He Pou a Rangi
Climate Change Commission

Summary of method

for the 2026 National Climate Change Risk Assessment for Aotearoa New Zealand

April 2026

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http://climatecommission.govt.nz/nccra-2026

Contents

1. Introduction

The National Climate Change Risk Assessment assesses the current and future risks Aotearoa New Zealand faces from climate change and advises the Government on the most significant risks. The ultimate purpose is to inform the national adaptation plan, identifying which risks to focus on at the national level to make the biggest difference. The assessment is broad and wide-ranging, as it needs to consider the full national picture. Because of that, it is qualitative in nature, underpinned by a mix of qualitative and quantitative evidence from many sources. It uses expert judgement from the Commission and others to interpret that evidence and draw conclusions.

This document provides a comprehensive summary of the method used by He Pou a Rangi Climate Change Commission (the Commission) to carry out Aotearoa New Zealand's second national risk assessment. It sets out:

- how the method was developed, including statutory requirements, lessons learned from the first assessment in 2020, and how te ao Māori was considered and integrated
- how the assessment was carried out, including how risks were identified, how evidence was analysed, how risks were assessed and scored, and how the most significant risks were identified
- other relevant matters, including the role of independent experts, use of commissioned evidence, and key limitations and clarifications.

It is intended as a companion to the Full assessment report and the Priorities for action report, for those with an interest in the Commission's detailed approach and specific assessment methods.

2. Developing the method

2.1 Statutory requirements

The Commission must consider the following statutory requirements when preparing a national risk assessment:

- Under section 5ZQ of the Climate Change Response Act (the Act), the Commission must prepare a national climate change risk assessment, no later than six years after the date on which the most recent assessment was made publicly available (3 August 2020)
- Under section 5ZP of the Act, the risk assessment must:
  a) assess the risks to Aotearoa New Zealand's economy, society, environment, and ecology from the current and future effects of climate change; and

b) identify the most significant risks to Aotearoa New Zealand, based on the nature of the risks, their severity, and the need for coordinated steps to respond to those risks in the next six-year period.

- Under section 5ZQ, the Commission must take into account:
  a) economic, social, health, environmental, ecological and cultural effects of climate change
  b) the distribution of the effects of climate change across society, taking particular account of vulnerable groups or sectors
  c) Aotearoa New Zealand's relevant obligations under international agreements
  d) how the assessment aligns or links with any other relevant national risk assessments produced by central government entities
  e) current effects and likely future effects of climate change
  f) any information received as a result of requests made under section 5ZW
  g) scientific and technical advice.
- Under section 5ZQ, the Commission may take into account:
  a) opportunities arising for Aotearoa New Zealand's economy, society, and environment as a result of the effects of climate change
  b) any other factor it thinks is relevant or appropriate.
- The Commission is also required to consider the matters in section 5M, where relevant:
  a) current available scientific knowledge
  b) existing technology and anticipated technological developments, including the costs and benefits of early adoption of these in Aotearoa New Zealand
  c) the likely economic effects
  d) social, cultural, environmental, and ecological circumstances, including differences between sectors and regions
  e) the distribution of benefits, costs, and risks between generations
  f) the Crown-Māori relationship, te ao Māori (as defined in section 5H(2)) and specific effects on iwi and Māori
  g) responses to climate change taken or planned by parties to the Paris Agreement or Convention.

2.2 Building on the first risk assessment

While this is the second national risk assessment for Aotearoa New Zealand, it is the first prepared by the Commission. The first was developed by the Ministry for the Environment (MfE) in 2020.[1]

Before starting work on the second assessment, the Commission carried out a 'lessons learned' exercise with key stakeholders and experts involved in the first. The Commission also spoke with international experts and reviewed climate risk assessments from other

jurisdictions to understand current best practice. Based in part on this exercise, the Commission refined some risks, consolidated others and added new risks and risk domains. The Commission also adjusted aspects of the assessment methodology to respond to emerging evidence and practice, embed lessons learned and reflect the Commission's role and functions.

Key themes to come out of the lessons learned exercise and key adjustments made by the Commission in response are summarised in Table 2.2.1.

