WAKA KOTAHI
NZ TRANSPORT AGENCY

Tiro Rangi: our climate adaptation plan

2022-24

Te Kāwanatanga o Aotearoa
New Zealand Government

Tiro Rangi

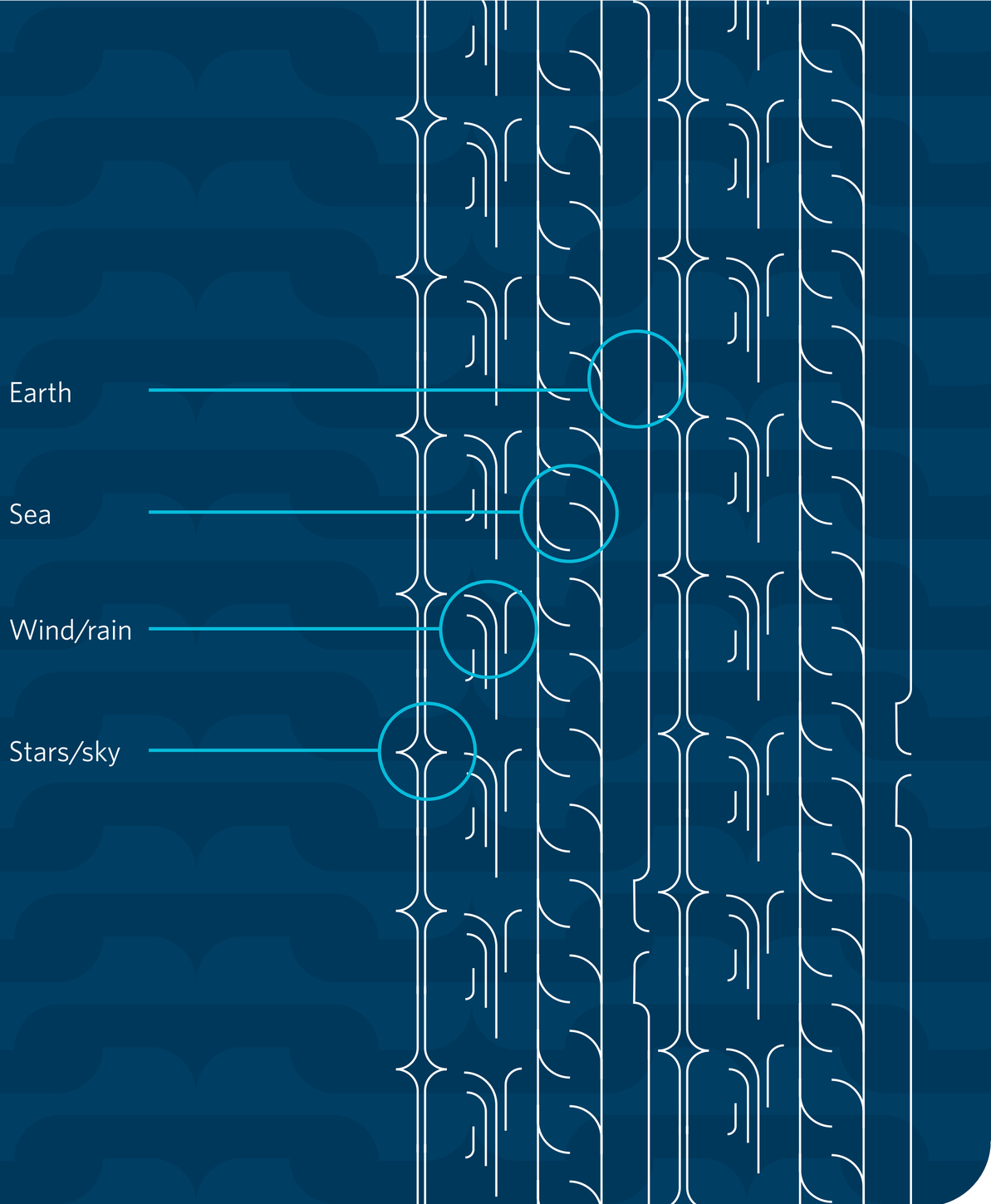
Tiro Rangi brings together our Waka Kotahi NZ Transport Agency view for adapting the land transport system to the reality of a changing climate.

Tiro from Titiro – to observe, to see, we need to look both with our physical eyes and spiritually.

Rangi from Ranginui – Sky Father.

Tiro Rangi – Observing all elements of the interaction between the sky and Earth – clouds, wind, snow, hail, wind – all elements interacting in the global environment.

Tiro Rangi – Looking at the impact of the environment upon all people, and all people on the environment. We're facing our responsibilities and actions today for today, tomorrow and the future.



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Waka Kotahi NZ Transport Agency

Published December 2022 | 22-356

ISBN: 978-1-99-106808-8

Foreword

Toitū te marae a Tāne-Mahuta, Toitū te marae a Tangaroa, Toitū te tangata.
If the land is well and the sea is well, the people will thrive.

Welcome to Tiro Rangi, our inaugural Waka Kotahi climate adaptation plan. This is an important step on the journey towards a transport system that is resilient to the impacts of climate change.

We see evidence all around us of how a changing climate will affect us. In 2022, we experienced many extreme weather events that led to significant floods, slips and rockfalls, severely damaging our state highway network and local roads, closing major routes and cutting off communities. In some places, people had only recently recovered from earlier devastating events.

There's already a lot of great work underway to reduce carbon emissions and to start to build climate resilience into the transport system. Preparing for and responding to climate change impacts will shape our work for decades to come. That's why Tiro Rangi is so important to all the work we do at Waka Kotahi.

Tiro Rangi lays a strong foundation for our approach to climate resilience. It sets out our high-level actions for the next two years for the step change we need in the way we work, and our long-term goal for a climate-resilient transport system.

The government is leading the response towards a climate-resilient Aotearoa New Zealand with the introduction of the national adaptation plan and embedding climate adaptation into reform of the resource management system. Tiro Rangi responds to these changes. We're putting a stronger focus on sustainable and resilient urban growth and form, and collaborating with communities, partners and Māori to consider wider spatial planning needs in the context of climate change. And climate risk will play an important role in our thinking, particularly when we make funding decisions.

Adapting to climate change will be complex to get right. We are unlikely to be able to build our way out of all the resilience challenges, so we must look to innovation and ways to work smarter alongside our partners, iwi, communities and the private sector.

Tiro Rangi is about putting the right foundations in place and building on what we already do. Responding to the challenges of climate change is our opportunity to shape and invest in a better land transport system that is safer, cleaner and more accessible for everyone – Te Anamata.

Nicole Rosie
Chief Executive

Purpose

Tiro Rangi 2022–24 – laying a strong foundation for adaptation

Tiro Rangi is our plan for adapting the land transport system to the reality of a changing climate. In the next two years we will lay a strong foundation and begin the step change for climate adaptation in the way we plan, invest in, design, deliver, operate and use the land transport system. In this first plan we will build on existing climate resilience activities and prioritise actions that unlock future action.

Introduction

Aotearoa New Zealand experiences a wide range of natural hazards that impact our land transport system, and affect the ability of people and freight to move about the country. Climate change will increase the severity and frequency of climate-related hazards, including flooding, coastal inundation and erosion, landslides, high winds, heatwaves, drought and wildfire.

The reality of a changing climate is already being felt across Aotearoa. The winter of 2022 was the warmest and wettest on record, breaking rainfall records in many places. Many parts of the country, including Marlborough, Nelson, Wellington and Northland, suffered severe damage and communities were cut-off by a large-scale weather system in August, with significant impacts on state highways and local roads caused by flooding, slips and washouts. This follows serious weather-related emergency events impacting most parts of the country over the last few years.

Recent weather events bring a sharp focus to the climate resilience challenge that we face, which will only escalate as climate change accelerates and risk increases over the coming decades. Emergency works are our short-term and costly response, but we cannot sustain this approach into the future. To invest in resilience for future generations in a changing and uncertain climate, the land transport system needs substantial additional investment.

Waka Kotahi recognises the need to take a planned and proactive approach to climate change adaptation. We will deliver climate resilience alongside achieving outcomes for safety, sustainability and a transition to a low-emissions transport system. Tiro Rangi, our first climate adaptation plan, shapes our approach to climate resilience and sets out the role for Waka Kotahi and the actions needed to adapt the land transport system to a changing climate.

Our strategic approach to climate adaptation

Our climate adaptation goal

We have set a climate adaptation goal that by 2050:
'Our land transport system is resilient in a changing climate to enable a system that improves wellbeing and liveability'.

This long-term goal extends to 2050 and beyond as we will need to adjust to increasing (and uncertain) climate risk in the future. A climate-resilient land transport system is required to achieve the outcomes and vision in Te Kāpehu – our Waka Kotahi strategic direction. This goal also aligns with the government's **national adaptation plan** (NAP) and Te Manatū Waka Ministry of Transport **Transport Outcomes Framework**.[1]

We are already working towards improving climate resilience, but reaching our climate adaptation goal will require a more coordinated and focused approach. It will take time to build climate resilience into the land transport system, and the choices we make now have long-term consequences, especially as we are responsible for investing in, managing and operating inter-generational assets and systems. We will also need to embed adaptation into maintenance programmes, including renewal cycles.

A step change in climate adaptation

Waka Kotahi recognises in **Arataki** – our long-term strategic plan for the land transport system – that climate change is a key driver, and that tackling climate change requires a step change in our response. We will need to make substantial and enduring changes to the way that we work.

Tiro Rangi (2022–24) is our plan to begin that step change in climate adaptation, and change the way we plan, invest in, design, deliver, operate and use the land transport system. In the next two years we aim to lay a strong foundation for our climate adaptation work over the next decade. We will build on existing climate resilience activities and prioritise actions that will unlock the future action required.

