Te Anga Mārohirohi
Waikato Resilience Framework

Waikato Regional Council's approach to natural hazard risk reduction and adaptation.

Waikato
REGIONAL COUNCIL
Te Kaunihera ā Rohe o Waikato

Kia tau iho mai te tauwhirotanga o te wāhi ngaro ki runga i
Te Arikinui Kuini Nga wai hono i te po me te Whare Kāhui Ariki.

Paimārire.

E te hunga mate, koutou i haohia e te kūpenga o Taramainuku,
haere ki tua o Paerau, haere ki te iti o kahurangi, okioki ai.

Ka huri ki a tātou, ki te hunga ora.
E ngā maunga whakahī, e ngā wai whakatere taniwha, e ngā
karangatanga maha puta noa i te rohe, ko te Kaunihera ā-Rohe o
Waikato e mihi atu nei ki a koutou, tēnā koutou, tēnā koutou,
tēnā koutou katoa.

May the providence of the unseen realm cascade upon
Te Arikinui Nga Wai Hono i te Po, and the royal family.

Peace and good will.

To those who have been caught up in the net of Taramainuku,
your people continue to grieve. Depart, with all our deceased to the
next world, to the stars.

To those living in the Waikato region, we acknowledge you, your ancestral
mountains, your water bodies, your people and your communities.
Warmest regards from Waikato Regional Council.

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Executive summary

The Waikato Resilience Framework (WRF) provides Waikato Regional Council's organisation-wide approach to natural hazard risk reduction and adaptation.

It responds to the growing challenges posed by flooding, drought, coastal hazards, erosion, land instability, wildfire and other natural hazards, which are increasing pressure on communities, infrastructure, the environment, and the regional economy. As the Waikato region is also home to nationally significant transport, energy, and primary production assets, the consequences of natural hazard events often extend beyond the region itself.

The WRF exists to ensure the council takes a coordinated, consistent, and forward-looking approach to resilience. It supports the vision and implementation of Te Pae Tawhiti | Strategic Direction 2026-2036. Natural hazard risk is managed through many council functions, including catchment management, flood protection and drainage, policy and planning, science and monitoring, infrastructure management, emergency management, and community adaptation. As risks become more complex and interrelated, these functions need to be increasingly well co-ordinated.

The WRF provides a common direction across all our organisation to align and co-ordinate how we will address natural hazard risk reduction and adaptation in our core functions, enabling the council to make good decisions under uncertainty and deliver long-term benefit.

It focuses on the **risk reduction and adaptation** aspects of resilience to natural hazard risk, and approaches include:

- taking a whole-of-system and partnership-based approach to risk reduction and adaptation
- building a clear, shared understanding of current and future natural hazard risk and its impacts across the Waikato region – for communities, infrastructure, natural systems and land use
- strengthening the resilience of communities, places, infrastructure, catchments and natural systems
- prioritising investment in risk reduction and adaptation where it delivers the greatest long-term reduction in risk, while balancing affordability, levels of service and long-term financial sustainability.

The WRF is an inward-facing document designed primarily for council staff, managers, executives, and elected members. It provides guidance for strategic and operational planning, investment decisions, policy development, service delivery, and organisational priorities. It also signals to partners and stakeholders how the council intends to contribute to natural hazard risk reduction and adaptation and where it will focus its efforts.

The WRF is organised in two main parts.

- **Part 1** sets the scene by explaining why an organisation-wide approach to natural hazard risk resilience is needed and how Waikato Regional Council contributes to natural hazard risk reduction and adaptation.
- **Part 2** sets out our approach, including the principles, steps, processes, systems and tools that will guide how we embed natural hazard risk management and adaptation in our decision making, services and work programmes.

Ultimately, the WRF aims to help achieve our council's vision:
Waikato: Empowered people shaping a healthy, prosperous place for generations to come.

Part 1
Te horopaki
Setting the scene

Te wero
The challenge facing Waikato

The Waikato region is exposed to a wide range of natural hazards, including flooding, drought, coastal inundation, erosion, land instability, wildfire and seismic and volcanic activity. Changes to our environment are increasing the frequency, intensity and complexity of many of these hazards, placing growing pressure on our communities, infrastructure, productive land, ecosystems, regional services and the economy.

This region's resilience to natural hazards is also of national importance. State Highway 1, the main trunk rail line, nationally important electricity transmission infrastructure, major primary production systems, key tourism destinations and significant ecosystems all pass through or depend on the region. Consequently, the effects of natural hazard events can extend beyond our local communities, disrupting national connectivity, supply chains, economic performance and environmental outcomes.

As natural hazard risks become increasingly complex and dynamic, the existing ways of how we work, plan and make decisions are inadequate for the responses that are necessary for the safety, prosperity and wellbeing of current and future generations.

Te aronga
Purpose

Waikato Regional Council plays a key role in reducing and adapting to natural hazard risk through a range of core regional functions[1], including catchment management, flood protection and drainage, regional transport, regional policy, spatial planning, science and monitoring, infrastructure planning, emergency management and the provision of information and advice on regional hazards to communities, stakeholders and partners.

The WRF provides a strategic, **organisation-wide approach** to **how** we will deliver these core regional functions in relation to natural hazard risk reduction and adaptation. It sets a common direction for how the council understands and reduces risk, navigates uncertainty, embeds adaptation in our work, and works with others to reduce risk and adapt across the region. It also identifies how to enable this approach and to respond to legislative reform, emerging risk information and evolving regional priorities.

The WRF will:

- guide the council's forward work programme by setting out the approaches, processes, systems and tools to reduce and adapt to natural hazard risk, and what change is necessary to embed and implement these
- help the council to develop organisation-wide measures to track how the council is reducing and adapting to natural hazard risk across its core functions
- support the Executive Leadership Team and councillors to make informed decisions on priorities, investment, resourcing and trade-offs across the organisation over the short, medium and long term.

The WRF is an inward facing document, intended to support council staff and decision makers.

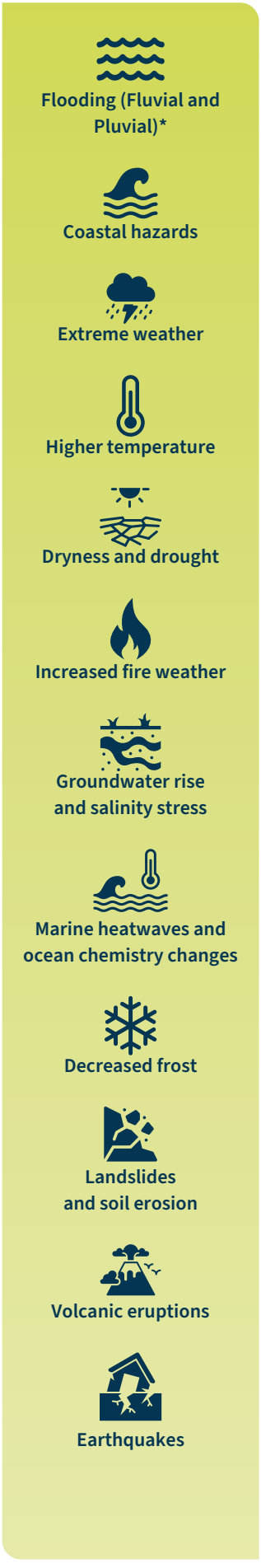
However, it also provides a clear signal to partners and stakeholders about how we will contribute to natural hazard risk reduction and adaptation. Resilience to natural hazard risk is a shared responsibility across all of society, and our contribution will be more effective when it is part of coordinated action across local government, central government, iwi, lifeline utilities, industry and Waikato communities.

The WRF is a non-statutory document that provides the council with an organisation-wide approach for how we will deliver our natural hazard risk reduction and adaptation activities across the region. While it does not create new statutory obligations, it helps align and coordinate how we deliver our legislative responsibilities, statutory plans, and wider programmes of work.

Scope

The WRF focuses on the **risk reduction and adaptation** aspects of natural hazard resilience for **communities and land use**. Emergency readiness, response, and recovery are closely related but are outside the scope of the WRF.

The WRF is not focused on ecological or environmental resilience, which is addressed through the *Waikato Regional Biodiversity Strategy* and other mechanisms. However, natural hazard resilience for communities and land use cannot be addressed in in isolation. Our planning and responses must be integrated with transition planning, environmental outcomes, sustainability principles and broader planning, investment and decision-making processes.



1 See the Groups of Activities in 2024-2034 Long Term Plan | 2024-2034 Te Mahere Roa

Contribution to strategic risk management

The WRF is consistent with and helps inform the *Waikato Regional Council Risk Management Framework*[2], which is underpinned by the *ISO 31000:2018 Risk management — Guidelines.*

The WRF and its implementation will support the treatment of a number of the council's strategic and organisational risks. Strategic risks the WRF addresses include relationships, climate change, information, data and technology, governance and reform transition, financial sustainability, and giving effect to Treaty of Waitangi Te Tiriti o Waitangi.

Implementing our vision and strategic priorities

Successive strategic directions have reflected our longstanding responsibilities for resilience to natural hazard risk. The WRF supports the vision and implementation of *Te Pae Tawhiti | Strategic Direction 2026-2036*, where all five strategic priorities recognise the council's role in resilience to natural hazards.

Future-fit organisation

"regional and catchment scale solutions and services"

Optimised transport system

"improved route resilience on key strategic corridors"

Sustaining natural resources

"communities are protected from the impacts of pests, weeds and diseases"

"water quality is maintained and improved, riverbanks are stable and flood risks reduced"

"sustainable and reliable access to quality fresh water"

Productivity and prosperity

"well-co-ordinated decisions ensure the responsible use, development and protection of our natural and built resources"

"data and information shared with Joint Regional Spatial Planning Committee"

Building regional resilience

"communities are less vulnerable and exposed to natural hazards"

"flood impacts are reduced within agreed service levels"

"our flood infrastructure and drainage network is enduring and affordable"

2 Waikato Regional Council Risk Management Framework (Doc ID 3375577)

Tō mātou tūranga
Our role in natural hazard risk management

New Zealand's system

Our natural hazard management activities exist within New Zealand's natural hazard management system, which provides the legislative, policy, scientific and operational settings for our work.

The following diagram shows the key features of New Zealand's natural hazard management system.

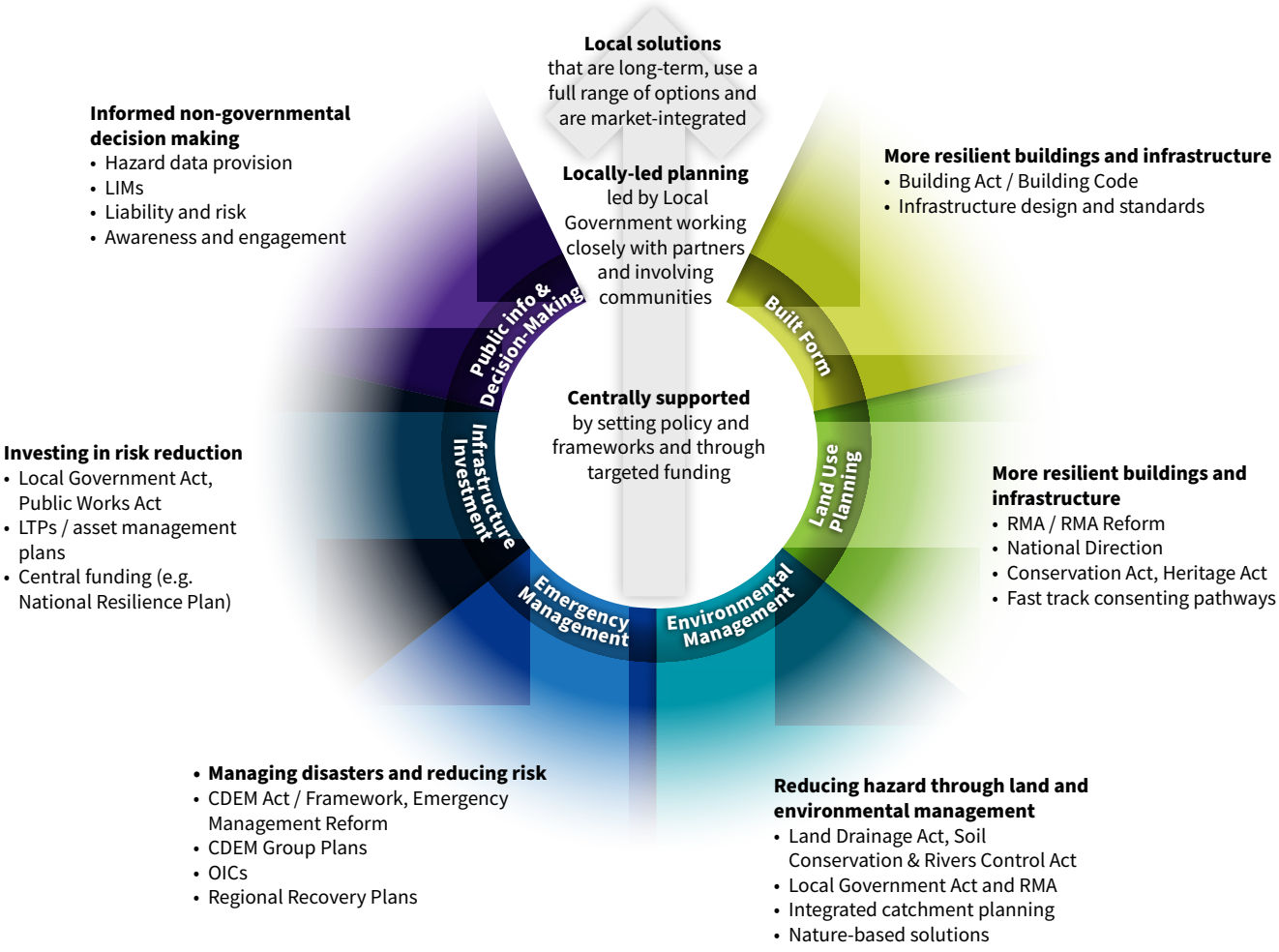


Figure 1: Key features of New Zealand's natural hazard management system.[3]

3 *Ministry for the Environment, 2026. Implementing the National Policy Statement on Natural Hazards [presentation to the Te Uru Kahika Regional Hazards and Risk Management Special Interest Group], 23 April.*

Risk management in the new planning system

Many of the current reforms are designed to address how this system operates, particularly in the context of climate-related risks. The following diagram shows how the new planning system fits within risk management processes.