Table 2.2.1: Key themes from lessons learned with key adjustments

Lessons learned from the first assessment	Key adjustments for the second
Te ao Māori: There was general agreement in the feedback that matters related to iwi/Māori were not sufficiently considered or integrated in the first assessment. An early intention to include a specific te ao Māori domain did not eventuate. Some iwi/Māori content was included but there was a shared view among Māori experts and those who worked on the assessment that this was insufficient. In response, researchers from Manaaki Whenua Landcare Research and Ngā Pae o te Māramatanga Māori Centre of Research Excellence completed an independent kaupapa Māori climate risk assessment, *Huringa Āhuarangi, Huringa Oranga* in 2021.[2]	**Enhanced consideration and integration**: The second assessment includes a dedicated te ao Māori domain with seven specific risks. The same researchers at Manaaki Whenua Landcare Research (now part of the new Bioeconomy Science Institute) and Ngā Pae o te Māramatanga were contracted to independently complete analysis for this domain. These researchers also worked with the Commission to support greater integration and consideration of iwi/Māori in the other domains. Engagement with Māori was also enhanced as part of the Commission's dedicated iwi/Māori engagement strategy. These actions have strengthened the assessment and helped to address the Commission's responsibility under section 5M(f) to consider te ao Māori and specific effects on iwi and Māori.
Prioritisation: Feedback in the lessons learned exercise acknowledged that the prioritisation of risks could have been stronger. Tight timeframes and the fact that it was the first assessment meant more time was spent on evidence gathering and understanding the risk (hazard, exposure, sensitivity and adaptive capacity), and less time prioritising between risks and considering current and planned adaptation actions for responding to the risk. Spending sufficient time on prioritisation and developing strong prioritisation criteria were also strong themes from review of international best practice.	**More time on assessment and prioritisation:** In response to this observation, the Commission spent less time in the risk identification phase by using the risks from the first assessment as a starting point, and making adjustments to their names, descriptions and scopes. This allowed the Commission to spend more time assessing and prioritising the risks for their severity, policy readiness (which considered current and planned adaptation actions), and cascading and indirect impacts.

Domains: There was consensus that the risk domains used in the first assessment generally worked to organise and categorise risks, but feedback noted the importance of retaining a holistic and systems view. It was noted that risks to primary industries did not sit naturally with others in the Economy domain and may have been better placed in a natural environment, land or primary industries domain in recognition of their high reliance on the natural environment. As noted above, there was also no specific te ao Māori domain, despite an early intention to include one.	**Two new domains:** The Commission retained the domains from the first risk assessment, but renamed the Human domain as People, health and communities and split the Economy domain into two: Economy and finance, and Sectors relying on the natural environment. A new domain was also added: Ngā mea hirahira o te ao Māori (things of importance in the Māori world). The Commission considered these adjustments were useful to ensure the full range of risks were identified and assessed appropriately.
Risk breakdown: Care was taken in the first assessment to ensure there were a similar number of risks in each domain. However, feedback noted that aiming for equivalency in numbers meant some risks were too broad and the content was less useful; the level at which the risks are set is important.	**Amendments to risk list:** The Commission made amendments to the list of risks from the first assessment, aggregating some and disaggregating others. Rather than aiming for a similar number of risks in each domain, the aim was a similar level of granularity across the list of risks.
Framing of risk statements: A key aspect of international review and discussion was how to frame the risk statements. There are multiple options, including element-based framing and hazard-based framing, which have different advantages. The consensus from these conversations favoured element-based framing.	**Maintain element-based framing:** In line with international best practice, the Commission made the decision to maintain element-based framing in the risk statements (i.e. Risk to [element] from [relevant climate hazards]) to make the risk assessment more useful for decision-makers.
Engagement and expert judgements: Feedback noted that the first assessment could have placed more emphasis on engagement. Timeframes were tight, making genuine engagement challenging, while the workshops that were held could have been better designed. It was noted that few outputs from these were used in the final risk assessment. Iwi/Māori engagement was not adequate due to the lack of time and capability. Further, it was noted (and supported by international best practice) that expert advice was needed to make judgements in the face of a lack of information to ensure that a risk is not deprioritised simply for that reason. While experts were engaged to assist, one for each domain was not sufficient. Some of these experts ended up informally testing their conclusions with others.	**Enhanced engagement and expert review process**: The Commission made enhancements to the engagement and expert review process which included: • an iwi/Māori engagement approach focused on building longer-term relationships across te ao Māori, with the aim of exploring a cohesive engagement approach alongside iwi/Māori • a call for evidence to transparently gather evidence more efficiently and from a wider audience • targeted engagement with key stakeholders for each domain during the evidence gathering and analysis phase • expert review groups for each domain to first review the evidence base and later test the Commission's assessment and prioritisation conclusions.

In addition to these adjustments, the Commission focused on building and iterating from the first risk assessment in two additional areas: greater consideration of **indirect and cascading risks** and applying a more direct **policy readiness** assessment approach.

Indirect and cascading risks

Most climate risks play out in cascades: one risk triggers another in a chain of cause and effect through space and time. This means that actions to address one risk can also help to address others. Efforts were made in the first risk assessment to identify potential risk cascades, but these did not inform the prioritisation of risks. Factoring cascading risks into risk assessment methodology is a challenge faced in many jurisdictions internationally.

