TE KAUNIHERA Ā-ROHE O
ŌTOROHANGA
DISTRICT COUNCIL

Ōtorohanga District Climate Change Response Plan – A Roadmap for Action

Te Mahere Urupare Huringa Āhuarangi a te rohe o Ōtorohanga – He Mahere Mahi

June 2025

Foreword by the Mayor

Kupu Whakataki a te Koromatua

We have all seen the effects of climate change and the devastation and disruption it causes, both here in Aotearoa New Zealand and around the world. We know the sooner the world transitions away from fossil fuels as the base of our society, the less we (humans) will need to adapt to the impacts of a changing climate and the fewer devastating extreme weather events that will impact on our communities in the future.

The extreme weather events of early 2023, including Cyclone Gabrielle, remind us that the challenges and changes arising from climate change are big. While the Ōpārau community was most impacted and the state highway access disrupted, we were fortunate those impacts weren't more widespread across our district. However, we cannot be complacent and think we won't ever be more impacted by severe weather events. That's why we need to plan well, work together, move quickly when we need to and be fair.

In our recently adopted Long-term Plan (LTP)[1] we said our focus must be on people, place and partnerships, with specific attention to building resilience, and being sustainable and transformational. The Te Korowai (CouncilMARK) independent assessment in late 2024[2] reinforced that as an organisation we need to be more intentional in how we plan for this. Responding to the challenges of climate change brings all these elements together.

This climate change plan directs our thinking and actions in two ways - as an organisation that needs to be more sustainable and reduce our environmental impacts; and helping our communities to be stronger and more resilient. We know we need to work with our communities, stakeholders and mana whenua partners on a shared plan of action – so we all know what's needed and when.

What future do we want for our children/tamariki and grandchildren/mokopuna? We can't leave things to chance or hope others will pick up the slack. We can all take steps now to reduce our environmental impacts and by working together ensure we have a collective plan of action to adapt to climate change.

Max Baxter *– Mayor of Ōtorohanga District*

[1] https://www.otodc.govt.nz/documents-and-forms/long-term-plan
[2] https://www.otodc.govt.nz/assets/Documents/Other/Media-Release-ODC-Te-Korowai-outcome-Otorohanga_District_Council_Independent_Evaluation_Report.pdf

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Ngā Kaupapa

Summary

Whakarāpopototanga

Climate change is the biggest global issue of our generation – and it will be for future generations, even if the international carbon reduction targets are achieved. While reducing emissions (mitigation) locally, regionally, national and internationally is critical, so too is adapting to climate change.

Climate change is here and now. Recent extreme weather events across Aotearoa New Zealand reinforce the scale of the threat and the potential disruption across our district. As a Council, we have a responsibility to promote community wellbeing, and taking a lead role in responding to climate change is integral to that responsibility.

Our role involves reducing/limiting the impact of Council's activities, primarily through emissions reduction, and working with our partners, stakeholders and communities to reduce the impacts of climate change on local people.

This response plan sets out the case for collective action and provides a roadmap (pathways) for responding to the impacts of climate change across specific areas of focus encompassing key activities, functions and locations.

Summary of Our Commitments

Council is committed to the following:

Focus Area	***Commitment***
Reducing our Footprint (Council)	• We understand and act on the impacts of climate change • We have prioritised a transition to low (carbon) emissions • We have adapted to reduce climate change risk
Partnerships with Iwi/Māori	• We recognise iwi/Māori diversity and the need for tailored engagement strategies; therefore, we commit to meaningfully engage and consult with iwi/Māori and to explore opportunities to have them represented at the decision-making table. Challenges for the Council and Māori in responding to climate change include capacity, capability and resources.

Climate Change and the Māori Economy	• We will continue to advocate for central government funding to enable responses by iwi/Māori, for iwi/Māori and with iwi/Māori, and to better enable iwi/Māori to work with us on shared climate action community-led initiatives.
	• We will continue to work collectively with iwi/Māori and central government agencies to progress climate action across our district, including in the development of more localised climate risk assessments, adaptation planning and Māori community and marae resilience.
	• We will continue to share climate change information and our expertise to support iwi/Māori to build resilience within their communities and to reduce the impacts of climate change on sites of significance such as urupā, wāhi tapu, marae and the district's Māori economic base.
	• This means we will identify specific risks relevant to Māori, iwi, hapū and marae communities, and ensure all adaptation and mitigation measures seek to recognise, respect and integrate Māori perspectives, values and knowledge.
	• We will continue to meet our Treaty settlement obligations through designing and carrying out our climate action activity, in a way that:
	  ○ meets our joint management Treaty settlement obligations.
	  ○ meets our obligations arising from future Treaty settlements.

Engaging with Communities	• We will understand what communities, including iwi, hapū and marae, value most and make it easy for people to participate in decisions and actions that affect them
Water Supply	• Continue work with other councils in the region to determine the best water services management and delivery arrangements for Ōtorohanga • Work with the councils in the region, including the Regional Council, on a consistent approach to help our communities understand possible sources of water and how to make the most of every drop, using smart ways of capturing, storing, using and recycling water. • Support opportunities for iwi and hapū-led environmental monitoring programmes and responses that utilise both mātauranga Māori and scientific methods.
Urban Form and Transport (roading)	• Facilitate higher density residential development e.g. adjacent to the Ōtorohanga town centre • Support the development and promotion of walking and cycling routes • Explore the use of low carbon bitumen for the district's road network • Support public transport options to allow connection with larger centres in the region • Assess the vulnerability of the district roading network to climate change impacts and incorporate resilience investment in future long-term plans
Coastal	• Support the Regional Council and other agencies in their work to understand the impacts of climate change on the health of the Kāwhia/Aotea coastal marine environment • Seek the renewal of resource consents for the Aotea and Kāwhia sea walls • Work with coastal communities to establish appropriate climate change adaptation plans
Community Resilience	• In conjunction with the Waikato Regional Council, complete a risk assessment of key Council assets and infrastructure to undertake the likely impacts of climate change and community exposure/vulnerability. • As the Government's climate adaptation framework is developed, understand Council's role and the implications for local communities and stakeholders. • Work with communities, mana whenua partners, the Regional Council and other agencies on the development of community adaptation plans that include agreed risk thresholds and triggers • When reviewing the Ōtorohanga District Plan, ensure appropriate controls are in place that enable development while limiting climate change/natural hazard risk. • Advocate for and support the Regional Council on nature-based solutions to limit the risks of climate change impacts. • Support the Regional Council in establishing a regional hub for hazard and risk information to inform local adaptation plans and decision-making. • Support communities in hazard reduction, readiness and resilience through our Civil Defence and Emergency Management function.
Community Funding and Investment	• Monitor the Government's work to consider whether to extend the application of mandatory climate-related disclosures to ensure our climate reporting and disclosure practices will meet foreseeable future requirements. • Explore opportunities for multi-organisation funding of community and iwi/Māori projects to increase the collective impact of funding and the sharing of in-kind resources focused on reducing climate change risks and impacts. • Review existing mechanisms through which the Council distributes funds to ensure that climate-related criteria are considered.

Why should we care about Climate Change?

He aha te take me aro tātou ki te Huringa Āhuarangi?

Climate change is one of the most critical issues of our time. It threatens our way of life and, in some places nationally and internationally, our very existence.

We recognise the scale of the threat and potential disruption from climate change across our district. As a Council we have a responsibility to promote community wellbeing, and taking a lead role in responding to climate change is integral to that responsibility. We are and will continue to apply a climate change lens to our planning and decision-making processes so that we can collectively adapt and transition to a resilient, sustainable future.

This commitment aligns with Council's strategic direction, as confirmed with the adoption of the 2024-34 LTP. In the LTP we said our focus needed to be on people, place and partnerships, as reflected in the following community outcomes. Council's role broadly falls under two areas:

- **Mitigation**: This is about reducing the effects from activities *on* climate change. Council's role in mitigation is largely limited to reducing the greenhouse emissions from our own day to day activities.

- **Adaptation**: This is about responding to the impacts *of* climate change on our communities. Councils play a key role in climate adaptation, such as ensuring critical infrastructure is robust in a changing climate, avoiding or reducing activities being located in high hazard areas, assisting communities in building resilience and emergency response to climate-related events.

Ōtorohanga Community Outcomes

We've taken the opportunity to further refine the themes developed as part of the last (2021) LTP process. When it comes to responding to climate change, we wanted to ensure that what we planned to do increases resilience, promotes sustainability and enables transformation.

Long Term Plan Themes

Resilient	• Continue to provide leadership that builds trust and confidence for social resilience. • Embed climate adaptation and mitigation practices into the way we work and: – Actively seek to reduce risks – Build back better where possible
Sustainable	• Adopting environmental protection and restoration practices when carrying out our work • Having and implementing a plan to reduce our emissions • Implementing better waste management to contribute to the national goal of a circular economy.
Transformational	• Continuing to improve delivery • Make sure the district and the organisation are well positioned for the future.

This climate change response plan helps provide direction for Council to:

- Identify actions that support mitigation and adaptation to climate change
- Signal projects that will deliver emissions reduction
- Meet its audit and statutory obligations
- Build resilience for its own assets and infrastructure
- Support community response and adaptation
- Meet community, stakeholder and partner expectations

We want to work with iwi/mana whenua, stakeholders and communities to understand what the needs and priorities are in response to climate change and to develop a shared Community Action Plan.

Note: a targeted approach to reducing district emissions is not part of the scope of this work. With agriculture contributing most of the district's emissions, Council believes there is already sufficient attention being given to emissions reduction in this area. Council staff will, however, provide guidance to any local businesses wishing to reduce their emissions.

Global Context

Horopaki ā-Ao

Climate Change is Here and Now

Kua Tae Mai te Huringa Āhuarangi

The understanding of climate change has shifted from a perception of just an environmental problem to one that is recognised as a threat to financial systems, social cohesion, health and wellbeing, and national and international security. Projections for local climatic changes present significant implications for our environment, the safety of our communities and the economy.

In 2018, the world's leading climate scientists, through the Intergovernmental Panel on Climate Change (IPCC), highlighted the unprecedented scale of the challenge required to keep warming to 1.5°Celsius and the significant impacts if we do not[3].

Since 2018, the IPCC has published its Sixth Assessment Report (AR6), with a synthesis report for policy makers published in March 2023[4]. These reports present the most recent state of knowledge of climate change science, its widespread impacts and risks, and climate change mitigation and adaptation.

In these reports, the IPCC warns that the challenge has become even greater due to a continued increase in greenhouse gas emissions. Human activities have caused our planet's climate to warm at a rate faster than anything people have experienced in at least 2000 years.

The pace and scale of what has been done so far, and current plans, are insufficient. However, there are multiple, feasible and effective options to reduce greenhouse gas emissions and adapt to human-caused climate change, and they are available now.

More than a century of burning fossil fuels as well as unequal and unsustainable energy and land use has led to global warming of 1.2° Celsius above pre-industrial levels. This has resulted in more frequent and more intense extreme weather events that have caused increasingly dangerous impacts on nature and people in every region of the world.

From any increase in global warming, we can expect:

- an increasingly variable water cycle
- long lasting changes in our ocean, sea level and the earth's frozen regions
- extreme weather events.

Every increment of warming results in rapidly escalating hazards. More intense heatwaves, heavier rainfall and other weather extremes further increase risks for human health and ecosystems. Across the world, people are dying from extreme heat and climate driven food and water insecurity, which are expected to increase with increased warming. When the risks combine with other adverse events, such as pandemics or conflicts, they become even more difficult to manage.

