

CLIMATE RISK AND RESILIENCE IN WAITAKI

▶ A SUMMARY OF WAITAKI'S PART IN
THE OTAGO CLIMATE STORY



Otago
Regional
Council

 Aukaha



TE AO
MĀRAMA INC.



About this summary

Climate change is already affecting the Waitaki plains and coastal areas. Coastal erosion, rising sea levels, heavier rainfall, hotter days and longer dry periods are placing more pressure on land, water, infrastructure and local communities.

Waitaki can continue to thrive in the coming decades if we act now to understand and adapt to these changes. This work will be challenging, but done well, it can help build climate-ready communities where people, nature, culture and the economy are resilient.

The Otago Climate Change Risk Assessment (2021) describes the main risks that the Otago region, including the Waitaki plains and coastal area within the Otago region, may face over the coming decades, and what they could mean for everyday life, local businesses and the services communities rely on.

This summary describes Waitaki's part in Otago's climate story, including Kāi Tahu mana whenua knowledge and experiences. It explains how the climate across the Waitaki plains and coast is changing, what these changes mean for local communities, infrastructure, services and natural environments, and what is being done today to build resilience.



Our place

Otago's communities, landscapes, infrastructure and ecosystems are all experiencing the effects of climate change. From the mountains to the sea, climate change is reshaping the systems that support the environment, people, businesses and the services communities rely on.

For the lower and coastal parts of Waitaki, the climate story is shaped by fertile lowlands, braided rivers, and a coastline that provides important habitat for some of New Zealand's iconic coastal wildlife, like the kororā / little penguin. The Waitaki River supports nationally important farming and renewable energy generation, while coastal communities such as Ōamaru and Moeraki show how closely everyday life is tied to the sea.

Farming, cropping, energy generation and tourism all help support the local and national economy. These activities depend on reliable water, healthy land, working roads and functioning infrastructure. These same strengths also make the area vulnerable to flooding, coastal erosion, storm surge, drought and changing water availability.

The Waitaki plains and coastal area includes small towns, rural settlements and dispersed communities, with Ōamaru as a key service centre for the wider district. State Highway 1 and the Main South railway line are important connections for people, freight and essential services between Otago and Canterbury, and State Highway 83 is a critical route inland. When flooding, erosion or storms disrupt these links, the effects can be felt quickly across homes, farms, businesses and supply chains.

Ki uta ki tai | From the mountains to the sea

Kāi Tahu mana whenua hold traditional customary authority and maintain contemporary relationships within this area, determined by whakapapa (genealogical ties), resource use and ahikāroa (the long-burning fires of occupation).

Wai (water) and waka (canoes) feature prominently in Kāi Tahu oral histories. Storms described in oral histories battered and capsized ancestral waka such as Te Waka o Aoraki, Araiteuru and Tākitimu. Neither atua nor tipuna were exempt from the turbulence of a changeable environment, and the pūrākau (stories) remain to remind us of the consequences.

According to Kāi Tahu cosmology, atua shape the balance between land, water, climate and people. A changing climate reflects a shift in the balance between these atua and their domains, which has wide-ranging and severe impacts on us living in Te Waipounamu.

He taura whiri kotahi mai anō te kōpunga tai nō i te pū au. From the source to the mouth of the sea, all things are joined together as one.

Ki uta ki tai is a philosophy that has become synonymous with the way Kāi Tahu think about te taiao (the natural world). While commonly interpreted as 'from the mountains to the sea', ki uta ki tai is about standing on the land and knowing the effects, both positive and negative, in every direction. This ethos reflects the mātauraka (knowledge) that all environmental elements are interconnected and must be managed as such. It is a way of understanding the natural environment, including how it functions, how climate changes may impact it, how people relate to it and how te taiao can be looked after appropriately.

Our climate, now and in the future

The climate of the Waitaki plains and coastal area, both today and in the future, is closely connected to the Waitaki River, the coast, hills and low-lying areas, and how these interact to affect the things we rely on across the Waitaki, like water supply.