Our ambition is to progress at pace with the step change over the next five years. We recognise that some changes will take time, so our aim is to have completed a step change in adaptation by 2035, including fully embedding climate risk in our decision making at all levels for the land transport system. Climate risk will be routinely considered in planning, operational and investment prioritisation alongside other objectives, and there will be substantial and integrated investment in climate resilience, especially for inter-generational assets and systems.

[1] This aligns with the national adaptation plan infrastructure outcome 'Our infrastructure is resilient to a changing climate, so that it protects or enhances the wellbeing of all New Zealanders', and the Transport Outcomes Framework goal of 'a transport system that improves wellbeing and liveability' and its resilience and security outcome.

Figure 1: How Tiro Rangi will help us achieve our climate adaptation goal

Ongoing building of resilience into the system in the face of escalating climate impacts

2024 2035 2050

Foundations: Tiro Rangi 2022–24

Lay the foundations over the next two years with actions that build on existing initiatives and by prioritising those that unlock future action.

1. Better understand and manage climate risks to Waka Kotahi
2. Ensure that our strategic system planning and investment direction is enabling climate adaptation
3. Embed climate adaptation in our investment decision-making processes and delivery
4. Ensure that robust evidence underpins our work on climate adaptation
5. Embed te ao Māori worldview and build a partnership approach to climate adaptation for transport
6. Get ready to work together on climate adaptation

Step change

By 2035 we will have completed a step change in the way we invest in, plan, design, deliver, operate and use the land transport system so it is resilient in a changing climate.

Tiro Rangi 2024–27 → **Tiro Rangi 2027–30** → **Future Tiro Rangi – climate adaptation plans**

Goal

By 2050 'Our land transport system is resilient in a changing climate to enable a system that improves wellbeing and liveability'.

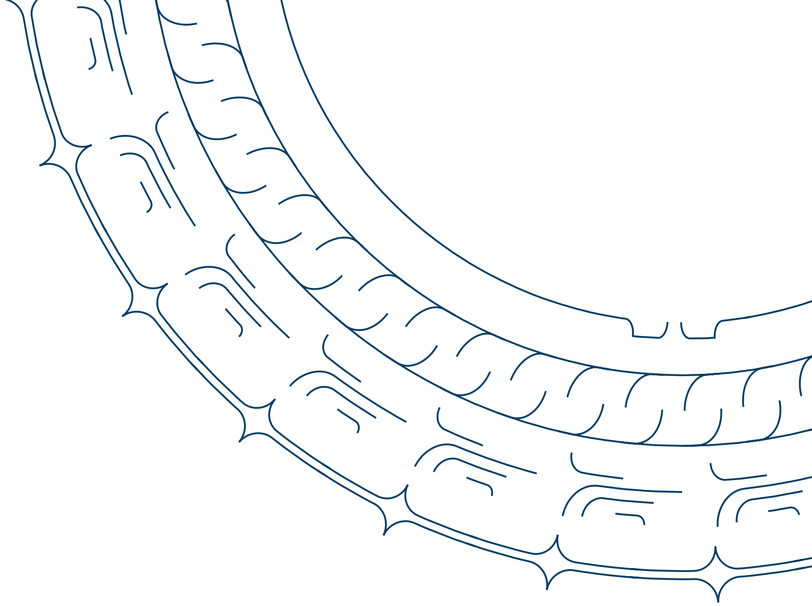
Te Tiriti o Waitangi and te ao Māori

Waka Kotahi, as a Crown agency, recognises and respects Te Tiriti o Waitangi and aims to work with Māori as partners to build strong, meaningful and enduring relationships. This is driven by **Te Ara Kotahi – Our Māori Strategy**, which provides a guiding framework for us to work with and respond to Māori.

Ko koe ki tēnā ko au ki tēnei kīwai o te kete

Waka Kotahi and Māori working together to succeed for a better New Zealand.

(Te Ara Kotahi: Te whakakitenga – vision)



It is essential that we develop our climate adaptation response in partnership with Māori, to uphold the principles of Te Tiriti o Waitangi and to protect the interests of Māori. This includes elevating te ao Māori and mātauranga Māori in the adaptation process – and empowering Māori in planning for Māori, by Māori.

This starts by acknowledging that Māori whānau, hapū and iwi are the kaitiaki of their whenua, wai and taonga. Hapū and iwi assert their right to own, control and manage their ancestral lands and territories, waters and other resources. They have a distinct spiritual and material relationship with their land and territory, which are at the core of their existence – and are inextricably linked to their survival and the preservation and further development of their knowledge systems and culture.

The impacts of climate change on the cultural, health, social, environmental and economic wellbeing of Māori are going to be profound. It will affect individual and collective hauora of Māori and their traditional, cultural and customary practices. Māori will be disproportionately impacted by climate change due to existing socio-economic inequities in transport. Many Māori also live in and have sites of cultural significance – including marae, papakāinga, urupā, wāhi tapu and mahinga kai – in coastal, rural and remote areas that are highly vulnerable to climate impacts. In many places it will be a challenge to maintain transport connections that Māori depend on.

Māori are also leading the response to climate change, as kaitiaki and as a Treaty partner to the Crown. Iwi are showing how we can adapt and thrive in a changing climate with their own climate strategies and action plans (for example **Ngāi Tahu** and **Ngaa Rauru Kiitahi**) and by working closely with local government (for example **Te Tai Tokerau climate adaptation strategy** was developed by four councils and iwi/hapū representatives from across the region). Waka Kotahi is committed to ensuring whānau, hapū and iwi lead climate change solutions for land transport, not just contribute to them.

We will be informed by mātauranga Māori, the body of traditional and contemporary knowledge about the world – both physical and spiritual. Mātauranga Māori will lead us to solutions that are innovative, proactive and values-based, and which will strengthen connections with the natural environment. Over time this knowledge has been devalued. However, as Western science searches for solutions to climate adaptation, this traditional Māori knowledge will assist us to learn and better inform Crown and Māori partnerships.

Waka Kotahi is committed to valuing te ao Māori views in the work that we do – and the restoration of environmental balance as part of a joint aspiration – ahakoa ko wai, ki hea.

Policy context

Under the Climate Change Response Act 2002 (CCRA) the government must assess and understand the risks posed by climate change and take action to manage these, including developing a national adaptation plan (NAP) every six years. The NAP released in August 2022 – *Urutau, ka taurikura: kia tū pakari a Aotearoa i ngā huringa āhuarangi – Adapt and thrive: building a climate-resilient New Zealand: Aotearoa New Zealand's first national adaptation plan* – is the first step towards meeting the government's long-term vision and goals for a climate-resilient Aotearoa.

Government strategies and policies

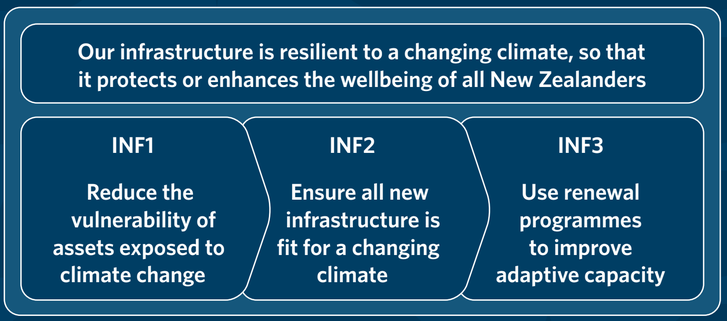
The 2021 **Government Policy Statement on land transport** (GPS) states that Waka Kotahi will undertake relevant actions in the NAP. The development and implementation of Tiro Rangi is a priority action in the NAP. There are transport system actions, which Waka Kotahi will co-lead with Te Manatū Waka Ministry of Transport, to ensure that our existing work programmes include climate adaptation. These include reviewing our investment decision making, public transport and active travel, and rail network investment and planning. We are expected to work with Te Manatū Waka on investigating and implementing the use of nature-based solutions (NBS) in our transport infrastructure and delivery of the freight and supply chain strategy. The actions that we co-lead in the NAP are also reflected in the government's **emissions reduction plan** (ERP).

The NAP brings together more than 120 actions to be delivered across government. Many of these are relevant to Waka Kotahi, including changes to the resource management system, a review of how The Treasury makes decisions on infrastructure, the Civil Defence Emergency Management Act 2002 review, working with Māori on climate action and ensuring that Aotearoa has the climate and hazard information we need to make decisions. Waka Kotahi will also play a leading role in delivering objectives in the NAP infrastructure chapter (figure 2), alongside partners across the sector. For more about the NAP actions that Waka Kotahi will lead or support, see appendix 1.

Waka Kotahi strategies and policies

Tiro Rangi is closely connected with Waka Kotahi strategies and policies. Addressing climate resilience is a key initiative in the **Waka Kotahi Resilience Framework**. In the long term, we will only achieve the four system outcomes and vision in Te Kāpehu if we have a climate-resilient land transport system. Adaptation is especially relevant to te anamata – leave great legacies – for future generations who will face increasing climate risk. We identified in **Arataki** that climate change is a key driver and that we need to make a step change in how we design, deliver, operate and use the transport system. Tiro Rangi will set the foundations for us to achieve this step change.