In this decade, accelerated action to adapt to climate change is essential to close the gap between existing adaptation and what is needed. Meanwhile, keeping warming to 1.5°Celsius above preindustrial levels requires deep, rapid and sustained greenhouse gas emissions reductions in all sectors. Emissions should be decreasing by now and will need to be cut by almost half by 2030 if warming is to be limited to 1.5° Celsius.

[3] https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/
[4] https://www.ipcc.ch/synthesis-report/

The AR6[5] concludes with the realisation we have left the stable climate in which our cultures, cities, agriculture, economies and the infrastructure were developed, and warns that future changes to our climate and how they affect us will depend on the choices we make today.

"If we act now, we can still secure a liveable sustainable future for all."

IPCC Chair Hoesung Lee, March 2023

[5] https://www.ipcc.ch/assessment-report/ar6/

It's All Connected – Economy and Society within Environmental Limits

E Hono Ana Ngā Mea Katoa – Te Ōhanga me te Iwi Whānui i roto i te Āheinga o te Taiao

Our environment is made up of many interconnected processes in climate, air, water and biodiversity that keep our planet stable and habitable.

People depend on stability of the environment for economic and food security, access to energy, reliable infrastructure, physical and mental health, cleaner water and less air pollution. It's in our interest to protect the planet.

The planetary boundaries concept, developed by the Stockholm Resilience Centre in 2009[6], identifies a set of nine planetary boundaries based on the interconnected processes that regulate the stability and resilience of the Earth system. These are the 'safe' environmental limits within which people can continue to develop and thrive. Crossing these boundaries increases the risk of tipping points, critical thresholds at which even small changes can cause large scale abrupt or irreversible environmental changes.

The planetary boundaries work has been regularly updated, most recently in May 2023, to incorporate socially 'just' limits at which people are not exposed to significant harm from planetary changes. The addition of justice takes account of the fact that everyone, particularly the most vulnerable, has a right to a healthy environment, clean water, food, energy and health[7].

This new study finds almost all of the 'safe' environmental Earth system boundaries have been breached, and that adding the justice perspective further tightens many of the original boundaries. For example, human beings are considered to be relatively 'safe' up to 1.5 degrees of global warming. However, at the current 1.2 degrees increase, we're already seeing environmental disasters causing direct impacts on people's homes, livelihoods and quality of life, including here in Aotearoa New Zealand. At current projections based on existing policies and action, the planet is on a trajectory towards 2.7 degrees warming by 2100[8].

These findings increase the urgency with which we must work towards existing sustainability goals, including the Paris Agreement for climate[9], the Kunming-Montreal Global Biodiversity Framework[10] and the 2030 Sustainable Development Goals[11]. Climate change, biodiversity and water quality are interconnected, as are wellbeing and economic stability. The interconnectedness means the sustainability goals for our environment, communities and economy must all be considered and addressed together, rather than being traded off against each other.

[6] https://www.stockholmresilience.org/research/planetary-boundaries.html
[7] https://www.nature.com/articles/s41586-023-06083-8
[8] https://climateactiontracker.org/
[9] https://unfccc.int/process-and-meetings/the-paris-agreement
[10] https://www.cbd.int/gbf
[11] https://sdgs.un.org/2030agenda

"This study brings into focus the human dimension of the climate debate. In putting a number on human needs and impacts, it shows how the protection of the planet is inseparable from the success of communities, societies and economies. These boundaries enable businesses to understand their fair share of resources and responsibilities, and to take measurable action to minimise their footprint on the planet that also helps improve human wellbeing. Every fraction of a degree of warming has a direct impact on people's lives and livelihoods, from undermining food security and displacing families from their homes to increasing the risk of disease and so much more. There has never been a more urgent need for leaders to take transformational action to limit global warming, protect nature and build a just economy for all."

Prof. Xuemei Bai, Distinguished Professor, Australian National University

and co-author of Safe and just Earth system boundaries.

National Context

Horopaki ā-Motu

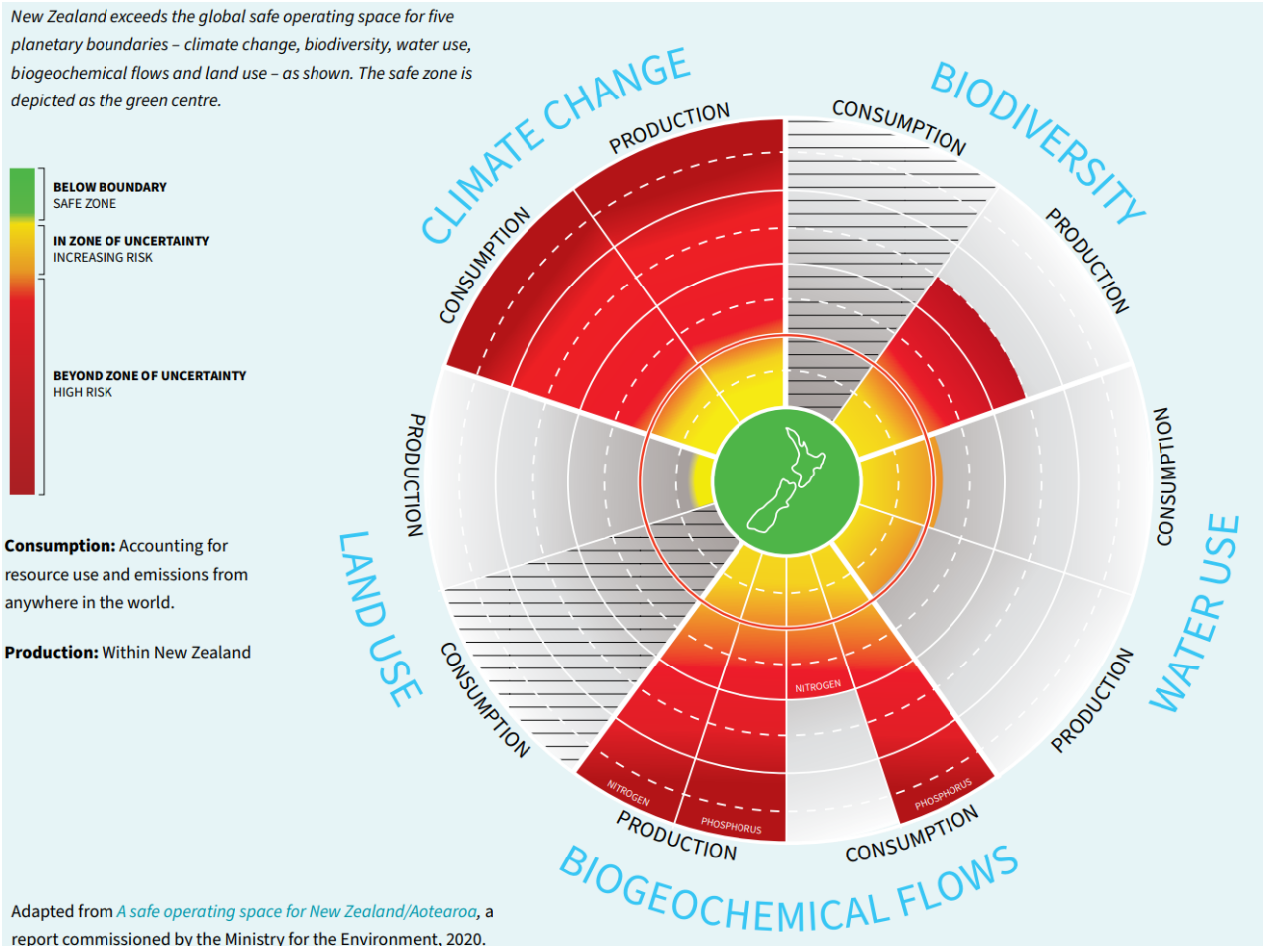
Planetary Boundaries New Zealand

Ngā āheinga o te ao i Aotearoa

A report commissioned by the New Zealand Ministry for the Environment in December 2020[12] quantified five of the nine planetary boundaries relevant to Aotearoa New Zealand. These being climate change, land use, freshwater use, biogeochemical flows (nutrient use, mainly nitrogen and phosphorus) and biodiversity.

The report found that New Zealand exceeds its fair share of the earth's resources and atmosphere related to climate, biodiversity, nutrient use and deforestation. The report provides context for local communities to consider interconnected environmental pressures and our opportunities for reducing these and working with nature to create a more sustainable and resilient region.

Five planetary boundaries translated to New Zealand



Adapted from A safe operating space for New Zealand/Aotearoa, a report commissioned by the Ministry for the Environment, 2020.

[12] https://environment.govt.nz/publications/a-safe-operating-space-for-new-zealandaotearoa-translating-the-planetary-boundaries-framework/

Projected national climate impacts[13]

Ngā pānga huringa ā-motu e matapaetia ana

The Ministry for the Environment has developed an interactive climate projections map for Aotearoa New Zealand, which has been updated with the latest climate change projections data[14]. This tool can provide more detail on the potential future climate that will impact the Waikato region and districts. The map and dashboard include projection descriptions and detailed maps for each territorial authority.

The following is a summary of projected impacts across various climate variables.

Temperature

The average annual temperature in Aotearoa New Zealand has increased by 1.26°C compared to the reference period of 1961-1990, with the warmest year on record being 2022 and eight of the 10 warmest years occurring in the last 10 years.[15] By 2090, annual average temperatures across the country are projected to increase by between 0.8°C and 3.0°C depending which climate change scenarios continue to play out[16].

The range of these annual average temperatures across Aotearoa are projected to be between 0.3°C and 1.2°C warmer by 2030, between 0.6°C and 2.1°C warmer by 2050, and between 0.7°C and 4.6°C warmer by 2090.

More hot days - days when maximum daily temperatures are over 25˚C - are projected for most of New Zealand, with the north and east North Island projected to experience the most change. For example, the Far North District is projected to experience between 22 and 87 more hot days on average by 2090 (currently an average of 25 hot days per year).

Fewer frost days - where minimum daily temperatures are below 0˚C - per year are projected in the west and south of the South Island. For example, the Mackenzie District is projected to experience the greatest decline in frost days per year, with an average of between 15 and 54 fewer frost days annually by 2090.

Rainfall

The North Island is projected to have less annual rainfall by 2090, particularly in the north and the east. The north and the east of the South Island are also projected to have less annual rainfall by 2090, however, the west and south of the South Island are projected to have more annual rainfall by 2090. For example, the Southland District is projected to receive on average between 5 and 8 per cent more annual rainfall by 2090.

There are expected to be more very rainy days – where daily rainfall exceeds 25 mm - for many regions, especially in the Westland District which is projected to experience between 3 and 5 more very rainy days on average by 2090. However, the Gisborne District is projected to experience up to 2 fewer very rainy days on average by 2090.

Drought

Drought exposure is projected to increase over the east and decrease in the west of the North and South Islands. For example, the Kaikōura District is projected to experience an increase in drought exposure by 2090.

Wind

There are projected to be fewer windy days - with maximum wind speed more than 10 metres per second - per year for much of the North Island, and more windy days per year in most of the South Island by 2090. For example, Dunedin City is projected to experience between 4 and 6 more windy days per year on average by 2090. Wellington City is projected to experience between 2 more and 5 fewer windy days per year on average by 2090.