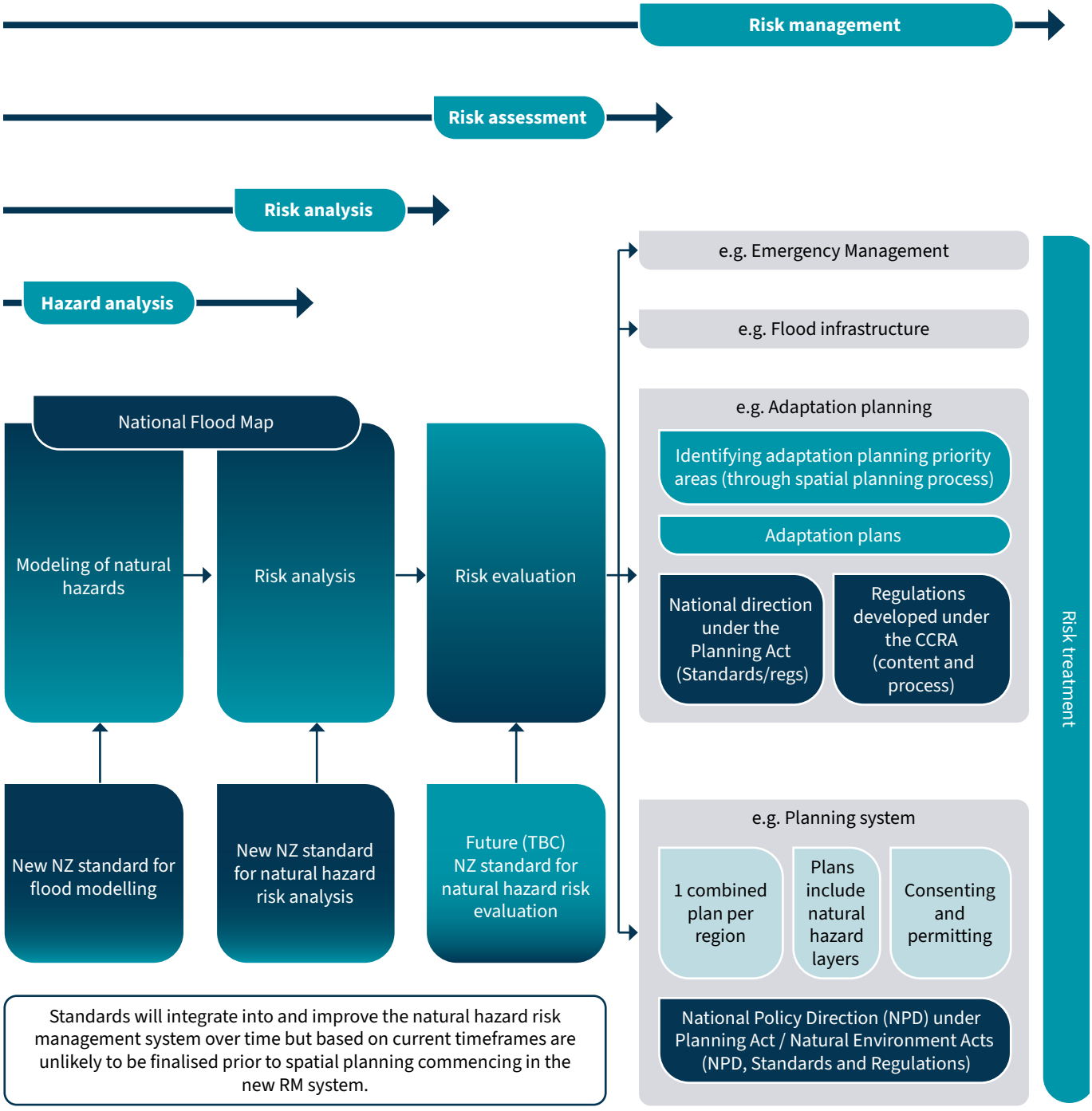


Figure 2: How the new planning system fits within risk management processes.[4]

4 Ministry for the Environment, 2026. *Implementing the National Policy Statement on Natural Hazards* [presentation to the Te Uru Kahika Regional Hazards and Risk Management Special Interest Group], 23 April.

Legislative responsibilities and activities

Waikato Regional Council has natural hazard risk management responsibilities mandated, enabled and defined primarily through the following legislation and regional policy:

- Resource Management Act 1991
- Local Government Act 2002
- Soil Conservation and Rivers Control Act 1941, and its ownership and management of flood protection and drainage schemes
- Civil Defence and Emergency Management Act 2002
- Waikato Regional Policy Statement[5] which requires us to take a guiding and collaborative role in the for natural hazard, resilience and adaptation activities in the Waikato.

While 'regional hazards and emergency management' is a dedicated long term plan (LTP) 'group of activities', many of the council's activities contribute to natural hazard risk reduction and adaptation, even where this is not their primary focus. These include:

- river and catchment management, land drainage and flood infrastructure programmes
- policy development, spatial and adaptation planning and implementation
- regulatory processes and education
- community and primary industry advocacy and engagement
- regional land transport planning and policy
- biodiversity and biosecurity implementation
- water management and water security collaboration
- environmental monitoring, modelling and spatial analysis
- weather data and early warning systems
- emergency preparedness and natural hazard advice
- coastal, water and soil science advice and research programmes.

A wide range of our regional strategies, frameworks and plans contribute to reducing and adapting to natural risk.

Strategies

- *Te Pae Tawhiti | Strategic Direction 2026-2036*
- *Regional Water Security Strategy*
- *Infrastructure Strategy*
- *Biodiversity Strategy*
- *Regional Energy Strategy*

Policy and plans

- *Civil Defence and Emergency Management Group Plan*
- *Regional Asset Management Plan*
- *Waikato Regional Land Transport Plan 2024-2054*
- *Regional Catchment Management Framework*
- *Regional Plan.*[6]

Regional policy obligations

The **Waikato Regional Policy Statement** is a fundamental document for our natural hazard risk reduction and adaptation activities. It sets out how the council must work in relation to natural hazards and risk.

Part 3 of *Waikato Regional Policy Statement* contains key objectives, policies and methods in relation to hazards and risk.[7]

HAZ-M1 contains the region's risk management framework and requires regional and district plans to incorporate a risk-based approach into the management of subdivision, use and development in relation to natural hazards. It requires that natural hazard risks do not exceed acceptable levels and intolerable risk is reduced to tolerable or acceptable levels.

Under HAZ-M5, Waikato Regional Council must collaborate widely to collect and analyse natural hazard risk information, raise public awareness of natural hazards and associated risks, store and share natural hazard risk information for the region, and advocate for proactive, best-practice natural hazard identification and risk management, including the use of mātauranga Māori and strategic approaches to development and redevelopment that minimise increased or residual risk.

An excerpt of these provisions can be found in Appendix 1 – Knowledge hub.

5 Waikato Regional Council, n.d. *Waikato Regional Policy Statement: Part 3 – topics*. Hamilton: Waikato Regional Council. https://www.waikatoregion.govt.nz/assets/WRC/RPS-Part-3-Topics.pdf
6 Under the new planning system, existing regional policy statements, regional plans, and coastal planning provisions will be consolidated into a single regional combined plan.
7 Waikato Regional Council, n.d. *Waikato Regional Policy Statement: Part 3 – topics*. Hamilton: Waikato Regional Council. https://www.waikatoregion.govt.nz/assets/WRC/RPS-Part-3-Topics.pdf

Our tools and systems

We use a range of tools and systems to reduce and adapt to natural hazard risk.

Governance systems and processes for risk management and to support planning, decision making and investment prioritisation

Monitoring, science and modelling to support evidence-based decision making based on robust science and data.

Infrastructure and catchment management to support the management of risks via nature-based solutions, natural systems and fit-for-purpose infrastructure interventions.

Community resilience and preparedness to support communities at both property and catchment scale in managing risk via response planning (CDEM), hazard risk communication and education.

Planning and regulatory systems, including spatial and adaptation planning, planning provision and technical input.

More detail on these can be found in Appendix 1 – Knowledge hub.

Our work to date

Our responsibilities for natural hazard risk reduction and adaptation have been delivered over decades, often as part of ongoing work and multi-year programmes. A selection of initiatives and projects that have been achieved over the past 10 years or so are summarised below.

These projects also demonstrate the changing focus of the council's work programmes and the increasing demands and complexity as we respond to new drivers, both legislative and climatic.

Year	Projects
2015-2019	• Launched key public-facing hazard information tools, including the Waikato Coastal Inundation Tool and Waikato Regional Hazards Portal. • Published foundational climate change direction-setting and impact assessment work.
2020-2024	Strengthened our natural hazard and climate resilience work: • new hazard layers in the Waikato Regional Hazards Portal • published new or updated climate and water security strategies • improved hazard information tools • expanded telemetry sites • contributed to adaptation planning • embedded climate change into infrastructure, catchment and sediment-erosion management work.
2025 +	Since 2025, we have significantly expanded our natural hazard and climate resilience work: • new regional hazard and risk reports and community risk assessments, including the development of regional adaptation guidance • organisational climate risk assessment • updated flood and coastal inundation modelling and data, • improved forecasting and decision-support tools • developed a water security strategy and a regional energy strategy • stronger use of modelling, AI and infrastructure decision-making frameworks to support long-term resilience.

Part 2
Te anga
Our framework

Tukanga **Approach**

The WRF is organised around four pou, or pillars, that set out how the council will approach natural hazard risk reduction and adaptation.

Pou 1
Integrated systems and collaboration

Pou 2
Understanding current and future natural hazard risk

Pou 3
Investment and decision-making for risk reduction and adaptation

Pou 4
Managing risk for resilient people and places

Each pou outlines the steps, systems, processes and principles we will use. And all pou are interconnected. The framework should therefore be considered and applied as a whole, rather than as a collection of separate components.

How will we get there?

The WRF will be implemented though a range of initiatives. Some are already underway or planned through funding provided in the current long term plan, while others are ongoing ways of working or will be progressed through longer-term work programmes.

Implementation will be phased over time, supported by a structured implementation plan. Any additional investment requirements will be considered through future long term plan and annual plan processes.

What does success look like?

Short term, we'll know we are making progress as an organisation when we:

- collaborate and connect across the council and the wider system to manage and adapt to natural hazard risk
- have the expertise, and partner with others, to translate outputs into trusted information, insights and advice
- invest in the data, science, models, tools and technology that enable our risk management and adaptation work
- use and integrate the full range of tools available to us to manage and adapt to natural hazard risk
- incorporate intergenerational, system-wide and te ao Māori perspectives and long-term public value into our decision-making processes.

Long term, we'll know we are successful when the following outcomes are achieved for the region.

- Iwi and communities have the information, tools and support they need to make informed decisions that reduce current and future natural hazard risks.
- People and nature adapt and thrive together in the Waikato region.
- Prioritised investment in risk management and adaptation reduces long-term costs and enables a healthy environment, vibrant communities and strong economy for current and future generations.
- Planning and investment decisions support adaptive responses and reduce community vulnerability and risk.

Pou 1

Integrated systems and collaboration

Take a whole-of-system and partnership-based approach.

Natural hazard risk reduction and adaptation depend on systems that work together. Pou 1 focuses on strengthening integration across the council's functions, tools, decisions and partnerships so that risk is managed in a coordinated, consistent and enduring way.

Climate change is increasing the frequency, severity and complexity of many hazards, with impacts felt across catchments, communities, ecosystems and infrastructure networks. Responding effectively requires a whole-of-system approach that connects governance, planning, investment, science, infrastructure, catchment management, regulatory functions and community action. It also requires strong collaboration with iwi, territorial authorities, central government, lifeline utilities, communities and other partners.

By working across boundaries and using the full range of available tools, the council can make better decisions, reduce duplication, manage trade-offs and support long-term resilience across the Waikato region.

Ki uta ki tai – from the mountains to the sea recognises the interconnectedness of land, water, people, ecosystems and infrastructure across the whole catchment.

This pou promotes a **ki uta ki tai** approach, supporting holistic and integrated catchment-wide decision-making that considers cumulative effects, cross-boundary impacts and long-term resilience.

Key approaches: steps, systems, processes

Embed multi-criteria decision-making across planning, investment and delivery.

Increase integration between regional functions within the council.

- Strengthen co-ordination and cross-discipline collaboration
- Increase integration between spatial/growth planning and infrastructure and catchment planning
- Implement the Infrastructure Strategy to better support river and catchment assets
- Evolve drainage services to support water management
- Transition to whole-of-catchment performance assessments
- Increase the scale and uptake of nature-based solutions

Strengthen external collaboration and coordination

- Focus external collaboration effort where it can have the greatest impact on regional resilience outcomes
- Strengthen our understanding and application of te ao Māori in a risk reduction and adaptation setting
- Improve strategic alignment and planning between CDEM and council

Pou 1

Integrated systems and collaboration

Embed multi-criteria decision-making across planning, investment and delivery

Pou 1

To recognise the systemic and compounding nature of natural hazard risk, a systems-based approach to decision making is essential. Community resilience, natural-system resilience, sustainability, adaptation and emissions reduction are mutually dependent outcomes.

A decision that protects people or land but degrades natural systems may increase long-term risk. Similarly, a decision that reduces emissions but places infrastructure in hazard-prone locations may create maladaptation. Our decisions must consider these interdependencies and seek to balance outcomes across environmental, social, economic, and cultural systems. And deliver benefits without shifting risk, cost, or consequences to other communities, places or future generations.