Figure 2: Infrastructure objectives from the NAP



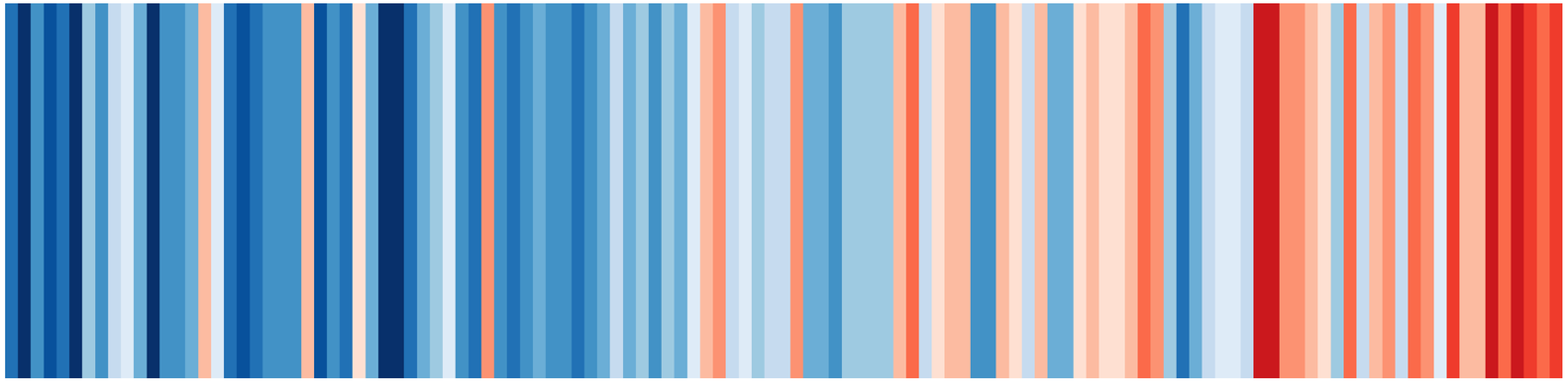
The changing climate and adaptation

How Aotearoa New Zealand's climate is changing

Climate change has well and truly arrived in Aotearoa.[2] The average annual temperature has risen by 1.1°C over the last century, with an increase in temperature extremes. Signals are also emerging of changing rainfall patterns in many places, wetter or drier, and an increase in extreme rainfall.

In the future, we expect profound changes in the climate of Aotearoa. Climate change will accelerate in the coming decades, although the amount of change will depend on global efforts to reduce greenhouse gas emissions. Temperature is projected to increase across the country, particularly in summer and autumn. Extreme rainfall, drought and wildfire risk are expected to increase in many places. Continued sea-level rise will put large amounts of coastal infrastructure at risk.

Figure 3: Aotearoa annual average temperature, 1910–2019



#ShowYourStripes by Ed Hawkins for New Zealand Region 1901–2021, data source Berkeley Earth.

The stripes turn from mainly blue (cooler) to mainly red (warmer), illustrating the rise in average temperature.

[2] Ministry for the Environment and Statistics NZ (2020). New Zealand's Environmental Reporting Series: **Our atmosphere and climate 2020**.

Future climate projections for Aotearoa[3,4]

Temperature

By 2040 average temperature is projected to increase by between 0.7°C (RCP2.6) to 1.1°C (RCP8.5), and up to 3.0°C by 2090 (RCP8.5).[5] There will be more hot days, fewer frost and snow days, and an elevated fire risk in rural areas.

Strong winds

Extreme wind speeds will increase by up to 10% or more in parts of the country, with the most robust increase in the southern half of the North Island and throughout the South Island.

Rainfall

Projected changes in rainfall vary around the country and with seasons. The overall annual pattern is for increased rainfall in the west and south, and decreases in the north and east. There will be an increase in very extreme rainfall throughout the country. Drought intensity and severity will also increase.

Sea-level rise

Median sea-level rise across Aotearoa is projected to be between 0.44 metres (RCP2.6) and 1.09 metres (RCP8.5) by 2100. In coastal areas where the land is subsiding the rate of relative sea-level rise will be even higher. Sea-level rise will accelerate coastal erosion and increase coastal inundation.

[3] Ministry for the Environment (2018). **Climate change projections for New Zealand: atmosphere projections based on simulations from the IPCC 5th assessment**, 2nd Edition.

[4] Ministry for the Environment (2022). **Interim guidance on the use of new sea-level rise projections**.

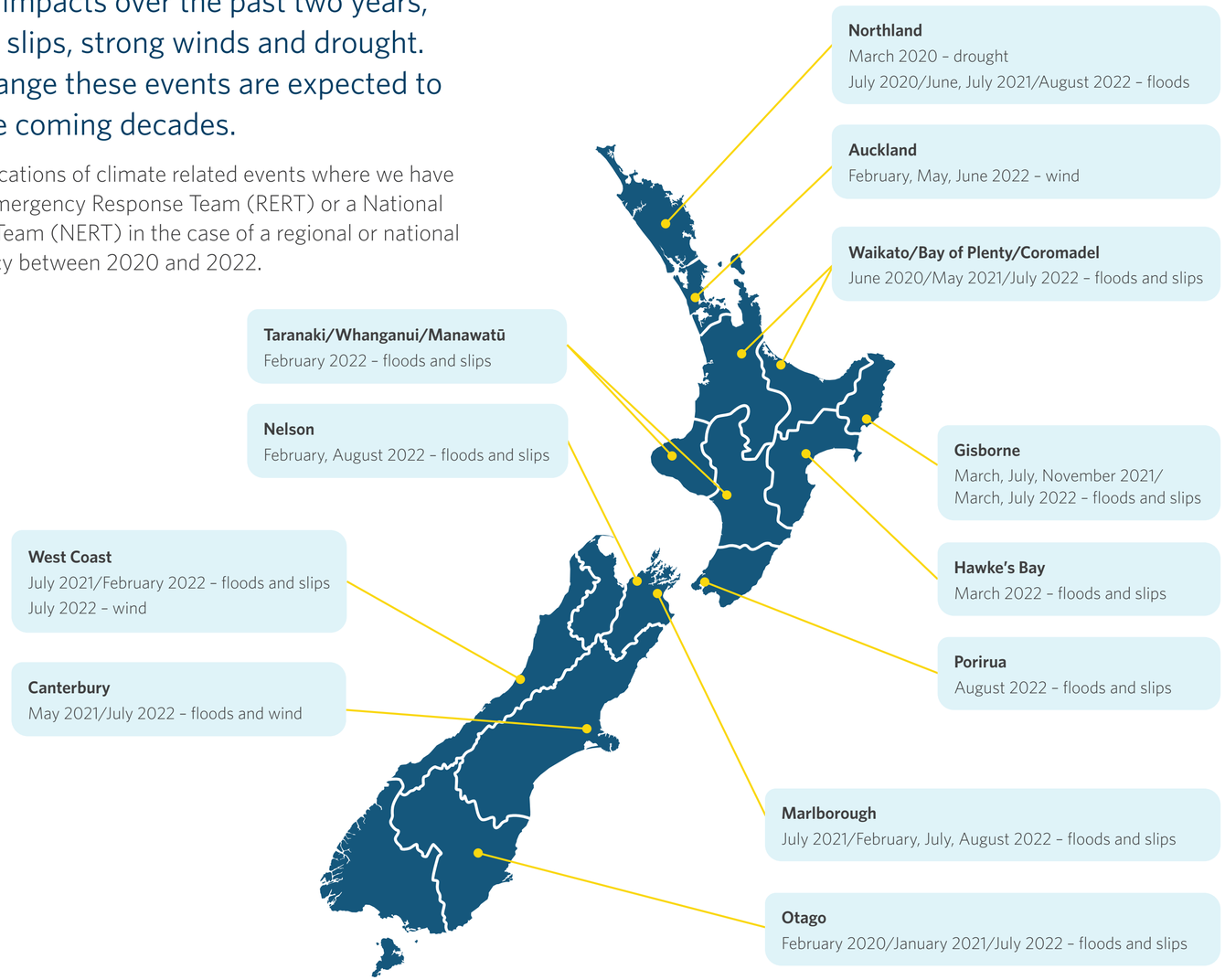
[5] RCP2.6 is a low emissions pathway, RCP8.5 is a very high emissions pathway.

Weather emergency events on the state highway

Many of our state highways have experienced weather-related impacts over the past two years, including floods, slips, strong winds and drought. With climate change these events are expected to escalate over the coming decades.

This map shows the locations of climate related events where we have deployed a Regional Emergency Response Team (RERT) or a National Emergency Response Team (NERT) in the case of a regional or national civil defence emergency between 2020 and 2022.

Figure 4: Significant state highway emergency events, 2020–22



Climate impacts and the land transport system

Aotearoa already experiences significant impacts from severe weather events that affect the land transport system. Climate change will increase the frequency and severity of climate-related hazards, including flooding, coastal inundation and erosion, landslides, high winds, heatwaves, drought and wildfire. The consequences of climate impacts will extend far beyond damage to transport infrastructure – it will impact on the economy and affect the lives and livelihoods of people who rely on our land transport system. This section provides examples of climate impact on our communities. It is not intended to be comprehensive.

Rural and coastal communities

Rural and coastal communities may become increasingly isolated as infrastructure is damaged more frequently, service outages last longer and repair costs increase. The accessibility of some locations will be compromised for residents, businesses, tourism and recreational visitors, and vital services. These communities rely on road transport for access and economic activity, and often lack alternative routes and modal options. Many Māori communities are in rural and coastal areas and will be disproportionately impacted by these changes.

Disruption to emergency services

The ability of emergency services to respond during emergencies can be impacted when road access is blocked by climate-related disruptions such as floods, landslides or wildfires. If there is serious damage to the transport network, recovery could take time and there may be an extended period with reduced emergency service provision.

Māori communities

Many Māori communities are in coastal and remote rural locations with transport connections that are exposed to climate-related hazards. Climate change could increasingly disrupt access to homes, businesses and sites of cultural significance, including marae, papakāinga, urupā, wāhi tapu and mahinga kai. This will affect individual and collective hauora and impact on traditional, cultural and customary practices.

Isolation of communities

Route closures from climate-related disruptions can lead to rural communities being cut off or facing long detours to access vital services in regional hubs, including health care, fuel and groceries. This disruption can last days or even months while repair work is undertaken, and in some locations alternative routes and services may not be viable in the long term.