[13] https://niwa.co.nz/climate-and-weather/updated-national-climate-projections-new-zealand
[14] https://map.climatedata.environment.govt.nz/
[15] https://www.stats.govt.nz/indicators/temperature/
[16] Shared socio-economic pathways https://environment.govt.nz/what-you-can-do/climate-scenarios-toolkit/climate-scenarios-list/ipccs-ssp-rcp-scenarios/

Local/Regional Context

Horopaki ā-Rohe, ā-Motu hoki

Climate projections for the Waikato and Ōtorohanga District

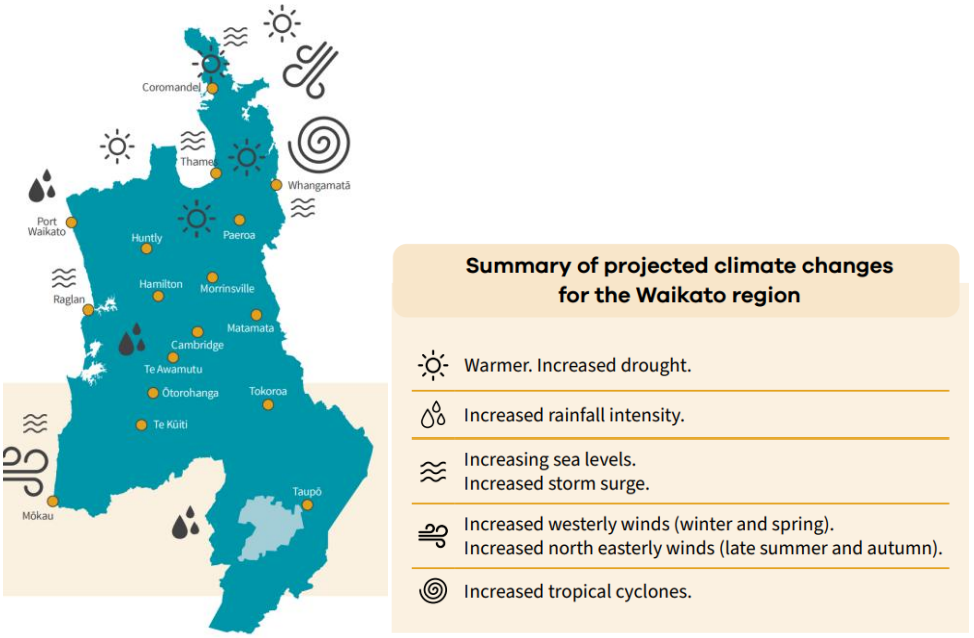
Ngā matapae āhuarangi mō Te Rohe o Waikato me Ōtorohanga

For Aotearoa New Zealand, future projections show a warmer, wetter and windier climate, with more extreme daily and seasonal variations and inconsistent geographic effects.

Over the next century, the Waikato region can expect rising sea levels, more extreme weather, warmer summers and milder winters with seasonal rainfall shifts. It is projected that drought risk will increase in the north and east over spring and summer, and there may be seasonal changes in rainfall and wind in the west. These climatic changes have implications for local communities, many of which are located along the coast or in floodplains.

To help with its decision making, the Waikato Regional Council commissioned detailed climate projections for the Waikato region, using the most recent international climate modelling data (CMIP6) and several scenarios from the AR6[17]. Trends in average seasonal and annual mean, maximum and minimum temperatures were explored; patterns in average seasonal and annual precipitation, run-off, wind speed, daily extreme precipitation, daily extreme wind speed and an annual drought index were analysed; and, in terms of socio-economic variables, historical water-take statistics examined.

The implications for our region are that we must future-proof our decisions and pivot from basing decisions on known past measurements of our environment to one that includes modelled projections. The future will be more dynamic and we are already starting to see more weather extremes, the cumulative effects of which we have not experienced before. In this changing climate, we need to develop confidence to make decisions under increasing uncertainty.



Waikato Regional Council 2023

[17] https://www.waikatoregion.govt.nz/assets/WRC/Waikato-Regional-Climate-Impacts-Report.pdf

Climate change is amplifying our natural hazards

Kei te kaha atu te raru o ō tātou pūmate ao tūroa

Climate change is already increasing the frequency, severity and impact of many natural hazards in the Waikato (e.g. changes in weather patterns and increased incidences of sub-tropical cyclones).

Coastal inundation and coastal erosion caused by sea level rise is the natural hazard commonly associated with climate change, but others include river flooding and land instability from extreme rainfall events, and heat waves, drought and fire from extended periods without rain and increased temperatures. Together, and including other natural processes such as land subsidence, the impacts will be greatly increased and wide-ranging.

In 2025 the Waikato Regional Council produced a report on the Climate Change Hazards and Risks in the Waikato Region[18]. This technical report covers the geographic area of the eleven councils in the Waikato region and provides insights into the hazards and potential risks associated with climate change across five domains (human, natural environment, economy, built environment, governance). The report includes a summary of the climate change hazards and risks impacting Ōtorohanga District.

The Waikato Regional Hazards Portal[19] and Coastal Inundation Tool[20] are key online resources our communities can use to identify and make informed decisions about their exposure to natural hazards. Improved natural hazard information will be available in Land Information Memorandum (LIM) reports from July 2025 to allow property owners and buyers to easily access existing information on natural hazard risks affecting properties. There is real potential for the insurance industry to withdraw, or partially withdraw, from selected parts of coastal, river or landslide-prone settlements in the region due to increased climate change risk[21]. The behaviour of the insurance industry may be an important catalyst for change given the changing climate.

Coastal inundation and erosion

Coastal inundation and erosion already occur in many places in the Waikato, and impacts worsen during king tide and storm events. In our region, coastal inundation is currently a risk to 8000 people, $1.46 billion worth of buildings and 540 square kilometres of productive land[22].

[18] https://www.waikatoregion.govt.nz/environment/climate-change/waikato-regional-climate-change-hazards-and-risks/
[19] https://www.waikatoregion.govt.nz/services/regional-hazards-and-emergency-management/regional-hazards-portal/
[20] https://www.waikatoregion.govt.nz/services/regional-hazards-and-emergency-management/coastal-flooding-inundation/coastal-inundation-tool/
[21] https://deepsouthchallenge.co.nz/research-project/climate-change-and-the-withdrawal-of-insurance/
[22] https://deepsouthchallenge.co.nz/wp-content/uploads/2021/01/Exposure-to-Coastal-Flooding-Final-Report.pdf

A 1 metre rise in sea level (forecast to progressively occur over the next 75 years) will mean present day 1-in-100-year extreme sea level events will happen with much more frequency and impact more than 11,000 residents, $2.2 billion worth of buildings and 630 square kilometres of land in the Waikato region if no future coastal protection or adaption occurs[23].

Sea level rise and ground water

Sea level rise also affects groundwater levels in coastal aquifers. This can have the effect of:

- increasing the water table, affecting the structure, usability and integrity of buried infrastructure, especially relevant to public three waters services and to private septic tanks
- affecting the foundations of infrastructure such as highways, rail and stop-banks
- increasing liquefaction risk
- shifting the position of the freshwater-saltwater interface of rivers, which could increase the area of saltwater inundation
- increasing the amount of groundwater that may need to be drained from low-lying coastal lands
- saltwater intrusion into groundwater bores.

River flooding

River flooding is likely to increase with more frequent and intense rainfall and in coastal areas exacerbated by sea level rise. As a consequence, groundwater tables may also be higher, further exacerbating flooding. The Waikato region has extensive flood management schemes and land drainage networks, all built to provide agreed levels of service. However, with climate change these may be unable to provide the level of protection they used to without considerable additional investment. Continual ongoing development in drained or flood protected areas further increases what and who is exposed to risk from flooding.

[23] https://deepsouthchallenge.co.nz/wp-content/uploads/2021/01/Exposure-to-Coastal-Flooding-Final-Report.pdf

State Highway 31 – Kāwhia Road

Land instability

Intense rainfall and river flooding are drivers of increased land instability, including landslides and erosion. Longer dry periods can increase the risk of land instability as dry cracked ground is more prone to failure during intense rainfall. Landslides occur in steep catchments where the geology (weak soils) is prone to erosion and when soils become over saturated. The Coromandel Peninsula is particularly prone to landslides, as seen during Cyclone Gabrielle in February 2023 with damage to many roads, including the closure of State Highway 25A due to a massive under slip. The hill country between Ōtorohanga township and Kāwhia/Aotea is equally susceptible to landslip. Erosion is also very common on outer river bends due to high energy water during flood events.

Drought

Northern and eastern parts of the Waikato region are at risk of increased drought, which will have a particular impact on our agricultural and horticultural industries. Places like the Hauraki Plains rely heavily on reticulated water, particularly in the farming industry, however, with increased drought and more dry days there is likely to be reduced water availability. Additionally, heat stress on animals and reduced pastural feed add an economic burden and have implications for food production.

The Waikato region experienced a dry 2019, with annual rainfall well below the long-term average. This was followed by a record-breaking summer of low rainfall. Ruakura (Hamilton) weather station recorded its driest summer (December 2019 to February 2020) and year (2020) on record, with January and February 2020 recording just 16 millimetres of rainfall.

Recent experience has highlighted the potentially significant cost of drought. The North Island drought of November 2007 to April 2008 cost the New Zealand economy $2.8 billion.[24]

Wildfire[25]

The warmer drier climate will cause an increase in extreme fire weather days and longer fire seasons. This has implications for the potential number, frequency and impacts of future wildfires, as well as for Aotearoa New Zealand's carbon sequestration ambitions and financial capital in planted forests. Recent research has highlighted that the conditions that led to the devastating 'Black-Summer' fires in Australia will occur every 3-20 years in areas of the Mackenzie Country, Central Otago and Marlborough. Wildfires in other parts of the country

[24] https://www.waikatoregion.govt.nz/services/publications/tr202128/
[25] https://www.scionresearch.com/?a=80922

can still affect the Waikato, such as if the high voltage transmission system between the South Island and North Island is impacted by wildfire.

Increases in temperatures

Extreme heatwaves are among the fastest-changing meteorological hazards in a warming world with impacts on human health, animal welfare and economic productivity.

Heatwaves in New Zealand over recent summers are already causing wide-ranging effects. Summer heatwaves in 2017/18, 2018/19 and 2021/22 saw the warmest months on record, with many more warm days (≥ 25°C) than usual. These warm season heatwaves (from November to March) all produced dramatic climate impacts across New Zealand, including marine heatwave conditions and major loss of glacier ice volume in the Southern Alps.26 Higher temperatures also impact our critical infrastructure, for example, high temperatures can degrade roading infrastructure.

While the Waikato region may not reach the highest daily temperatures in New Zealand during a heatwave, our high afternoon temperatures and humidity can combine to produce significant heat stress. Such extreme events can persist for several days at a time with overnight temperatures offering little respite. Recent research suggests that for the northern half of the North Island, less variation from day-to-day will mean larger risks, as further warming occurs over the twenty-first century.[27] Further work is needed to understand the impact of projected temperature increases and heatwaves on different sectors and communities in the Waikato.

An increase in temperature also means fewer frost days. We're already seeing the impact of a warmer climate on winter recreational activities and tourism. In 2022, Tongariro National Park had record-breaking low snowfall, with financial implications for Ruapehu Alpine Lifts and the surrounding towns and businesses.

Thunderstorms

Increased heating causes increased evapotranspiration which results in an increase in atmospheric moisture. In the Waikato this translates to more thunderstorms, more often, being bigger and with more energy. We are already seeing an increase in thunderstorm related hazards, such as localised heavy rain bursts, tornadoes and high wind events.