To support enduring outcomes, we will assess options across multiple dimensions, including:

- reducing risk to people, places, infrastructure and services
- the resilience of rivers, wetlands, floodplains, soils, coastal systems and biodiversity
- cultural values, mātauranga Māori and iwi/hapū aspirations
- water quality, water availability and catchment health
- emissions reduction and transition impacts
- lifecycle costs, avoided costs and long-term affordability
- intergenerational equity and maintaining future adaptation choices
- the risk of maladaptation and the transfer of risk to other places, communities or future generations.

Opportunity in reform

New Zealand's resource management reforms present an important opportunity to strengthen natural hazard risk management through a more integrated, system-wide approach.

This extends beyond protecting communities to enhancing the resilience of natural systems as well. The proposed Planning Bill and Natural Environment Bill both give greater prominence to climate change and natural hazards.

In particular, the Natural Environment Bill incorporates climate change and natural hazards into environmental limits, requiring consideration of how natural systems will respond to future climate-related pressures and disturbances.

Together, these reforms support a more holistic approach to resilience, recognising the interdependence of communities, infrastructure and the natural environment when responding to current and future hazards.

Increase integration between regional functions within council

Pou 1

Managing natural hazard risk effectively requires us to use the full range of our regional functions, powers, assets and partnerships in a coordinated way. Operating as an integrated system helps planning and decisions account for multiple hazard types, infrastructure limitations, catchment processes, sediment and flood dynamics, nature-based interventions, growth planning, and upstream/downstream interactions. It also improves collaboration and reduces duplication of effort.

Strengthen co-ordination and cross-discipline collaboration

Effectively managing natural hazard risk and adaptation requires close integration across the council's natural hazards, climate change, catchment management, infrastructure, environmental management and planning functions.

While teams and sections already work closely together across the council on a range of projects and initiatives, a key focus of the WRF is to strengthen co-ordination and cross-discipline collaboration. The council's Resilience and Adaptation Advisory Group is one mechanism to help achieve this.

Increase integration between spatial/growth planning and infrastructure and catchment planning

Opportunities for closer integration include strengthening the relationship between spatial and growth planning, and infrastructure and catchment planning. This is because the performance and limitations of infrastructure and catchment management activities can influence land use opportunities and constraints.

Implement the Infrastructure Strategy to better support river and catchment assets

Although river and catchment management assets are identified as being within the scope of the Infrastructure Strategy, the strategy provides limited guidance on their long-term management. We need to better support the planning, maintenance and renewal of river and catchment management assets, including rock groynes, weirs, erosion control structures and green infrastructure such as fencing and planting. This will include making better use of existing IT systems to improve catchment asset information, lifecycle management and investment decision-making.

Evolve drainage services to support water management

Drought is an increasing climate risk, but our drainage services are primarily focused on managing excess water. Transitioning from a drainage-focused approach to integrated water management will enable a more balanced and resilient response to flooding, drought, water security and future water storage needs.

Transition to whole-of-catchment performance assessments

Current assessments focus primarily on the performance of flood protection infrastructure. However, this infrastructure operates within a broader flood risk management system that includes river and catchment management activities, nature-based solutions, and emergency management arrangements, for example, stopbank breach/overtopping evacuation plans.

By evaluating the performance and resilience of components within an entire catchment system, we'll also consider residual risk, the effectiveness of complementary risk reduction measures, and areas where formal flood protection infrastructure are not in place. This approach will enable the assessment of triggers and thresholds for a catchment (see Pou 4). There is also an opportunity to incorporate other non-hazard thresholds, such as water quality and biodiversity.

A whole-of-catchment approach will support better decision making by accounting for catchment processes, sediment and flood dynamics, nature-based interventions, growth and land use planning, and upstream and downstream interactions.

Increase the scale and uptake of nature-based solutions

These solutions offer a multi-faceted opportunity to reduce natural hazard risk across the Waikato region's landscapes, while advancing the restoration and protection of catchment systems.

Solutions such as wetland restoration, river naturalisation, floodplain reconnection, riparian planting, detention systems, constructed wetlands, upstream reforestation, animal pest control and pole planting on hill country can complement, and in some cases replace, traditional hard infrastructure solutions. They do this by:

- increasing infiltration and storage capacity across rural headwaters (for example, the Waipā hill country) and lowland flood-prone areas (for example, Whangamarino Wetland)
- attenuating peak flows, which slows and reduces runoff
- stabilising land and controlling sediment and erosion impacts on lower river systems.
- reducing pressure on engineered infrastructure
- mitigating downstream flood risks
- providing water retention in drought
- delivering shade in heat.

Nature-based solutions can also deliver a wide-range of co-benefits, including cultural, water quality, climate adaptation, biodiversity, amenity, recreation, economic, and water security outcomes. These co-benefits reinforce the value of nature-based solutions as integrated responses to natural hazard risk. They not only reduce exposure and vulnerability to hazards, but enhance community wellbeing, biodiversity and the long-term health of our waterways.

Recognising their ability to address multiple risks and deliver multiple outcomes, increasing the scale and uptake of nature-based solutions is a key approach of the WRF. The council's *Regional Catchment Management Framework* provides the vehicle to achieve this.

"Hard infrastructure might sit idle for years because it's designed for rare events. Nature-based solutions can work every day."
–Staff reflection

Strengthen external collaboration and co-ordination

Pou 1

Responsibility for managing natural hazard risks is distributed across multiple organisations and legislative frameworks, with roles varying depending on the hazard and what is exposed.[1] As a result, achieving resilience requires strong partnerships, shared understanding, and coordinated action across local, regional and national agencies, iwi, communities, infrastructure providers and other sectors. Irrespective of broader national reforms simplifying the regulatory landscape, collaboration remains one of the most important tools for achieving integrated, region-wide resilience. Nationally, there is much to gain by working collaboratively with our colleagues across local government, the regional sector and central government, while joint governance and partnership arrangements with iwi provide an important mechanism for bringing together different knowledge systems, values and perspectives.

Focus external collaboration effort where it can have the greatest impact on regional resilience outcomes

Reducing natural hazard risk requires coordinated action and collaboration across many organisations and decision makers – locally, regionally and nationally. Purposeful co-ordination is necessary to ensure the right people across the council are working where we can have the greatest impact on risk reduction and adaptation outcomes. Clear definition of where Waikato Regional Council will lead, influence or align with territorial authorities, iwi and hapū, CDEM, lifeline utilities, central government and sector groups will support a focused and prioritised approach to external collaboration.

Strengthen our understanding and application of te ao Māori in a risk reduction and adaptation setting

Te ao Māori and mātauranga Māori provide a systems-based understanding of the world, recognising people, whenua, wai, ecosystems, infrastructure and future generations as interconnected and interdependent parts of a wider living system.

Combining these perspectives with scientific, technical and local knowledge, and integrating te ao Māori into our risk reduction and adaptation activities, supports integrated and holistic decision-making and is essential for developing solutions that are sustainable, place-based, and resilient over the long term. Iwi bring valuable mātauranga Māori, deep connections to whenua and wai, and an intergenerational perspective that considers outcomes over 100 years or more. By strengthening our understanding of te ao Māori and our engagement with iwi, we can better address complex environmental challenges, make better informed decisions, and give effect to Te Mana o te Wai, ensuring the health and wellbeing of our water bodies, communities, and future generations.

Improve strategic alignment and planning between CDEM and council

Risk reduction, emergency management and climate adaptation are closely connected, yet strategic planning between Waikato Regional Council and CDEM can be better aligned and occur earlier in the planning process. A key action is to strengthen coordination between the council and CDEM by aligning strategic planning cycles and developing a shared work programme across risk reduction, readiness, response, recovery, flood risk management and adaptation planning.

Earlier and more integrated planning will reduce duplication, improve identification of interdependencies, and strengthen community resilience. It will result in a more strategic partnership with shared priorities, clear roles and coordinated delivery.

1 The complexity of our operating environment was recently recognised in a review of the state of New Zealand's regulatory systems: Ministry for Regulation, 2026. *The state of New Zealand's regulatory systems.* Wellington: Ministry for Regulation. https://www.regulation.govt.nz/assets/Publication-Documents/The-state-of-New-Zealands-regulatory-systems.pdf

Pou 2

Understanding current and future natural hazard risk

Build a clear, shared understanding of current and future natural hazard risk and its impacts across the Waikato region.

Understanding current and future natural hazard risk is the foundation for effective risk reduction and adaptation. Pou 2 focuses on strengthening the council's evidence base, tools, capability and processes so we can identify changing hazards, understand exposure and vulnerability, and translate complex information into clear insights for decision making.

Climate change is reshaping the risks facing the Waikato region, increasing uncertainty and challenging past assumptions about land use, infrastructure, communities and natural systems. Historical records remain important, but they are no longer sufficient on their own.

Data, technology, modelling, monitoring systems and digital tools are critical enablers, helping us bring together multiple knowledge sources, detect change, test scenarios and make information accessible. By combining these with mātauranga Māori, local knowledge and expert judgement, the council can better understand where risks are emerging, how they may change over time, and where action should be prioritised.

Key approaches: steps, systems, processes

Grow council-wide natural hazard, climate risk and adaptation intelligence.

- Build capability to understand risk and adaptation planning
- Mature the organisational climate change risk assessment
- Use climate scenario analysis as a tool

Strengthen the evidence base and tools for decision making.

- Co-ordinate resilience data improvement
- Enable fit for purpose information technology to support core functions and innovation
- Embed catchment-scale modelling insights in council-wide decision-making

Analyse and evaluate regional natural hazard risks

- Carry out spatial assessments of exposure and risk
- Apply our regional risk-based analysis process for prioritisation
- Know our priority climate risks and align with national priority risks

Prepare natural hazard information for the new planning system.

Pou 2

Understanding current and future natural hazard risk

Grow council-wide natural hazard, climate risk and adaptation intelligence

Pou 2

Resilience to natural hazard risk starts with strengthening our ability to understand, anticipate and respond to a changing risk environment. We must also understand how risks interact and cascade across systems and consider the full range of climate and natural hazards affecting the region.

Looking beyond individual assets, activities and hazards helps us identify where risks are connected, where actions can deliver multiple benefits, and where coordinated intervention has opportunity to mitigate multiple risks.

Build capability to understand risk and adaptation planning

As natural hazard risks become increasingly complex and interconnected, the council needs the expertise, tools and systems to identify emerging risks, understand their implications, and make informed decisions in the face of uncertainty. A key enabler of the WRF is building the organisational capability needed for action, with an immediate focus on increasing climate risk and adaptation planning capability across relevant council functions. With the growing need for this expertise across multiple sectors, we will need deliberate capability, workforce and partnership planning.

Mature the organisational climate change risk assessment

This risk assessment is a key tool for understanding climate related risks to the council's people and assets and to the services we provide to the region. Establishing this process was a key first step in building organisational risk intelligence, but deliberate effort is required to ensure it continues and matures as an effective tool for managing current and future climate risks.

Use climate scenario analysis as a tool

Climate scenario analysis complements climate change risk assessments by testing how risks, opportunities and decisions may change under different plausible futures. Climate scenario analysis is most valuable when used as a tool for exploring uncertainty, not trying to eliminate it. Climate scenarios help us ask, "what if?" and to prepare for a range of outcomes – even while the exact future remains unknown.

We'll use climate scenario analysis, together with our organisational climate change risk assessment, as critical organisational tools to understand our specific climate related risks and opportunities and test whether existing plans and proposed decisions are resilient under different futures.

In practice:

- Risk assessment = identify, evaluate and prioritise the risks.
- Scenario analysis = test whether today's plans remain effective under different futures.
- Dynamic adaptive planning pathways (DAPP) = decide what to do and when as those futures unfold.

Learn more about these in Appendix 1 – Knowledge hub.

A range of agencies recognise climate risk as a crucial governance issue, including the New Zealand Institute of Directors, the External Reporting Board (XRB) and the New Zealand Local Government Funding Agency. To support good decision-making by councils, **Local Government Sector Climate Scenarios** have been developed and are hosted by New Zealand Local Government Funding Agency. These scenarios present science-based, plausible but challenging futures that can be used as a practical tool to help local government navigate uncertainty, stress-test decisions, and build long-term resilience.

Strengthen the evidence base and tools for decision-making

Pou 2

Good decision-making depends on good information – and on the tools to analyse, interpret and communicate it clearly. These tools help us identify changing hazards, understand exposure and vulnerability, test future scenarios, and make informed decisions about where and how to invest in resilience.

Our evidence base must also be broad enough to support a multi-hazard understanding of risk. It cannot be limited to visible climate impacts such as floods, storms and other extreme weather events. We also need to understand and plan for:

- **geologic hazards**, including earthquakes, landslides and volcanic activity
- **interactions between geology, hydrology and climate-driven hazards**, including vertical land movement, peat subsidence, sea level rise and saline intrusion into groundwater
- **climate-exacerbated hazards**, such as wildfire, drought, higher temperatures and fewer frosts
- **rapid shifts between extreme conditions**, such as prolonged drought followed by intense rainfall and flooding
- **cascading and compounding risks**, where one hazard or impact can trigger, intensify or worsen another.

Co-ordinate resilience data improvement

The council is already improving its data management and governance through valuable initiatives and projects delivered through our *Enterprise Data Strategy* and the *Data Information Governance Group*.

However, further collaboration and co-ordination is required on the specific domain of resilience data. In recent years, there has been a vast increase in the pace of development of resilience data internationally, nationally and regionally.

