

# CLIMATE RISK AND RESILIENCE IN CLUTHA

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



Otago  
Regional  
Council

 **Aukaha**



TE AO  
MĀRAMA INC.



## About this summary

Climate change is already affecting the hills, plains, low-lying areas, coast, and estuaries across the Clutha area. Heavier rainfall, coastal erosion, storm damage and changing seasonal patterns are placing more pressure on farms, roads, water and the places that people call home.

Clutha 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 Clutha area, 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 Clutha's part in Otago's climate story, including Kāi Tahu mana whenua knowledge and experiences. It explains how the climate across the Clutha area is changing; what these changes mean for Clutha's 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 services that communities rely on.

Clutha's climate change story is shaped by its productive farmlands, coastal communities, forested landscapes and strong connections to land and water. From the inland rolling hills and productive plains of Beaumont, Tapanui and Milton to the wild coastlines of Taieri Mouth, Ōwaka and The Catlins area, water connects the district, with the Clutha River/Mata-Au flowing through the landscape.

The natural environment supports much of life and work in Clutha. Farming, forestry, tourism and local communities all rely on healthy soils, reliable water, working roads and essential services. These strengths are also part of Clutha's climate change story. When rivers flood, coasts erode, storms damage roads, or high winds affect power and communications, the impacts can quickly spread across homes, farms, businesses and communities.

Clutha is a large district with many small towns and households spread across the area, connected through strong rural community networks. These connections are especially important as more extreme weather events occur. As climate change brings more pressure from heavy rainfall, flooding, coastal inundation and storm damage, careful planning is critical to keeping our communities connected, safe and supported.

## 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.

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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.

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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

From the Clutha River/Mata-Au and its floodplains to The Catlins coast, the Blue Mountains and farming valleys around Milton, Balclutha, Lawrence and Tapanui, Clutha's climate affects many of the things people rely on, like roads, water supplies, coastal places, wildlife and local businesses.

Different parts of Clutha will experience climate change differently depending on how close they are to the coast, rivers, floodplains and hills. Low-lying areas around Balclutha, Kaitangata, Milton and Waihola are more exposed to heavier rainfall, flooding and drainage systems being overwhelmed. The Catlins and other coastal settlements are more exposed to sea-level rise, coastal erosion and storm events.

Some places are more exposed than others. Coastal communities such as Pounawea, Kākā Point and Ōwaka may face growing pressure on homes, roads, beaches and estuaries. Inland areas, such as Moa Flat and Lawrence, are likely to see bigger changes in temperature, changing river flows, and at times, drier conditions.

Over time, Clutha is expected to become warmer, with higher winds, more hot days and more rainfall overall, especially in winter and spring. Heavy rainfall is expected to become more intense, increasing flood risk in some places. Warmer conditions may bring some benefits for farming, such as better winter pasture growth, but can also create challenges for infrastructure, coastal communities, ecosystems and places that people value.

## 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 Clutha\*

Risks to the local economy, primary production, transport networks, supply chains, and business continuity from climate-related disruption, higher operating costs, infrastructure damage and reduced productivity.

Risks to Clutha homes, buildings, roads, bridges, flood protection schemes, and critical supply chain connections from inland flooding, heavy rainfall, landslips and more frequent extreme weather events.



Risks to freshwater ecosystems, water supply infrastructure, farms, forestry, and communities across Clutha from drought, higher temperatures, reduced water availability and increased water demand.

Risks to coastal and estuarine ecosystems, low-lying farmland, buildings, flood schemes, and infrastructure from sea-level rise, coastal erosion, flooding and extreme weather.

Risks to community wellbeing, livelihoods, natural ecosystems, productive land, and essential services where multiple climate hazards occur together or in sequence, including flooding, drought, heat, wildfire, pests, disease and sea-level rise.

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

## ▼ KEY CLIMATE CHANGE RISKS CONTINUED

### Heavier rainfall and flooding

Heavy rainfall is expected to become more frequent and intense across the Clutha area over time. This means more water flowing in the Clutha River/Mata-Au and its tributaries, and a higher chance of flooding in low-lying places like Lawrence and Milton. Heavier downpours over a short time can overwhelm stormwater drains and flood protection schemes, leading to surface flooding of streets, homes and farmland.