[26]Coupled ocean-atmospheric summer heatwaves in the New Zealand region: an update – in Weather and Climate Vol42 No1 (2023) pp 18-41 NZ Meteorological Society

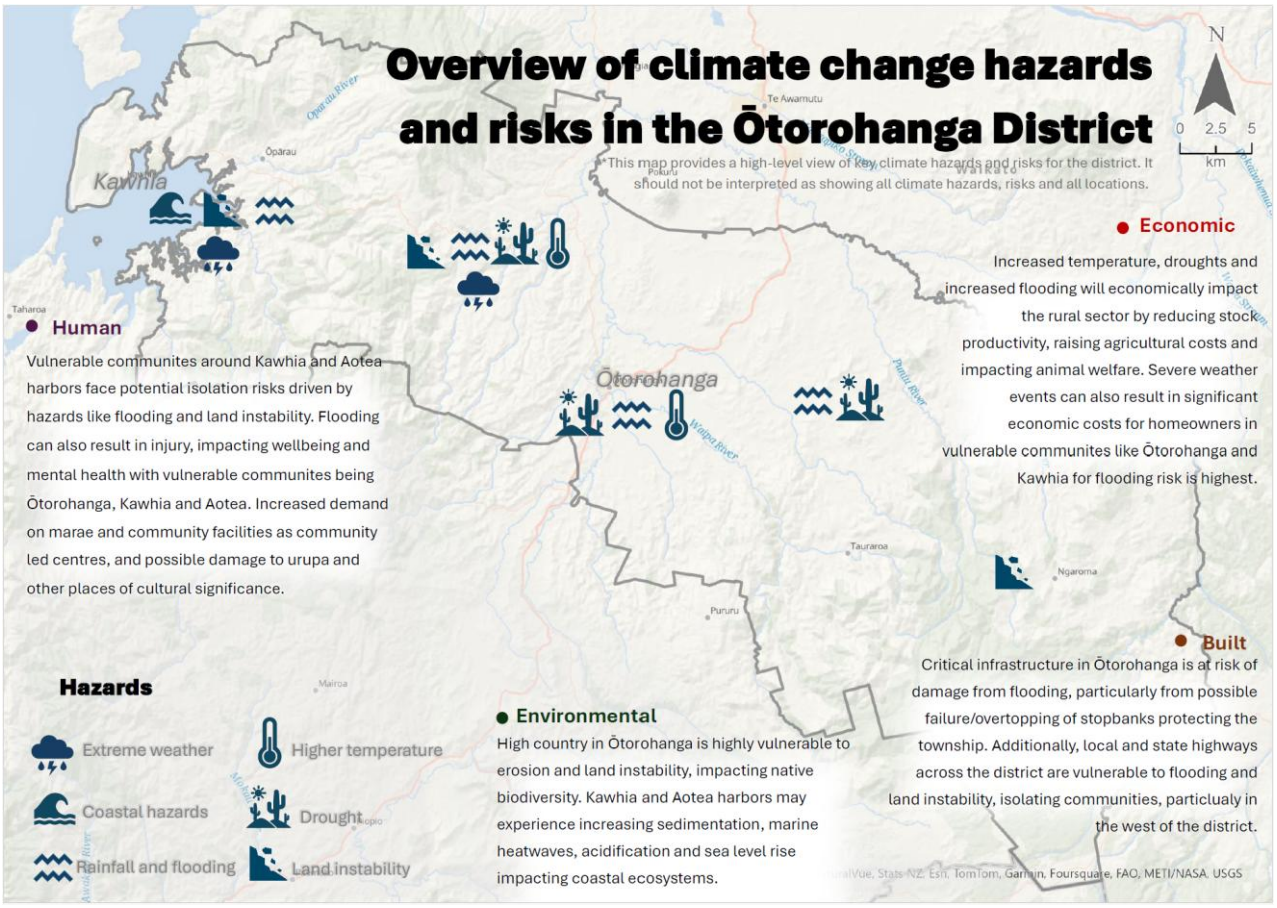
[27] https://link.springer.com/article/10.1007/s10584-022-03427-7

Understanding our climate risks

Understanding the projected changes and their impacts is a key first step in securing intergenerational social, economic, cultural and environmental wellbeing in a changing climate.

We need to better understand the specific climate change risks in order to support adaptation planning. Over time we intend to develop a climate change risk assessment for the whole district. This risk assessment will bring together a collective understanding of climate risk across all aspects of our environment, our people, our property and our economy across a range of climate scenarios and timeframes.

Waikato Regional Council are currently finalising a technical report (2024/28) - Climate Change Hazards and Risks in the Waikato region – which will be very helpful in informing/supporting our work on climate change response.



Waikato Regional Council, 2025

Adapting to climate change and a focus on climate resilience is embedded in each of the pathways shared later in this document. Our initial focus is on assessing the resilience of the Ōtorohanga town flood protection network under updated climate change projections. In addition, we see the opportunity to focus on the Kāwhia/Aotea area and work with partners, stakeholders and the community on responding to the climate change risks.

Our National Response

Tā Tātou Urupare ā-Motu

The Paris Agreement is an international commitment to limit global warming to well below 2° Celsius above pre-industrial levels, and to pursue efforts to limit the temperature increase to no more than 1.5° Celsius. For global warming to remain below 2° Celsius, emissions reductions of 60 per cent to 80 per cent by 2050 must be achieved.

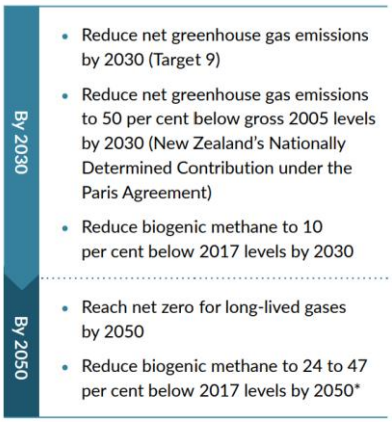
The Climate Change Response Act 2002 provides a framework for New Zealand to contribute to the global effort under the Paris Agreement. This Act, alongside associated policies, plans and regulations, are the Government's main response to climate change.

Aotearoa New Zealand has a national emissions reduction target of reducing greenhouse gases to net zero by 2050 and to reduce biogenic methane by between 24 per cent and 47 per cent. To do this, the Government is using a system of emissions budgets, of which the first three (2022-2025, 2026-2030, 2031- 2035) were published in May 2022.

In July 2024 the coalition Government announced its Climate Strategy – Responding to a changing climate[28]. While the Government is committed to meeting agreed climate change goals/targets, the new strategy establishes five pillars (areas of focus):

- Infrastructure is resilient and communities are well prepared (Outcome: Delivering a fair and enduring system that helps Aotearoa New Zealand be ready for climate change and provides clarity on costs)
- Credible markets support the climate transition (Outcome: Pricing emissions fairly and effectively to incentivise emissions reductions)
- Clean energy is abundant and affordable (Outcome: Doubling renewable energy by 2050 and installing 10,000 public charging points for electric vehicles)
- World-leading climate innovation boosts the economy (Outcome: Providing tools and removing barriers for businesses to innovate and prepare for the future)
- Nature-based solutions address climate change (Outcome: Restoring biodiversity, while investigating new ways of harnessing nature to remove emissions from the atmosphere)

Government measures to reduce emissions



In April 2024, the Government announced nine targets "to achieve better results in areas that matter to Aotearoa New Zealanders"[29]. Target 9 is focused on reducing net greenhouse gas emissions to no more than 290 megatonnes of carbon dioxide equivalent ($MtCO_2$-e) from 2022 to 2025 and 305 $MtCO_2$-e from 2026 to 2030. The Government believes this keeps us on track to meet Aotearoa New Zealand's 2050 net zero target.

[28] https://environment.govt.nz/assets/J001281-MfE-Climate-strategy-brochure-FF_webV2.pdf
[29] https://www.dpmc.govt.nz/our-programmes/government-targets

National Emissions Reduction Plan

Tā Aotearoa Mahere Whakaheke Tukunga Tuarua

Aotearoa New Zealand's first Emissions Reduction Plan was released in May 2022 and contained strategies, policies and actions for achieving our first emissions budget (2022-2025) and contributing to global efforts to limit global temperature rise to 1.5˚Celsius above pre-industrial levels. This required Aotearoa New Zealand to reduce emissions by an extra 11.5 $MtCO_2$-e) between 2022 and 2025. The Government is required to act to reduce emissions across the economy, all parts of government, and support all Aotearoa New Zealanders to make the most of the transition to improve living standards. The first Emissions Reduction Plan is based on five principles:

- playing our part
- empowering Māori
- equitable transition
- working with nature
- a productive, sustainable and inclusive economy.

In December 2024 the Government released the second emissions reduction plan (ERP)[30]. The actions and initiatives in this plan are intended to meet the second emissions budget (2026-2030) and achieve the national 2050 net zero target. The Government advises that this ERP creates opportunities that will help us maintain our way of life, while minimising the cost to the country of mitigating climate change. It has been guided by public feedback and is anchored by the five pillars of the New Zealand Climate Strategy.

The new ERP requires climate action from every part of Government and sector of the economy, including transport, energy, building and construction, waste, agriculture and forestry.

National Adaptation Plan

Urutau, ka taurikura: Kia tū pakari a Aotearoa i ngā huringa āhuarangi

The first national adaptation plan (NAP) was released in August 2022[31]. This plan sets out what actions the Government will take over a six-year period to help all Aotearoa New Zealanders adapt and thrive in a changing climate. It includes a programme of work to support councils to take action and adapt to climate change. It brought together existing actions and proposed future work to:

- enable better risk-informed decisions
- drive climate-resilient development in the right places
- lay the foundations for a range of adaptation options, including managed retreat
- embed climate resilience across government policy.

The NAP is informed by a national climate change risk assessment completed in 2020. The next national risk assessment will be undertaken by 2026, which will inform the second NAP due for release in 2028.

[30] https://environment.govt.nz/publications/new-zealands-second-emissions-reduction-plan/
[31] https://environment.govt.nz/what-government-is-doing/areas-of-work/climate-change/adapting-to-climate-change/national-adaptation-plan/

Legislative Reform and how it impacts on our National Response

Te whakahou ture me ōna pānga ki tā tātou Urupare ā-Motu

The coalition Government has embarked on a comprehensive and widespread reform of key legislation, including the Resource Management Act 1991. The outcome of these reforms will impact on how we (central government, local government, businesses, households and communities) respond to climate change, although some of the details will remain unclear until the reform programme is complete.

Emissions

Ngā Tukunga

Emissions in Aotearoa New Zealand

Ngā Tukunga Waro i Aotearoa

Aotearoa New Zealand's Greenhouse Gas Inventory is the official annual report of all human-induced emissions and removals of greenhouse gases in New Zealand. The most recent inventory contains all major emissions trends from 1990 to 2022[32].

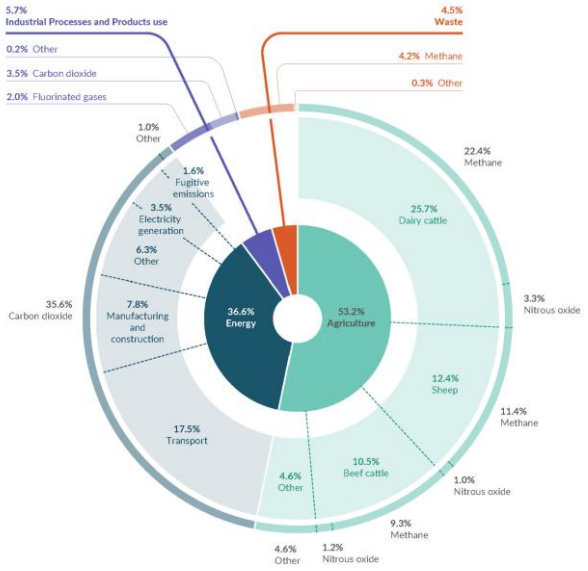
The Inventory indicates that gross emissions peaked in 2006 and have been declining since 2019.