Access for tourists

Aotearoa attracts large numbers of visitors to unique remote and exposed locations and relies on land transport connections that are often vulnerable to climate-related hazards. If visitors are unable to reliably access locations it creates a difficult operating environment for tourism businesses, which may affect investment and their long-term viability in some locations.

Disruption to rural businesses

Rural business relies on freight services, which use a long network that is exposed to many climate-related hazards. When this is disrupted, it has a significant impact on the rural economy. Many businesses in primary industries require time-sensitive movement over considerable distances to operate, with perishable products particularly at-risk if they are unable to reach market.

Urban areas

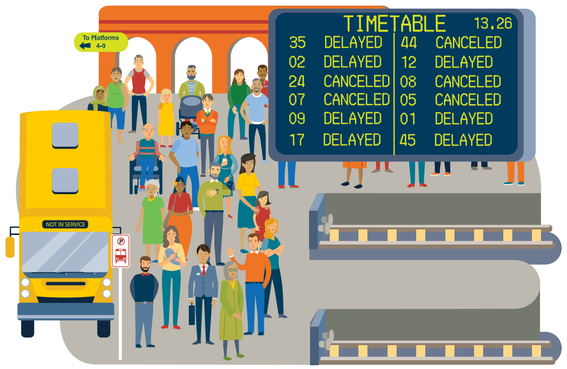
Urban transport networks play an important role moving large numbers of people and freight. Roads, rail lines, bus routes and cycle lanes may face increasing levels of disruption and delay, affecting access to essential services. Urban areas have a greater variety of options for alternative routes and modes, but the overall network efficiency may be compromised with additional pressure on the areas still functioning. Although disruption for many people in urban areas may be short-lived, it can affect a very large number of people and have significant economic cost.

Complex transport system disruption

Climate change is likely to bring more frequent disruptive weather events. In urban areas these can affect large numbers of people and the economic cost and total social impact quickly adds up, even when they don't cause significant damage individually. Although multiple travel modes provide more options and can improve wider resilience, impacts can be complex, widespread and cascade across the transport system.

Closure of major routes

The closure of main roads due to weather events in urban areas can lead to delays and congestion, and this can become widespread if traffic shifts to alternative routes. Damage to a major route would have significant impact on the operation of the overall transport network.



Reliable public transport

People need reliable and comfortable public transport in all weather conditions, and this can be impacted by extremes of weather – hot, cold, wet or windy. Delays and cancellations can result from physical damage to transport infrastructure or changes in passengers travel patterns. People can also be exposed to adverse weather effects while using public transport, whether they are onboard or waiting for a service.

Interdependent infrastructure

Urban infrastructure is highly interdependent, with extreme weather potentially affecting multiple systems and causing a chain of impacts. Disruption to transport can prevent access to other critical infrastructure such as power, water or telecommunications, which may need repair. Likewise, these services are essential for our emergency response and recovery.

Major transport corridors

Some major transport corridors are already exposed to climate-related hazards, and more will become exposed in the future. These routes are vital for moving people and freight within and between regions. In some places there are limited options for detours and diversions if infrastructure is damaged. The cost of maintaining the current level of service will increase and, in some cases, may become economically unviable. Increased frequency and length of disruption and outages are likely to have significant economic consequences.

Increased maintenance and renewal

In many locations climate change is likely to increase the need for more maintenance to keep the network functioning and shorten the operational lifespan of assets. More works increases delays, as well as diverting funds from other potential investments. However, targeted maintenance activities can be an effective way to introduce adaptive responses to the network.

Disruption of inter-regional connections

With more of the network exposed to climate-related hazards, the risk of a major disruption will increase for inter-regional connections and the economic and social interactions that rely on them. Long detours and delays for freight would have significant economic impact, especially if prolonged.

Exports and imports

An increase in disruptive or damaging weather events would impact on the movement of exports and imports across the network, potentially leading to backlogs at airports, ports and freight hubs. Disruption to supply chains has significant impacts across the economy.

Access to consumer goods

Climate-related supply chain disruptions, either within Aotearoa or internationally, could lead to product shortages or lost income for producers. This impacts on retailers and consumers and could potentially include difficult access to essential items.

Adaptation responses

To achieve our goal of a land transport system that is resilient in a changing climate, we must adapt. The NAP provided a framework for adaptation response grouped into four categories: avoid, protect, accommodate and retreat.

Waka Kotahi will use a combination of these categories to effectively adapt in different locations, and over different time scales. Adaptation strategies will be built into long-term planning to avoid ongoing expensive repairs, disruption and declining levels of service. The most appropriate adaptation options will be different for every community or project.

Avoid

We can be proactive and choose to avoid building transport infrastructure or enabling development in locations that are exposed to significant climate-related hazards. This avoids locking in risk that may be costly and difficult to address in the future. The planning system will be key to preventing or limiting development in at-risk places.

1. Avoiding future climate hazards

We can avoid development in an area exposed to multiple future climate hazards including flooding, storm surge, and sea level rise. It is likely that infrastructure built in this location would not last its design life.

2. Transport-orientated development in the right location

By planning and locating development away from areas exposed to climate hazards the network and associated places are less at risk and can continue to function effectively.

3. Future climate risk

Decisions to avoid areas should be considered on a location-by-location basis. Regardless of where development takes place, some level of climate risk will remain. We can be proactive about managing this residual risk.

Protect

We can protect our infrastructure from climate hazards using both grey and green engineering solutions, such as sea walls and living shorelines, or by managing hazards using approaches like catchment flood management. Protection enables infrastructure and development in at-risk locations, but we need to consider the long-term viability of protection in a changing climate.

1. Coastal protection

Seawalls and barriers, offshore breakwaters and platforms, and nature-based solutions such as dunes function as effective forms of coastal protection. These solutions provide a barrier from storm surges, dissipate wave energy, and prevent overtopping and flooding.

2. Managing flood water

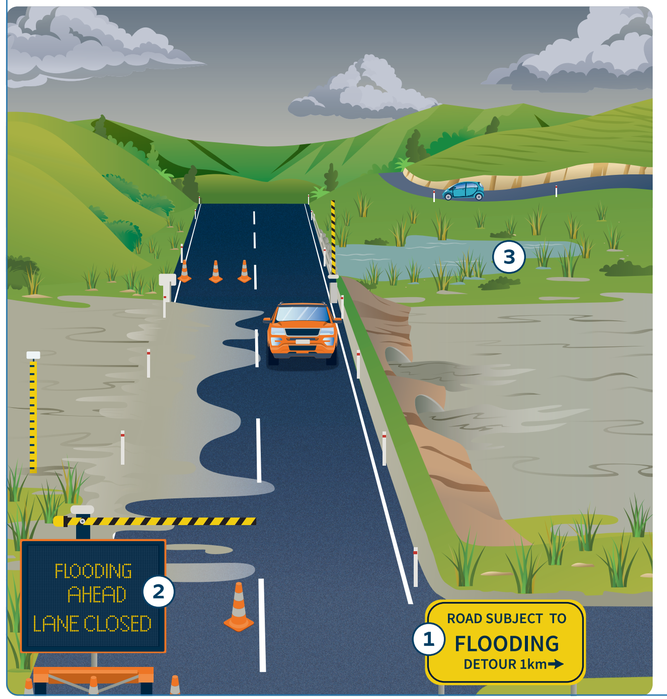
Catchment management and culverts can prevent flooding and reduce erosion by providing a pathway for water and debris. Culverts can be designed to take increased flows and facilitate safe fish passage.

3. Slope system stabilisation

Green engineering and planting options such as living walls and native reforestation can be used alongside hard engineering solutions such as retaining walls and rockfall mesh. These solutions combine to stabilise and bind soil, control erosion, and slow and reduce slips.

Accommodate

We accommodate climate-related hazards by accepting that they will occur and have impacts on our infrastructure, but we ensure that disruption is minimised and we can recover quickly. We already do this through emergency management, although this system is under pressure from escalating events and will need to keep pace with climate change. We can also better design infrastructure and networks to cope with hazards.



1. Alternative routes and detours

The network can be adapted to manage change through detour routes. These accommodate weather events by allowing journeys to be completed if a primary route is closed.

2. Smart technology and mobile variable message signage (VMS)

Advanced warning can help people plan ahead if their journey is interrupted. Along with web-based information and media, mobile VMS can be used as part of a traffic management system to provide motorists with advanced warning of hazards.

3. Flood and water management

Wetlands provide an area for excess water to pool and slow runoff, reducing the impact of flooding on network infrastructure. Culverts can also be designed to accommodate increased water flows.

Retreat

We can retreat by relocating transport infrastructure and other assets away from locations exposed to climate-related hazards. Homes and even entire communities may need to retreat. Retreat may be necessary when options for protection and accommodation are not viable, and the risk is intolerable. A planned managed retreat process that involves communities will be needed.

1. New inland routes

Roads can be rerouted inland so they will no longer be exposed to coastal hazards and inundation. The new road will provide a safe pathway to connect the wider network, which would otherwise not function.

2. Original coastal route and coastal hazards

After retreating from a hazard area impacted by climate change, infrastructure should be removed or repurposed, for example by adapting the road to be used as a coastal walkway.

3. Open space

Retreating from the coast creates space to allow natural coastal protection and processes to be reinstated. Climate change impacts can take place without immediately affecting infrastructure.

We are already responding to climate change

Our work to adapt to climate change is already underway in many parts of Waka Kotahi. For some people, adapting to climate change means building on what we are already doing.

Responding to emergencies

We expect critical infrastructure to be resilient in emergencies, and civil defence planning to be integrated with community planning. Across the transport network we respond well to climate-related emergency events – we reinstate the network to reopen connections for communities. We have good working relationships with other critical infrastructure operators through regional and national infrastructure groups, helping us plan for civil defence emergencies.

However, the frequency and severity of recent weather events across Aotearoa is leading to:

- repeated cycles of repair and damage
- increasing time taken to return corridors to at least single lane
- significant strain on local teams, our people, communities and suppliers.