Heavier rain will also affect how water moves through the landscape. Rivers like the Clutha/Mata-Au, Pomahaka, and smaller catchments in places like The Catlins, are expected to carry higher flows, increasing the risk of riverbank erosion, slips and damage to nearby land, roads, bridges, and infrastructure. These impacts can go on to affect farms, businesses, essential services and isolated households.

### Hotter, drier conditions and drought

Hotter and drier conditions are expected to occur more often across the Clutha area, particularly in inland areas like the Clutha Valley, and around Lawrence and Tapanui. Summers will become warmer with more hot days, which can dry out soils more quickly. Over time, this may lead to longer dry spells and drought conditions, putting more pressure on pasture growth, crops and livestock.

As soils dry out and water becomes less available, rivers, streams and groundwater supplies may also be affected, making it harder to maintain reliable water for people, farms and communities. Periods of drought can increase pressure on rural water supplies and raise the risk of fire in grasslands and forestry areas, particularly during hot, windy weather.

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Clutha River/Mata-Au at Beaumont Bridge

## ▼ KEY CLIMATE CHANGE RISKS CONTINUED

### Sea-level rise and coastal change

Sea-level rise and coastal change are expected to increasingly affect low-lying parts of the Clutha area, particularly around the Clutha Delta and coastal settlements like Kaitangata, Toko Mouth, and Kākā Point. Over time, rising sea levels combined with storm surges and high tides mean the sea will reach further inland more often, leading to more frequent flooding of coastal land, roads and properties. In places like the Clutha Delta, even moderate storms could push seawater onto farmland and areas that have not historically flooded. This will gradually increase the pressure on stopbanks and drainage systems, and the communities that depend on these services.

### Planning ahead in the Clutha Delta

**Action is already underway to help Clutha Delta communities build resilience to the future effects of climate change.**

The Clutha Delta Natural Hazards Adaptation Programme is a long-term effort to help the communities of Balclutha, Kaitangata, Stirling, Inch Clutha and the surrounding rural delta prepare for a future shaped by changing natural hazards. The delta is a low-lying landscape already exposed to river flooding, high groundwater and drainage problems, coastal erosion and inundation, tsunami risk, and earthquake-related hazards, and many of these pressures are expected to become more serious as the landscape and climate continue to change.

The programme has been set up to understand these risks more clearly, both now and in the future, and to support practical, long-term decision making that helps protect people, homes, livelihoods, infrastructure and the places the community values.

A major strength of the programme is that it is not just about technical studies, it is also about working alongside the community to plan ahead. This is about helping the Clutha Delta stay safe, liveable and resilient for generations to come.



Clutha River / Koau Branch mouth

# What matters most?

## Connectivity and essential services

Keeping Clutha's community connected will become more challenging as heavier rainfall, higher river flows, rising seas and coastal erosion put more pressure on roads, bridges, drains, water supplies and other lifeline services. Clutha's road networks are particularly vulnerable to these impacts, with State Highway 1 near Milton, State Highway 90 in West Otago, the Papatowai Highway, Taieri Mouth, Pounaweia, Kākā Point, Hina Hina Road and Jacks Bay Road all exposed to flooding or future coastal inundation.

The biggest risks come when these roads and essential services fail together. Flooding can affect drinking water, wastewater and stormwater systems, while slips, storms, or coastal damage can disrupt roads, electricity and communications at the same time. In rural and coastal areas, where there are often fewer back-up routes or alternative services, even short disruptions can have wide impacts for households, farms, businesses and emergency responses, making careful planning and preparedness essential.

## Our natural environment

Clutha's natural environment will experience the effects of climate change in many connected ways. Heavier rainfall and higher river flows can wash more sediment into rivers, damage riverbanks and flood low-lying areas. At the coast, rising seas and erosion will put pressure on estuaries, beaches and coastal wetlands around areas such as Kākā Point, Ōwaka and Tautuku. These places provide important habitat for native plants, fish, birds and marine mammals.

Over time, warmer temperatures, fewer frosts, warmer seas and changing rainfall will also shift the balance of local ecosystems. Some species may move, while others may struggle with habitat loss, pests, disease, warmer water, changing food sources, and more frequent disturbance from floods and storms.