In 2022, Aotearoa New Zealand's gross emissions were 78.4 Mt CO_2-e. This is a 14 per cent increase from emissions in 1990 (the base year for United Nations Framework Convention on Climate Change (UNFCCC) reporting).

The five emission sources that contributed most to the increase since 1990 were:

- enteric fermentation from dairy cattle, largely due to an increase in the dairy cattle population (methane) (an increase of 9.0 Mt CO_2-e)
- road transportation, due to traffic growth (carbon dioxide) (an increase of 5.7 Mt CO_2-e)
- agricultural soils, due to increased fertiliser use (nitrous oxide) (an increase of 1.7 Mt CO_2-e)
- fluorinated gases, mainly due to increased use in refrigeration and air-conditioning systems as replacement for ozone-depleting substances (an increase of 1.5 Mt CO_2-e)
- fuel use in manufacturing and construction, due to increased economic activity leading to increased production (carbon dioxide) (an increase of 1.3 Mt CO_2-e).

The following diagram reflects 2022 gross greenhouse gas emissions percentages by sector, category and gas type.



[32] https://environment.govt.nz/publications/new-zealands-greenhouse-gas-inventory-19902022-snapshot/

All sectors had gross emissions reductions from 2021. The largest reduction was from electricity and heat production due to increased renewable electricity generation. Aotearoa New Zealand's levels of renewable electricity generation are highly dependent on where and when there is rainfall. 2022 was a high-rainfall year, resulting in increased hydroelectricity generation that displaced coal and gas-fired power generation. As gross emissions in 2022 were influenced by this annual variation in rainfall, the high level of emissions reductions seen in 2022 does not mean a permanent reduction in emissions.

Waikato Region Emissions

Ngā Tukunga Waro i te Rohe o Waikato

The regional greenhouse gas emissions inventory provides an understanding of the Waikato region's emissions profile over time. Compiled every three years[33], the first baseline greenhouse gas emissions inventory for the Waikato region was for the 2015/16 financial year.

The most recent inventory, for 2021/2022, indicates that activities within the region generated approximately 12.0 $MtCO_2$-e. Gross emissions have decreased by 3 per cent since the 2015/16 baseline year. On a per capita basis, the Waikato's gross emissions remain significantly higher than the national average. This means that future Government policy initiatives to reduce greenhouse gases may have a significant impact on Waikato people, economically and socially.

Those sectors with the highest emissions provide the best opportunities for reducing the region's emissions. Agriculture remains the largest contributor to the total gross emissions for Waikato (67 per cent), followed by transportation (16 per cent) and stationary energy (13 per cent). On road petrol and diesel engines contribute to approximately 86 per cent of the transportation emissions and the main source of emissions from stationary energy is natural gas consumption.

Trends over the three inventories undertaken so far have been similar, with modest changes seen within each sector year to year. The three sectors with greatest changes are:

- transport, with an increasing but fluctuating trend between years
- agriculture, with a downward trend based largely on animal number reductions (particularly dairy and sheep)
- forestry (the largest change), with increased harvest volumes significantly reducing the sector's overall sequestration, which is used to offset other emissions.

The region's emission's profile for 2021/22 showed forestry removed 14 per cent of total gross emissions, compared with 44 per cent in 2018/19.

Increasing native forest has an important role in our region's long-term response to climate change. As well as increasing carbon sequestration, benefits of increasing native forest include increased biodiversity and improving soil health, while providing food, shelter and breeding sites for native species.

It is proposed that greenhouse gas emissions arising from the drainage and disturbance of organic soils such as our Waikato peatlands be included in future regional inventories.

Quick facts:

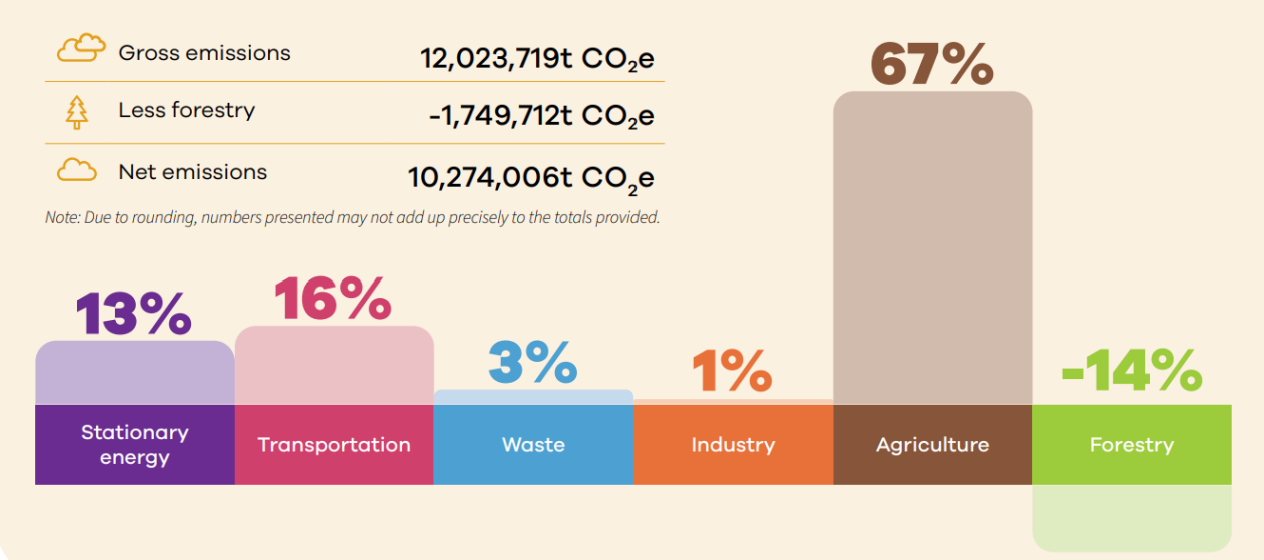
• Waikato region's per capita net emissions are approximately 35 per cent higher than the national average (23.7 v 15.0 tCO_2-e per capita).

- Agricultural activities generate 67 per cent of all emissions.
- Waikato region's per capita agricultural emissions are more than twice the national average (16.0 v 7.4 tCO_2 e per capita), showing the dominance of agricultural emissions in the Waikato.

[33] https://www.waikatoregion.govt.nz/environment/climate-change/waikato-regional-greenhouse-gas-inventory/

- 91 per cent of carbon sequestration in the Waikato comes from exotic forest and 9 per cent from native forest.

Waikato region emissions by percentage:



The Waikato Regional Council aims to enable Waikato farmers to be national leaders in the adoption of climate smart practices and technologies. They will do this by aligning farmer education and support services with those of industry bodies and central government.

The Waikato is one of the most productive agricultural regions in New Zealand. Dairy and meat products make up around two-thirds of the Waikato's international exports. Most of the towns in the Waikato are highly dependent on agriculture for their economic sustainability. We all have an interest in the enduring success of our primary industries.

Dairy farming is dominant. It was recently estimated that the Waikato has over 3000 dairy herds – around ¼ of the total herds in New Zealand[34] – and, economically, dairying brings in $1.6 billion (around 5 per cent of regional gross domestic product) each year to the region, as well as employing about 10,000 people.

The agricultural sector also includes sheep, beef and goat farming, horse breeding and horticulture. Vegetable growing, which used to be centred around Pukekohe, has expanded and shifted south to the Matamata area.

Those working in agriculture fully appreciate that weather patterns are changing, as this affects their livelihood. Farmers are already changing traditional management systems and learning to work with a changing climate. New technologies and improved genetics are being developed to adapt to changing conditions and reduce emissions. Farmers are also planting a significant number of trees, protecting existing forest lots and creating and protecting wetlands. Recent legislation has mandated all farmers to prepare and implement farm environment plans to address impacts on fresh water. Many of the actions also provide climate change response benefits.

Export markets are increasingly cognisant of emissions from land use, and these may result in formal or informal trade barriers in the absence of an appropriate climate response from New Zealand.

[34] https://www.dairynz.co.nz/media/bywm13d4/dairy-statistics-2023-24.pdf

Emissions in the Ōtorohanga District

Ngā Tukunga Waro i Te Rohe o Ōtorohanga

The Ōtorohanga District greenhouse gas emissions inventory provides an understanding of the district's emissions profile over time. Compiled every three years, the first baseline greenhouse gas emissions inventory for the district was for the 2018/19 financial year. The most recent inventory was completed in August 2023 and covers the 2021/2022 year[35].

Key results are:

- Ōtorohanga District emissions were 866,094 metric tonnes of carbon dioxide equivalent (t CO_2e) gross and 1,052,562 t CO_2e net emissions. The gross emissions for the Ōtorohanga District have decreased by 7% between 2018/19 and 2021/22. However, the net emissions have risen by 21%, largely due to an increase in forest harvest emissions.
- The largest two sectors are Agriculture with 783,964 t CO_2e and Transportation with 40,601 t CO_2e gross emissions.
- Activities within the Ōtorohanga District boundary generated 7% of Waikato Region's emissions (approximately 12,023,719 t CO_2e in total).

[35] https://www.otodc.govt.nz/assets/Documents/Climate-Change/Greenhouse-Gas-Emissions-Inventory-Otorohanga-District-August-2023.pdf

What are we doing at Ōtorohanga District Council?

Kei te aha mātou i Te Kaunihera ā-rohe o Ōtorohanga?

Reducing our footprint

Te whakaiti i tō tātou pānga waro

We have been taking action to reduce our greenhouse gas emissions. This includes purchasing more fuel-efficient vehicles and upgrading lighting and heating/ventilation in our main building.

However, we wanted to take a more coordinated and deliberate approach to reducing our greenhouse gas emissions, so in June 2024 we adopted our own climate change response plan[36]. This plan is ambitious based around achieving three goals:

- We understand and act on the impacts of climate change
- We have prioritised a transition to low (carbon) emissions
- We have adapted to reduce climate change risk

We are targeting reduced emissions, and we also want to ensure our staff understand and act on the impacts of climate change and that our plans, policies, systems and processes reflect that.

In 2024 we completed an assessment of our energy use and calculated our greenhouse gas emissions for 2023/24 at 390 t CO_2-e. This comprised approximately 125 t CO_2-e for electricity, 75 t CO_2-e for natural gas and 190 t CO_2-e for fuel (petrol/diesel). We will endeavour to calculate our emissions for 2019 to establish that as a baseline year. This will provide a point of comparison consistent with the baselines for other councils in the Waikato region.

For the emission sources we have direct control over we will use a mix of behaviour, operational and investment interventions to reduce our emissions.

Our plan acknowledges that we also need to adapt to reduce the risk of climate change impacts on our assets and infrastructure, much of which is critical to the wellbeing of our communities. In 2025 we anticipate completing risk assessments for our assets and infrastructure and feed that work into the development of our 2027-37 Long Term Plan.

Through our economic wellbeing strategy[37], we have also recognised the value of transitioning to a circular economy, where waste is minimised, and materials and products are kept in use. Minimising waste reduces

[36] https://www.otodc.govt.nz/assets/Documents/Climate-Change/ODC-Corporate-Climate-Change-Action-Plan-Endorsed-by-Risk-Assurance-Committee-June-2024.pdf
[37] https://engage.otodc.govt.nz/economic-wellbeing-strategy

greenhouse gases in several ways, including keeping products and materials in use to reduce energy use in manufacturing and retain embodied energy.