We are reconsidering our emergency and recovery practices (including how we fund it) and using the recovery work from storms in 2022 in Nelson, Marlborough and Northland to challenge our approach. This includes considering how we move from response and recovery that reinstates the network as it was, to using the event to build in long-term resilience and avoid further disruption to communities.

Tairāwhiti response and recovery

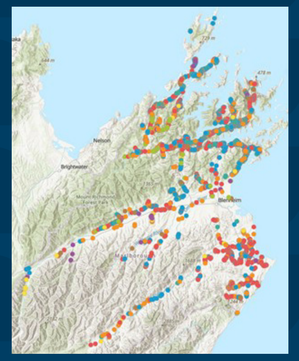
The topography of Tairāwhiti Gisborne – with a hilly, mountainous interior, low-lying river plains and coastal flats – makes the region prone to erosion and slips. It is also vulnerable to the impact of climate change and extreme weather, as seen in the March 2022 weather event. Waka Kotahi responded with emergency work to get the network up and running as soon as possible by repairing the Mangahauini Bridge, a key connection on State Highway 35, after a large section of it washed away. This work was completed within 10 days. Further major repairs were needed at 15 sites and minor repairs at more than 800 sites across the network.

Building resilience into sections of SH35 is being funded through the Provincial Growth Fund – in response to priorities identified in the National Resilience Programme Business Case. As part of the recovery, work to strengthen infrastructure to respond better to natural events and improve reliability took place at five of the 14 highest-risk sites. Native plants on roadside banks also help to strengthen and stabilise the road.

Repair of the Mangahauini Bridge

Nelson/Marlborough emergency response

During August 2022 a significant weather event caused damage and major disruptions to the state highway network and local roads in the Nelson and Marlborough regions, with flooding, slips and rockfalls cutting off access to many communities. A Waka Kotahi Regional Emergency Response Team (RERT) was set up in the Nelson/Tasman region to increase support, to help coordinate resources, communications, welfare and liaison into Civil Defence. The RERT came together very quickly, highlighting our expertise dealing with emergency events. Many of our people played a role and worked through the weekend providing valuable coordination to people on the ground.



Map showing locations of network faults following severe weather events that occurred in August 2022

Building more resilient infrastructure

When we design and build our infrastructure we take high rainfall and flood risk into account, and for coastal infrastructure we consider sea-level rise and coastal inundation. Infrastructure projects also incorporate nature-based solutions during the design of slope stability, coastal or inland flood protection.

We are using the **National Resilience Programme Business Case** to prioritise and manage physical risks from major and extreme natural hazards, and undertake remedial actions. This provides a national picture of the vulnerability and exposure of our state highway network to natural hazards (including climate-related hazards).

Te Ara Tupua, Wellington

Our Te Ara Tupua project is designed for future climate risk by using new and upgraded seawalls to protect the rail line and state highway from storm and sea surges between Ngā Ūranga and Pito-one in Wellington. The design incorporates the ability to further adapt in the future to long-term sea level rise. The project is also increasing resilience in the Wellington region with a shared path that gives people travel choice and an improved public open space, supporting local and national tourism and recreational opportunities.

Figure showing rock sea walls that will help to protect the transport corridor

Wetlands and pou at the historic Rangiriri Paa

Rangiriri wetlands, Waikato Expressway

Using nature-based solutions for stormwater management is commonly used in Waka Kotahi infrastructure projects. Instead of managing stormwater runoff at different places along the Waikato Expressway near Rangiriri, we diverted the stormwater to create an extensive wetland feature. This wetland reflects the natural watery landscape that was part of the natural defences for a former paa. The form of the landscape design honours the 1863 Battle of Rangiriri and the wider wetlands and river landscape of the Waikato River nearby. The historic paa earthworks also cross the arms of the wetland and the cultural installations recognise this waahi tapu area.

Working with our partners

Working towards a climate-resilient transport system means working with a wide range of stakeholders, including central and local government, community, businesses and iwi. Our actions also need to be integrated with the local and regional adaptation responses that are being developed with communities.

We collaborate on resilience issues with our partners as we work through the development and funding of business cases for transport investment. With local and central government partners, we are beginning conversations across Aotearoa about adaptation. This includes not only roads and infrastructure, but also working together on regional and local climate adaptation responses and supporting decision making for communities that may ultimately have to retreat due to climate-related risks.

Papakura to Drury, Tāmaki Makaurau/ Auckland

The State Highway 1 Papakura to Drury project team is working in close partnership with mana whenua. Part of this project involves two parallel motorway bridges and a local road bridge which cross streams (and are right beside the coastal marine area) that must be replaced and lifted by about 2 metres in response to flood modelling and climate change. The replacement of the two motorway bridges also impacts on a site of cultural significance spanning both sides of the motorway. Co-design with mana whenua to minimise the project's impact on the awa and the site of significance, while also improving resilience to flooding and stormwater management, are critical to the project's success.

Aerial view of Drury Interchange with streams and coastal area to the north

Figure showing future pedestrian bridge over Hutt River

RiverLink, Lower Hutt

The RiverLink project is a partnership between Waka Kotahi, Greater Wellington Regional Council, Hutt City Council and mana whenua – Ngāti Toa Rangatira and Taranaki Whānui ki te Upoko o te Ika. It will transform Lower Hutt with transport improvements, upgraded flood protection and urban development, resulting in a more resilient, connected and vibrant city.

Combining flood management with transport infrastructure through the RiverLink project is expected to safeguard people and businesses. The river channel will be widened to 90 metres, giving more room for it to flow naturally, with a wider channel to help a higher volume of water pass through during floods. The planning for bridge construction and flood protection improvements will be aligned as closely as possible.

These works are expected to lead to social and economic growth and turn Lower Hutt into a true river-facing city.

Tiro Rangi actions

Tiro Rangi (2022–24) is the first Waka Kotahi climate adaptation plan. It aims to lay a strong foundation for a step change in climate adaptation over the next decade. To achieve this we have identified a set of 21 priority actions that we will be implementing over the next two years. We have prioritised these actions as they will unlock future action required for a step change in climate adaptation.

The actions included in this plan are high-level. Some actions are new, but many build upon activities already underway for climate resilience in Waka Kotahi. There will also be opportunity to connect our actions with progress under the NAP, with other government agencies, the transport sector, Māori and regional and local partners.

There are six themes for priority actions in Tiro Rangi, as shown in figure 5.

Figure 5: Themes for priority actions in Tiro Rangi

Foundations: Tiro Rangi 2022–24

Lay the foundations over the next two years with actions that build on existing initiatives and by prioritising those that unlock future action.

1. Better understand and manage climate risks to Waka Kotahi

2. Ensure that our strategic system planning and investment direction is enabling climate adaptation

3. Embed climate adaptation in our investment decision-making processes and delivery

4. Ensure that robust evidence underpins our work on climate adaptation

5. Embed te ao Māori worldview and build a partnership approach to climate adaptation for transport

6. Get ready to work together on climate adaptation

1. Better understand and manage climate risks to Waka Kotahi

We will build our understanding and management of not only physical risks to assets, but also risks to our ability to deliver to expectations, maintain service levels and fund priorities. This includes improving climate-related disclosure, underpinned by new transport sector climate scenarios and an enterprise climate risk assessment. This is essential for future adaptation planning.

Action 1.1 Embed climate adaptation governance and reporting
Ensure Waka Kotahi leadership has clear accountability for climate adaptation. We will also develop measures to enable us to report on risk and progress towards outcomes.

The commitment and accountability of leadership ensures that adaptation is central to the overall strategic direction of an organisation, is integrated into business processes, is prioritised and resourced appropriately, and that there is accountability for progress towards outcomes. The Waka Kotahi Board and executive are clear on the importance of responding to climate change. The Climate Change and Sustainability Executive Subcommittee is the core organisation-wide governance mechanism providing direction and oversight of our climate change responsibilities and opportunities. It ensures that we are meeting our climate change accountabilities, contributing to government outcomes, and aligned with strategic priorities and system outcomes in Te Kāpehu. A Climate Change Portfolio has been established to support our executive leadership team in the appropriate level of oversight and assurance relating to our climate change activity, strategic change and tracking the progress of overall programme outcomes to our strategic priorities. We will develop measures and milestones for adaptation in our Te Kāpehu framework and for reporting progress of our actions in the national adaptation plan.

Action 1.2 Improve climate-related disclosures
Continue to improve our climate-related disclosure. We will develop our approach in step with standards being developed by the External Reporting Board.

Aotearoa New Zealand's largest financial market participants will be required to analyse and publicly disclose their climate-related risks and opportunities each year. This is to ensure the effects of climate change are routinely considered in decisions for business, investment, lending and insurance. Although Waka Kotahi is not currently required to make climate-related disclosures, we began on a voluntary basis with our annual reports in 2021.[6] We will improve our approach in step with standards and supporting guidance being developed by the External Reporting Board (XRB) and the Ministry for the Environment. This includes our actions below to improve enterprise climate risk assessment and collaborate on transport sector scenarios. We see climate disclosures as an important way to improve transparency to our stakeholders and the community. It also helps us manage climate risk.

Action 1.3 Undertake enterprise climate risk assessment
Undertake an enterprise climate risk and opportunity assessment for transition and physical risks to inform our climate response and underpin future adaptation planning.

Waka Kotahi has identified climate risk as a key strategic risk that is owned and reported by ELT to the Board. These risks go beyond physical impacts on assets and relate to how we function as an organisation and our ability to deliver outcomes. Our enterprise risk management framework covers all risk management, including evolving and emerging risks associated with climate change. We will use this framework to undertake an enterprise climate risk and opportunity assessment. This will systematically assess both transition and physical climate risks across the enterprise in the short, medium, and long-term.

