

Canterbury Climate Change Risk Assessment



Summary
Report



Foreword

Climate change is the biggest environmental challenge of our time. It is already affecting us, and although we must take mitigation actions now, it will have broad and ongoing implications for all of Aotearoa New Zealand, across many generations.

Regardless of efforts to reduce emissions, science tells us that some aspects of climate change are already determined for this century, such as the sea level rising.

We need to understand the impact that climate change will have on our environment, and the risks and opportunities associated with it. Doing so now allows us to best plan for the future.

The Canterbury Climate Change Risk Assessment (CCCRA) has been designed to build a shared understanding of climate change risks across Waitaha/Canterbury, and to help us prepare and respond effectively.

The assessment centres around a framework that aligns both a Te Āo Māori worldview, and the National Climate Change Risk Assessment (NCCRA) framework. The NCCRA, released by the Ministry for the Environment in 2020, gave the first national picture of the risks we face from climate change.

The CCCRA was tasked to the Canterbury Climate Change Working Group, which has been set up by the Canterbury Mayoral Forum. This builds on a risk screening undertaken at the Canterbury Mayoral Forum's direction in 2019, which identified priority risks to form the basis of this work.

This project has been supported by a Ngāi Tahu Papatipu Rūnanga Steering Group. This Steering Group advised and supported the project team to develop a Te Āo Māori risk assessment framework to ensure the project was fit-for-purpose and reflected Waitaha/Canterbury and Ngāi Tahu.

Mayor Sam Broughton
Chair, Canterbury Mayoral Forum



Mayor Dan Gordon
Chair, Canterbury Climate Change
Steering Group





Te Tīmatanga – Introduction

*Kei a te pō te tīmatataka mai o te
waiatataka mai o te atua*

Nā Te Pō, ko Te Ao

Nā Te Ao, ko Te Ao Mārama

Nā Te Ao Mārama, ko Te Ao Tūroa

Nā Te Ao Tūroa, ko te Kore te whiwhia

*Nā te Kore te whiwhia, ko te Kore te
rāwea*

*Nā te Kore te rāwea, ko te Kore te
tāmaua*

Nā te Kore te tāmaua, ko te Korematua

*Nā te Korematua, ko te Mākū Ka moe i a
Māhoranuiātea, ka puta ko Raki*

*Ka moe i a Pokohārua te Pō Ka puta
ko Aoraki, ko Rakamamao tāna ko
Tāwhirimātea*

Ko te aitaka o te takata

Ki te whai ao, ki te ao mārama

Ki te ao tūroa e tū nei

Tihei Mauriora!

Ngāi Tahu values and beliefs define all things from the time of nothingness – Te Kore, through the vast ages of darkness – Te Pō, to the first ever glimmer of light – Te Ao, to the longstanding light – Te Aotūroa, through to the emergence of moisture – Te Mākū.

This shared whakapapa reinforces the tribal philosophy that all things are from the same origin. The welfare of any part of the environment determines the welfare of the people.

It is through whakapapa that all things are intricately linked, as well as having their individual place in the world. Ultimately, it is whakapapa that connects people to each other, to their ancestors, to the land and natural resources. For Ngāi Tahu, it is whakapapa that elucidate their descent from the gods of creation.

Ngāi Tahu lay claim to the same whakapapa as other iwi, through Rakinui and Papatūānuku and connection to their descendants. Whakapapa accounts for the way in which the earth, sky, oceans, rivers, elements, minerals, plants, animals, and people have been created. Whakapapa explains the very origins of everything, past and present, within the Māori world. It is the foundation upon which all things are built, the web that connects all things together, the anchor which holds all things in place and the vehicle by which all things link back to the beginning of time. Whakapapa binds Ngāi Tahu to the mountains, forests and waterways and life supported by them and the Taiao (environment). All things are considered to have a mauri (life force), to be living and to have a genealogical relationship with each other. People are therefore related to the natural world.