Our commitment

Our commitment in responding to climate change is reflected in our corporate climate change action plan adopted in

Goal	Action
We understand and act on the impacts of climate change.	Update Procurement Policy and procedures to embed carbon reduction and waste minimisation considerations into procurement decisions. Develop an internal policy to ensure climate change principles and targets are included in all major decision-making reports, project management and the development and review major plans, policies and bylaw and strategies. Measure organisation carbon emissions and use to inform reduction programme. Ensure availability of climate change learning module. Update the District Plan and regulatory tools (e.g. bylaws). Ensure resource consents, building consents and other approvals are processed in accordance with presiding legislation and policy requirements. Ensure statutory reporting requirements are met.
We have prioritised a transition to low (carbon) emissions.	Vehicle policy prioritises the transition to low-emission vehicles in the Council fleet. Encourage efficient/low-travel options such as car- pooling to events/meetings and virtual meetings, webinars and conferences. Include energy efficiency as a criterion in Council's procurement policy. Progress opportunities to electrify Council operations where meaningful emissions reduction can be achieved. Undertake specific energy efficiency initiatives/upgrades at Council facilities where meaningful emissions reduction can be achieved. Emissions avoidance/reduction is a key consideration in project and service delivery. Improve internal organisation awareness and behaviours about energy reduction/efficiency. Conduct waste audits of Council facilities and use data to optimise waste reduction/management. Organic waste from Council operations is composted. Improve internal organisation awareness and behaviours about waste reduction/recycling.
We have adapted to reduce climate change risk.	Significant climate change risks will be identified and, where appropriate, mapped. Provide a climate change evidence base and risk assessment to feed into future planning. Identify at-risk/vulnerable critical infrastructure (roads, water, wastewater, community facilities) susceptible to various climate change scenarios and take steps to enhance their resilience. Determine dynamic planning and risk management approaches. Incorporating climate change impacts into asset management planning and considering response/adaptation approaches/options (protection, retreat, design, capacity). Minimise/mitigate risk to Council infrastructure from climate change, with a priority on essential services.

Partnerships with Iwi/Māori

Ngā hononga me ngā Iwi/Māori

Upholding the principles of Te Tiriti o Waitangi is central to both the National Adaptation Plan and Emissions Reduction Plan. It is also central to how we work at ŌDC. This means our climate responses must be made in partnership with Māori. Māori responses to climate change are holistic and long term, therefore critical for a future-focused and resilient Ōtorohanga district. They draw on mātauranga Māori[38] perspectives and scientific expertise and incorporate a uniquely Māori understanding of environmental, whānau and community wellbeing.

This understanding will guide our work with iwi, hapū, marae and Māori organisations to frame climate change risks, adaptation and mitigation, and influence how we prepare for, respond to and recover from the impacts of climate change.

[38] Traditional collective Māori knowledge based on observations of events over time

Climate Change and the Māori Economy

Huringa Āhuarangi me te Ōhanga Māori

Economic wellbeing and environmental wellbeing are intertwined. The regional Māori asset base is over $6 billion – approximately 15 per cent of the national collective Māori asset base. This asset base is mostly made up of primary industries (60 per cent), including property, energy, agriculture, forestry and fishing industries. For this reason, a lot of research is being done on climate change impacts and opportunities for iwi, hapū, whānau and Māori businesses.

Climate change risks

The Council recognises how the following risks could potentially affect iwi/Māori interests, kawa (protocols) and tikanga (cultural practices), as well as diverse expressions of mana (authority, dignity, influence, governance) and kaitiakitanga (inherited guardianship of resources for intergenerational sustainability).

- Risks to iwi/Māori social, cultural, spiritual and economic wellbeing from loss and degradation of lands and waters, as well as cultural assets such as marae, due to ongoing sea level rise, changes in rainfall, drought and extreme weather events.
- Risks to iwi/Māori social, cultural, spiritual and economic wellbeing from loss of species and biodiversity due to greater climate variability and ongoing sea level rise.
- Risks to cultural heritage sites due to ongoing sea level rise, extreme weather events and increasing wildfire risk.
- Risk of a breach of Treaty obligations from a failure to engage adequately with and protect current and future generations of iwi/Māori from the impacts of climate change.
- Risks of exacerbating existing inequities and creating new and additional inequities due to differential distribution of climate change impacts (iwi/Māori are already disproportionately represented among vulnerable groups such as low-income families).

Our commitment

The Council is committed to working with Māori, iwi, hapū and marae communities to enable adaptation and mitigation actions that will safeguard their cultural, social, economic and environmental health and wellbeing, now and into the future.

We recognise iwi/Māori diversity and the need for tailored engagement strategies; therefore, we commit to meaningfully engage and consult with iwi/Māori and to explore opportunities to have them represented at the decision-making table. Challenges for the Council and Māori in responding to climate change include capacity, capability and resources.

- We will continue to advocate for central government funding to enable responses by iwi/Māori, for iwi/Māori and with iwi/Māori, and to better enable iwi/Māori to work with us on shared climate action community-led initiatives.
- We will continue to work collectively with iwi/Māori and central government agencies to progress climate action across our district, including in the development of more localised climate risk assessments, adaptation planning and Māori community and marae resilience.
- We will continue to share climate change information and our expertise to support iwi/Māori to build resilience within their communities and to reduce the impacts of climate change on sites of significance such as urupā, wāhi tapu, marae and the district's Māori economic base.

In the delivery of our climate commitments our aim is to be collaborative, culturally responsive and community led, and to achieve equitable outcomes for iwi/Māori.

This means we will identify specific risks relevant to Māori, iwi, hapū and marae communities, and ensure all adaptation and mitigation measures seek to recognise, respect and integrate Māori perspectives, values and knowledge.

We will continue to meet our Treaty settlement obligations through designing and carrying out our climate action activity, in a way that:

- meets our joint management Treaty settlement obligations.
- meets our obligations arising from future Treaty settlements.

Engaging with Communities

Te Kōrerorero Tahi ki Ngā Hapori

We want to work with and help local communities adapt to a changing climate and transition to a low-emissions way of living.

Responding to climate change requires changing the way we live, one that we all must make together to reduce our emissions and adapt to a new climate.

Mitigation requires nationwide and multi-agency alignment, as well as reducing business and household carbon emissions. We can all do our part, such as reducing waste, turning lights and computers off when not in use, walking and biking for short trips, taking public transport or having an electric vehicle rather than relying on fossil fuels. The last Waikato Regional Council survey of Waikato residents in 2022 showed that a significant majority of people feel concerned about the effects of climate change, and an increasing number had undertaken activities to reduce greenhouse gas emissions.

Adaptation focuses on local action and requires community engagement at a local level. It can sometimes involve taking practical actions that may be hard to accept right now to manage future risks from climate impacts, protect communities and strengthen the resilience of the economy.

We will work with the Regional Council to access the best local information on climate hazards, risks and impacts, and work with local communities affected by climate change to create tailored solutions. Working with communities is important from the outset.

We will learn about the things that are important to communities, including economic, social and cultural values, and how these values might change with a changing climate. The information will help tailor bespoke solutions for communities, as no two communities will experience climate change in the same way.

Some communities will be disproportionately affected by climate change. A key principle of both the National Adaptation Plan and Emission Reduction Plan is an equitable transition that is fair and inclusive, and we are committed to helping achieve this for the district. This means working closely with different groups to understand their needs, supporting our communities through the changes and upholding Te Tiriti o Waitangi.

Our commitment

We will understand what communities, including iwi, hapū and marae, value most and make it easy for people to participate in decisions and actions that affect them.

Climate Response Plan Roadmap Pathways

Te Mahere Urupare ki te Āhuarangi (Ngā Ara)

Water Supply

Putunga Wai

It is expected there will be less rainfall across the Waikato overall, but the rainfall we do get will arrive quickly as intense storm events. We will also have increased drought intensity and frequency with implications for water availability and water quality. This is important for Ōtorohanga and Kāwhia drinking water and the district's rural water supply schemes.

How climate change impacts this pathway

Climate change presents challenges to the availability of water for allocation and will be a major factor controlling land use patterns and future growth.

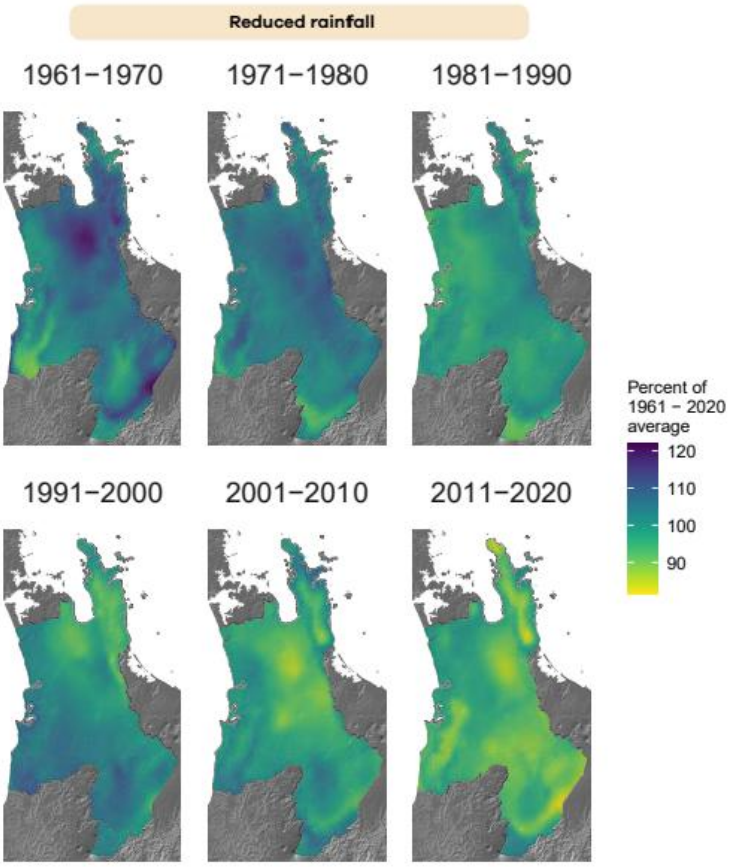
Two things will greatly impact future water allocation: nutrient loads, as a result of land use intensification, and increasing droughts, with low flow conditions lasting longer and becoming more severe.

The impacts on water of projected periods of low rainfall in combination with increased temperatures include:

- less habitable environments with potential negative impacts on instream indigenous biodiversity
- a need to increase the resilience of town water supplies, including factoring in population growth
- less ability for waterways to assimilate contaminants and heated discharges from point sources, requiring redesign of wastewater treatment plants to increase effluent quality and/ or not allowing

discharges to waterways for extended periods of time or permanently (with potentially considerable financial implications for new water management entities)

- for landowners without reticulated supply, particularly marae and isolated Māori and rural communities, reduced or alternative water use choices and/or the cost of funding additional water supply, storage and treatment options
- potential changes to land use, for example, different types of pastoral agriculture, horticulture and forestry, which require less water.



Note: This analysis uses rainfall data from the NIWA Virtual Climate Station Network dataset, which is available as a region-wide dataset from 1960.