Taking a strategic, co-ordinated organisation-wide approach to resilience data requires focused effort. To ensure we can meet the current and future needs of our core functions, we must co-ordinate and collaborate on resilience data across **the council,** and **regionally, nationally and internationally,** to understand:

- what data already exists and whether it is accessible and fit for purpose
- where critical information gaps exist and what data will be required to understand emerging and future risks
- what new data is being developed, the purposes it will be suitable for, and when it will become available
- who is the organisational 'owner and manager' of different data
- what key data is needed to undertake effective natural hazard and climate change risk assessments
- where investment in data collection, research, and modelling should be prioritised
- the capability, capacity and specialist expertise required to manage data and modelling, and to translate modelling outputs into decision-ready insights.

Not all data necessary for regional decision making needs to be collected or managed by the council. Central government agencies, territorial authorities, research institutes, utilities, emergency management agencies, insurers and other sector partners are often better placed to develop, manage or improve certain datasets. With multiple institutions working on new resilience datasets, knowing what data is available or planned, and being able to influence this, is a growing strategic need if the council wishes to optimise the data it chooses to invest in.

Resilience data includes natural hazard data, telemetry, climate projections, asset/element data (for example, water conveyance asset attributes, floor levels for building footprints, critical infrastructure, bridge heights, infrastructure monitoring) and satellite imagery. It is fundamental to the delivery of our core services.

Enable fit for purpose information technology to support core functions and innovation

Our investments in information technology infrastructure and services, geospatial systems, modelling and analytical tools enable many of our core functions. Continued investment in digital technologies, data systems and analytical tools will help us meet future information needs and support effective decision-making across the organisation. Understanding current and future organisational data, modelling and technology requirements is a critical first step in planning the investments needed to support effective risk management and informed decision-making.

Embed catchment-scale modelling insights in council-wide decision-making

Advances in hydraulic, hydrological and related modelling are significantly improving our understanding of Waikato catchment systems. Our investment in water resource modelling through the *2024-34 Long Term Plan* represents a major step forward in strengthening the region's natural hazard evidence base and decision-making capability. By combining real data about rainfall, land surfaces, soils and water flow, the model simulates how water moves through the landscape under a range of conditions, including climate change scenarios. The model is now a major regional asset with benefits that can be realised beyond flood management. It enables better planning, stronger adaptation pathways, clearer investment cases and improved operational decisions.

A key focus of the WRF is ensuring the model:

- supports decision-making across the council by providing consistent, evidence-based insights
- informs planning, investment, and risk management activities across relevant functions
- serves as an enduring decision-support tool for natural hazard and climate resilience initiatives
- supports collaboration with partners, stakeholders, and other users by providing information that can inform their own planning and decision-making.

We will continue to refine and enhance the model, while working with communities to improve its accuracy and ensure it reflects local knowledge and experience.

Pou 2

Monitoring provides information on current and historic conditions, trends, and impacts, helping us understand how systems are changing and validating predictive models.

Our telemetry sites provide real-time information to support flood forecasting, emergency response and early warning systems, while also supplying essential data for regional flood modelling and national forecasting systems such as those used by MetService.

Modelling provides insights into current hazards and risks and how they may change over time by combining historic data, current observations, and future projections to support informed decision-making.

Analyse and evaluate regional natural hazard risks

Pou 2

The risk profile of a particular location, community or asset can change over time as development increases, land use changes, demographics shift or hazard intensity increases. Assumptions may also exist around the extent of hazard risk management in place and its suitability in a changing climate.

To support the delivery of our core functions, we need a clear understanding of:

- current and future hazard exposure and risk across the region
- the vulnerability of particular locations, communities or assets, including the extent and limitations of flood defence infrastructure
- residual risk and how it may change over time
- how the suitability of existing hazard risk management approaches may change
- how risk will change if land use, demography or the economy changes
- where adaptation planning, risk reduction activities or development should be prioritised
- how different tools, such as infrastructure, early warning systems, community preparedness and land-use planning, work together to support resilience in specific locations.

To achieve this, we need to use **multiple sources of knowledge and information** and take a **multi-hazard approach**.

Understanding risk requires more than a single hazard dataset, model or assessment. It is built by bringing together qualitative and quantitative information that provides different perspectives on how hazards may interact and affect the region now and in the future.

High-quality, location-specific quantitative data will not always be available for every hazard, asset, community or value at risk. Where gaps exist, informed expert judgement, evidence-based assumptions and consistent assessment approaches are essential. In many cases, we already know enough to act; waiting for certainty may mean losing the opportunity to reduce risk.

Scientific research, environmental monitoring, hazard and climate modelling, mātauranga Māori, local knowledge, community experience, historic event observations and technical expertise all contribute to a stronger, more rounded understanding of risk.

Together, these sources help the council identify priority risks, compare locations consistently, and make better decisions about where and how to invest in resilience. The following approaches support the council to analyse and evaluate natural hazard risk.

- Flooding (Fluvial and Pluvial)*
- Coastal hazards
- Extreme weather
- Higher temperature
- Dryness and drought
- Increased fire weather
- Groundwater rise and salinity stress
- Marine heatwaves and ocean chemistry changes
- Decreased frost
- Landslides and soil erosion
- Volcanic eruptions
- Earthquakes

Carry out spatial assessments of exposure and risk

A spatial understanding of the region's exposure to natural hazards is a key foundation for prioritisation and decision making. A key tool for this is an exposure assessment, which assesses the exposure of elements such as roads, people, buildings, critical infrastructure and marae to in-scope natural hazards, both now and in the future with climate change. An exposure assessment differs from a risk assessment, as it does not consider vulnerability of the exposed elements.

With the region-wide water resource model and coastal inundation modelling now available, we are in a good position to progress our first regional exposure assessment. An exposure assessment can:

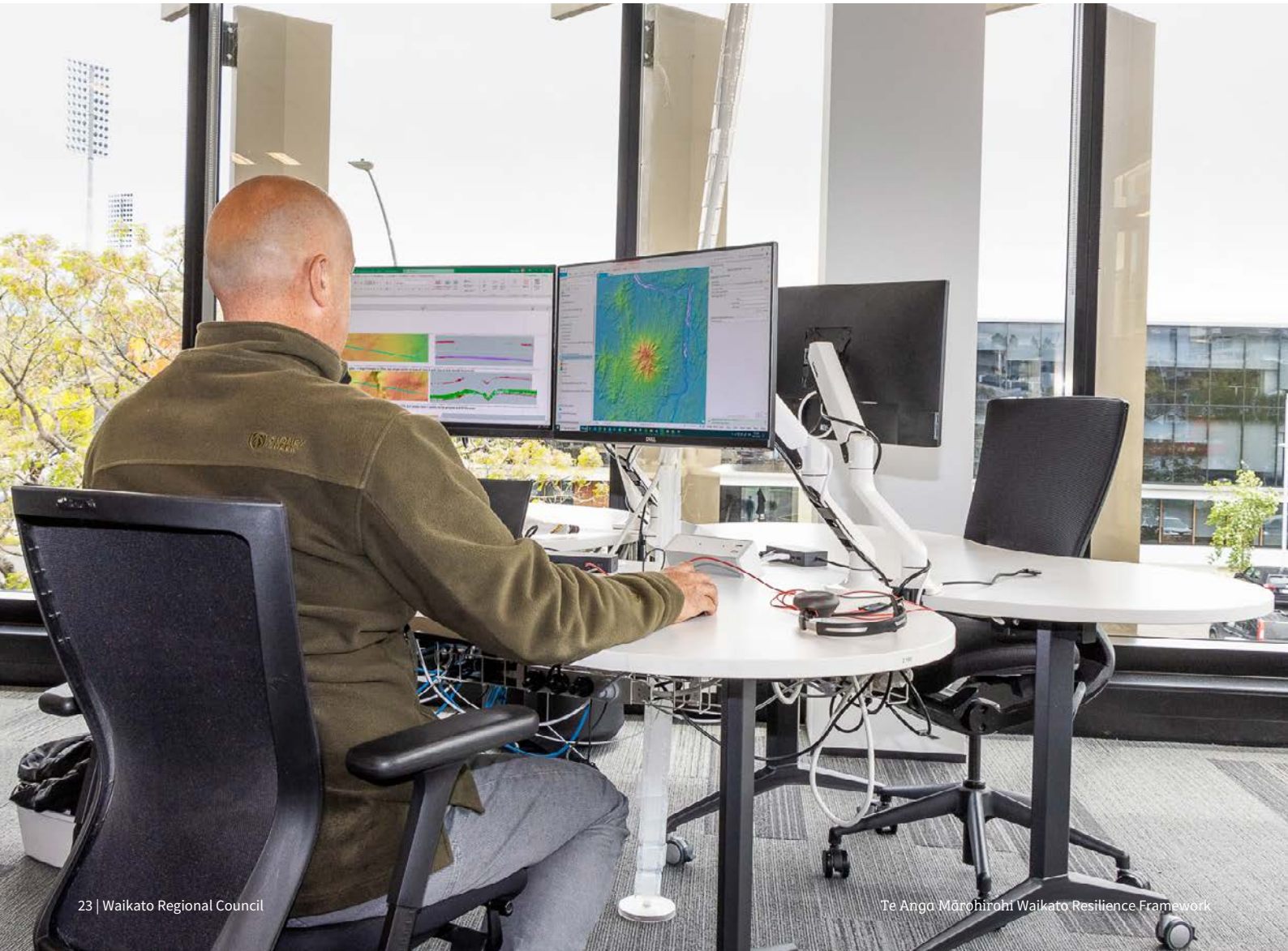
- provide region-wide exposure analysis to quantify spatially the exposure of elements to particular hazards now and in the future with climate change
- assist with identifying priority locations for adaptation planning in regional spatial plans
- help inform evidence-based prioritisation of the council and territorial authority investment of resources in hazard management and adaptation, including where a detailed risk assessment may be required.

As more detail becomes available on the planning system reforms, we will seek to confirm future roles and responsibilities for natural hazard risk assessment.

Apply our regional risk-based analysis process for prioritisation

A key step in our natural hazard risk management approach is to consistently understand and analyse natural hazard risk across the region.

To support this analysis, we will apply our *Regional Risk-based Analysis Process for Prioritisation* (RRAPP, see pou 4 for further detail on how this informs investment decisions). The process supports investment decision making by combining an exposure assessment with practical expert-led judgement about urgency and consequence to identify, compare and rate locations across the region.



Know our priority climate risks and align with national priority risks

Pou 2

Climate risk assessments are not just about identifying hazards and vulnerabilities. They are a tool for prioritising action, directing resources, and supporting adaptation planning through a structured and evidence-based understanding of risk. They help inform decisions about where, when and how to intervene to reduce risk and build resilience.

Individually, the approaches set out in this pou improve our understanding of climate risks. However, a critical step is to bring this knowledge together in a clear set of priority climate risks for the council that inform planning and decision making (see also pou 3). One possible framework to help prioritise climate risks for adaptation investment and action is as follows. For more information on risk severity and policy readiness, referenced in the diagram, please refer to the priority climate risks section of Appendix 1 – Knowledge Hub.

Figure 3: Approach to support risk prioritisation[2]

We also need to align with the evidence-based national climate risk priorities in New Zealand's National Climate Change Risk Assessment (NCCRA). The second NCCRA was released in May 2026 by the Climate Change Commission. It identifies the country's 10 priority risks where focused and coordinated action can make the biggest difference for people, places and ways of life. These risks are already seriously affecting people, or will soon, and will take time to prepare for; and they are risks where acting soon can have the biggest influence on many other risks.

We must understand how these NCCRA priority risks translate to our local context and ensure they are reflected in the council's risk management, planning and decision-making processes. To do so will help inform our choices and align effort regionally and nationally.

Prepare natural hazard information for the new planning system

The planning system reforms are a major opportunity to shape where and how growth occurs. Managing natural hazard risk better is one driver for the reforms and is intended to deliver reduced future exposure, stronger land-use decisions and better alignment between planning, infrastructure and adaptation.

A key step for reform readiness is to ensure that appropriate natural hazard information is built into spatial choices from the start. At present there is a varying natural hazard data held and used by territorial authorities across the region. Not enough is currently known as to what information the new planning system will require, but it is flagged as a key piece of work that will likely require focus, effort and co-ordination.

2 Climate Change Commission, 2025. Webinar: National Climate Change Risk Assessment call for evidence – academics and researchers [video]. https://www.youtube.com/watch?v=jShoXA9pp68 [accessed 11 April 2025].

Pou 3

Investment and decision making for risk reduction and adaptation

Prioritise investment in risk reduction and adaptation where it delivers the greatest long-term reduction in risk, while balancing affordability, levels of service and long-term financial sustainability.

Natural hazards and climate change are reshaping the risks faced by communities, infrastructure, the environment and regional economy. Managing these challenges requires decisions that look beyond immediate needs and consider the long-term consequences, costs and opportunities associated with risk reduction and adaptation.

Finance is both an enabler and a constraint. It enables the council to deliver services, maintain infrastructure, and invest in projects that improve community wellbeing by providing the funding, planning and financial insights needed to support informed decision-making and long-term outcomes. At the same time, the council must operate within limits of affordability, available funding, and long-term financial sustainability. This requires balancing competing priorities and making choices about where resources can deliver the greatest benefit.

Pou 3 provides approaches for making resilient, evidence-based decisions. It recognises finance as both an enabler and a constraint, while supporting the integration of natural hazard and climate risks into long-term planning, sustainable and equitable funding arrangements, targeted investment in resilience, and assessment of projects based on their full lifecycle value. Together, they support proactive, financially responsible actions that deliver enduring risk reduction and adaptation outcomes for current and future generations.

Key approaches: steps, systems, processes
Integrate natural hazard and climate risks into long-term planning and performance.
Develop sustainable and equitable funding arrangements for resilience investment.
Use a consistent methodology to identify locations for natural hazard risk reduction and adaptation investment.
Assess resilience investments for full lifecycle value, avoided risk and wider benefits.