When developing the method for the 2026 assessment, the Commission sought to factor indirect and cascading relationships between climate risks into the prioritisation of risks as much as possible. This should help to ensure policies, plans, and actions taken in response to the assessment result in well-targeted adaptation. The Commission explored multiple avenues to do this, settling on a bespoke methodology for this purpose. See *3.3 Assessing and scoring risks* for more on how indirect and cascading impacts were assessed.

Policy readiness

The first national assessment in 2020 used a decision urgency rating method adapted from the 2017 United Kingdom Climate Change Risk Assessment to indicate "the degree to which further action is needed in the next five years to reduce a risk or realise an opportunity from climate change".[3] To generate this rating, experts used qualitative judgement to issue a score out of 100 reflecting the perceived need for different categories of response to each risk.

The 2026 assessment has considered the need for action through a 'policy readiness' rather than an urgency lens, to reflect the Commission's mandate and the fact that a national adaptation plan has been in place since 2022. A set of assessment criteria were used for this purpose rather than a numerical score, to reflect the qualitative nature of the judgement. Each risk was given an overall policy readiness score from "minor gaps" in readiness to "insufficient" readiness. This mirrors the Commission's assessment approach for the first national adaptation plan progress report in 2024. See *3.3 Assessing and scoring risks* for more on how policy readiness was assessed.

2.3 Commissioning independent Māori climate risk expertise

The Commission sought to strengthen consideration of te ao Māori in the assessment by including a new domain analysing seven specific risks to iwi/Māori. The domain name Ngā mea hirahira o te ao Māori translates to 'things of importance in the Māori world'. The

Commission also aimed to improve the integration of consideration of iwi/Māori in the analysis of all risks in the assessment.

Researchers from Manaaki Whenua and Ngā Pae o te Māramatanga who completed the independent Māori climate risk assessment in 2021 were contracted to carry out the analysis for Ngā mea hirahira o te ao Māori. This independent assessment involved reviewing recent evidence since 2021 and aligning findings with the Commission's risk assessment framework. It is published in full alongside the Commission's final risk assessment and can be read as a standalone Māori climate risk assessment. The Commission accepts its findings, which are reflected in the conclusions of the risk assessment.

Commission staff also worked closely with the researchers leading the analysis in Ngā mea hirahira o te ao Māori to integrate stronger consideration of iwi/Māori into the assessment of risks in the other six domains. This involved:

- including specific sections in the templates used to gather evidence and assess all risks to capture impacts and considerations for iwi/Māori (see *Appendix 2: Risk assessment template*)
- embedding consideration of iwi/Māori into the assessment criteria used to score the risks for their severity and policy readiness (see *Appendix 3: Risk severity assessment criteria* and *Appendix 4: Policy readiness assessment criteria*)
- testing emerging findings from the assessment of all domains with researchers leading the Ngā mea hirahira o te ao Māori analysis, and vice versa.

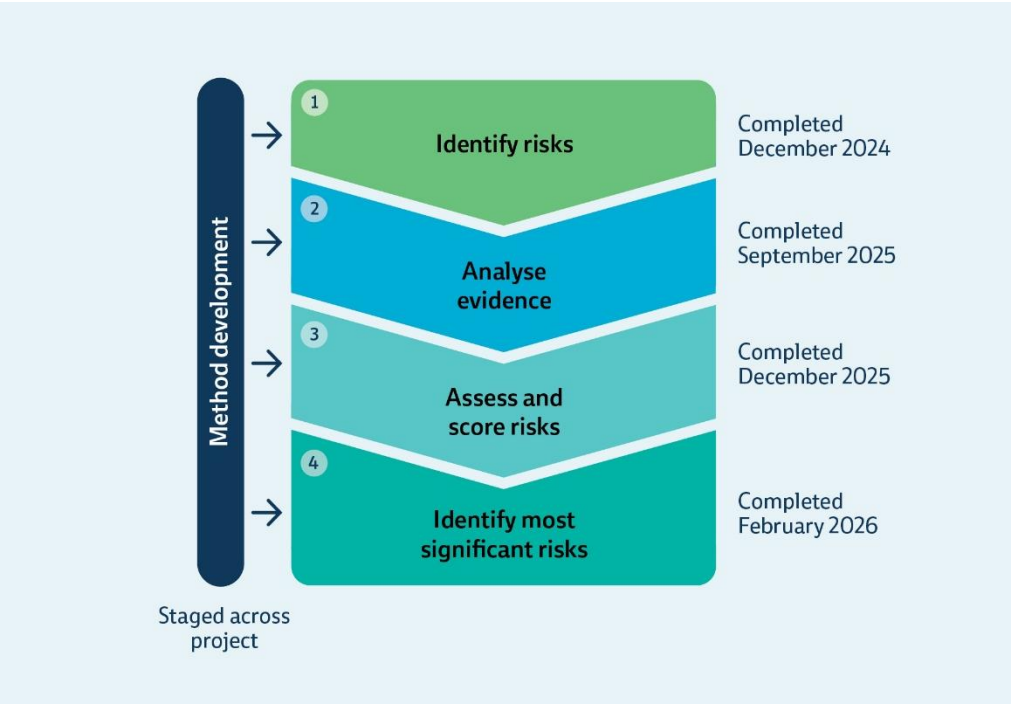
When it came to identifying the most significant risks, the Commission drew from both sets of analysis and tested its approach to identifying te ao Māori risks with the research team leading on Ngā mea hirahira o te ao Māori and the Commission's Pou Herenga (Māori Advisory Board).