How we are responding

Noting that the management and delivery of Three Waters activities is currently under review (Local Water Done Well), we have been:

- Investing in increased treated water storage for drinking water supplies (Ōtorohanga and Kāwhia)
- Installing water meters to enable real time consumption monitoring (all water schemes)
- Implementing an enhanced reticulated water leak detection and management programme (all water schemes)

Our commitment

- Continue work with other councils in the region to determine the best water services management and delivery arrangements for Ōtorohanga
- Work with the councils in the region, including the Regional Council, on a consistent approach to help our communities understand possible sources of water and how to make the most of every drop, using smart ways of capturing, storing, using and recycling water.
- Support opportunities for iwi and hapū-led environmental monitoring programmes and responses that utilise both mātauranga Māori and scientific methods.

Urban Form and Transport (Roading)

Te Āhua Tāone me te Momo Waka (Ngā Huarahi)

Urban form and transport system shape the way we live. While this provides the foundation for thriving communities, if poorly planned it can also establish and then perpetuate unhealthy urban form and travel patterns, as well as exacerbate vulnerabilities in some communities.

Urban form, growth and travel behaviour all influence climate change.

A low-carbon urban environment, with a multi-modal transport system that includes public transport to major centres and walking and cycling options, has benefits beyond reduced greenhouse gas emissions. These include:

- improved individual and community wellbeing, health and safety outcomes
- improved air and water quality
- a more accessible and connected region
- more affordable travel
- resilience to fuel price increases
- energy security.

Typically, our urban areas were planned and constructed to accommodate cars as the dominant transport mode, usually at the expense of other ways to travel. Lower density development requires more land and increases both individual transport costs and emissions, and external costs such as building and maintaining roads and accident risk.

Planning that supports low-emissions urban form (the location, shape, size, density, and configuration of settlements) through more mixed-use and higher density development close to town centres creates more accessible, healthy, resilient and vibrant towns. Higher densities result in lower operational emissions per dwelling and allow infrastructure, including the road network, to be used more efficiently, avoiding or delaying the need for more infrastructure and further emissions.

In our urban areas improved walking and cycling options help reduce the number of short car trips with single occupants, and bus services reduce the dependency on cars by those living far from employment, education, commercial areas and recreation, and reduce traffic problems like congestion and greenhouse gas emissions.

Having only two small urban areas (Ōtorohanga and Kāwhia) enables us to be closely aligned to how Council can influence local urban form. We also have the challenge of our urban communities being very car-reliant (as rural towns) and having been developed around larger residential sections.

How climate change impacts this pathway

The long-term effects of climate change will increase the hazard risk to homes, communities, infrastructure and the transport network.

Climate or weather-related risks that are relatively common in Aotearoa New Zealand's urban environments are river flooding, coastal erosion and inundation, and various forms of land instability. Other less common risks include the potential for extended drought, with consequences such as reduced access to water supply or fire risk, and high winds.

The resilience of our road transport network to climate change, whether it be sea level rise, coastal and riverine flooding, land instability or increasing temperatures, is critical to secure social and economic wellbeing in our district.

According to NIWA, the Waikato region has approximately 558 kilometres of local and arterial roads in areas that would be impacted by a rise in sea level of 1.2 metres above the current coastal 1 per cent annual exceedance probability (AEP) levels[39]. We know that roads to and around the Kāwhia/Aotea area are prone to coastal inundation during major weather events. In addition, 2750 kilometres of regional roads are exposed to known or mapped floodplains[40]. Some of these roads are located in the Ōtorohanga district.

[39] https://deepsouthchallenge.co.nz/wp-content/uploads/2021/01/Exposure-to-Coastal-Flooding-Final-Report.pdf
[40] https://deepsouthchallenge.co.nz/wp-content/uploads/2021/01/Exposure-to-River-Flooding-Final-Report.pdf

How we are responding

A transition to a low emission urban form, infrastructure and transport system is within the direct control of local government, by working together at both a regional and local council level. We can change the way we use land and resources and provide infrastructure so that our urban areas generate lower emissions and are resilient to the impacts of climate change. The transition needs to be well-signalled and inclusive, maximising opportunities and minimising disruption and inequities. The Ōtorohanga Town Concept Plan makes provision for many of these things.

Our commitment

- Facilitate higher density residential development e.g. adjacent to the Ōtorohanga town centre
- Support the development and promotion of walking and cycling routes
- Explore the use of low carbon bitumen for the district's road network
- Support public transport options to allow connection with larger centres in the region
- Assess the vulnerability of the district roading network to climate change impacts and incorporate resilience investment in future long-term plans

Coastal

Takutai

While we have limited ability to influence ocean temperature and acidification, our management of the lands and waterways can reduce stressors to increase the resilience of marine ecosystems to climate-related changes.

Significant economic activity is derived from the region's 'blue economy'[41] based in and around its marine areas, including from fishing, aquaculture, transport and tourism. Kāwhia and Aotea are local examples of marine-based economies.

Marine species and communities will need to adapt to ocean temperature changes, acidification[42] and sea-level rise. For some, this may not be possible, and invasive species may thrive. Flow-on effects mean many other organisms are at least indirectly affected by projected changes.

The coastal marine area is sensitive to land and freshwater uses. The Regional Council has an important role in managing these activities for the health of sensitive coastal receiving environments in a changing climate.

How climate change impacts this pathway

Coastal and marine areas are among those that are most exposed to the already unavoidable effects of climate change. Our oceans are being impacted in ways that change physical and chemical ocean processes and reduce biodiversity, with consequences for human communities.

The major climate change impacts on the marine environment will continue to worsen, even if targets for reducing emissions are achieved globally. They are:

- ocean warming and associated marine heatwaves (peak temperature events)
- ocean acidification
- sea level rise
- ocean deoxygenation

These effects influence other processes and will modify current sediment and nutrient stressors, further affecting the composition and functioning of ecological systems. From a te ao Māori perspective, these changes affect the mauri of ecosystems and risk taonga species, kai moana, kaitiakitanga and manaakitanga practices, the transmission of knowledge to future generations, wāhi tapu and marae along the foreshore[43]. Climate change will likely affect aquaculture, a key economic sector for parts of the Waikato region, including our district.

With rising sea levels, the intertidal zone may get squeezed out by new structures, such as seawalls, leading to the loss of those ecosystems and the services they provide.

Blue carbon captured by oceans and coastal ecosystems may represent important opportunities in our region to meet climate change commitments, such as considering alternative uses of marginal coastal land that would restore healthy ecosystems at the same time. For example, in areas like the Hauraki Gulf, salt marsh and seaweed plantations, when healthy, are important carbon sinks.

In the Waikato region, we are already seeing the impacts of a changing climate on our coastal and marine environment[44].

- From April 2022 to April 2023, the Hauraki Gulf experienced six marine heatwave events, the longest being 94 days. On the west coast near Raglan, four marine heat waves occurred, the longest being 188 days.

[41] https://www.sustainableseaschallenge.co.nz/our-research/blue-economy/
[42] https://niwa.co.nz/oceans/what-ocean-acidification
[43] https://www.landcareresearch.co.nz/assets/researchpubs/He-huringa-ahuarangi-he-huringa-ao-a-a-changing-climate-a-changing-world.pdf
[44] https://www.waikatoregion.govt.nz/assets/WRC/WRC-2019/Climate-Roadmap.pdf p35

- Bleaching of sponges on rocky reefs, a phenomenon not previously documented in New Zealand, was associated with the heatwaves in the Hauraki Gulf in 2022. Sponges have enormous ecological importance because of their water-filtering services, and they provide a home for other animals.
- In the Firth of Thames, ocean acidification[45] has already led to low pH levels that had not been predicted to occur until 2100.
- We have also seen deaths of birds in estuaries and coastal wetlands around the Firth of Thames, from events associated with drought, warm water and decreased oxygen levels.

Some of these impacts may be evident in our harbour/estuary areas (Kāwhia and Aotea).

How we are responding

The way we use and manage land, fresh water and marine environments will influence how resilient our coastal and marine ecosystems are to climate change. The Regional Council has a key role to play in managing and regulating land and freshwater activities to reduce stressors on the coastal and marine environment. High nutrient and sediment loads in water, together with increasing temperature, acidification and deoxygenation, will have greater combined impacts on marine ecosystems than any one factor alone[46].

The existing Aotea and Kāwhia sea walls have been serving those communities for many years. We are seeking the renewal of their resource consents and that process, which is managed by the Regional Council, will likely have regard to ecological and environmental considerations for the coastal environment in which they are located. The maintenance of these sea walls should be considered a part of a broader climate change adaptation plan rather than the only response.

Our commitment

- Support the Regional Council and other agencies in their work to understand the impacts of climate change on the health of the Kāwhia/Aotea coastal marine environment
- Seek the renewal of resource consents for the Aotea and Kāwhia sea walls
- Work with coastal communities to establish appropriate climate change adaptation plans

Aotea Sea Wall

[45] When marine algae and plants decompose acidic carbon dioxide is released. Ocean acidification occurs due to an excess of these algae and plants caused by high levels of nutrients coming from land and river run off

[46] https://news-oceanacidification-icc.org/2022/02/11/attributing-controlling-factors-of-acidification-and-hypoxia-in-a-deep-nutrient-enriched-estuarine-embayment/

Community Resilience

Tū Pakari o te Hapori

We have left behind the climate we have known, and with this the district faces new and growing risks from climate change-induced natural hazards. The increasing impacts of climate change threaten community resilience and wellbeing, infrastructure, the environment and our economy.

The Waikato region is already feeling the impacts of our changing climate – hotter temperatures, more droughts, bigger and more frequent weather events. Cyclone Gabrielle in February 2023, following hard on the heels of Cyclone Hale and the Auckland Anniversary weekend flooding events, exposed some of the vulnerabilities of the region. The effects on critical infrastructure, such as roading, was substantial in parts of the region, while the impacts from flooded pastures and damaged forests will be felt for some time to come.

Aside from localised flooding, such as at Ōpārau, and short-term access disruption, our district was largely spared the impacts from these major weather events. However, we must accept that it is not 'if' but 'when' we will be severely impacted.

The 1950s floods devastated Ōtorohanga township and in the 1960s a stop-bank system was constructed to protect the town from future floods. Since then, major weather events have tested but not breached the Ōtorohanga flood control system. As climate change is expected to increase the frequency and severity of weather events, the capacity and capability of the local flood protection system will be challenged.

In many situations nationally, the only long-term mitigation action that will eliminate risk from the effects of projected sea level rise and flooding is planned relocation from existing developed areas. In developed coastal areas or currently productive rural areas such as the Hauraki Plains and Lower Waikato catchment, the socioeconomic and cultural implications of relocation is a significant issue, affecting property, livelihoods and way of life. Careful consideration of potential transition pathways and timing will be needed to successfully navigate these challenges.

Unlike flooding, where the problem is too much water in a short period of time, drought is effectively a slow-moving, supply-side 'shock' that will particularly affect the economic wellbeing of the Waikato region, which has always been based on having plentiful water. While droughts typically do less damage to capital assets than floods, reduced incomes and associated higher costs mean they can have severe economic impacts.

How climate change impacts this pathway

Nationally, transformational change is required to ensure our communities and our economy are resilient to climate change. We must take bold and deliberate steps to change the way we plan and fund investment in infrastructure. This means long-term thinking and planning that considers whether and where communities can evolve and grow, as well as managing the increasing risks to our existing buildings and infrastructure. This needs to be achieved in a way that secures intergenerational social, economic, cultural and environmental wellbeing.

As the climate changes, some communities will be more vulnerable to the effects than others, including those living in more isolated places or with fewer resources available. Many Māori communities are particularly vulnerable due to their location near waterways and the coast.