The Waitaki area that falls within the Otago region stretches from the tussock grasslands of the Kakanui Range to the coast and north to the Waitaki River. Across these diverse landscapes, different places will experience the effects of climate change differently. Coastal areas like Ōamaru and Kākaunui / Kakanui are more exposed to sea-level rise, storm tides and erosion, while rural inland parts of the plains are more exposed to hotter days and drier conditions, along with more frequent heavy rainfall.

Over time, the Waitaki plains and coast are expected to become warmer, with more hot days and fewer frosts. Rainfall is likely to increase overall, especially in winter, but dry periods may still become harder for farms, stock and water supplies. Heavy rainfalls are expected to become more intense, putting more pressure on drains, roads, bridges, streams and low-lying properties.

Sea-level rise will continue to increase coastal erosion and the impact of storms in low-lying coastal areas, especially north of Ōamaru where parts of the coastline are subsiding. These changes will put more pressure on homes, infrastructure, our iconic wildlife, and the places people care about, making it important to plan ahead.

Emergency management in Kāi Tahu whānau

Severe weather events across the lower plains are already increasing vulnerability to isolation and disruption. Power outages, road damage, and blockages are particularly common in rural areas, heightening the risk of disconnection from critical lifelines, essential services, communication disruptions and key resources.

During previous flood and wind events, access to food has been a significant concern, with road closures disrupting supply chains and limiting the ability of whānau to access and gather natural food resources. Mahika kai areas across the lower plains, including rivers, wetlands, and raupō habitats, can also become unsafe during and after these events due to increased sedimentation and the mobilisation of contaminants. Strengthening the resilience of lifeline infrastructure, protecting and restoring mahika kai, and supporting community-led adaptation approaches will be critical to reducing these risks over time.

Communities across the lower plains do not all have the same ability to prepare for, respond to, and recover from climate-related hazards. Adaptation responses therefore need to recognise the different capacities, resources, and support needs of whānau and sectors across these areas. Some communities will require targeted investment, technical expertise, and sustained support to build resilience and ensure equitable outcomes.

As Mana Whenua Emergency Facilitators working across the takiwā, we believe there is no one solution, no one agency, no one area and the strength remains in our collective Kotahitanga.



Mauriri Kimura-McGlinchey
Mana Whenua Emergency Facilitator | Araiteuru

Angie Hopkinson
Mana Whenua Emergency Facilitator | Murihiku

Key climate change risks in Waitaki*

Risks to community wellbeing, essential services, and regional connectivity where multiple hazards occur together or in sequence, including flooding, drought, wildfire, sea-level rise and ocean change.

Risks to wetlands, freshwater ecosystems, three waters networks, and communities from decreased rainfall, drought, higher temperatures and changing water availability.

Risks to homes, buildings, roads, bridges, critical supply chain connections, productive land, and infrastructure networks from coastal and inland flooding, landslides, extreme weather and erosion.



Risks to forestry, horticulture, pasture, livestock, and native biodiversity from warmer temperatures, increased wildfire conditions, drought, flooding, and changing growing conditions.

Risks to the local economy, primary industries, tourism, fisheries, transport networks, and business continuity from climate-related disruption, higher operating costs, damaged infrastructure and reduced productivity.

Risks to coastal ecosystems, fisheries, tourism activities, buildings, transport routes, and three waters infrastructure from sea-level rise, coastal erosion, flooding and extreme weather.

*Key risks summarised from the Otago Climate Change Risk Assessment (2021).

▼ KEY CLIMATE CHANGE RISKS CONTINUED

Sea-level rise and coastal change

Sea-level rise is expected to make coastal flooding and erosion more common along Waitaki's coast over time. Low-lying places, such as Moeraki, Hampden and the Ōamaru waterfront, are likely to be more exposed during high tides and storm surges. This can put pressure on homes, roads, businesses and coastal infrastructure.