3. Carrying out the assessment

Carrying out the risk assessment involved four key steps:

- **Identify risks** to be assessed across seven interconnected domains.
- **Analyse available evidence** on the nature and severity of each risk, and on the adequacy of current and planned policies, practices and actions to address those risks.
- **Assess and score risks** for their severity, policy readiness, and potential indirect and cascading impacts.
- **Generate a list of the most significant risks** for the Government's attention, drawing on the analysis of evidence and all three scoring methods.

Figure 3.1: Carrying out the assessment



Source: Commission analysis

3.1 Risk identification

To identify the list of risks for the 2026 assessment, the Commission used the first national assessment in 2020 as a starting point and made amendments, rather than starting from scratch. Amendments were informed by international examples (such as the United Kingdom (UK)[4] and European Union's (EU)[5] most recent risk assessments), as well as by targeted engagement and testing with experts. Changes were primarily made to ensure a similar level of granularity across all the risks. Some risks that were more specific were aggregated up (particularly in the Natural environment domain) and some others that were framed more broadly were disaggregated to ensure their component parts received enough focus (particularly the risks in the Sectors relying on the natural environment domain).

Seven new risks were created in the Ngā mea hirahira o te ao Māori domain. These were consistent with the risks identified in the independent kaupapa Māori risk assessment undertaken by researchers from Manaaki Whenua Landcare Research and Ngā Pae o te Māramatanga in 2021.

Table 3.1.1: Elements at risk analysed in each domain of the assessment

Domain	Elements at risk analysed
Natural environment	• Risks to coastal ecosystems • Risks to freshwater ecosystems • Risks to marine ecosystems • Risks to terrestrial ecosystems • Risks to indigenous biodiversity (from invasive species and pathogens)
Built environment	• Risks to water infrastructure • Risks to buildings • Risks to waste management infrastructure • Risks to ports and airports • Risks to road and rail networks • Risks to electricity and telecommunications infrastructure • Risks to electricity supply
Economy and finance	• Risks to central and local government funding • Risks to the stability of the financial system • Risks to the insurability of assets • Risks to businesses and public organisations (from supply and distribution disruptions)
People, health and communities	• Risks to social cohesion and wellbeing (from displacement) • Risks to physical health • Risks to mental health • Risks to the ability of the emergency management system to respond • Risks to social infrastructure and community services
Sectors relying on the natural environment	• Risks to pastoral agriculture • Risks to horticulture • Risks to forestry • Risks to tourism • Risks to fisheries
Governance	• Risks to enduring adaptation governance • Risks to effective adaptation implementation • Risks to the legitimacy of democratic institutions (from contested climate decision-making) • Risks to the ability to uphold Te Tiriti o Waitangi/The Treaty of Waitangi in adaptation governance and implementation
Ngā mea hirahira o te ao Māori	• Risks of loss of access to taonga species • Risks of damage to Māori infrastructure • Risks of economic losses for Māori in primary industries • Risks of disruption to tikanga and hapū/iwi identity • Risks of loss of indigenous knowledge systems • Risks of legal exclusion and governance failures for Māori • Risks of increased Māori health vulnerabilities

See *Appendix 1: List of risks and how they have changed since the first assessment in 2020* for a full list of risks analysed in this assessment and how they have changed since the first.

3.2 Analysing available evidence

Risk analysis templates

A standard template was used to gather and analyse available evidence for each risk. This informed assessment and prioritisation, and ensured risks were assessed consistently across domains. The key information in each template was later summarised for publication.

In developing the template, the Commission considered the key components that drive climate risk and elements that increase or reduce risk, drawing on international examples (the UK, EU and Australian risk assessments in particular) as well as the first risk assessment.

The template was divided into two main sections: risk severity and policy readiness (see *Appendix 2: Risk assessment template*). Each template was completed by an analytical staff member from the Commission between March and August 2025.