Karakia based on 'Te Waiatanga mai o te Atua: South Island Traditions' original manuscript authored by Matiaha Tiramōrehu in 1849. Translated and edited by Manu Van Ballekom and Ray Harlow in 1987, and published by the University of Canterbury. Te Maire Tau, Anake Goodall, David Palmer, and Rakiihia Tau (1990). Te Whakatau kaupapa: Ngāi Tahu resource management strategy for the Canterbury Region. (Aoraki Press, Wellington)

The world's climate is changing like we have never seen before due to the effects of increasing greenhouse gas emissions. Within this greater context, Canterbury's climate is also changing.

Changes in our climate are projected to continue into the future, and their severity, impact and frequency will depend on global efforts to curb greenhouse gas emissions.

Currently, climate change modellers use a set of standard scenarios called Representative Concentration Pathways (RCPs) to measure and explain the impacts of climate change.

The CCCRA was developed using RCP 8.5, which indicates the likely outcome of climate change impacts under a high-end scenario where greenhouse gas emissions continue to rise over this century. This is sometimes referred to as a business as usual scenario.

The National Institute of Water and Atmospheric Research (NIWA) has developed national and regional projections based on RCP 8.5, which have been used as a basis for the CCCRA.

These projections show that Canterbury will see warmer temperatures, including an increasing number of hot days and an overall increase in temperature ranges, as well as decreasing frosts and snow days.

The frequency of extreme weather events is also likely to increase, with drought and sea level increases also expected.

These projected changes are likely to cause natural hazards such as flooding, wildfires and wind damage.

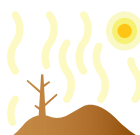
Summary of climate change projections for Canterbury by 2100



The sea level is projected to rise by about 0.8m above present day levels.



Wildfires will become more likely as hotter, drier summers occur. Rural areas will be more highly exposed.



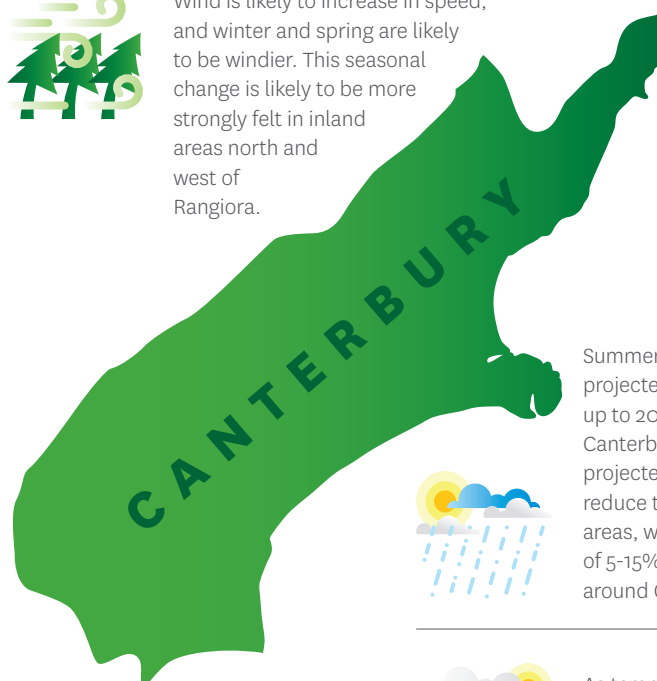
Drought potential is likely to increase across most of Canterbury.



Hot days are those over 25°C. It is projected that there will be between 20 and 60 more hot days annually by 2100.



Wind is likely to increase in speed, and winter and spring are likely to be windier. This seasonal change is likely to be more strongly felt in inland areas north and west of Rangiora.



Summer rainfall is projected to increase up to 20% in the inland Canterbury Plains. It is projected to gradually reduce towards coastal areas, with a decrease of 5-15% in the area around Christchurch.