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## Community wellbeing and resilience

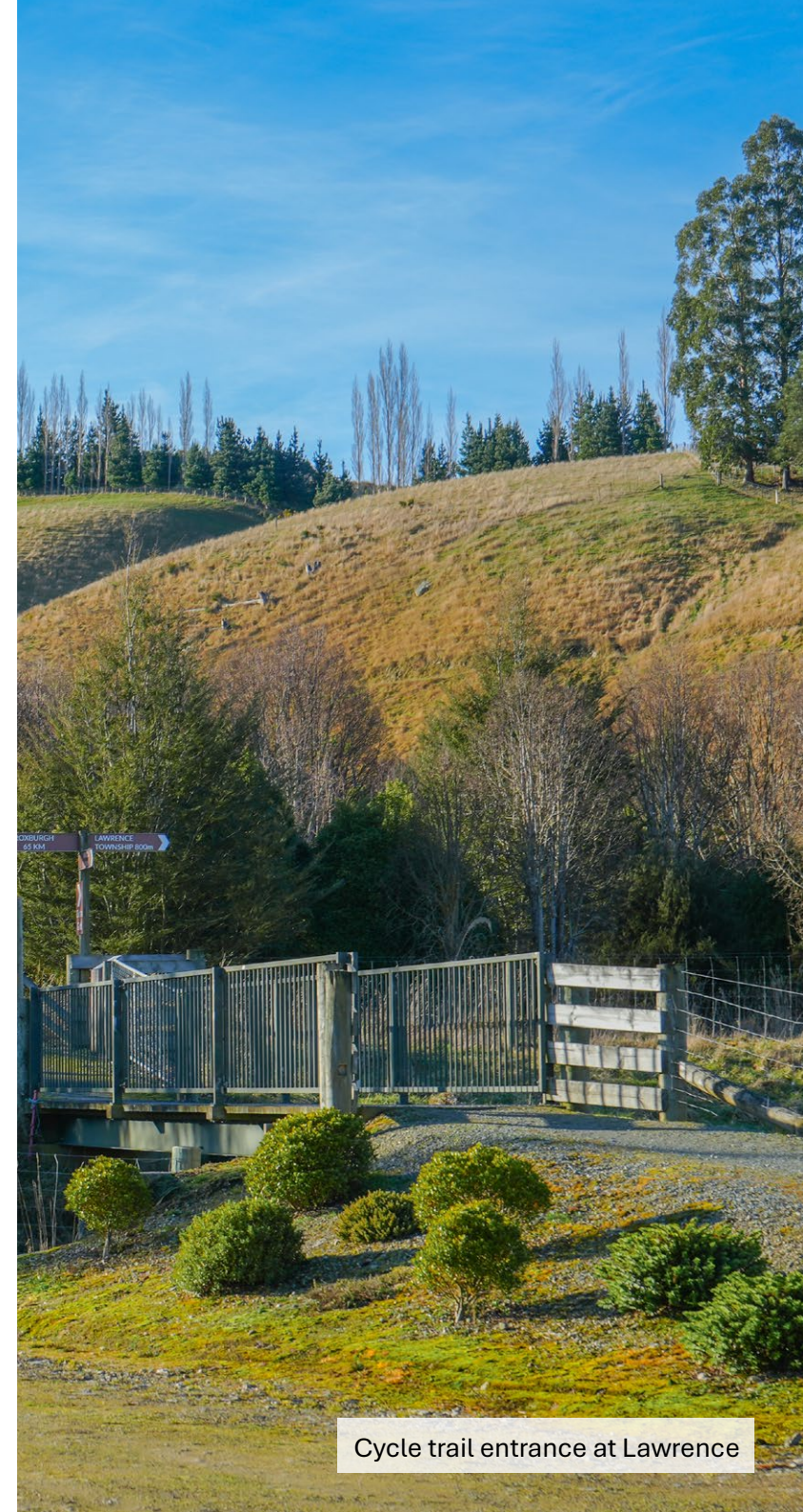
Strong, connected rural and coastal communities are central to life in Clutha. However, heavier rainfall, higher river flows, rising seas and coastal erosion may make it harder for people to get to work, school, healthcare; access supplies; or check on whānau and neighbours. For smaller or more remote communities, a flooded bridge, washed-out road, power cut or phone outage can quickly affect everyday life and take longer to repair.