Part one: Risk severity

Climate change risk is defined by the Intergovernmental Panel on Climate Change (IPCC) as the potential for adverse consequences for human or ecological systems arising from a combination of hazards (the physical elements of climate change that create problems, such as sea level rise or increased precipitation), exposure (whether the hazard reaches people, places or things) and vulnerability (factors that determine how those people, places or things are affected, including their sensitivity to change and ability to adapt).[6]

The risk severity section of the template asked analysts to review and analyse evidence about the potential consequences of each risk in the present day, for the middle of the century (around 2050), and for the end of the century (around 2090), and to identify and consider the likely consequences of each risk under a low climate impact scenario and a high climate impact scenario. Analysts were advised to consider, as much as possible, sources of evidence that aligned with global warming of 1.5–2.0°C by 2050 and 2°C (low climate impact scenario) and 3–3.5°C (high climate impact scenario) by the end of the century.

Analysts were also advised that evidence that did not correspond exactly to those timeframes and scenarios could still be considered. The important task was to gather information that corresponded to both a low and a high climate impact scenario for each risk at different time periods.

Box 3.2.1: Why these scenarios were chosen

Scenarios are used to explore what the future might look like – they are not predictions. They can be used to assess the potential future impacts of climate change and to inform risk assessments and adaptation decision-making. The use of a low and a high climate impact scenario to assess risks from climate change is in line with international best practice and the approaches used by other countries when carrying out national climate change risk assessments. Assessing the impacts associated with a low and high scenario

allows us to understand the full extent of possible climate risk and how it could impact Aotearoa New Zealand.

It is important in risk assessments to consider the potential consequences of events that may have a low probability of occurring, but high consequences if they do. In some cases, higher emissions scenarios can provide helpful insights about such low probability, high consequence events. A high emissions scenario such as RCP8.5 or SSP5-8.5 may not represent a plausible emissions scenario compared to the world's current trajectory, but can provide valuable information on less well understood features of the climate system such as thresholds, tipping points and positive feedback loops.

The Commission did not use RCP8.5 or SSP5-8.5 as the high climate impact scenario in this assessment, but, because this is a qualitative assessment, it was possible to separately consider tipping points, thresholds and other factors that may lead to low probability, high consequence events when assessing the severity of each risk.

The assessment also considered climate attribution information where it was available (i.e. how actual climate change to date is affecting climate hazards and contributing to risk severity). How climate change affects each risk is best seen in how climate change affects hazards, and how this affects the relative risk severity score under different timeframes and scenarios. Climate attribution science is a new and fast evolving area and was not a systematic part of the risk assessment.

The risk severity section of each template was used to gather evidence about hazards, exposure and vulnerability (including sensitivity and adaptive capacity) for each risk, both for the present day and for each of the time periods and scenarios mentioned above. The templates were also used to capture information relating to:

- whether the risk has significant impacts for iwi/Māori
- how the risk compounds or cascades (or how it is influenced by other risks)
- any socioeconomic trends that may exacerbate the risk
- climate thresholds and/or other tipping points that may exacerbate the risk
- possible interactions with climate mitigation actions
- any notable regional differences in exposure, sensitivity or adaptive capacity to the risk
- data gaps
- the strength, quality and quantity of available evidence, and the level of agreement within that evidence.

Part two: Policy readiness

This section of the template asked analysts to assess the degree to which existing and planned adaptation actions will contribute to addressing the risk. It considered:

- the policies, plans, and actions that are currently in place to support adaptation to the risk (particularly those that have occurred since the first risk assessment was published in 2020)
- what other policies, plans, and actions could be taken to address the risk
- whether the policies, plans and actions that are currently in place appropriately consider the specific effects on iwi/Māori
- barriers to adaptation action to address the risk
- the policy horizon associated with the risk – namely if there is potential lock-in of risks or loss of opportunities in the next six years, and whether addressing the risk requires long lead times (where action would need to start early)
- whether the current adaptation policies and actions are sufficient to address the risk, and, if not, what is the shortfall between the action that is needed to address the risk and the action that is actually occurring
- benefits to further action in the next six years
- data gaps.

Once completed, the templates were externally reviewed by independent expert review groups for each domain. This took place in August 2025. See *4.1 Expert review* for more information.

Sources of evidence

To populate the templates, analysts incorporated evidence obtained from several streams:

- information shared through a formal Call for Evidence
- desktop research
- engagement with academics and researchers, central and local government officials, the private sector, iwi/Māori, and others
- case studies and regional engagement
- externally commissioned evidence (see *4.2 Use of commissioned evidence*).

Call for Evidence

The Commission put out a formal Call for Evidence between 28 November 2024 and 31 March 2025 inviting anyone to submit material the Commission should consider when carrying out the risk assessment. Information obtained through the Call for Evidence was tagged against the various risks and considered by analysts when filling out the templates for each risk. The Commission also held three well-attended webinars – one for researchers and academics, one for local government, communities and non-governmental organisations, and one for iwi/Māori – and encouraged attendees to submit material through the Call for Evidence.