An increase in winter rainfall of 15-40% is expected in the eastern, western, and southern parts of the region. Winter rainfall has the potential to be more strongly associated with storm events.

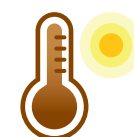
As temperatures rise, there will be less snow days across the region.



Extreme weather events (e.g., severe storms) are likely to happen more often.



It is projected that there will be 20-50 fewer cold days per year, where the temperature is at or below 0°C.



Our annual mean temperature is set to rise by 1.5 - 3.5°C. Overall, our maximum daytime temperatures will be up 2-5°C. Canterbury's alpine and subalpine areas could be 5-6° warmer.

An integrated framework was developed for the CCCRA, in collaboration with a Papatipu Rūnanga Steering Group, to provide a clear understanding of key climate risks to the Canterbury region and our communities.

The development of this integrated framework is aligned with the NCCRA framework and centres around a Te Āo Māori worldview.

The framework has been gifted the name 'Te Tūtei o Te Hau: The Surveillance of the Wind'.

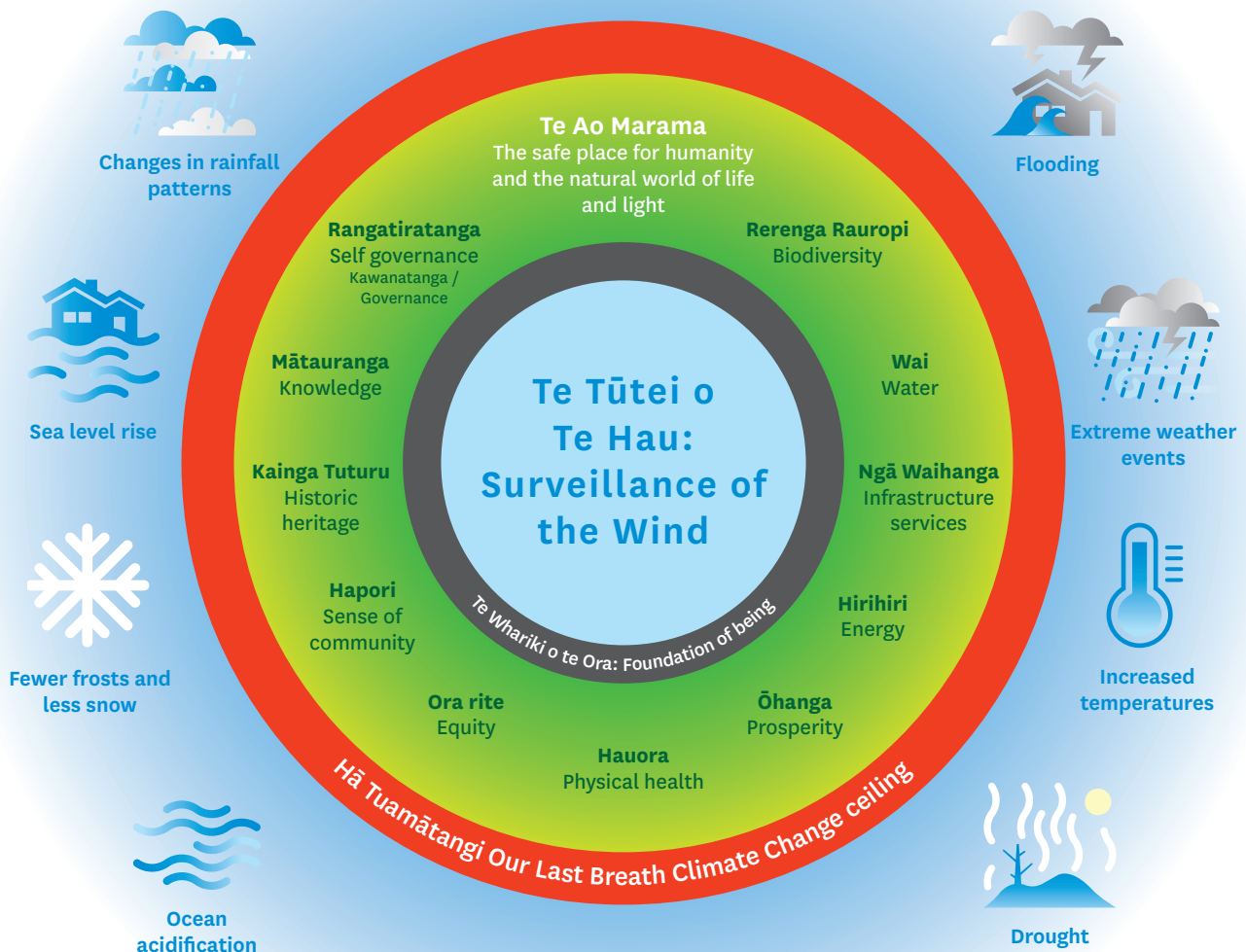
When considering the effects of climate change, observations in the CCCRA have been considered against this framework, our alert system, for understanding climate risk.