Coastal change will also affect the places and landscapes people value. Rising seas and erosion can damage beaches, estuaries and coastal ecosystems, while also increasing risks to places such as old landfill sites, cemeteries, urupā and recreation areas. For communities along the Waitaki coast, this could mean more frequent disruption, higher repair costs and gradual changes to important coastal places.

Heavier rainfall and flooding

Heavier rainfall is expected to become more common in Waitaki, especially in winter. On the Waitaki plains, stormwater drains, streams, paddocks, roads and low-lying areas may flood more often, affecting rural properties as well as townships such as Maheno and Palmerston.

Along the coast, heavier rainfall events can coincide with rising seas and storm surges to make flooding worse in low-lying places like Kākaunui / Kakanui and the Ōamaru waterfront. During storms, water can exceed stormwater drains, increasing pressure on roads, homes, businesses and important community places. Over time, these events are expected to increasingly disrupt travel, farming, services and daily life across Waitaki.

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Farmland near Maheno

▼ KEY CLIMATE CHANGE RISKS CONTINUED

Changing rainfall and dry spells

Changing rainfall patterns mean Waitaki is likely to see more rain overall, but not evenly through the year. Winters are expected to become wetter, while inland parts of the district may have drier summers compared to today. On the Waitaki plains, this could mean more ‘too much water at once’ events in winter and spring, followed by longer dry periods when people, pastures and waterways need water most.

Dry spells are also expected to affect the plains and coast differently. Coastal areas may have slightly less dry days overall, whereas further inland near the Kakanui Ranges, more dry days and reduced summer rainfall could place pressure on water supplies, and make grasslands, shelterbelts and forestry more fire-prone during hot, dry summers.

Moving old waste back from the sea

Coastal erosion is already affecting parts of the Waitaki coast.

Around Beach Road near Ōamaru and the closed Hampden landfill, old waste sites have been exposed as the coastline erodes and retreats. If left in place, waste could be washed onto beaches and into the sea, affecting water quality, marine life, recreation and the places people care about.

Project Reclaim was completed by the Waitaki District Council in 2024, focused on removing waste from three historic coastal contaminated sites and relocating it to Palmerston Landfill. This reduced the risk of old rubbish and contaminated material entering the marine environment as erosion continues.

This work demonstrates what practical and proactive adaptation can look like. It is not always about holding the line. Sometimes it means moving things out of harm's way before the sea reaches them.



Beach Road, south of Ōamaru



What matters most?

Access and infrastructure

Waitaki's roads, bridges, rail links and coastal access routes are expected to face growing pressure from climate change, especially from heavier rainfall, flooding, sea-level rise, coastal erosion, storm surge and slips. Low-lying coastal areas, such as Kākaunui / Kakanui, Moeraki and the Ōamaru waterfront, are particularly exposed, while rural roads and river crossings across Waitaki may be more often damaged or cut off during intense rainfall and flood events.

Disruption to transport across Waitaki can affect much more than everyday travel. Flooded roads, damaged bridges, rail disruption or erosion near key routes can make it harder for people to get to work, school, healthcare, and emergency support, and can also interrupt freight and delivery of food and supplies. These impacts can be felt strongly in smaller coastal and rural households with fewer alternative routes.

Community wellbeing and resilience

Waitaki communities are expected to face growing wellbeing and resilience risks from hotter days, heavier rainfall, flooding, drought, wildfire risk, sea-level rise and coastal erosion. Low-lying coastal areas are particularly exposed to coastal flooding and storm surge, while inland and rural communities near Macraes and the Kakanui Ranges may face more frequent droughts, fire weather and pressure on water supplies. These changes can affect people's homes, community spaces and cultural sites, as well as the natural places that people value and rely on.

Climate change can also put pressure on the things that help communities cope during hard times. Floods, fires, water restrictions, road closures, power or communications outages, and damage to homes or local services can increase stress, disrupt access to healthcare and support, and raise living costs. Building community resilience in Waitaki will mean more than protecting infrastructure; it will also mean supporting local networks, improving emergency preparedness and keeping people connected.