Desktop research

Desktop research was largely limited to evidence that is in the public domain, as the Commission does not full have access to academic databases. Evidence behind a paywall was considered if provided by the submitter through the Call for Evidence.

Targeted engagement

Within each of the domains, analysts identified key organisations and individuals it would be useful to engage with and mapped these stakeholders to each of the risks. Analysts then carried out meetings with the identified stakeholders in the first half of 2025. Information shared during these meetings fed into the analysis of risks. Approximately 50–60 engagements were carried out across the six domains the Commission analysed.

Case studies

The Commission uses case studies to better understand how climate change affects Aotearoa New Zealand and how communities are responding. Hearing directly from affected communities is particularly important for understanding climate risks and adaptation, since climate hazards play out differently in different areas, and responses from communities, councils and industries vary widely.

The Commission has undertaken four case studies to date. Two in 2024 – of Wairoa and South Dunedin – informed the first assessment of progress made on the Government's national adaptation plan. In 2025 the Commission visited the region of Te Taitokerau/ Northland and the town of Westport. The Te Taitokerau/Northland case study was published as a standalone report in November 2025, and the Westport case study will be published in 2026. All four case studies generated insights that have informed the risk assessment and will also inform the next adaptation progress assessment to be published in 2026.

3.3 Assessing and scoring risks

After the completion of the risk analysis templates, the next stage was to assess and score the risks. This took place between July and September 2025. There were three main components to this stage, with risks being separately assessed three different times based on:

- risk severity
- policy readiness
- indirect and cascading risks and impacts.

Assessment of risk severity

To assess risk severity, the first step was to produce a set of criteria that would be used to score each of the risks. The magnitude of consequence criteria used in the first assessment were used as a starting point, as well as criteria used in international climate risk

assessments (particularly the EU and the UK assessments). Overarching criteria were produced for four risk severity levels – Minor, Moderate, Major and Extreme – as well as domain-specific guidance to aid the assessment of the risks in each of the different domains. The criteria and guidance are included in *Appendix 3: Risk severity assessment criteria*.

Once the criteria were finalised, each of the risk template authors completed a preliminary assessment of the severity of their risk four times: for the present day, for 2050, and twice for 2090 (under both a low and a high climate impact scenario).[i]

Our scores for 2050 assume global warming of 1.5–2.0°C by the middle of the century – consistent with the 1.4°C of warming the world has already experienced from pre-industrial levels.[77]

When scoring the severity of risks in 2090, we considered two scenarios for different levels of global warming (as compared to pre-industrial levels) based on the latest international climate science:

- low climate impact scenario based on global warming of 2.0°C by 2090
- high climate impact scenario based on global warming of 3.0–3.5°C by 2090.

Next, internal workshops were held for each of the domains. Template authors shared draft scores and rationale with the wider analytical team working on the assessment and a set of scores was discussed and agreed by consensus. When agreement could not be reached, this was noted for later moderation by a smaller group. Some scores were adjusted following moderation.

Assessment of policy readiness

A similar process was carried out to assess policy readiness for each risk. First, scoring criteria and guidance on its application were developed to assess the overall policy readiness of each risk against four levels – No Significant gaps, Moderate gaps, Significant gaps, and Insufficient readiness. Although there was no assessment of policy readiness in the first assessment, the team drew on international examples as well as previous monitoring work carried out by the Commission (for example, the Progress Report on the National Adaptation Plan)[8] to develop the criteria (included in *Appendix 4: Policy readiness assessment criteria*).

Again, each template author completed a preliminary assessment of policy readiness for their risk, this time for three categories – policy coverage, readiness to implement/deliver,

[i] While we assessed risks using two climate impact scenarios (based on different levels of global warming), risks were scored only once for 2050. This was because the difference in projected impacts between a low and high climate impact scenario by then is unlikely to be large enough to produce different scores. Scoring the risks only once for 2050 is in keeping with recent climate risk assessment practice, for example the 2024 European Climate Risk Assessment.

and shortfall – as well as an overall readiness score. Workshops followed for each domain where template authors shared draft scores and rationale, and the group agreed scores by consensus. In cases where agreement could not be reached for a particular score, this was noted for later moderation by a smaller group. Some scores were adjusted following moderation.

Assessment of indirect and cascading risks and impacts

To assess how the risks in the assessment interact with each other, and how potential adaptation actions taken to address one risk may affect others, analysts compared each risk with every other risk, considering how addressing it might mitigate another risk and how addressing another risk might mitigate it. The guidance provided to analysts to undertake this task is provided in *Appendix 5: Instructions for scoring indirect and cascading risks*.