Te Whāriki o te Ora: The black ring represents whakapapa, or genealogical connection, that extends from the spiritual realm to that of the human domain. It recognises that humans cannot exist without basic needs and a social foundation.

Te Ao Mārama: The green ring represents the area in which humans can exist when we are functioning within the capacity of our ecosystems. Ngā pono (the values) identified within this circle are critical for us to understand and respond to when considering climate risk.

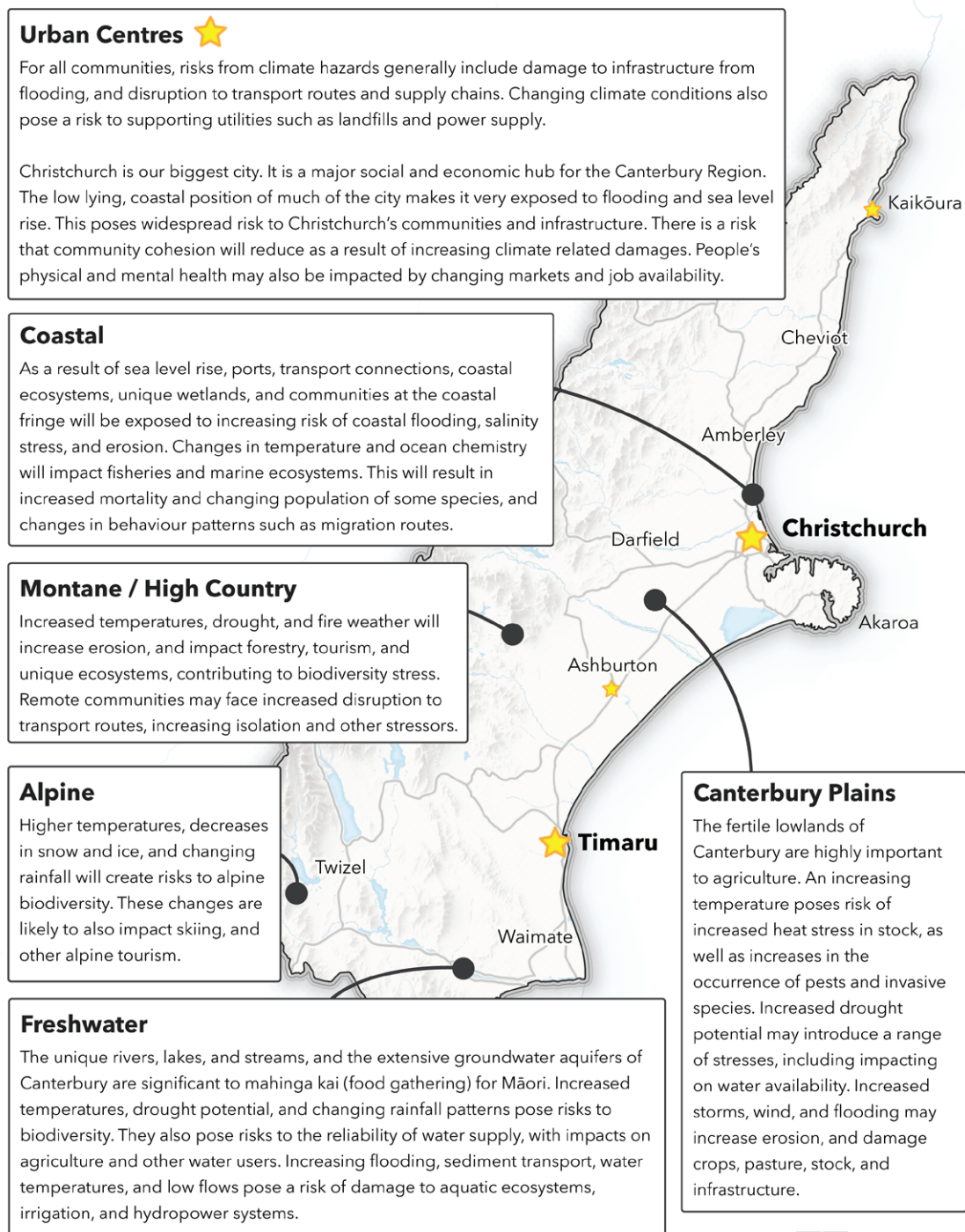
Hā Tuamātangi: The red ring represents the upper limit in which humans, environments and ecosystems can continue to exist. Beyond this boundary, it is no longer possible to respond to risks proactively.