Action 1.4 Develop transport sector climate scenarios and roadmap
Work alongside the transport sector to develop climate scenarios that can be used for scenario analysis in risk management and adaptation planning.

Scenarios help to challenge assumptions about the future of Aotearoa in a changing climate. They are not predictions, but they do help us explore a range of plausible climate and socio-economic changes that we could see in coming decades. Scenarios are an important tool for climate risk assessment and means of stress-testing policy and investment decisions, as well as potential trade-offs associated with those decisions. We plan to collaborate on a shared set of scenarios with the transport sector (led by Te Manatū Waka), using an approach being applied in other sectors (for example marine, tourism and agriculture) and socio-economic scenarios that will be produced under the NAP (action 3.7.4).

[6] The government will decide whether to extend mandatory disclosure to public entities by 2024 (NAP action 3.5).

2. Ensure that our strategic system planning, and investment direction is enabling climate adaptation

We will use the window of opportunity now to engage with system changes already underway nationally (such as resource management reform) and internally (for example Arataki and the State Highway Strategy), and to influence investment settings (for example the Government Policy Statement on land transport) that enable long-term investment in climate adaptation.

Action 2.1 Adjust investment settings and funding
Engage in the wider system reform signalled in the NAP that will change planning and investment settings, along with sources of future funding, to enable climate adaptation as we work towards a climate-resilient transport system.

The government objectives for infrastructure in the NAP are to reduce the vulnerability of assets, ensure new infrastructure is fit for a changing climate and use renewal programmes to improve adaptive capacity. The right investment settings and funding need to be in place to deliver to these objectives. We will work with Te Manatū Waka on the next Government Policy Statement on land transport (GPS 2024–27) so that the investment settings enable Waka Kotahi to invest in infrastructure in a way that aligns with the goals in the NAP, while delivering outcomes identified in the **Transport Outcomes Framework** (TOF).

The NAP (action 5.15) also signals that the government may invest in climate change adaptation initiatives through the Climate Emergency Response Fund (CERF) and the Sovereign Green Bond programme. We will use the National Resilience Programme Business Case to identify initial funding priorities, while we plan a longer-term proactive strategy for climate resilience.

Action 2.2 Embed adaptation into strategic system and spatial planning
Ensure that our strategic system and spatial planning documents embed climate adaptation and set clear signals about our intent, and use this to inform discussions with our partners and stakeholders.

Communities and businesses in Aotearoa rely on the land transport system and make decisions based on where transport infrastructure is or will be. We already work with our partners on long-term spatial plans, including Arataki and plans formed under the Urban Growth Partnerships. Regional spatial strategies will eventually cover the whole of Aotearoa, with time frames of between 30 and 100 years for climate adaptation. These will show where we will no longer build urban environments, and areas from which communities and infrastructure may eventually retreat. The plans will also need to step forward in time and signal future changes in land use and infrastructure as we adapt to climate impacts, along with being able to adjust when new information comes to light about climate impacts and risk.

We will work with councils, other infrastructure providers and the community in each region to plan for transport and transport infrastructure that factors in climate adaptation and shows our intent. We will clearly identify priority infrastructure that we will protect, where withdrawal may occur and the triggers for this, and our position if development is planned in highly vulnerable locations. This information will inform our response to regional spatial planning.

Action 2.3 Engage with resource management system reform
Develop positions on and engage with resource management system reform and its objective to prepare for adaptation and risks from natural hazards. We will also prepare for implementation of the new resource management system, including transitional arrangements.

The resource management system reforms will set up a statutory framework for climate adaptation within it that is new and will be implemented at local, regional and national levels. Actions in the NAP relating to the reforms include setting a clear direction for climate adaptation in the National Planning Framework, using regional spatial strategies to identify risks zones and signal intent for adaptation, and passing legislation on managed retreat – the Climate Adaptation Act (CAA). Local councils will likely also set up more specific planning controls and guidance. We are working on our position to inform the new aspects of the reform that relate to climate adaptation, including managed retreat, and are getting ready for implementation. We may also need to respond to specific changes in the existing system, for example the use of climate scenarios to make decisions at a local level as recommended in the NAP.

Action 2.4 Scope future state highway corridor resilience
Scope state highway corridor resilience planning to translate climate risk into actionable information that can be used for decision making. This will be used to inform activities such as business case development, spatial planning, and ongoing maintenance and renewal programmes.

When we plan, develop, maintain and operate the state highway network there are many opportunities to create greater resilience in the network as we work towards a climate-resilient transport system overall. However, we need to have a clear plan and principles about how we will go about this so that we invest wisely, achieve transport outcomes, and make the most of limited resources. We also need to integrate resilience planning with spatial planning at the system level, including linkages with other infrastructure, lifelines utilities, communities and the built environment. We will use climate risk information to develop plans for state highway corridors that guide what resilience actions we will take for the network under specific circumstances, such as responding to climate-related events, asset renewals and managed retreat. These plans would align with the infrastructure objectives in the NAP and consider intended use, triggers for adaptation, accepted level of risk and availability of alternative routes or modes of transport.

3. Embed climate adaptation in our investment decision-making processes and delivery

Continue work underway on the Investment Decision Making Framework and climate policy that requires climate risk management in infrastructure delivery, and maintenance and operations. This will be supported by the review and updating of standards and guidance.

Action 3.1 Introduce climate change policy
Waka Kotahi will introduce the Climate Change Policy for Land Transport Infrastructure to manage the risks that climate-related hazards pose to, and the risks that arise from, land transport infrastructure.

This policy will ensure that the risks posed by climate change are considered at the right time during all planning and investment decision-making phases. It aligns with the infrastructure objectives in the NAP and will be a requirement for infrastructure planning, delivery, operation and maintenance activities where Waka Kotahi is the primary entity or partner responsible for the activity. Our partners are encouraged to implement the policy requirements for activities that are funded by the National Land Transport Fund (NLTF). While climate-related hazards are already considered in many business cases, new guidance supporting the policy will help project managers, planners and maintenance managers to consider climate change risk during the lifecycle of a project.

Action 3.2 Incorporate adaptation into investment decision making
Incorporate adaptation in the Investment Decision Making Framework, our structured approach to decisions on investment in land transport.

The Investment Decision Making Framework (IDMF) guides our investment decisions, including how we develop, assess and prioritise funding in the land transport system. It gives effect to the government's priorities for expenditure, including climate change. We will continue work to update the IDMF (NAP action 4.7) through our climate change and investment decision-making work programme. This includes the Investment Prioritisation Method (IPM), business case, and financial and non-financial assessment. This will help ensure that investment decisions better account for future climate impacts and uncertainty.

Action 3.3 Update standards and guidance
Systematically update our standards and guidance to account for climate impacts and enable adaptation.

Waka Kotahi operational standards and guidance allow us to clearly specify expectations around infrastructure construction, operation and maintenance so that they can be consistently and widely applied. While many standards already consider climate-related hazards, we will shift from an understanding of climate based on historical weather records, to the use of the latest projections of future climate. We will look for opportunities to remove barriers to adaptation and enable innovation – including the use of adaptive management, adaptation pathways, nature-based solutions and mātauranga Māori. We will scope, identify and update an initial priority set of standards and guidance that can unlock adaptation action. We will also include an adaptation lens on a wider systematic review of all Waka Kotahi operational standards and guidance.

We will also contribute to relevant reviews of national standards by Standards New Zealand (NAP action 3.1) and collaborate with Te Waihanga New Zealand Infrastructure Commission on scoping a resilience standard for infrastructure (NAP action 5.6).

Action 3.4 Deliver adaptation solutions
Take opportunities to embed adaptation in infrastructure delivery, and work with the transport sector to build capability.

Building on the success of recent projects that include 'green engineering', slope system approaches, green-blue infrastructure, ecological design and nature-based solutions, we will identify and deliver a range of adaptation actions that are both short- and long-term, easy and difficult. This will support the transport sector in building capability and send the right signals about the future of infrastructure delivery in a changing climate. We will foster a community that will emphasise learning by doing, as we seek to do things differently – with support from practical case studies and exemplars. We will also look at ways to remove barriers and create an enabling environment for innovative adaptation solutions.

4. Ensure that robust evidence underpins our work on climate adaptation

Assess climate change risk across the state highway network and identify resilience solutions using the latest available hazard data and translate this into actionable information for decision making.

Action 4.1 Improve access to climate-related hazard and risk data
Identify and improve access to hazard and asset data required by Waka Kotahi to assess climate risk, including setting up a data reference group.

Climate-related hazard and risk data is needed to underpin decision making in the transport sector, both for us and our partners. There is a significant amount of information on hazards already available in Aotearoa, but it is not consistently collected and managed, and varies across regions. We will continue to use the best available data – but recognise that higher-quality and more consistent information will become available over the next few years. This will ensure that decision making is more transparent and effective, and that we are not duplicating effort. We will set up a data reference group to enable this. We will use new data as it becomes available (for example NZ SeaRise and national flood maps), connect with the upcoming climate adaptation information portal (NAP action 3.2), and look to use wider information sources including mātauranga Māori and those that help us to consider equity, the environment and community outcomes. We will also play our part in supporting access to relevant data for our partners and stakeholders – including data that better responds to iwi, hapū and Māori needs for information.

Action 4.2 Undertake physical climate risk assessment of the state highway network
Undertake a state highway network climate change risk assessment, focusing on corridors and assets, to identify resilience priorities.

Waka Kotahi will undertake climate change risk assessment of the state highway network to identify and prioritise material risks. To do this we will continue to develop our approach to assessing physical climate risks to assets and corridors. We will begin with corridor and regional assessments based on resilience priorities and the availability of data – working towards an approach that can be applied as a national assessment using consistent national datasets, when they become available. These will inform our resilience planning and investment, and underpin discussions with partners on regional resilience and spatial planning.

Action 4.3 Support and initiate adaptation research
Identify adaptation priorities for the Land Transport Sector Research Programme and connect with national science research programmes.