Analysts were asked to score each connection by assessing the extent to which fully addressing one risk might also help to address another. A scoring criterion of 0–3 was used to consider risks in pairs. A score of zero meant fully addressing one risk would have no or insignificant influence on the other, while a score of three meant fully mitigating one risk would result in a major reduction in the other.

For each score, analysts recorded a rationale. Because the assessment was conducted in both directions, two scores and rationales were generated per risk. Once complete, a moderation panel normalised the scores. Moderation was focused on higher scores, and where there was a deviation between two scores. The analysts' rationale, along with moderators' understanding of the risk and criteria, was used to develop a final set of scores.

The final scores that appear in the assessment were developed by summing all individual scores greater than 1 and then grouping the risks by percentile into four groups. Risks with a low cascading risk score in the final assessment were in the bottom 50%, medium the next 25%, high the next 15%, and very high the top 10%.

Because the consideration of cascading risk is an emerging area of climate risk assessment, the Commission obtained an international expert review of this methodology (for more information, see *4.1: Expert review*).

3.4 Analytical methods for Ngā mea hirahira o te ao Māori domain

As with the risks in the other domains, the starting point for identifying the seven Māori-specific risks was the previous assessment, in this case the independent Māori climate risk assessment undertaken in 2021.[2] Six risks were retained from that assessment, and a seventh (risks of legal exclusion and governance failures – identified but not analysed in 2021) was added.

The methodology used to assess these risks for the second risk assessment drew on a qualitative content analysis approach, structured by the risk assessment framework being used by the Commission for the other domains. Each risk was assessed using the risk assessment's standardised template. The analysis to complete these templates followed a support-then-expand approach:

- An initial content analysis was reviewed and strengthened with evidence from additional sources. The primary evidence base for this consisted of peer-reviewed literature since 2021, Waitangi Tribunal submissions, iwi/hapū reports, policy documents and National Science Challenge outputs, particularly from Biological Heritage, Deep South Challenge, Resilience Challenge, Sustainable Seas, Building Better Homes Towns and Cities, and Our Land and Water.
- New content was added only where the original text lacked coverage of emerging issues or unique iwi/Māori perspectives.
- Statements were moderated to ensure accuracy, avoid overstatement, and maintain alignment with both the risk assessment's tone and kaupapa Māori values.

Researchers then applied the risk assessment's four-tier Risk Severity and Policy Readiness scoring scales to the risks in Ngā mea hirahira o te ao Māori domain (see *3.3: Assessing and scoring risks*). These ratings considered impacts on: decision-making, outcomes, and hapū/iwi priorities; the ability to recover within existing or reformed governance settings; the extent to which inequities (intra-Māori) are reinforced or reduced; the degree of exclusion or resourcing of iwi/Māori-led strategies; and the extent to which current policies, plans, and actions will address the risks to iwi/Māori. The analysis was reviewed by Māori reviewers with specialist expertise in each risk area (identified and recruited by Manaaki Whenua).

While the evidence base for analysis of climate change risks to iwi/Māori has increased since the first independent assessment in 2021, significant gaps remain that affect both the analysis of the seven risks in Ngā mea hirahira o te ao Māori domain, and the inclusion and consideration of iwi/Māori in the wider risk assessment. Key gaps in te ao Māori evidence base were elucidated in the full Ngā mea hirahira o te ao Māori report, available on our website.

3.5 Generating a list of the most significant risks

The final step was to draw from multiple analytical inputs – including all three scoring methods outlined above, as well as substantive risk analysis in all seven domains – to generate a list of the most significant risks requiring the most coordinated policy action. This took place between October and December 2025.

The following steps were taken to generate this list.

Step 1: screen the risks using three principles

- **Principle 1:** Risks with a present-day severity rating of at least 'major' and a policy readiness rating of at least 'significant gaps' could be considered significant. These risks present high potential for adverse consequences now, with little in place to address them, warranting immediate focus.
- **Principle 2:** Risks with a 2050 severity rating of at least 'major' and with a policy readiness rating of 'insufficient' could be considered significant. These risks will present high potential for adverse consequences by 2050, and because of the very low base of current readiness, significant lead time is required to prepare for them.
- **Principle 3:** Risks with a 2050 severity rating of at least 'major' and with a cascading risk score indicating that actions to address them have 'high' or 'very high' potential to address other risks could be considered significant. These risks will also present high potential for adverse consequences by 2050, and acting now provides an opportunity to get ahead of future impacts and address several risks at once.

Step 2: identify other potentially significant risks, taking into account:

- considerations such as equity or intergenerational impacts
- strategic decision points in the next six years
- where a risk was closely aligned with other risks already identified as significant.