Shown outside the rings are the key climate impacts that we face.



The integrated CCCRA framework developed in collaboration with a Papatipu Rūnanga Project Steering Group.

The challenges of climate change will occur in different ways across the region. The large land area and geographic diversity of Canterbury means that some risks will be more relevant to certain areas.



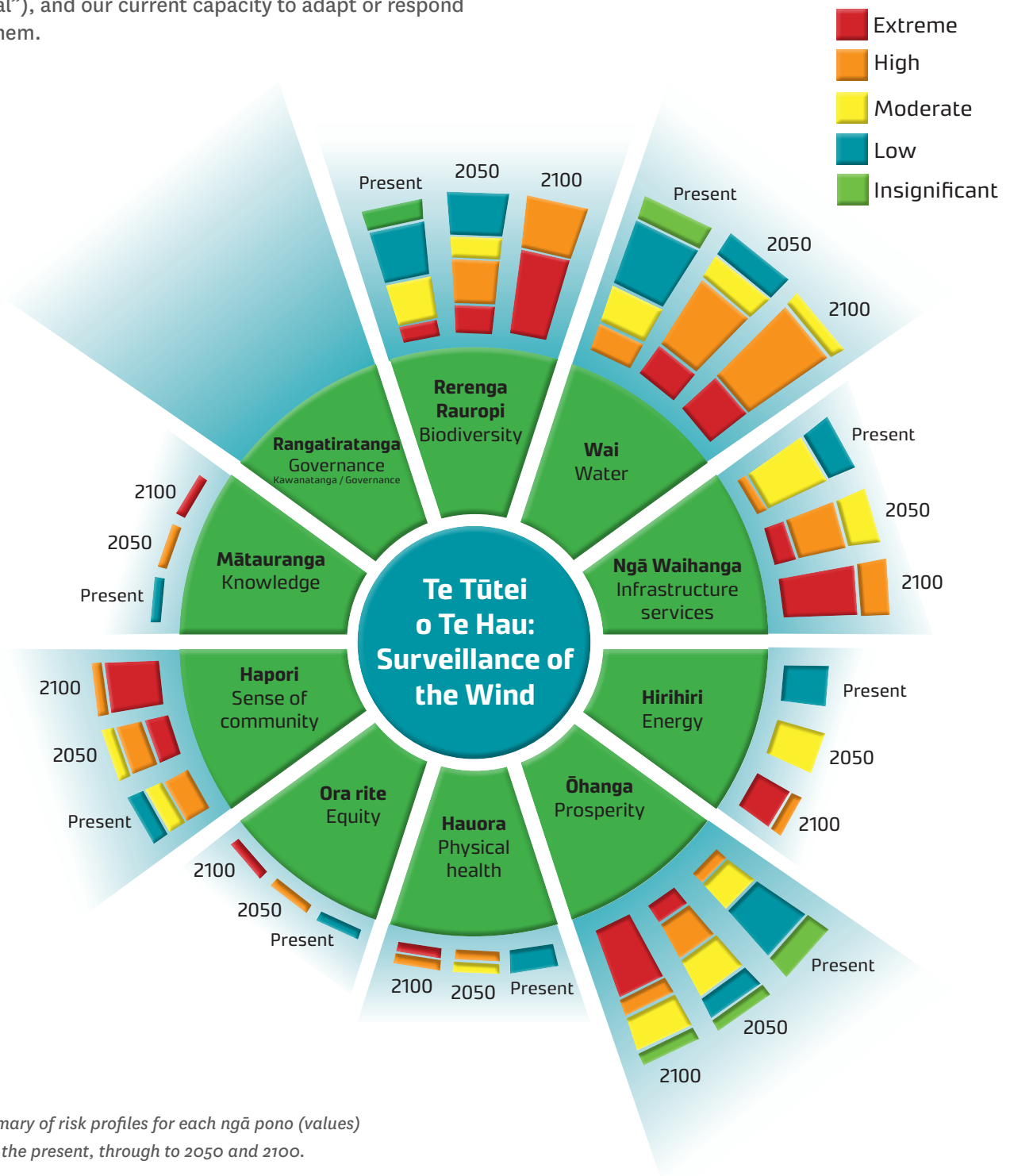
The overall findings in the CCCRA show that climate change risks are threatening all eleven ngā pono (values) in the framework, and that direct and indirect risks will increase over time.