Decisions on climate adaptation should be made using the best available science. This includes research, data and tools that help us to understand hazards and risk, and identify practical and innovative solutions, including those that are nature-based. We will work with Te Manatū Waka to plan and initiate sector research on climate adaptation that aligns with the **Transport Evidence Base Strategy** (TEBS objective 7.2). We will also collaborate on wider science system research where that research directly supports our understanding of climate risks to the land transport sector.

5. Embed te ao Māori worldview and build a partnership approach to climate adaptation for transport

It is integral that Tiro Rangi is implemented in partnership with Māori, to uphold the principles of Te Tiriti o Waitangi and to protect the interests of Māori pertaining to their whenua, wai and taonga. This must be a central aspect of the Waka Kotahi long-term adaptation approach for climate change. It means that Waka Kotahi must develop adaptation responses in partnership with Māori, including elevating te ao Māori and mātauranga Māori within the climate-adaptation process.

Action 5.1 Partner with Māori and empower climate solutions
Promote a partnership approach in our work with Māori to take climate action.

We will support and coordinate work across government by engaging with the Māori Climate Action platform (NAP action 3.3) as it builds a climate response partnership with Māori. This includes engaging with the National Iwi Chairs Forum and their Pou Take Āhuarangi (climate lead) to understand the local, regional and national issues for Māori and their whenua, wai and taonga.

Māori communities need to be engaged, accommodated, resourced and empowered to strengthen resilience to climate change. We will play our part to support adaptation plans that are developed by hapū and iwi at both local and regional levels for site-specific or regional solutions. Māori will also design and deliver their own climate solutions within their communities. Waka Kotahi will contribute to government support of Māori solutions with access to latest information, data, resourcing and technology – as required by Māori.

Te Ara Kotahi – Our Māori Strategy recognises that we need to identify and seize opportunities to partner with Māori on our projects. This includes our climate action at the local and regional level. We also recognise the need to foster Māori capacity and capability to contribute to our decision making at all levels and to support and promote Māori economic and employment opportunities when delivering climate adaptation solutions. When we communicate to a large external Māori audience we will ensure the mana of te reo Māori is recognised with full or partial translation.

Action 5.2 Incorporate te ao Māori and restoration of environmental balance
Integrate an ecological approach that incorporates te ao Māori and mātauranga Māori

The **Rauora** framework published alongside the NAP brings together Māori values and principles into an indigenous worldview of climate change. Key aspects are the need to accelerate ecological restoration, and for maintenance and restoration of environmental balance to be part of a joint aspiration – ahakoa ko wai, ki hea. Waka Kotahi can support this by further integrating an ecological approach that incorporates te ao Māori and mātauranga Māori into our projects, guidance and standards. This will also provide a foundation to our work to embed nature-based solutions as a key part of our climate adaptation response.

Action 5.3 Apply mātauranga Māori to climate action
Ensure that traditional Māori knowledge is incorporated into our solutions and decisions.

Mātauranga Māori will lead to solutions that are innovative, proactive and values based – and will strengthen connections with the natural environment. This traditional Māori knowledge will assist us to learn and better inform Crown and Māori partnerships for decision making around climate change. We will establish an effective way for Waka Kotahi to engage with mātauranga Māori experts to provide strategic advice and assist us in developing kaupapa Māori solutions for climate adaptation.

Mātauranga Māori indicators (NAP action 3.21) are being developed for monitoring and evaluating impacts on biodiversity, mahinga kai, flora, fauna and human health and wellbeing (hauora). We will look at how these can be applied by Waka Kotahi as we continue to embed mātauranga Māori in our programmes, projects, operations and maintenance. We will also learn from mātauranga-a-iwi on climate change from our work in regional and local projects, including recent major projects (for example using the Take Hono Take Mauri taiao baseline tool developed by mana whenua in Tāmaki Makaurau).

6. Get ready to work together on climate adaptation

We will use and build on existing engagement and partnership arrangements and build capability amongst our people to make sure we are ready to work together on climate adaptation with our partners and stakeholders.

Action 6.1 Review who we are working with
Review and build on our existing local and central government stakeholder relationships, so we are ready to work on climate change adaptation together.

Taking action on climate adaptation will require close collaboration with local government, iwi/Māori and a range of central government agencies, some of which we don't yet work closely with. We will review our stakeholder relationships in light of the NAP and emerging strategic needs for climate adaptation (including integrating with other infrastructure providers), to ensure that we are engaging in the right way and are ready for the challenging conversations ahead. This includes incorporating adaptation into our current Stakeholder Engagement Framework, checking existing memoranda of understanding (MOUs) and, where needed, nurturing new connections across central government.

Action 6.2 Build common understanding
Contribute to knowledge sharing and implementation across the wider infrastructure sector to support alignment on climate adaptation.

We and our partners are already dealing with impacts from climate change, and together we are all learning to navigate our way towards a climate-resilient Aotearoa. To do this effectively, it's important that we build on our collective learning together and are consistent with our policy approaches, including how we share and use data and information. We will seek to work with Te Waihanga and Te Manatū Waka to establish a community of practice that contributes to knowledge sharing and implementation of adaptation actions across the infrastructure sector (NAP action 8.8) and other sectors as relevant.

Action 6.3 Build internal capability
Help our people understand how to incorporate climate adaptation and risk into their work so that they can confidently apply the concepts to their day-to-day activities.

For most people at Waka Kotahi, climate adaptation is new and will become increasingly important to their work. This will be especially so as we start providing advice for upcoming regional transport plans in 2023 and start to build adaptation into our maintenance, operations and renewals activities. For some, awareness and understanding will be enough but for others it means increasing technical knowledge, including about adaptation pathways, having a clear understanding of our policy response and being able to use the right information and tools. We will follow Tā Tātou Rautaki Akoranga – Our Learning Strategy to build capability within Waka Kotahi so that our people can confidently apply their knowledge about climate adaptation and climate risk to their work, while achieving wider transport system outcomes. This includes building our capacity and capability to work confidently with Māori on climate adaptation. We will also build an internal community of practice so we can learn from each other and adjust our approach over time.

Implementing Tiro Rangi

Implementation planning

Waka Kotahi will lay the foundations by implementing the high-level actions in Tiro Rangi over the next two years. Our next step is to develop an implementation plan to translate our actions into specific activities. We will engage and consult with stakeholders as part of the implementation planning process.

Implementation planning will set out timescales and sequencing of activities to ensure that resource is in place, and that we have the capability and capacity in the organisation to deliver. It will also clearly identify roles and responsibilities for implementing actions and activities in Tiro Rangi.

Implementation planning will be an iterative process as we will need to adjust our plan as we learn and when circumstances change. It will also need to adapt to take new opportunities as they emerge.

Engaging with stakeholders

Tiro Rangi is the Waka Kotahi plan for how we will change the way that we work in response to a changing climate. However, the way we work is with our partners – and we seek long-term trusted relationships with iwi, central and local government, industry and stakeholders. Delivering Tiro Rangi actions and undertaking implementation planning will depend on us building upon our existing relationships and forming new ones.

There are specific actions within Tiro Rangi relating to working with partners (actions 5.1, 6.1 and 6.2). However, the delivery on all actions will benefit from engaging with stakeholders – and we will consult as required on specific activities.

Monitoring and reporting framework

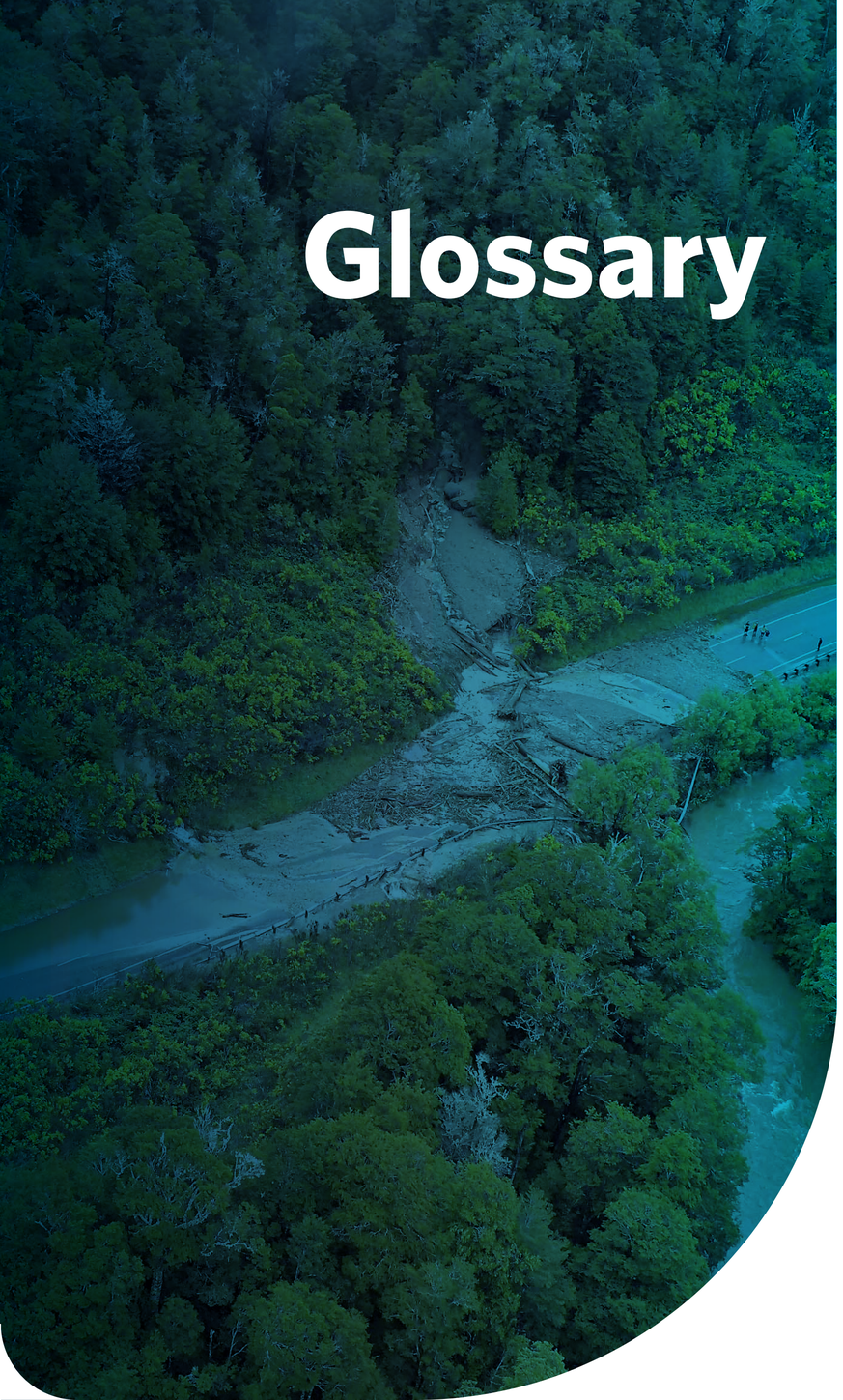
We will develop a monitoring and reporting framework for Tiro Rangi.

