 attendees of varying demographic and lasted approximately 1.5 hours. The following questions were asked to the participants.

Activity: How have disasters (earthquakes, COVID-19 pandemic, flooding, etc.) impacted your community in the past?

Social impacts

- Isolation of vulnerable people.
- Split families.
- Psychosocial impact (fear, anxiety).
- Gained understanding of what to do.
- Access to health services impacted.
- No power = no home heating.
- Being away from our homes when evacuated.
- Flooding isolating families/small groups between bridges (island effect).
- Community spirit developed and grew.
- Basic needs met.
- Limited resources /fuel/power/ food/medical.
- Isolation – no warning systems.
- Lack of communications.
- Anxiety, fear.
- Poor mobile reception at normal times, in the event it was rubbish.

Impacts to the built environment

- Possible damage to the aquifer from flooding (shallow aquifer).
- Saline intrusion, permanent changes to the groundwater table.
- Standing water.
- Pollution of groundwater.
- Contaminants and effluent.

Economic impacts

- Employment affected.
- Loss of income due to reduced certainty of employment.
- Travel impacted.
- Lack of communications reduced ability to make decisions.
- People not being able to get to work.
- Essential supplies.
- Zero – mostly retired community.

Impacts to the natural environment

- Housing destroyed.
- Damaged Roading, bridge infrastructure, water, power, etc.
- Loss of electricity.
- Bridge damaged = community isolation.
- Downed powerlines were a barrier for evacuating Pembers Rd.
- Local stream flooded, backs up if diversion fails.
- Stopbanks are a vulnerability, risk of overtopping.
- Recent established compound for locals to use for pets at the fire station (fenced area).
- Road damage/closures.
- Building damage/inspection – hard to get qualified people into the community to inspect for safety.

Activity: What are the top three hazards which affect Rārangi the most?

Group 1	Group 2	Group 3
1. Earthquake/ Tsunami	1. Flooding	1. Earthquakes
2. Flooding/weather related	2. Earthquake	2. Tsunami
	3. Tsunami	3. Flooding
	4. Fire	

Activity: How resilient is Rārangi?

A series of resilience indicators were developed across the four environments. Indicators were developed using a mix of research regarding resilience factors and indicators as summarised in Becker et. al (2013)[1], elements from the NEMA Risk Assessment DGL, and information from stakeholder interviews.

Participants were asked to consider how these indicators related to their community and to individually mark on the sheet what that meant for their community's level of disaster resilience. The participants were encouraged to edit or add to the indicators if they didn't work for their community – commentary from the participants is added to the table in *italic* and lines are used to show the spread of scoring by participants.

The purpose of the assessment was to understand how the community views their level of resilience, to see where the biggest gains can be made when building resilience, and to help ground truth the results of the regional hazard risk assessment with the community – it is not to provide a 'score' or to grade the community. Scoring is subjective and no doubt influenced by factors such as prior experiences in disasters and risk perception.

1 Becker, J., & Paton, D., & McBride, S. (2013). Improving community resilience in the Hawke's Bay : a review of resilience research, and current public education, communication, and resilience strategies.

Social environment

Indicator	Low	Medium	High
Degree of community connection/cohesiveness. Considers: • Presence of and participation in community networks and groups. • Community communication networks, e.g., Facebook pages, newsletters, regular hui *(Some room for improvement. Social media is good for speed but not everyone has it.)*			
Presence of focal points in community, e.g., halls. Access to- and availability of- health and wellbeing services. Considers access to: • Emergency services • Community organisations/volunteer services. • Fast moving consumer goods. *High resilience – with Fire + First response* *Low resilience – with Health + Ambulance*			
Dependency / concentrations of vulnerable groups in community – refugee centre, aged care, or residential care facilities for the disabled. *(Older vulnerable folk who need assistance in the community)*			

Natural environment

Indicator	Low	Medium	High
Presence of rare and endangered flora and fauna species, susceptible to hazards. (*Beachfront reserve, wetlands in community)*			
Ability of community to adapt to the impacts of climate change.			