Pou 3

Investment and decision-making for risk reduction and adaptation

Pou 3

Integrate natural hazard and climate risks into long-term planning and performance

Knowing the anticipated financial impacts of natural hazard and climate change risk is fundamental to robust financial planning. That's why it's a key requirement of the XRB's climate-related disclosures regime. Although the council is not subject to that regime, the good practice principles driving the requirement apply equally to us. Having a good handle on the council's anticipated financial impacts enable us to:

- make adequate financial provision for current and future costs
- ensure the adequacy of our insurances
- provide sufficient disaster reserves.

We will use climate scenario planning and risk assessments to anticipate future financial impacts and inform long-term financial planning, including funding, insurance, reserves, investment decisions, and key financial assumptions. Alongside assessing the adequacy of insurance cover, we will monitor its affordability and availability, recognising that changes in insurance markets can provide an early signal of increasing climate and natural hazard risk.

As our adaptation planning matures and community adaptation plans are developed across the region, adaptation pathways will need to be reflected in our *Infrastructure Strategy*, financial strategy and long term plan. This includes identifying the timing of investment, funding requirements, affordability impacts and decision triggers. We will also embed natural hazard risk reduction and adaptation outcomes into long term plan group of activities (GOA) performance measures to strengthen long-term resilience.

Develop sustainable and equitable funding arrangements for resilience investment

Flood management is central to building resilience across the Waikato region, but it faces growing engineering and financial challenges. Climate variability, ageing assets, rising costs, changing land use and increasing expectations of environmental, adaptation and cultural outcomes are placing greater pressure on both flood protection assets and the targeted-rate model that supports them.

For this reason, it's important to develop funding arrangements that are sustainable, affordable and equitable, ensuring that costs, benefits and decision-making responsibilities are shared fairly across communities and future generations. We'll also identify and leverage other funding sources beyond general and targeted rates where appropriate.

The last in-depth systemic review of the funding system for flood management was Project Watershed, which was completed nearly 20 years ago. A review of funding mechanisms for essential infrastructure is now underway, including the development of principles to guide how adaptation costs are shared among beneficiaries, ratepayers, asset owners, communities and external funding partners. This work aims to ensure funding responsibilities are transparent, equitable and clearly understood before investment decisions are made.

This work is timely given the CCRA 2002 Amendment Bill requirement for adaptation plans to identify how adaptation will be funded. By requiring plans to state how costs will be met before an event occurs, the bill shifts responsibility for adaptation decisions and costs to local authorities, property owners, and communities – with the expectation they will be met through rates, targeted rates, user charges, or reduced service levels. The implications for decision makers are significant. Adaptation plans will need to be reflected in councils' long-term planning, infrastructure planning and financial strategies, meaning adaptation costs can no longer be treated as unquantified future risks. While territorial authorities must lead the development and adoption of community adaptation plans, implementation will often depend on regional council functions, and trigger-based adaptation pathways will effectively create commitments to future investment and funding.

Pou 3

Use a consistent methodology to identify locations for natural hazard risk reduction and adaptation investment

Given financial and resource constraints, we need to prioritise where and how we invest in natural hazard risk reduction and adaptation. Robust, evidence-based analysis is essential to identify investment priorities, inform decision making, and to support applications or requests for central government investment in regional resilience.

We will use our RRAPP to provide a consistent and transparent process for informing investment decisions in natural hazard risk reduction and adaptation. It brings together hazard and risk evidence with expert judgment to assess urgency and consequence and compares locations across the region. The RRAPP also considers key enabling factors, including social, political, economic and cultural factors, to ensure investments are practical, achievable, and supported by effective collaboration and engagement.

Assess resilience investments for long term risk reduction, full lifecycle value, avoided risk and wider benefits

Resilience investments should be assessed on their long-term risk reduction potential, full lifecycle value, avoided risk and wider benefits. Traditional cost assessments can undervalue avoided damage, avoided disruption and wider co-benefits that proactive investment can prevent. Short-term responses that focus on immediate needs without considering future risk and a range of plausible future conditions can create unintended consequences, increase long-term costs, and result in maladaptation.

Focusing on whole-of-life value, rather than upfront costs alone, helps ensure limited funding and resources are directed to investments that deliver the greatest long-term risk reduction benefits and public value. It also supports more transparent, evidence-based decisions, stronger business cases, clearer trade-off advice and better recognition of co-benefits such as community wellbeing, environmental outcomes and service continuity.

Spending to save

Prioritising investment in proactive risk reduction and adaptation makes economic and social sense, even though the benefits may be long term and in the form of avoided costs.

Recent analysis of New Zealand's public natural-hazard spending found that since 2010, around **97 per cent** of central government spending has gone to response and recovery, compared with only **3 per cent** on risk reduction and resilience. The common international benchmark is that **$1 invested in risk reduction can save about $4 in response and recovery spending.**[1]

1 Sapere Research Group, 2025. Natural hazards-related public spending in New Zealand: tracking costs over time by the nature of spending.

Pou 4

Managing risk for resilient people and places

Strengthen the resilience of communities, places, infrastructure, catchments and natural systems.

Pou 4 focuses on turning risk understanding into practical action that strengthens the resilience of people, places, infrastructure, catchments and natural systems. The council brings important strengths to this work, including a regional and landscape-scale perspective, flood and drainage infrastructure delivery, catchment management, science, monitoring, modelling, hazard information and experience working with partners on adaptation planning.

Managing risk requires more than knowing where hazards and risks exist – it requires coordinated decisions about land use, infrastructure, investment, communication, community action and long-term adaptation pathways. By embedding adaptive planning into core functions and working with iwi, territorial authorities, communities, infrastructure providers and central government, the council can help reduce exposure and vulnerability, avoid creating new risk, and support resilient places that can adapt as conditions change.

"Enough is already known about the changes Aotearoa New Zealand will face over the coming decades to put the country in a good position to prepare for those impacts."[1]
– 2026 National Climate Change Risk Assessment for Aotearoa New Zealand

Key approaches: steps, systems, processes

Embed adaptation planning in the delivery of core functions.

- Integrate adaptation planning into existing planning frameworks
- Develop signals, triggers and thresholds for assets, services and systems
- Develop intergenerational, integrated adaptation pathways for catchments
- Establish processes for determining risk tolerance and risk tolerance thresholds for land use

Working with partners on community adaptation planning.

- Use transparent and consistent processes for our involvement in community adaptation planning
- Develop a pipeline of flood risk management and community adaptation projects

Strengthen adaptive, risk-based asset management.

Communicate risks and insights for action and change.

- Develop and deliver a proactive communication and education programme for hazard and risk information

Enable community-led action.

- Support practical land-use transition/adaptation pathways
- Provide mechanisms for community-led adaptation

Use the current reforms to improve regional risk reduction and adaptation outcomes.

- Implement changes to existing regional operational planning and management frameworks
- Implement regional policy changes to address issues

This pou contains reference to a number of adaptation terms and concepts. Learn more about these in Appendix 1 – Knowledge hub.

1 He Pou a Rangi Climate Change Commission, 2026. Full assessment – 2026 National Climate Change Risk Assessment for Aotearoa New Zealand. Wellington: He Pou a Rangi Climate Change Commission. www.climatecommission.govt.nz/assets/Uploads/NCCRA/finals/2026-NCCRA-Full-assessment.pdf, p. 12.

Pou 4

Managing risk for resilient people and places

Embed adaptation planning in the delivery of core functions

Pou 4

Climate change requires responses far beyond traditional hazard management. Adaptation planning is a key tool to support our response and involves more than traditional preparedness for climate variation, natural hazards and disaster events. It requires developing a comprehensive understanding of how a changing climate will affect the environment, communities and economy, actively working to reduce our exposure and vulnerability to climate risks and capturing new opportunities.

Irrespective of scale or purpose, adaptation planning must consider how multiple environmental, social, economic, cultural, and infrastructure pressures interact and compound over time to influence risk and resilience. Although the WRF has a community and land-use focus, adaptation planning must extend beyond people to include the region's ecosystems and species, which have value in their own right and also play a key role in community resilience.

Successful adaptation is a proactive and long-term process. It can take many forms, including changing the way we do business, constructing better infrastructure, building resilient communities, and eliminating stressors on our biodiversity and critical ecosystem services.

Successful adaptation also requires monitoring and evaluating performance, so we can learn from experience, adopt actions that provide the most benefit, and adjust plans as necessary.

Together with integrated systems thinking, multi-criteria decision-making and risk-based prioritisation, we'll use DMDU (decision making under deep uncertainty) and DAPP (dynamic adaptive policy pathways) to help the council navigate uncertainty. DMDU and DAPP help us by stress-testing options against a range of future scenarios, using "signals and triggers" to enable timely adjustments before critical thresholds are reached. In the context of climate change adaptation, this approach supports flexible decision making that can respond to changing conditions over time and avoids locking in unsustainable strategies or costly transitions for future generations.[2] In short, DMDU and DAPP approaches help the council invest wisely for both current and future generations.

Integrate adaptation planning into existing planning frameworks

The council has a broad suite of strategies, policies and plans that guide the delivery of our core functions. These include catchment management plans, zone plans, business contingency plans, asset management plans, the *Regional Land Transport Plan*, *Infrastructure Strategy*, long term plans, *Waikato Regional Policy Statement* and *Waikato Regional Plan*. Many of these already recognise climate change as a key issue.

The next step is to integrate adaptation planning, using DAPP as a key tool, across these existing planning frameworks and new ones being developed through the planning system and local government reforms.

Using DAPP for water security

The region's Water Security Action Plan proposes a DAPP approach to help plan and stage the Waikato region's water security decisions. In the context of water security this means monitoring river flows, storage, seasonal outlooks, demand patterns, and environmental and cultural considerations, and progressing pre-identified strategic option/s when a trigger is reached.

2 Lawrence, J., 2023. *A decade of dynamic adaptive decision-making tools in New Zealand: practice applications, lessons learned and next steps*. Resilience to Nature's Challenges. Wellington: Climate Change Research Institute, Te Herenga Waka Victoria University of Wellington. https://resiliencechallenge.nz/outputs/a-decade-of-dynamic-adaptive-decision-making-tools-in-new-zealand-practice-applications-lessons-learned-and-next-steps/, p. 2.

Develop signals, triggers and thresholds for assets, services and systems

Pou 4

A key component of adaptation planning is the establishment of signals, triggers and thresholds (STATs). Once thresholds are defined, signals and triggers provide a mechanism for monitoring when assets, services or systems are approaching their adaptive limits, indicating when preparation is needed to transition to an alternative pathway. This enables decision-makers to anticipate change and take timely action before risks become unacceptable or critical thresholds are exceeded.

Setting STATs for assets, systems and services is a key next step in maturing the council's climate risk management practices. Many organisations are facing similar challenges in identifying and implementing STATs, creating opportunities for collaboration, knowledge sharing, and coordinated approaches to climate adaptation. Figure 2 below shows how STATs fit within adaptation planning.

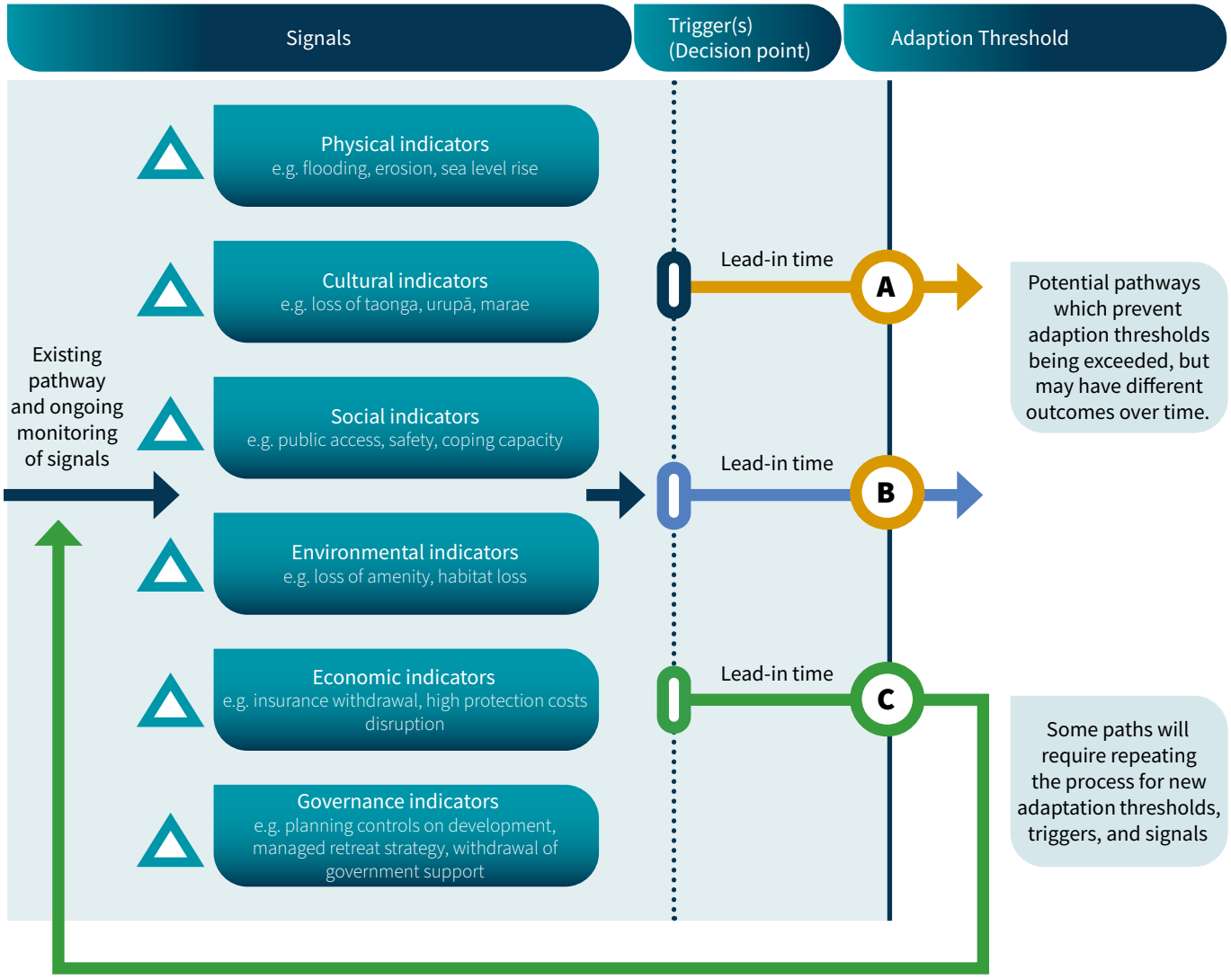


Figure 4: How the new planning system fits within risk management processes.[3]

Multiple ways of knowing

For adaptation planning to be a systemic risk response, it must consider multiple types of knowledge. Social and cultural indicators should also be used wherever appropriate, integrating inclusive worldviews and understanding in decision making.