While many present risks are currently rated as insignificant or low, by the year 2100 there are high or extreme risks against all values.

Risks have been rated based on the likelihood of being exposed to hazards under RCP 8.5 (“business as usual”), and our current capacity to adapt or respond to them.

Highly rated risks include those to biodiversity, water and infrastructure services. Present-day risks that are rated extreme include those related to water supply and irrigation.

The CCCRA technical report provides an in-depth assessment of the climate change impacts across each of the eleven values, as well as the potential impacts to individuals, communities and businesses.



Summary of risk profiles for each ngā pono (values) from the present, through to 2050 and 2100.

In addition to the challenges and risks that climate change presents, it may provide us with some opportunities. It's important to note that opportunities cannot be considered in isolation, but must be considered as part of the broader CCCRA, as the risks often outweigh the benefits.

The projected increase in temperature, and reduction in cold days in winter, could provide the following opportunities:

Warmer living conditions in the winter that reduce energy consumption and improve wellbeing.

A longer growing season could present opportunities for the horticultural industry to increase productivity, reduce crop waste, and grow different varieties within new locations.

Increased water storage from winter rainfall.

Less disruption to our transport networks due to less snowfall and icy conditions.

An increase in both air and ocean temperatures may provide a new environment for new marine fish species, potentially providing an opportunity to the fisheries industry.



Where to from here?

The work to understand the climate change risks we face doesn't end here.

The information we now have from the CCCRA gives us an in-depth, technical overview of the risks and opportunities associated with climate change in Canterbury.

The Canterbury Mayoral Forum will continue to work with Papatipu Rūnanga and key stakeholders to consider the risks highlighted in this report, and work to prioritise these risks at a local and regional level to help inform future planning by councils.

Understanding the risks and opportunities from climate change now and into the future is a vital step in our efforts to curb its long-term impact in our region.

Notes section



Produced for the Canterbury Mayoral Forum
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