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Land, water and productivity

Waitaki's rural landscapes and waterways are likely to be affected by climate change through a mix of wetter winters, heavier rainfalls, hotter summers and longer dry spells inland. This means farms and rural communities may have to deal with both too much water and not enough at certain times of year. Floods can wash soil, sediment and nutrients into rivers, damage paddocks, and increase erosion; while drought can reduce pasture growth, put pressure water supply and increase fire risk.

For rural production, these changes can make day-to-day farming and growing less predictable. Sheep, beef, dairy, arable and horticulture operations may face higher costs from feed and water shortages, damaged farm infrastructure, and disrupted access. Healthy soils, reliable water, good drainage and resilient supply routes will become increasingly important to keep local food production and rural livelihoods strong.

Coastal environments and values

The Waitaki coast is already changing, becoming more exposed as sea levels rise and storms push further inland. Around Ōamaru, Palmerston, Kākaunui / Kakanui and low-lying parts of the North Otago coast, coastal flooding, erosion and saltwater intrusion could gradually change beaches, estuaries, wetlands and nearshore habitats. Heavier rainfall inland can also carry more sediment and contaminants into the sea, affecting water quality and the health of fish, seabirds and other coastal life.

The impacts are not just environmental. The Waitaki coastline supports recreation, heritage, mahika kai and tourism, particularly connected to the kororā / little penguin, so damage to coastal areas can affect how people use and connect with these places. Erosion and flooding may also threaten beach access, important infrastructure links and old landfill areas, creating wider cultural, health and community concerns. Looking after Waitaki's coastal values will require early planning and management as shorelines continue to change.



Bushy Beach



The changing coastal environment

Climate change is also having a huge impact on whānau at Moeraki.

They have seven urupā in Moeraki and four of the main ones are right on the high-water mark. They have got some that are being inundated on king tides more often than they used to be, and others that are eroding faster than they ever have.

This means that, periodically, they have kōiwi and caskets being exposed by the more extreme weather we experience now and falling into the sea. From a tikaka perspective, that area below where they fall becomes a wāhi tapu and we cannot access kai there.

A lot of the time it is the most accessible and easiest places to gather kai that become wāhi tapu in these instances, which then impinges on our ability to engage in our mahika kai practices, and in extension, whānau wellbeing.

Justin Tipa (Te Rūnanga o Moeraki)

He waka eke noa | We are all in this waka together

Kāi Tahu mana whenua often perceive climate risk and climate change through a lens informed by te ao Māori values and perspectives.