Built environment

Indicator	Low	Medium	High
Community vulnerability to lifeline infrastructure loss (communications, energy, transport, and water). Considers: • Impact of past events • Alternate/back-up lifelines in community			
Transport access to the community. Considers: • Number of access routes and their vulnerability • Impact of past events and restoration timeframes			
Number of buildings and housing at risk from flooding, liquefaction, or tsunami. Considers: • Presence of earthquake prone buildings in community • Strengthening work undertaken following previous hazard events			

Economic environment

Indicator	Low	Medium	High
Diversity of local economy. Considers reliance on sectors exposed to hazard events.			
Historic economic losses and impacts in community.			
Degree of collaboration shown between businesses to keep operating through past events. *(Minimal business presence in community)*			
Household ability to cope with economic disruption. Considers: • Deprivation levels in community • Flexibility of key sectors to work from home/ other locations			

- **Infrastructure**
  - Road signs regarding speed and current conditions.
  - Better cell phone coverage.
  - Backup generators for community water schemes.
  - Better infrastructure maintenance.
  - Strengthen bridge approaches and bridges.
  - Clear/maintain culverts and drains.
  - Assign a designated helicopter landing pad for emergencies– tennis courts suggested.
  - Reduce the risk of fallen power lines in a disaster (only one way out of community, these can impede access).
- **Warning and informing**
  - Improve fire station siren reach for residents away from the beachfront (i.e., to the west).
  - Signage to educate visitors at each beach entrance about local hazards – tsunami, earthquakes, 'long strong, get gone'.
  - Develop a tsunami alert system.
  - Install another signposted walking evacuation route for tsunami (that's not the only road in and out of community – need another option).
- **Preparedness**
  - More newsletters/brochures.
  - More community meetings.
  - Better pharmaceutical supplies i.e., storage with fire brigade?
  - Simple basic communication/education on what the plan is in each emergency.
  - Assist elderly to understand what to do – large retired population in community.
  - Assist with enthusiasm for 'community groups' so we can divert 'new blood' into emergency management.
  - Have paper copies of essential information for households available at the fire station.
  - Get people to be pro-active in taking responsibility for themselves being prepared.
- **Other**
  - Public transport options for the community.

Rārangi workshop results

Rārangi has most recently been impacted by the August 2022 storm event which led to the evacuation of some properties and isolation of the community. The community has a large retiree population and its own Civil Defence team. Similar to Seddon, workshop participants noted that the elderly in the community prefer paper copies of preparedness collateral which could be stored at the fire brigade – a central gathering point in the community.

Hazards which concerned workshop participants the most included earthquake, tsunami, and flooding. Of note during the workshop was that participants often used the term 'tidal surge' in place of tsunami – further hazard education regarding the difference between wind waves, storm surge and tsunami may be appropriate in this community.

Rārangi has a community operated water scheme and the resilience of this to emergencies was frequently discussed during the workshop. The local aquifer is shallow and therefore exposed to contamination (tsunami and flooding), land uplift or subsidence impacting bores (earthquakes) and saltwater intrusion (climate change). Backup generators for the scheme were suggested as a resilience building initiative (bores rely on electricity to pump).

Roads into the community are also likely to be impacted by hazard events – participants suggested road signs regarding speed and conditions, designating the local tennis courts as a helicopter landing pad and increasing the resilience of power lines which often block road access as resilience building initiatives. Like Seddon and Linkwater, workshop participants in Rārangi noted they had low resilience in terms of access to medical and health services due to their likelihood of being isolated.

Discussion

This project has adopted a strategic and unique approach to identify how the disaster resilience of individuals, communities, and the Marlborough region can be increased. With recent disasters continuing to impact the resilience of Marlborough communities, and the potential for future impacts to their resilience (such as the increasing impacts of climate change), targeted initiatives are imperative to increasing resilience within communities and getting the most value out of Marlborough EM resources.

Risk assessment process

A regional-level risk assessment utilising the NEMA Director's Guideline for Risk Assessment: Guidance for CDEM Group planning [DGL 23/22] was conducted at the outset of the project to help identify the main hazards within the region and their consequences. Identifying the consequences of hazards across the four environments (social, built, economic and natural) supports the identification of targeted hazard specific resilience building activities.