This will support tracking the progress of implementation as well as delivery of our governance and reporting action (1.1). This action also includes developing appropriate measures and milestones for adaptation.

As Tiro Rangi is an action in the NAP, we will need to report on progress of Tiro Rangi to the Climate Change Chief Executives Board and to the Climate Change Commission for their reporting on implementation and effectiveness of the NAP.

Future climate adaptation plans

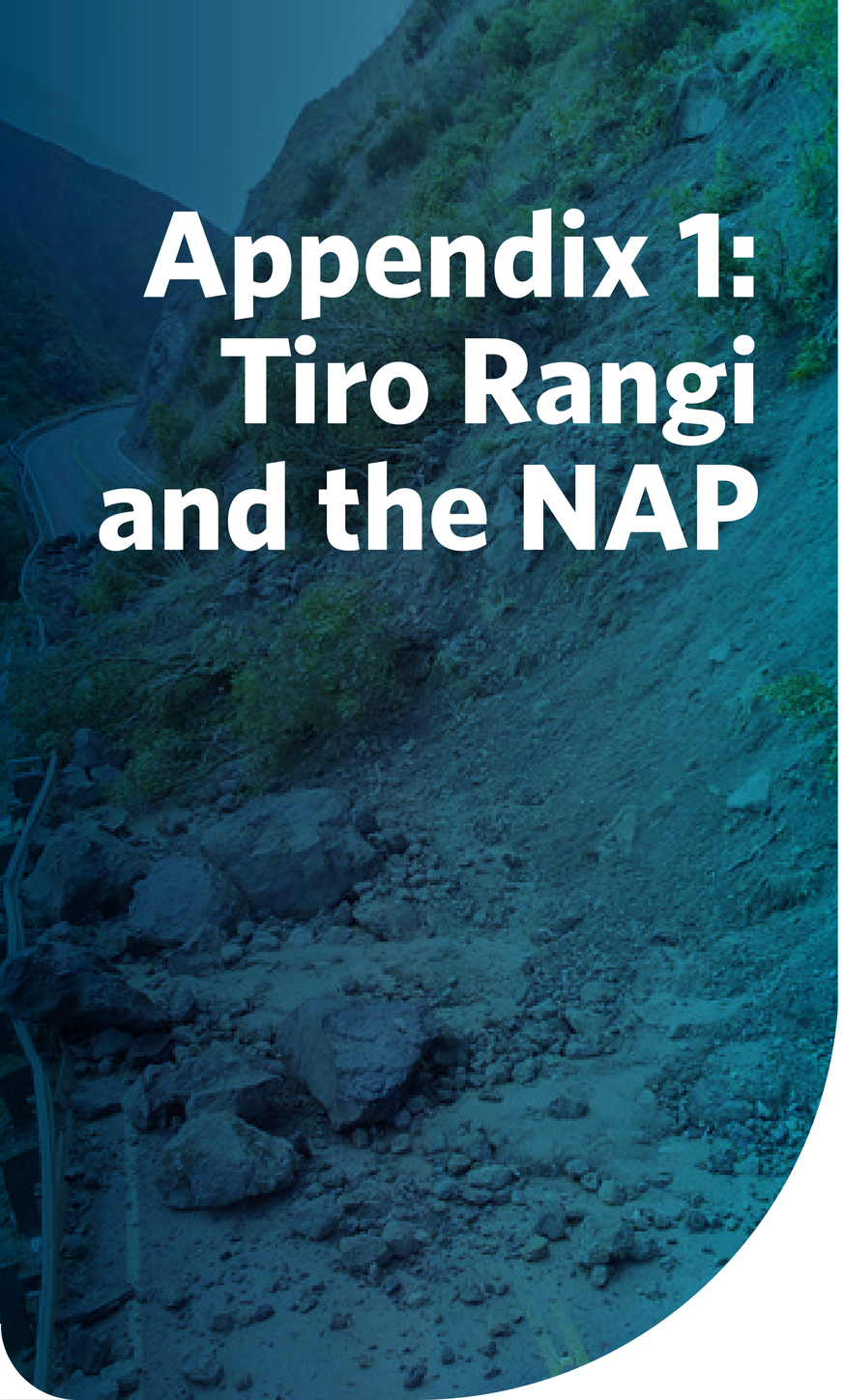
Waka Kotahi will require a climate adaptation plan for decades to come, and Tiro Rangi will need to be periodically refreshed as we progress, including identifying new actions and further developing our approach to adaptation. We anticipate an update will be needed in 2024 to build upon this inaugural climate adaptation plan.



Glossary

Term	Definition
Hapū	Kinship group, clan, subtribe.
Hauora	Health, wellbeing
Iwi	Tribe, large group descended from a common ancestor.
Kaitiaki	Guardian or guardianship, stewardship – for example, of natural resources.
Kaupapa Māori	Māori approach, topic, customary practice, institution, agenda, principles, ideology – a philosophical doctrine incorporating the knowledge, skills, attitudes and values of Māori society.
Mahinga kai	Places where traditional food and other natural resources are obtained.
Mana	Prestige, authority, control, power, influence, status, spiritual power, charisma.
Marae	A site of cultural importance to Māori. Courtyard – the open area in front of the wharenui (meeting house) where formal greetings and discussions take place. Often also used to include the complex of buildings around the marae.
Mātauranga Māori	Traditional Māori knowledge. Māori knowledge systems and worldviews, including traditional concepts.
Mātauranga-a-iwi	Knowledge with an iwi-specific base.
Pā/paa	A site of cultural significance.

Term	Definition
Papakāinga	Original home, home base, village, communal Māori land.
Taonga	Treasure, resources, anything prized – applied to anything considered to be of value, including socially or culturally valuable objects, resources, phenomena, ideas and techniques.
Te ao Māori	The Māori world.
Te reo Maori	Māori language.
Te Tiriti o Waitangi/ Te Tiriti	The Treaty of Waitangi. Note: While these terms are used interchangeably, Waka Kotahi acknowledges that the English version and te reo Māori translation are separate documents and differ in a number of respects.
Urupā	Burial ground.
Wāhi tapu	Sacred site – a place subject to long-term ritual restrictions on access or use, such as a burial ground, a battle site or a place where tapu objects were placed.
Wai	Water.
Whānau	Family, extended family, family connection.
Whenua	Land.
Whenua Māori	Māori land. There are three types of whenua Māori: Māori freehold land, Māori customary land and general land owned by Māori.



Appendix 1: Tiro Rangi and the NAP

We will deliver on actions that Waka Kotahi leads or co-leads with Te Manatū Waka in the NAP and support delivery of other transport actions.

NAP actions led or co-led by Waka Kotahi

- Action 4.7: Integrate adaptation into Waka Kotahi decision-making
- Action 8.1: Develop and implement the Waka Kotahi climate adaptation plan
- Action 8.6: Invest in public transport and active transport
- Action 8.5: Progress the Rail Network Investment Programme

Actions led by Te Manatū Waka

- Action 8.7: Embed nature-based solutions as part of the response to reducing transport emissions and improving climate adaptation and biodiversity outcomes
- Action 10.1: Deliver the National Freight and Supply Chain Strategy

Tiro Rangi actions are also connected to work across government to deliver the NAP. By working with others, we can ensure more effective delivery of our own actions.

Tiro Rangi action	Description	Relevant NAP actions
1.1	Embed climate adaptation governance and reporting	3.7.2, 11.1
1.2	Improve climate-related disclosures	3.5
1.3	Undertake enterprise climate risk assessment	3.5
1.4	Develop transport sector climate scenarios and roadmap	3.5, 3.7.4
2.1	Adjust investment settings and funding	4.6, 5.5, 5.15
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2.3	Engage with resource management system reform	4.1, 4.2, 5.1
2.4	Scope future state highway corridor resilience	
3.1	Introduce climate change policy	3.7.3, 3.7.5, 3.7.8
3.2	Incorporate adaptation into investment decision making	4.7
3.3	Update standards and guidance	3.1, 3.2, 5.6
3.4	Deliver adaptation solutions	5.16, 8.7
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There are many actions in the NAP that are directly relevant to Waka Kotahi and will have an impact on our work programmes. We will support actions of other agencies and ensure that we are ready for the changes that will arise as those actions progress, in particular where they affect the way Waka Kotahi works and is funded.

If you have further queries, call our contact centre on 0800 699 000 or write to us:

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This publication is also available on the Waka Kotahi website at **nzta.govt.nz**

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NZ TRANSPORT AGENCY

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