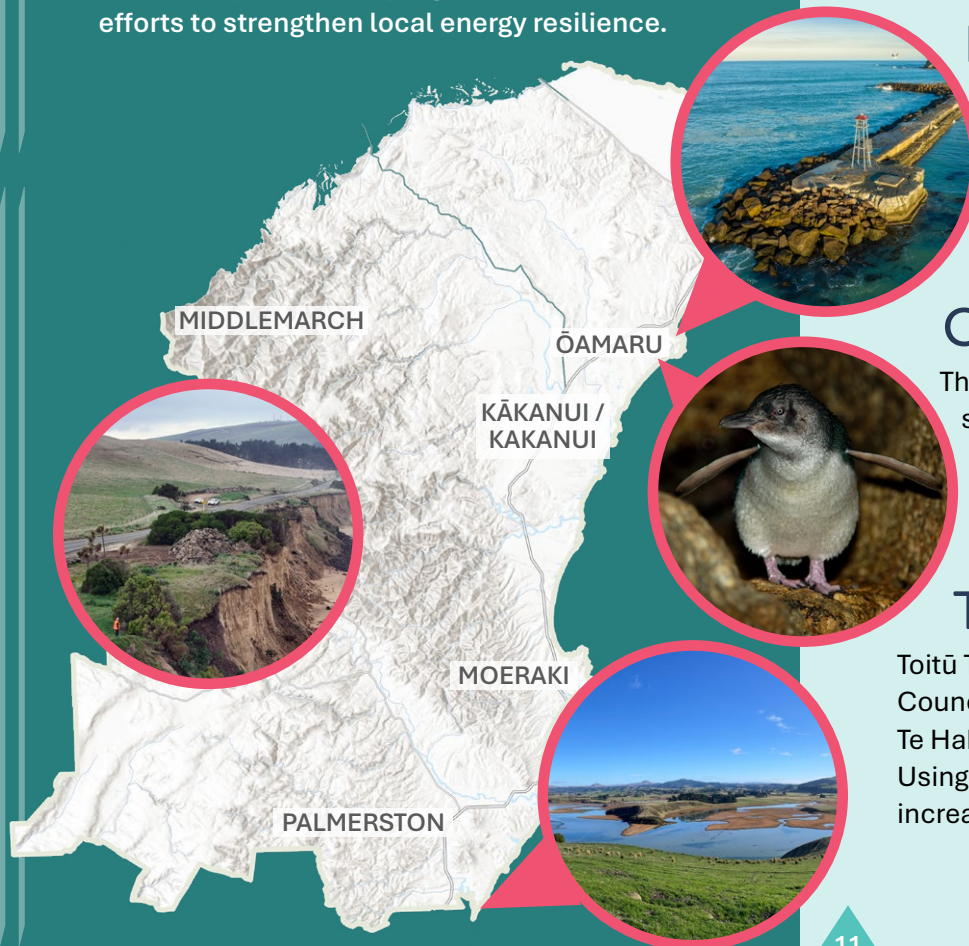
An example of a Kāi Tahu-led approach to climate risk assessment is provided by the South Dunedin Future Mana Whenua Risk Assessment Report, which used core values of mana, mauri, whakapapa and tapu/noa to frame a range of specific risks. While framed as risks to mana whenua values, these also encompassed a broad understanding of risks to South Dunedin, including wider environmental, social and economic risks.

Tying this back to the ki uta ki tai philosophy, climate change is viewed by Kāi Tahu as a disruptor to interconnected systems. Only by bringing a holistic approach in responding to all types of climate risk will our society achieve a fair and lasting transition to a climate-safe future that keeps our collective waka upright and afloat.

What is being done?

Kāi Tahu, councils, landholders, businesses and community groups are already taking practical steps to strengthen resilience across the Waitaki plains and coastal area.

Work is underway to strengthen resilience through initiatives such as native planting projects, community resilience programmes and combined efforts to strengthen local energy resilience.



Restoring the Lower Waitaki

Te Rūnanga o Moeraki is leading Whiria Te Waitaki, restoring sites along the Lower Waitaki River through native planting, weed control, trapping and the work of kaiaka taiao. This supports healthier river margins, native species and mana whenua connection to the awa.

Responding to coastal change

Waitaki District Council is using coastal hazard information to guide decisions about roads, wastewater assets and coastal land. The council recently completed Project Reclaim, a project that was committed to cleaning up waste from beaches to protect our environment and promote a sustainable future.

Protecting Ōamaru Harbour

To protect Ōamaru Harbour, the Waitaki District Council has invested in erosion prevention measures along Ōamaru Harbour's breakwater. This has seen many tonnes of rock and concrete pods being placed along the breakwater in recent years to prevent its erosion.

Caring for kororā in Ōamaru

The Ōamaru little penguin colony combines tourism, conservation and science. Visitor income supports predator control, nesting habitat, rehabilitation, monitoring and research. This helps kororā breed successfully while improving understanding of how coastal wildlife responds to environmental change.

Toitū Te Hakapupu

Toitū Te Hakapupu is a partnership project between Otago Regional Council and Kāti Huirapa Rūnaka ki Puketeraki to restore the health of the Te Hakapupu / Pleasant River catchment, near Palmerston in East Otago. Using nature-based solutions and other intervention, this work is helping to increase resilience to damaging flooding in the area.



Bushy Beach, Ōamaru