3 Ministry for the Environment, 2026. *Implementing the National Policy Statement on Natural Hazards* [presentation to the Te Uru Kahika Regional Hazards and Risk Management Special Interest Group], 23 April.

Develop intergenerational, integrated adaptation pathways for catchments

Pou 4

Every part of the region will need to adapt to changing climatic conditions – not just those areas undertaking community adaptation planning projects.

Given that many of the council's core functions are place-based and centred on catchments, an opportunity exists to develop and monitor intergenerational, integrated adaptation pathways for each catchment. These pathways would provide a long-term plan for managing changing conditions, showing how flood protection and drainage infrastructure, water quality and quantity, environmental outcomes, land use and nature-based solutions may need to evolve over time as key thresholds are reached.

These pathways could be incorporated into existing operational catchment management or zone plans, or their future equivalents as planning frameworks evolve. They would provide an integrated view of the thresholds, signals and triggers across a catchment that may require changes in management approaches over time.

Bringing together agreed or evidence-based thresholds across multiple functions, rather than considering individual assets or activities in isolation, would support more coordinated and proactive decision making. It would also enable clearer conversations with communities and stakeholders about future levels of service, adaptation choices, and the trade-offs that may be required as climate risks and environmental conditions change. It would also enable potential recovery actions to be identified in advance, helping to ensure post-event rebuilding or restoration reduces future risk rather than recreates existing vulnerabilities.

The pathways would also be deliberately intergenerational, looking beyond typical timeframes used in local government planning to reflect the time scales that natural and indigenous systems operate within. As this is a new approach, a pilot will be an important first step.

Establish processes for determining risk tolerance and risk tolerance thresholds for land use

Pou 4

Risk tolerance and risk tolerance thresholds are an important part of managing current and future natural hazard risk in land use planning. Together, they are used to put risk-based policies into practice. Decisions about how risks are managed require consideration of the level of risk that governments, councils, communities and individuals are prepared to accept, and when intervention is needed to reduce unacceptable levels of risk.

Thresholds can be measured using qualitative, quantitative or combined metrics. Regardless of the approach, metrics should be measurable, based on available information, and clearly documented. Supporting descriptive criteria can also help ensure the intent of the threshold is consistently understood and applied.

There are many challenges with setting risk tolerance thresholds, such as deciding which life metrics to use, scalability, and reconciling varying risk tolerances. Additionally, risk tolerance (and thresholds) may change over time, or when considered against cost. It is important to have a clear process for determining and reviewing risk tolerance and risk tolerance thresholds, so that there is an agreed approach to putting risk-based policies into practice.

The Natural Hazard Commission has identified the lack of clear national guidance as a critical gap[4] and the *Waikato Regional Policy Statement*, which provides our regional risk management framework, does not set out processes for how to determine what is tolerable and intolerable, nor agreed metrics. If the planning system reforms do not provide direction, a priority piece of work will need to be the development of regional policy on how to set risk tolerance and risk tolerance thresholds for land use.

Risk tolerance is the willingness to bear a risk. It is classified as 'acceptable', 'tolerable' or 'intolerable', and recognises that not all risk needs to be reduced. Understanding risk tolerance helps decide risk thresholds for managing potential impacts of a hazard on the things we value (such as our health, environment, economy, and buildings and infrastructure).

Risk tolerance thresholds provide clear delineation between 'acceptable', 'tolerable' or 'intolerable' levels of risk. A risk tolerance threshold is used to identify when a different adaptation pathway is required. Risk thresholds need to be determined at asset, community, catchment and regional scale. Signals and triggers are used to allow adequate time to transition from one adaptation pathway to another.

4 Natural Hazards Commission Toka Tū Ake, 2025. Risk tolerance methodology 2025. https://www.naturalhazards.govt.nz/resilience-and-research/research/search-all-research-reports/risk-tolerance-methodology/, pp. 3, 6, 16.

Working with partners on community adaptation projects

Pou 4

Community adaptation planning is already underway across the Waikato region. It is resource intensive and requires ongoing commitment by multiple stakeholders. After adoption, a community adaptation plan requires funding for ongoing monitoring of risk (signals and triggers for agreed pathways), periodic review of thresholds, and implementation of interventions.

The council has a key role in adaptation planning, regardless of the legislative framework, which is currently shared between central government and territorial authorities. This is due to the region-wide implications of adaptation decisions, the catchment-scale nature of many natural hazards, our responsibility for key regional functions and infrastructure, and our role in enabling and implementing adaptation responses.

Flood protection and drainage infrastructure, along with key resource management considerations such as water quantity and quality, biodiversity, catchment management and soil conservation, are critical inputs into community adaptation planning. These factors shape the scope of adaptation projects, the development and assessment of options, and their eventual implementation. The council also holds essential hazard, risk and geospatial information that supports multiple stages of community adaptation planning. In addition, our rating and funding frameworks play an important role in determining how adaptation options can be financed and delivered.

Use transparent and consistent processes for our involvement in community adaptation planning

With resourcing and investment constraints, the council is only able to contribute to a small number of adaptation plan processes at one time. Transparent and consistent processes for how the council works with partners on community adaptation projects are important – to guide the council and so partners can know what to expect.

Appendix 2 – Principles for working with partners on community adaptation planning sets out clear parameters to how the council works with partners on community adaptation projects. These principles expand on the principles adopted by the Strategy and Policy Committee in 2023[5]. The principles support a coordinated, risk-based approach to community adaptation planning, with the council's involvement focused on priority areas. They emphasise early partnership, clear roles and responsibilities, evidence-based decision making, integrated regional solutions that consider environmental, social, cultural, economic, and intergenerational outcomes, and alignment between adaptation planning, infrastructure investment and future funding decisions.

The RRAPP discussed in Pou 2 and Pou 3 provides risk-based analysis to support this approach.

Both the RRAPP and the principles in Appendix 2 will need to be reviewed as the new planning system is implemented and when adaptation planning amendments to the CCRA, and supporting regulations, are passed.

5 Adopted at the meeting of the Strategy and Policy Committee on 6 September 2023 (SP23/28).

What do the adaptation planning amendments to the CCRA 2002 mean for us?

The proposed amendments to the Climate Change Response Act (CCRA) 2002 would introduce significant resource and financial implications for the council. In particular, adaptation planning would shift from discretionary good practice to a statutory obligation, with prescribed timeframes for delivery.

Local government would be required to adopt community adaptation plans for 'priority 1' locations identified in the first regional spatial plan within five years and adopt plans for 'priority 2' locations in the following five years.

Territorial authorities would be required to lead the preparation of the adaptation plans and adopt them. Regional councils, and other agencies, would be required to have regard to them, and reflect the agreed adaptation pathways in their own planning.

The council will need to carefully plan its resourcing to contribute to the proposed mandatory adaptation plans.

Develop a pipeline of flood risk management and community adaptation projects

Pou 4

Managing flood risk is a core council function that relies on significant investment in flood protection infrastructure, drainage services, and catchment management. As community adaptation planning will identify adaptation pathways that are likely to include flood mitigation measures, it is important that flood risk management programmes are aligned with the timing and outcomes of adaptation planning.

To support this, the council will develop a pipeline of regional flood risk management and community adaptation projects. This will improve the sequencing and alignment of work programmes, support resource and investment planning, avoid duplication of community engagement, and provide greater certainty for councils, infrastructure providers and communities as adaptation pathways are developed and implemented.

Strengthen adaptive, risk-based asset management

The *Infrastructure Strategy* and *Regional Asset Management Plan* already propose a risk-based approach to managing the council's flood protection, land drainage and river and lake management assets. As part of our approach, we'll extend and strengthen this adaptive, risk-based approach across the council's wider asset portfolio. Key approaches include the following.

- Identify our critical assets. In the case of flood infrastructure, update the criteria to determine criticality so that it focuses on risk to life and regional significance, and then reassess the assets against the new criteria.
- Develop and monitor signals, triggers and thresholds for the management of each asset type.
- Ensure we hold accurate, up-to-date information about our assets so we can assess and monitor risks from natural hazards.
- Understand the vulnerabilities of our assets and the feasibility or limitations of upgrades.
- Develop adaptation pathways for council assets that incorporate PARA response options (see Appendix 1). The 2024/34 *Infrastructure Strategy* has already begun aligning with the PARA framework through its *maintain, optimise, adapt, transform, retreat* pathways, and recognises the need for transformational responses.
- Place-based resilience planning where assets are managed as part of a wider system. For flood infrastructure, asset management must take place as part of a wider system of risk management responses.

These approaches embed a strategic asset management approach across the council's entire assets portfolio, shifting the focus from managing individual assets in isolation to place-based resilience planning. They also acknowledge financial constraints by supporting the prioritisation of investment towards critical assets and allowing lower-priority assets to be managed through alternative approaches where appropriate. The use of signals, triggers and thresholds aligns with best practice in adaptive asset management, enabling proactive planning and investment.

Communicate risk and insights for action and change

As an organisation, we hold a vast *kete* (basket) of data and knowledge, and our understanding of natural hazards and risk continues to grow. However, as recognised by the *Building regional resilience* priority of our *Te Pae Tawhiti | Strategic Direction 2026-2036,* information alone does not build resilience. We must translate our knowledge into clear, accessible insights and practical decision-support tools that help inform action. By making information easier to understand and apply, and proactively communicating it, we can support better decision making by the council, partners, iwi, hapū and whanau, communities and individuals.

Achieving this will require significant capability and investment. Effective science communication, risk communication and behaviour change engagement all rely on specialist skills and expertise.

There is also growing demand to translate complex natural hazard and climate risk information into accessible maps, spatial products and other decision-support tools, placing increasing pressure on the capacity and capability of the council's spatial information team. Technical experts must be closely involved in the development of communication materials and decision-support tools to ensure information is robust, relevant and fit for purpose. Delivering these outputs effectively will also require coordinated, strategic communication and engagement programmes that help different audiences understand risk and enable them to make informed decisions.

Pou 4

Develop and deliver a proactive communication and education programme for hazard and risk information

We need to strengthen our approach to risk communication by establishing a coordinated communications and education programme that delivers timely, accessible hazard and risk information ahead of events and when it is most relevant to decision-making. This includes key moments such as property purchases, land use and zoning decisions and the release of new hazard layers.

Enable community-led action

Community-led risk reduction and adaptation planning can be a practical way to build durable, locally supported resilience. It can:

- support earlier action to progress preparedness, risk reduction and local adaptation conversations before a formal council-led adaptation plan is possible
- strengthen social resilience by building relationships, capability, preparedness and mutual support networks, which are critical before, during and after natural hazard events
- reduce pressure on councils – seed funding, guidance and technical support can enable communities to begin adaptation planning where councils do not yet have capacity to lead a full process.

Support practical land-use transition and adaptation pathways

Practical land-use transition and adaptation pathways that reduce risk and meet the needs of landowners, iwi and hapū, industry and communities are key to future regional prosperity. We'll work with partners to support a regional transition that aligns catchment, adaptation and primary sector outcomes. Trusted relationships, clear advice and coordinated support will be central to this approach.

Provide mechanisms for community-led adaptation

Waikato Regional Council and territorial authorities are unlikely to have capacity or capability to work with every community or group interested in developing an adaptation plan. Currently, there is no community adaptation grant fund available to provide seed funding for locally led adaptation planning initiatives. This contrasts with other areas of council work where funds such as the Environmental Initiatives Fund, the Natural Heritage Fund and the Community Transport Grant Fund support community groups to deliver outcomes that councils may not have resources to achieve directly.

Once there is greater certainty around the future structure of local government, we will consider opportunities to establish a community adaptation grant fund. In the meantime, we'll support communities and groups to advance their own adaptation planning efforts by continuing our current work to make hazard information, adaptation guidance and decision-support tools accessible and publicly available.

Pou 4

Use the current reforms to improve risk reduction and adaptation outcomes

Tomorrow's risk is built today. There is no such thing as a natural disaster. Hazards – earthquakes, floods, cyclones – are natural, but disasters are not. Disasters occur when people, places and infrastructure are exposed and vulnerable to hazards, often as a result of the choices we make about where and how we develop.

Therefore, an immediate focus is to be well prepared for the planning system and local government reforms. These reforms will provide a once-in-a-generation opportunity to build natural hazard resilience and climate adaptation into the Waikato's future planning, investment and decision-making systems.

From a natural hazard risk reduction and adaptation perspective, the reforms raise several key considerations, outlined in Appendix 3. One opportunity is to shape the Combined Plan, which will replace multiple existing district, city and regional plans, to support integrated, system-wide natural hazard resilience across the region.

Implement changes to existing regional operational planning and management frameworks

Regional operational planning and management frameworks, including regional and catchment-based plans, will need to evolve in response to the changing legislation. This is an opportunity to make changes to our existing operational planning frameworks, for example, zone and catchment plans, to achieve resilience outcomes in the new legislative operating environment.

Implement regional policy changes to address issues

Subject to the scope of the new planning system, the reforms provide an opportunity to address shortcomings in our current policy settings for natural hazard risk reduction and adaptation. A key priority will be identifying and implementing the regional policy changes needed to improve natural hazard resilience outcomes across the Waikato region.