These impacts quickly flow through to affect local businesses and livelihoods. Farms, tourism operators, transport services and small businesses may face more clean-up costs, delays, supply disruptions or insurance pressures after storms or floods. Warmer, wetter conditions may bring some benefits, but resilience will depend on strong local support networks, reliable access routes, and households and businesses being prepared for extreme weather events.

## Land-based livelihoods

Climate change will bring both challenges and some opportunities for land-based livelihoods in Clutha, especially farming and forestry. Warmer, wetter winters may improve pasture growth and could present new crop options in some places. But heavier rainfall, higher river flows and rising flood risk will make land and water management harder, particularly on low-lying farmland around the Clutha Delta, Tokomairaro Plain, Balclutha, Milton, Clydevale and parts of the Pomahaka catchment.

These risks can flow through whole rural communities, not just individual paddocks or forests. Flooding, erosion, slips, heat stress and water shortages can damage pasture, fences, forestry blocks and rural roads; disrupt milk, stock, timber and feed movements; and add costs for repairs. In places like West Otago, Central Clutha and The Catlins, resilience will depend on practical farm and forestry planning, such as protecting waterways, placing infrastructure out of flood-prone areas, and keeping local roads and supply chains reliable when extreme weather hits.



Cycle trail entrance at Lawrence

## Climate change in coastal Catlins



For our whānau we have seen significant changes in The Catlins, erosion and accessibility to sites and wāhi tapu, estuary changes, taonga species availability and movement and wetland recession in some areas. Some specific examples we have observed include reduced access to whenua Māori and whānau housing in Tautuku to increased sedimentation in our estuaries and greater erosion along the coast overtime. At Kaka Point, whānau have observed pāua being washed ashore after major storm events to which we believe may be linked to increased mixing of freshwater and seawater during periods of heavy rainfall, wind and flooding. In saying that, we have seen some positive effects which may be linked to this mixing of freshwater and sea water on our whitebait; while no studies have been done over the past few years, there appears to be an increase in some places.

Another huge concern and experience we have had is that many of our wāhi tapu sites along the coast are often exposed to erosion, and as whānau we are regularly checking on these sites after big weather events to ensure nothing is lost, as kaitiaki of these places it is deeply saddening to think that our access, connection and tūpuna who lay in some of these areas may be lost.

We are also seeing the combined effects of warmer temperatures and land-use change, with increased sediment moving through the system and into our waterways. Our awa that were once abundant with wai kōura are now almost completely without them. In our estuaries, pātiki/flounder, once a key mahinga kai resource, have also declined significantly. This appears to be linked to climate-related changes, including reduced food availability, other predators changing their food and degraded habitat, making these environments much harder for taonga species to survive in.



Steph Blair and Stevie-Rae Blair  
Waikawa Whānau and Kaitiaki

## 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 Clutha.**

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



## Planning for climate change in Clutha

Since 2019, Clutha District Council has been working on climate change projects that have developed and informed a district-wide Climate Change Strategy. The strategy aims to align the relevant climate response activities already underway throughout the Clutha district and provide a framework for collaboration across the district and beyond.

## The Catlins Catchment Action Plan

The plan brings together community, land-based industries, Te Rūnaka o Awarua and local councils to protect and enhance the Otago Catlins area. Restoring forests, soils, wetlands and waterways strengthens the catchment's ability to absorb climate shocks.

## Managing flood risks in Milton

Milton 2060 is a long-term flood risk management strategy for Milton and the Tokomairaro Plain, identifying areas exposed to flooding from the Tokomairaro River system, including low-lying ponding areas around Milton, floodway corridors where water can be deeper or faster, and rural and semi-rural floodplain areas.

## Restoring Lake Tuakitoto

Otago Regional Council is working with the community to improve Lake Tuakitoto, a regionally significant wetland near Kaitangata. As climate change brings heavier rainfall, warmer conditions and variable water levels, wetland restoration can support biodiversity, water quality, cultural values, flood buffering and ecosystem resilience.

## Growing local emergency readiness

Clutha District Council and Emergency Management Otago support community response planning and the Otago Gets Ready alert system. These tools help people share local knowledge, receive warnings and support each other when storms, floods, wildfire, outages or earthquakes disrupt daily life.



Waihora / Lake Waihola