Climate change may mean some of Council's infrastructure (e.g. flood protection, sea walls and road network) is no longer fit for purpose. Reassessments of the level of services provided by this infrastructure will be required, and further investment may be needed just to maintain current levels of service. In some cases, the nature and existing location of infrastructure may not be the best long-term option and new infrastructure investment in different locations may be required. The location of both infrastructure and people needs to be considered as part of developing climate change adaptation plans for the district.

In coastal areas, flooding may be exacerbated as high tides prevent flooded rivers from discharging to sea. Additionally, 92 per cent of the region's freshwater wetlands have been drained[47], impacting their ability to

[47] https://www.waikatoregion.govt.nz/assets/WRC/TR202219.pdf

reduce flood risk by slowing water runoff and act as carbon sinks. Assuming current land use can be maintained in a changing climate, upgrades to drainage or flood management infrastructure may become financially and environmentally unsustainable.

The Government is proposing the establishment of a national climate adaptation framework in 2025[48]. This framework is expected to cover ways to:

- Minimise the long-term costs to Aotearoa New Zealand of adapting to the impacts of natural events.
- Provide certainty for property owners and ensure any support is predictable, principled and fair. This includes clarity about the Government's response and the roles of insurers, local government and other groups.
- Improve the sharing of information so that everyone – individuals, communities, councils and industries - can make informed decisions.
- Contribute to maintaining efficient housing and insurance markets.
- Ensure people have the ability and incentive to make decisions to reduce their risk where they can.

The framework will focus on the areas where people live and work. This includes both existing and future development, and the infrastructure which serves these places.

How we are responding

The council recognises that working with communities, partnerships with Māori and a whole-of- government approach are essential to address these issues. Changes in resource management, spatial planning and climate adaptation support this type of holistic approach. We are in the early stages of transition to this new national regulatory planning environment and there is still uncertainty around how the Council's functions, existing and new legislative responsibilities and community adaptation processes will evolve.

As the details of the new legislation and transition timetable become known, Council and Waikato Regional Council will need to work together to prepare for the new system. In the meantime, we will work closely with the Regional Council and our communities to understand the local risks from climate change. We will be helping these communities to plan for their future through the development of community adaptation plans that include agreed community risk thresholds and triggers.

The Regional Council's Resilience Programme has the aim of reducing the current and future impact of natural hazards. So, it makes sense for us to work with the Waikato Regional Council to:

- ensure sufficient information on natural hazards and risk is available to support local decision making
- manage risk by working with local communities to agree natural hazard risk thresholds and management options.

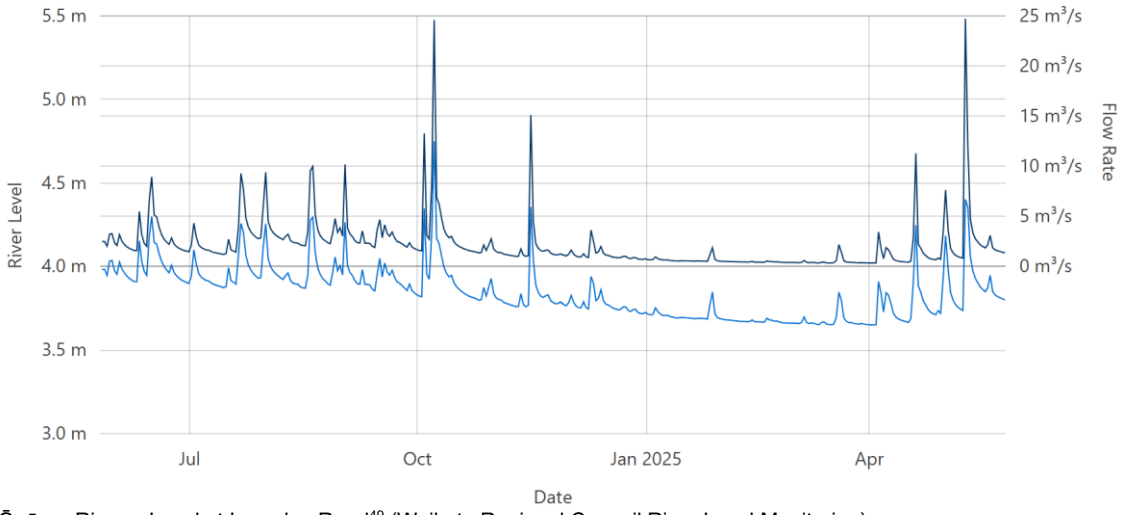
The primary land use controls for managing the location, development and expansion of communities and infrastructure sit with Council through the Ōtorohanga District Plan. However, the Waikato Regional Policy Statement provides for the Waikato Regional Council to control the use of land for the purpose of decreasing risk from natural hazards, such as inundation from rising sea levels and river flooding, where the risk is intolerable (primary hazard zones). In our forthcoming review of the District Plan, we will work with local communities and the Regional Council to ensure appropriate controls are in place that enable development while limiting climate change/natural hazard risk.

Where retreat, relocation, retirement of land and alternative land uses are not considered to be options, the National Adaptation Plan and the Emissions Reduction Plan provide for nature-based solutions to be prioritised in policy, planning, design and decision making. We will support the Waikato Regional Council and advocate for nature-based solutions in their integrated catchment management and policy work programmes, as well as in their research, collaborations and work with communities.

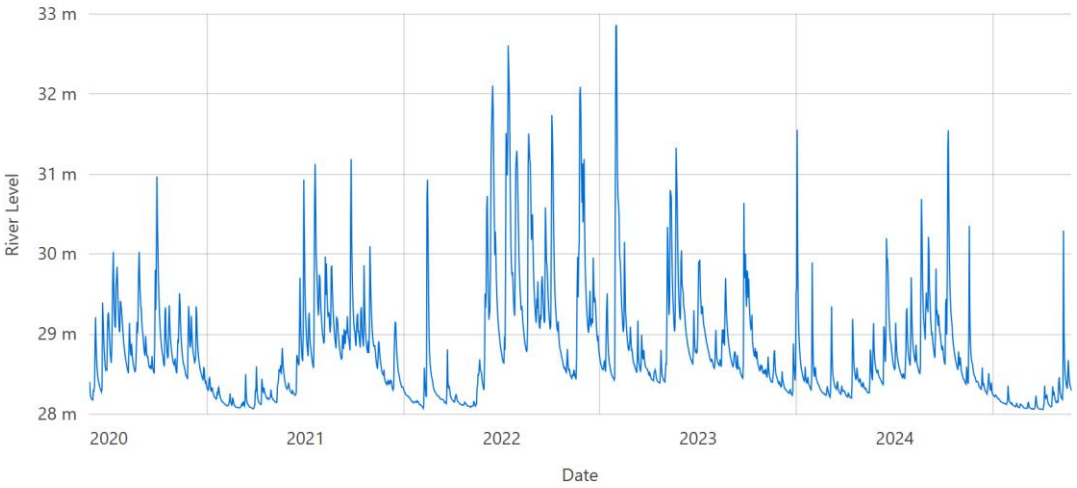
[48] https://environment.govt.nz/what-government-is-doing/areas-of-work/climate-change/adapting-to-climate-change/adaptation-framework/

Our commitment

- In conjunction with the Waikato Regional Council, complete a risk assessment of key Council assets and infrastructure to undertake the likely impacts of climate change and community exposure/vulnerability.
- As the Government's climate adaptation framework is developed, understand Council's role and the implications for local communities and stakeholders.
- Work with communities, mana whenua partners, the Regional Council and other agencies on the development of community adaptation plans that include agreed risk thresholds and triggers
- When reviewing the Ōtorohanga District Plan, ensure appropriate controls are in place that enable development while limiting climate change/natural hazard risk.
- Advocate for and support the Regional Council on nature-based solutions to limit the risks of climate change impacts.
- Support the Regional Council in establishing a regional hub for hazard and risk information to inform local adaptation plans and decision-making.
- Support communities in hazard reduction, readiness and resilience through our Civil Defence and Emergency Management function.



Ōpārau River – Level at Langdon Road[49] (Waikato Regional Council River Level Monitoring)



Waipā River – Level at State Highway 31 Bridge, Ōtorohanga[50] (Waikato Regional Council River Level; Monitoring)

[49] https://www.waikatoregion.govt.nz/environment/envirohub/environmental-maps-and-data/station/41211/WL/?dt=Level
[50] https://www.waikatoregion.govt.nz/environment/envirohub/environmental-maps-and-data/station/43916/WL/?dt=Level

Community Funding and Investment

Ngā Pūtea hapori me te Haumitanga

Climate change is no longer considered to be just an environmental challenge. It has wide-ranging impacts, including threatening financial systems and economic security. Funding and investment decisions have important roles to play in mitigating emissions and supporting adaptation.

Finance is a key tool in responding to climate change by aligning investments and spending with climate objectives and supporting and enabling others in climate action initiatives.

There are many layers of uncertainty already impacting investments, such as post-pandemic economic circumstances characterised by higher inflation, a complex geo-political landscape and a changing regulatory environment, including a move to a low-emissions economy. The value and insurability of underlying investment assets may be further affected by a world destabilised by climate change. In this environment, understanding and managing the exposure of investments and assets to climate risk is crucial. Sustainable finance mechanisms need to consider the climate impacts of funded activities, and how climate resilient investments might be progressed.

At the same time, it is well recognised that responding to climate change is not solely a government, business or financial response. All sectors of society have a role to play, including individuals in their activities and spending. The growth of local community-led initiatives is an essential component of an overall climate change response plan.

How climate change impacts this pathway

As climate change becomes more apparent and increasingly impacts on day-to-day life, we expect communities will want to respond with faster action and will have a growing interest in accessing community funding from a range of sources.

Climate change materially impacts the performance of investments and, in recent years, the costs of extreme weather events have impacted business sectors, including the insurance industry, severely.

There are three ways that climate change can affect financial stability[51].

1. Physical risks: The impacts today on insurance liabilities and the value of financial assets that arise from climate and weather-related events, such as floods and storms that damage property or disrupt trade.
2. Liability risks: The impacts that could arise tomorrow if parties who have suffered loss or damage from the effects of climate change seek compensation from those they hold responsible.
3. Transition risks: The financial risks that could result from the process of adjustment towards a lower-carbon economy. Changes in policy, technology and physical risks could prompt a reassessment of the value of a large range of assets as costs and opportunities become apparent.

How we are responding

The implications of climate change are routinely considered in the Council's decisions and through its risk and assurance activities.

The Council's Risk and Assurance Committee monitors our activities to mitigate the risks of climate change on Council business, as well as how we affect the climate. The Committee is particularly interested in understanding and mitigating the effects that a disrupted climate might have on service delivery and legislative obligations.

Under the Climate Change Response (Zero Carbon) Amendment Act 2019, councils are reporting organisations. The Act enables the Minister for Climate Change or the Climate Change Commission to request that a reporting organisation provides information about its governance, risk identification and management as it relates to climate change mitigation and adaptation. Staff are considering what may be required to ensure Council is well positioned should it be required to meet reporting requirements under the Zero Carbon Act.

[51] https://www.bis.org/review/r151009a.pdf

Our commitment

- Monitor the Government's work to consider whether to extend the application of mandatory climate-related disclosures to ensure our climate reporting and disclosure practices will meet foreseeable future requirements.
- Explore opportunities for multi-organisation funding of community and iwi/Māori projects to increase the collective impact of funding and the sharing of in-kind resources focused on reducing climate change risks and impacts.
- Review existing mechanisms through which the Council distributes funds to ensure that climate-related criteria are considered.