The process was conducted through interviews with the Marlborough EM team and key stakeholder representatives within each of the four environments to help determine risk ratings for each hazard consequence element. While this provides a high-level representation of regional risk, it is only representative of the views of those who were involved in the assessment process. As part of future work within Marlborough EM, it is strongly suggested that this work be further refined as part of the Group Plan review process to help understand specific consequences of hazards upon the communities of the region.

The risk assessment has shown that earthquakes, tsunami, and biosecurity threats (that can significantly affect the primary industries and economy in Marlborough) present the highest risk in terms of hazard consequence to the region. The analysis of earthquake events, including an Alpine Fault event, shows significant consequences are anticipated to occur across all environments. Of key concern is the impact of these events on communities in Marlborough, as impacts on access to health and wellbeing services, psychosocial and societal impacts are anticipated to be significant. Also of note is the anticipated impact of the event on the natural environment, such as river aggradation, stopbank damage, and freshwater quality impacts (sedimentation), and how this impacts Marlborough's key economic sectors (tourism and primary industries).

Across all hazards, consequences with the highest level of risk have been determined. This can help inform future resilience initiatives, such as targeted public education. For example, within the social environment 'injuries and illness' and 'impacts to temporary populations' were identified as the highest risk consequences across all hazards. Continuing with public education campaigns regarding the right life safety actions to take, promoting EQC messaging of 'fix, fasten, forget', and working with tourism providers and RSE workers to increase disaster resilience of these temporary populations may help reduce risk in these areas.

Social environment stakeholder workshop

While a number of community stakeholders and government agencies were engaged in the process through the social environment stakeholder workshop, the project team was not able to fully engage all potential community stakeholders to understand influences upon resilience building within the region. This included the disability sector, migrant and RSE workers, aged communities, small and medium businesses and cultural/religious representatives. While many of these groups have been engaged in other aspects of Marlborough EM work, there is potential in the future to focus work with these sectors on disaster resilience building.

Community workshops

Three community workshops were held in Seddon, Linkwater and Rārangi to gain each community's perspectives on how disasters have impacted them in the past, their level of disaster resilience and ideas they had for improving disaster resilience both in their community and the region. Outcomes from these workshops include an understanding of how these communities have been, and in some cases continue to be, impacted by recent disasters. Workshop participants suggested ideas for increasing resilience in their communities, many of which appear to be 'low hanging fruit' and some consistent across all three communities. In addition, understanding each community's perspective on their 'top' hazards will be useful to inform future engagement, hazard education, and public information campaigns.

A key learning from these meetings would be ensure the resilience indicator tables include 'plain English' rather than technical/scientific language, and to utilise all community networks when advertising the meetings to get a good cross section of the community in attendance. In addition, it should also be noted that the suggestions for resilience building in these communities are based upon the views of those who attended the workshops, and therefore cannot be taken as fully representative of the entire community. It is suggested that where practicable, further community workshops are conducted in individual communities across the region to help the continued understanding of disaster resilience building.

Outcomes of the project

Twenty-eight ideas for resilience building initiatives sourced through stakeholder interviews, workshops and community meetings are presented in the 'Regional and local context' section of this report. Initiatives span a wide range of categories including public education campaign ideas, flood modelling, further development of online CDEM platforms, and building the resilience of businesses within the region (particularly primary sector entities). As these are informed by stakeholders and the case study communities (Linkwater, Seddon, Rārangi), it is likely implemented ideas will have more buy-in and contribute to meaningful gains in resilience.

In addition to the regional results, opportunities to further enhance disaster resilience with iwi, hapū, and marae have been identified through discussion with the Marae Emergency Management Team (chaired by the Te Kotahi o Te Tauihu Charitable Trust). These opportunities include continuing to engage with the team and trust to build on relationships formed in recent emergencies.

The intention of Marlborough EM is to use the results of this project to develop a five-year resilience strategy and work programme for the region, however many findings are also applicable to the Marlborough EM Group Plan which is currently in review. Further stakeholder engagement through the review process of the Marlborough EM Group Plan will be used to ground truth the results of the regional hazard risk assessment and to prioritise the suggested activities and initiatives within this report. Further engagement with communities of interest and stakeholders unable to participate in the project to date will also help to further refine suggested activities and the development of the resilience work programme and Group Plan.