Ngā āpitihanga
Appendices

Appendix 1 – Knowledge hub

Climate Change Adaptation Guideline for the Waikato Region

Our Climate Change Adaptation Guideline for the Waikato Region is a technical guide which offers the latest policy guidance, scientific information and frameworks to help the Waikato region prepare for climate impacts and promote a coordinated approach. It includes guidance on climate risks for Māori and working with our iwi partners.

Excerpts from part 3 of the Waikato Regional Policy Statement

Waikato Regional Policy Statement-RPS-Part-3-Topics

HAZ-M1 – Risk management framework

Regional and district plans shall incorporate a risk-based approach into the management of subdivision, use and development in relation to natural hazards. This should be in accordance with relevant standards, strategies and plans, and ensure that:

1. new development is managed so that natural hazard risks do not exceed acceptable levels;
2. intolerable risk is reduced to tolerable or acceptable levels;
3. the creation of new intolerable risk is avoided;
4. any intolerable risk as a result of existing use and development is as low as reasonably achievable; and
5. where intolerable risk remains, the risks will be managed until an acceptable level is achieved.

HAZ-M5 – Information, education and advocacy

Waikato Regional Council will

1. Collaborate with:
    a. territorial authorities to support the collection and analysis of natural hazard risk information;
    b. territorial authorities, the Ministry of Civil Defence and Emergency Management, the Waikato Civil Defence and Emergency Management Group and other agencies to develop and implement public education and awareness programmes on natural hazards and their associated risks;
    c. agencies involved in the property market, including insurance companies, lending agencies and real estate agencies to promote understanding and awareness of natural hazard risk to properties; and
    d. research organisations; and
2. store all natural hazard risk information that is available and relevant to the Waikato region, and share this information with territorial authorities and other relevant stakeholders; and
3. advocate for:
    a. a proactive approach to natural hazard identification in district and regional plans;
    b. the use of best practice approaches, including mātauranga Māori, to natural hazard identification and management of the associated risks; and
    c. a strategic approach to development (including redevelopment) that seeks that any increase in risk from natural hazards (including residual risk) is minimised.

List of tools and systems for natural hazard and climate risk reduction and adaptation

Governance systems and processes

- Governance processes for support planning, decisions and investment.
- Decision-making frameworks and assessment criteria.
- Organisational, programme and project-based risk and issue management.
- Long-term financial planning, including assumptions, funding mechanisms, insurance, reserves and investment decisions.
- Long term plan outcomes, levels of service and performance measures.

Infrastructure and catchment management to support the management of risks via nature-based solutions, natural systems and fit-for-purpose infrastructure interventions

- Flood protection and drainage infrastructure such as stopbanks, pump stations, floodgates, telemetry networks and tide gauges.
- Catchment management, river management and erosion control programmes.
- Wetlands, forests and other nature-based solutions that improve resilience while delivering biodiversity, water quality and carbon benefits.
- Ki uta ki tai approaches that recognise the connections between land, water, ecosystems and communities.

Planning and regulatory systems

- Regional policy and planning frameworks.
- Resource consent applications and conditions for managing natural resources and land use.
- Spatial planning and land-use controls.
- Community adaptation planning.
- Natural hazard provisions in plans and consent processes.
- Technical guidance and regulatory requirements.
- Compliance and enforcement activities that support risk reduction outcomes.

Monitoring, science and modelling to support evidence-based decision making based on robust science and data

- Weather forecasting and flood forecasting systems.
- Monitoring networks and telemetry.
- Hazard and climate risk modelling.
- Environmental monitoring and trend analysis.
- Understanding changing risk profiles over time.

Supporting community resilience and preparedness at property and catchment scale

- Response planning (CDEM).
- Hazards risk communication and public education.
- Access to natural hazard and risk information, for example, the Regional Hazards Portal, Coastal Inundation Tool, and Flood Room on our council website.
- Provision of property-specific or general natural hazard information on request.

Catchment-scale water resource modelling

Catchment-scale water resource modelling can support a wide range of planning, risk management, and decision-making activities, including:

- how different interventions, such as land use change and nature- based solutions, can increase or reduce the extent of flooding
- performance assessments of our flood schemes, including the limitations of the infrastructure
- identifying current and future locations suitable for potential wetland restoration and refugia for native species
- improving the regional flood hazard layer of our Regional Hazards Portal
- providing more comprehensive flood information on Land Information Memoranda (LIM)
- informing developers and consultants of flood risks affecting individual land parcels and development proposals
- supporting land use planning, zoning decisions, and resource consenting processes
- informing implementation of the Waikato Regional Policy Statement
- identifying current and future land use constraints and opportunities for the regional spatial plan
- the identification of priority locations for adaptation planning by spatial plan committees and councils as part of the process of creating regional spatial plans under the Planning Act, once it is in force
- assessing exposure and flood risk across communities, catchments and the wider region
- strengthening community response planning, including evacuation protocols
- improving flood forecasting before and during weather events
- identifying where further monitoring and/or research is needed.

Climate change risk assessment and climate scenario analysis

Climate change risk assessment and climate scenario analysis are different but complementary tools to manage risk and test our planning and decision-making under uncertainty. The table below describes the differences.

Climate Change Risk Assessment	Climate Scenario Analysis
Identifies and assesses **climate-related risks and opportunities**.	Explores **different plausible futures** and how those futures could affect objectives, services, assets and decisions.
Answers **"What are our risks?"**	Answers **"What if this future occurs?"**
Focuses on likelihood, consequence, vulnerability, exposure, and risk prioritisation.	Focuses on uncertainty and stress-testing plans and decisions under different future conditions.
Produces a risk register, priorities, controls, and treatment actions.	Produces insights about resilience, strategic options, triggers, adaptation pathways, and robustness of plans.
Usually based on current information plus projected climate impacts.	Uses multiple plausible narratives (physical and transition futures).
Helps determine where action is needed.	Helps determine whether proposed actions remain effective across different futures.

Together, these tools can help inform a range of strategic and operational decisions.

- **Infrastructure planning** can be guided by adaptive pathways, enabling investment to be staged over time as conditions change. For example, restoring wetlands now may provide sufficient risk reduction, with future investment in hard infrastructure triggered if rainfall intensifies or land use changes through growth and development.
- **Managing transitional impacts,** such as changes in national climate policy, economic activity or evolving expectations around low-emissions living. Councils may need to plan for increased uptake of electric vehicles, changing building standards, or the economic implications of decarbonisation pathways aligned with Aotearoa New Zealand's emissions budgets and the Zero Carbon Act.
- **Land use and spatial planning** can use scenario insights to steer development away from high-risk zones, such as low-lying coastal areas or regions prone to wildfire, while identifying areas suitable for future growth, housing demand and changing community needs.
- **Public health and emergency preparedness** can be strengthened by considering demographic change and potential shifts in transport modes. This can help ensure public transport is equipped to support an emergency response or evacuations if private vehicle ownership declines.
- **Financial planning** can be informed through scenario stress-testing, helping councils understand how climate risks may affect long-term service delivery costs, insurance availability and affordability, and infrastructure renewal and depreciation profiles.
- **Service provision** may be challenged or constrained as funding is redirected towards transition or climate impact response. Scenarios can be used by councils to work with communities to explore potential necessary trade-offs if climate action takes a priority. Equally, they can help identify opportunities for innovation and operating agility.[1]

1 Local Government Funding Agency, 2025. *Local government sector climate scenarios: guidance document*. Wellington: Local Government Funding Agency. https://www.lgfa.co.nz/sustainability/sustainability-lgfa/local-government-sector-scenarios, p. 8.

Methodology for climate change risk assessments

Climate change risk assessments use a specific methodology that considers the hazard, exposure and vulnerability to determine risk. Vulnerability can be combination of both physical and social vulnerability and includes considerations of sensitivity to the hazard and capacity to adapt. This methodology differs from the traditional risk assessment methodology of *likelihood* and *consequence*.

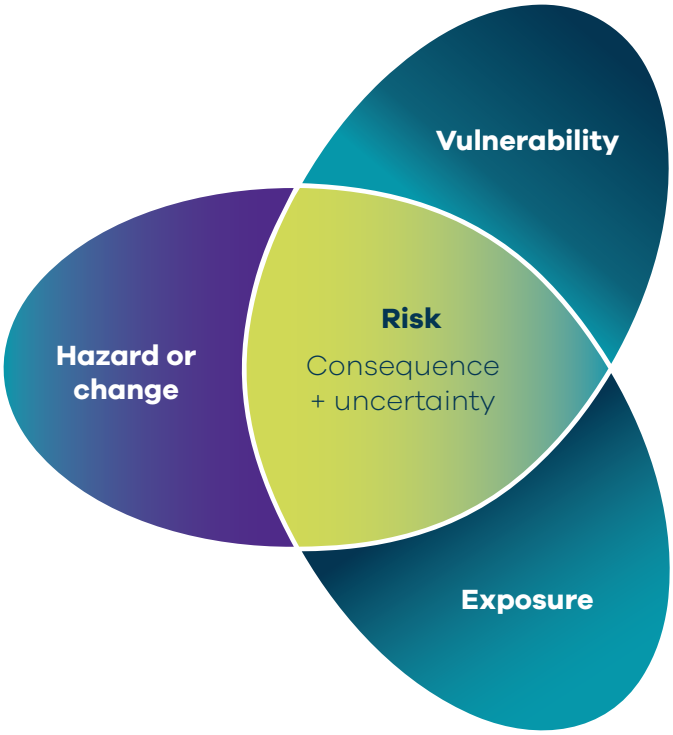


Figure 5: Components of climate change risk assessment[2]

Priority climate risks

To understand risk severity, factors that need to be considered include:

- the level or severity of the risk in different time periods under different emissions scenarios
- how the risk may compound and cascade
- whether the risk varies in different locations
- whether the risk has significant impacts for Māori
- potential lock-in risks and at what point in time this will occur (lock-in is where decisions made today are difficult to reverse and can increase exposure to subsequent risks long-term and/or will commit decision-makers to future interventions to manage exposure)
- climate and non-climate aspects that may exacerbate or reduce the risk, such as thresholds, tipping points, socio-economic trends and climate mitigation action.

To understand policy readiness, consider:

- what actions can be taken to address the risk, the potential impact of those actions on future risk, and the lead-in time for those actions
- what action is already being taken to address the risk and the impact it is having
- whether any actions could have, or lead to, maladaptation
- when risks may become locked in
- whether there are any barriers delaying action to address the risk
- shortfalls in planned adaptation action – a sense of what further action is needed.

2 Intergovernmental Panel on Climate Change (IPPC), 2014. *AR5 Climate change 2014: impacts, adaptation, and vulnerability. Working Group II contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. https://www.ipcc.ch/report/ar5/wg2/

Key concepts for adaptation planning

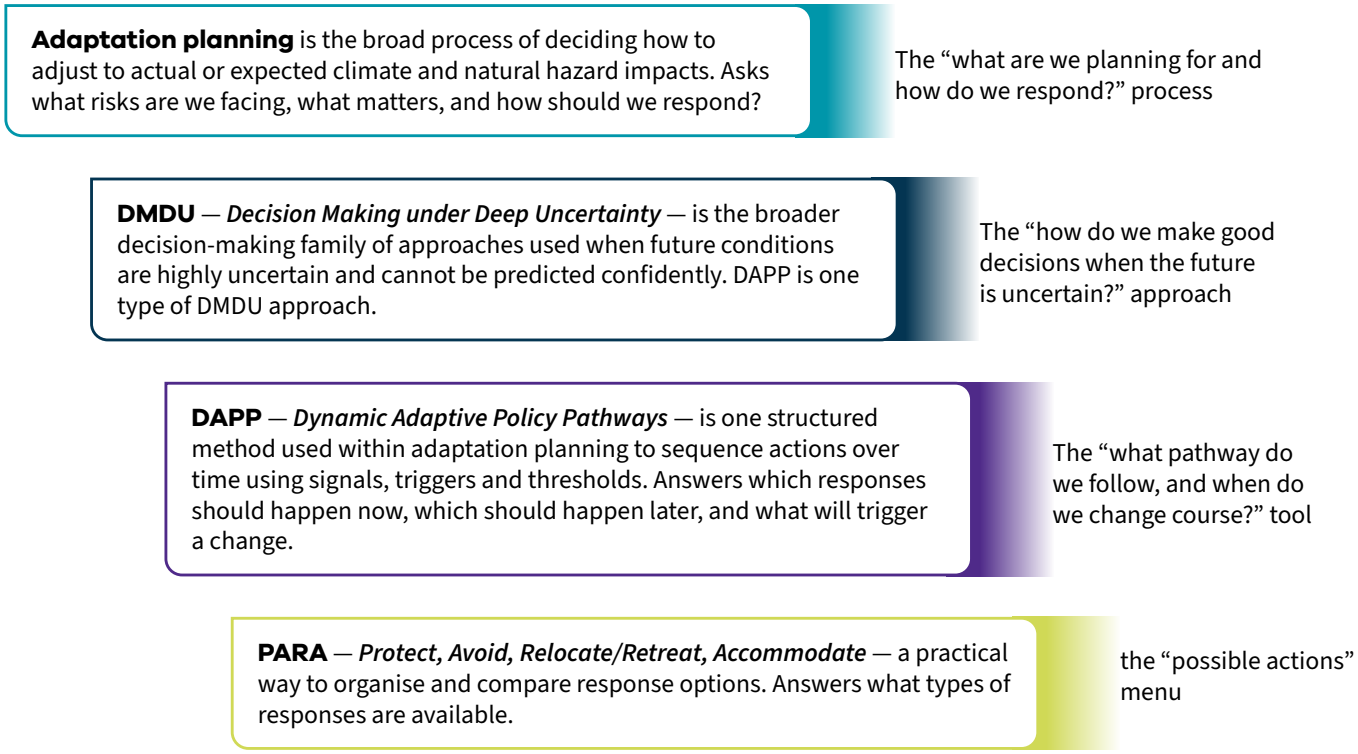


Figure 6: Key concepts for adaptation planning.

*Communities in Waikato adaptation projects have signalled a preference to use the term "relocate" over "retreat".

DAPP can be used either as part of a community adaptation planning process or by itself to scope the range of available options and pathways. It can be tailored for any scale. Over the past decade, DAPP has been applied in New Zealand to help reduce the risk of pluvial, fluvial and coastal flooding exacerbated by climate change, and to manage other hazards and situations of deep uncertainty. Applications span national and local levels: coastal adaptation, flood management, conservation, agriculture, infrastructure, and military planning.[3]

3 Lawrence, J., Gallop, S.L., Marquardt, L., Bell, R., Blackett, P., Cradock-Henry, N.A. and Wreford, A., 2025. Dynamic adaptive pathways planning for adaptation: lessons learned from a decade of practice in Aotearoa New Zealand. *Journal of Integrative Environmental Sciences*, 22(1), p.2451424. https://doi.org/10.1080/1943815X.2025.2451424

Adaptation response options

The diagram below shows how **PARA** is used to consider and organise responses for a flood prone community. Used with DAPP, these options can be sequenced over time, with signals and triggers identifying when the council should shift from maintaining or upgrading an asset to alternative risk management pathways.

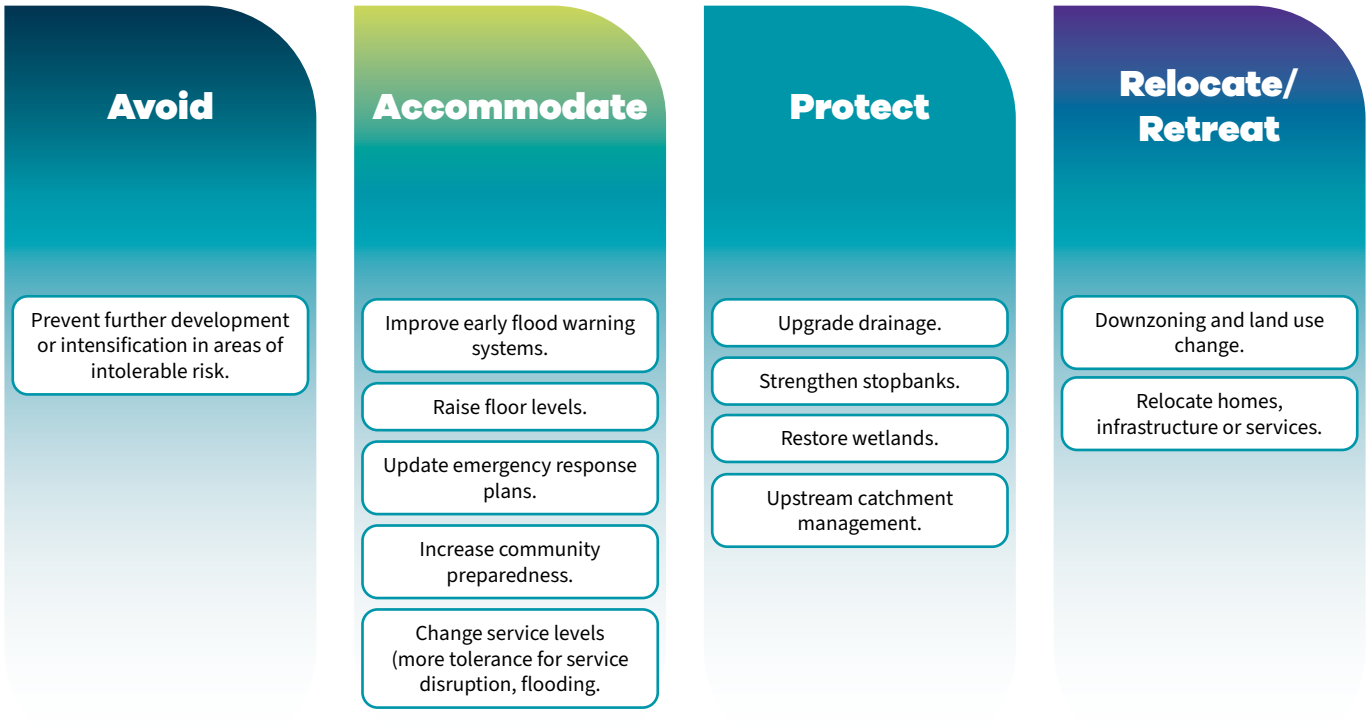


Figure 7: Examples of applications of PARA adaptation approach for a flood-prone community

How is adaptation planning different to community adaptation planning?

We talk a lot about community adaption planning in local government, however, adaptation planning is used at different scales and for many different purposes, including for sectors, specific assets, infrastructure networks, locations, communities, catchments and ecosystems. Because these processes vary in scope, purpose and level of community involvement, we need to be clear about the differences.

Adaptation planning for specific assets and infrastructure is often technical and asset-based, focused on asset performance, service levels, investment timing and adaptive pathways.

Community adaptation planning is broader and more participatory, supporting communities, iwi, partners and stakeholders to understand risk, consider acceptable levels of risk, and identify options and pathways for managing that risk over time.

Both are important for the council, as they are closely connected and need to inform one another. The risk tolerance thresholds of communities will inform the service levels for specific assets and infrastructure. The council's own asset planning and management processes may also identify the need for a more comprehensive community adaption project. The performance of specific assets and infrastructure will inform thresholds for community adaptation planning. The adaptation pathways developed in community adaptation projects will inform our own planning.

For some of the council's assets and services, such as our flood and drainage infrastructure and our public transportation services, adaptation planning must be both technical and community-focused. They provide services to specific communities and landowners, based on agreed levels of service. Future decisions about them will directly affect community risk, costs and adaptation choices.

Appendix 2 – Principles for working with partners on community adaptation planning

Regional infrastructure and adaptation pipeline: The council will seek to work with territorial authority partners to develop a pipeline of risk-informed flood management projects and community adaptation projects. This pipeline would:

- be a key tool to support both regional council and territorial authority resource and investment planning
- integrate the timing of community adaptation planning projects with the timing of flood infrastructure projects (capital, maintenance, nature-based)
- signal ongoing resourcing needs for the monitoring and implementation of community adaptation plans
- deliver clearer sequencing and better partner alignment.

Risk-based involvement: The council values its partnership with territorial authorities. However, due to resource constraints, the council cannot be involved in every adaptation project. Our involvement will be determined by the Regional Risk-based Analysis Process for Prioritisation and the identification of priority locations for adaptation planning in spatial plans. Where the council is able, it will provide resilience leadership, technical, and political and project governance support to agreed community adaptation planning projects.

Involvement in early planning: The council will seek to be involved in community adaptation planning with external partners and stakeholders from the very outset. The council's experience across multiple adaptation projects, combined with its data, technical expertise, regional functions and understanding of flood protection policy settings, rating mechanisms and funding, provides a critical foundation for shaping the scope, priorities and approach of community adaptation planning.

Advocacy: As community adaptation projects are scoped and planned, the council will advocate for key local and regional considerations to be incorporated. These include:

- the development of options for intervention, which will be integrated whole-of-catchment, whole-of-region solutions
- using multi-criteria decision-making frameworks to ensure system-wide intergenerational implications are addressed in option development and decisions
- consideration of iwi perspectives and interests, and inclusion of te ao Māori and Mātauranga Māori perspectives and lived experience in the risk assessment and optioneering
- inclusion of iwi, CDEM and critical infrastructure providers as key strategic partners in the project
- consideration of environmental risks and opportunities, which are often more difficult to quantify
- opportunities for non-climate hazard risk reduction activities to be incorporated to increase resilience to all hazards
- seeking to integrate project community engagement with existing community events to increase participation and reduce engagement-fatigue.

Clear definition of roles and responsibilities: The council will ensure a clear understanding of roles and the extent of commitment is agreed.

Data and knowledge: The council holds and will make available key data and knowledge that is necessary to inform community adaptation planning, including hazard data such as drought, erosion, landslip, seismic, tsunami and liquefaction and modelling for flood and coastal inundation, water quality and availability, flood risk management and groundwater. Key data requirements should be determined early to ensure enough time to develop/source/check hazard and element data prior to commencing the risk assessment.

Regional functions integral to enduring future-proofed solutions: Regional functions such as flood and drainage infrastructure, catchment management, soil conservation, water quantity and quality and biodiversity are all integral to developing future-proof options for community adaptation planning. Experts for these work areas need to be closely involved in both early planning and scoping of a community adaptation project, risk assessment and the development and assessment of suitable options for community adaptation plans.

Agreement in writing:

The council's input into adaptation planning process will be agreed and formalised in writing at the outset of projects and approved via appropriate governance forums. This should consider:

- councillor representation on political governance arrangements
  - *the constituent Waikato Regional Council councillors of the relevant community will be the first preference for governance appointment requests*
- the council's staff representation in project governance
- the council's staff representation on technical advisory groups
- roles and responsibilities at each stage of a community adaptation project, including:
  - *implementation of agreed adaptation plan outcomes that require a council service or further support*
  - *ongoing monitoring and review of the community adaptation plan*
- nature and detail of technical support
- proposed funding arrangements for the project itself and potential interventions.

Funding of interventions:

- The council will advocate for
  - *options for intervention to include indicative costs to guide conversations*
  - *funding options and impacts on rates to be outlined early to assist communities to understand the cost implications of adaptation pathways.*
- The council's participation in a community adaptation planning process does not indicate an agreement or a commitment to fund interventions.
- The funding of options and interventions will:
  - *need to travel through additional funding processes, such as council LTP processes or seek external funding*
  - *include consideration of whether targeted and/or general rates will apply, where a discussion on option beneficiaries will be well canvassed.*

Appendix 3 – Considerations for reform

Consideration for reform include the following.

1. Ensuring spatial and land use plans:
    a. account for future risk of existing development
    b. identify areas of likely future natural hazards and extents
    c. allow for changing hazard and risk data rather than static maps
    d. have robust mechanisms for managing uncertainty
    e. set policies and objectives to prompt consideration of *all* natural hazards, not only hazards which are specifically referenced in the plan. See for example the approach taken by the Rotorua Lakes Council in its District Plan Change 8 - Natural Hazards | Participate Rotorua Lakes Council
    f. incorporate the integrating role of the current Regional Policy Statement.
2. Preparing the data required to inform spatial and land use planning.
3. Management and quality control of natural hazard data.
4. Designing systems, structures and processes to ensure land use planners are aware of the activities of asset management and capital planning, and vice versa.
5. Appropriate governance, institutional and decision-making arrangements, recognising the systemic nature and complexity of climate change and the cross boundary nature of hazards.
6. The interaction between community adaptation planning and the development of spatial and land use plans, and how community adaptation plans are implemented via other local government processes.
7. Where key opportunities for community engagement and consultation about regional risk management are likely to occur in the new system, noting that:
    a. community engagement is intended to occur primarily during the development of spatial and land use plans, where strategic choices about growth, infrastructure, and environmental limits are made
    b. in local areas, community input will be through adaptation plans
    c. public input into consent applications is expected to be limited to more significant developments.
8. If not provided through the planning system reforms, the development of regional policy on setting risk tolerance and risk thresholds for land use.

Glossary

Adaptation planning	The broad process of deciding how to adjust to changing natural hazard and climate risks over time.
Natural hazard risk reduction	The concept and practice of reducing existing natural hazard risk, avoiding or minimising future risk, and managing residual risk. It can be achieved by reducing one or more of the key components of risk: hazard, exposure, and/or vulnerability.
Nature based solutions (NbS)	Solutions that are inspired and supported by nature, cost-effective, and simultaneously provide environmental, social and economic benefits and help build resilience.
Residual risk	Describes the part of the risk that remains after efforts have been made to reduce it. It describes the level of risk that remains after efforts to address the risk.
Resilience	Resilience has become a commonly used term and can mean different things in different contexts. For the purposes of developing the WRF, we have adapted the *Resilient Cities Network* definition of urban resilience: *"Resilience is the capacity of a region/district/city/community's systems, businesses, institutions, communities, and individuals to survive, adapt, and thrive, no matter what chronic stresses and acute shocks they experience."* – What is Urban Resilience? Resilient Cities Network This is generally consistent with the definition of resilience used in New Zealand's National Disaster Resilience Framework, as shown below, which is more disaster/event focused. *"Resilience is the ability to anticipate and resist the effects of a disruptive event, minimise adverse impacts, respond effectively post-event, maintain or recover functionality, and adapt in a way that allows for learning and thriving."* – National Disaster Resilience Framework

Acronyms

Acronym	Definition
AI	Artificial intelligence
CCRA	Climate Change Response Act 2002
CDEM	Civil Defence and Emergency Management
DAPP	Dynamic Adaptive Policy Pathways
DMDU	Decision Making under Deep Uncertainty
GOA	Group of activities
HAZ-M1	Waikato Regional Policy Statement hazards method 1: Risk management framework
HAZ-M5	Waikato Regional Policy Statement hazards method 5: Information, education and advocacy
ISO	International Organization for Standardization
LIM	Land Information Memorandum
LTP	Long Term Plan
NbS	Nature-based solutions
NCCRA	National Climate Change Risk Assessment
NIWA	National Institute of Water and Atmospheric Research
PARA	Protect, Avoid, Relocate/retreat, Accommodate
RPS	Regional Policy Statement
RRAPP	Regional Risk-based Analysis Process for Prioritisation
STATs	Signals, triggers and thresholds
WRF	Waikato Resilience Framework

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Waikato
REGIONAL COUNCIL
Te Kaunihera ā Rohe o Waikato

He taiao mauriora **Healthy environment**

He hapori hihiri **Vibrant communities**

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