Step 3: look for opportunities to combine risks, where:

- they were similar in scope
- they could be addressed by similar actions
- combining them would support explanation and action.

A draft list of most significant risks was produced following these steps.

4. Other matters

4.1 Expert review

Expert review groups for each domain

The Commission ran an open tender process in June 2025 seeking to contract six Expert review groups (one for each of the domains, except for Ngā mea hirahira o te ao Māori domain, for which expert review was procured directly by the researchers leading the analysis). Each group was made up of three to five members (see *Appendix 6: Expert review groups*). They were selected for their expertise related to the risks in the domain, ability to look across the whole domain and provide a broad view (including knowledge and understanding of relevant considerations for iwi/Māori), and experience of providing similar services.

The purpose of the groups' work was to test the Commission's analysis and prioritisation of the risks identified in the National Climate Change Risk Assessment. The members of each group individually reviewed risk templates focusing on their area of expertise (but had access to all risk templates for their domain). They were specifically asked to provide feedback on the following aspects:

- **Scope**: Does the assessment cover the most important sources of risk to the element or system being considered?
- **Evidence**: Are there other important sources of evidence that should be included in the assessment?
- **Assessment**: Does the assessment draw appropriate conclusions about the risk based on the evidence reviewed?
- **Assumptions**: Does the assessment make any implicit or explicit assumptions that should be reconsidered or nuanced?
- **Links**: Are the most important links between this risk and other risks identified appropriately?
- **Structure**: Does the way the assessment steps through the risk make sense, or are there alternative ways of organising the material?
- **Terminology**: Are there any critical terms for this domain that should be defined (and how), or key terms we are not using correctly?

The groups provided substantial and robust feedback on the risk templates in July and August 2025, which was then considered and incorporated as appropriate by risk template authors. After changes were made to all templates, the final templates were shared with the reviewers for visibility in October 2025 so they could see how their feedback had been incorporated.

The groups also reviewed draft scores for risk severity and policy readiness for each of the risks in their domain. Here, they were asked to provide comments on the draft scores and rationale and whether they made sense, as well as whether the scoring criteria had been applied consistently across the risks in each domain. This took place in September 2025. The scores of 10 risks were adjusted as a result.

International review

The Commission used the findings of international reviewers, Paul Watkiss (Director, Paul Watkiss and Associates, United Kingdom), Marc Zebisch (Head of Center for Climate Change and Transformation, Eurac Research, Italy) and Kevin Hennessy (Director, Climate Comms, Australia).

Paul Watkiss conducted an independent review of the method used by the Commission to inform the second risk assessment. He concluded that the method was detailed, thorough and improved the approach used for the first risk assessment. He identified opportunities

for refinement, for this assessment and for future assessments, including clarifying aspects of the risk scoring process, implicit levels of residual risk in the policy readiness assessment and incorporating considerations of urgency into the final prioritisation analysis.

Marc Zebisch conducted an independent review of the risk assessment's cascading risk methodology, as this is an emerging field with no globally established best practice framework yet in place. He determined that the methodology applied is robust and provides a clear structure for examining complex interdependencies. At the same time, he recommended strengthening the evaluation of cascading risk findings, particularly in relation to the prioritisation process and the key insights drawn from the wider assessment. This feedback was incorporated into the final risk assessment analysis and will be taken into account in future risk assessments.

Kevin Hennessy conducted an independent review of the risk assessment results and conclusions materials provided and found that they present a credible, defensible and coherent picture of Aotearoa New Zealand's most significant climate risks. He highlighted the comprehensive coverage across domains, regions, timeframes, emissions pathways and warming scenarios, and noted that the technical detail in the analysis templates and scoring spreadsheets, supported by expert review, adds robustness to the findings. His feedback focused on strengthening the quantification of risk severity, improving the organisation of risk summaries, and expanding consideration of the range of actors and cascading risks.

4.2 Use of commissioned evidence

The Commission has been working to build its adaptation evidence base over time. Several pieces of independent analysis were commissioned to support the Commission's wider adaptation work programme, including the risk assessment and the forthcoming second National Adaptation Plan Progress Assessment (also due in 2026). These contracts ran concurrently with the analysis for the risk assessment, which meant not all commissioned evidence fed directly into the analysis of individual risks.

Table 4.2.1 summarises each piece of commissioned evidence and highlights which aspects of the risk assessment it directly informed.

Table 4.2.1: Summary of commissioned evidence

Name	Description	Assessment of relevant individual risks	Establishing context
Impact of sea level rise on groundwater and pasture production in Aotearoa New Zealand	This report examines the likely impacts of a change in sea-level rise on groundwater to assess how grass growth on different types of agricultural land across Aotearoa New Zealand may be affected.	Yes	No

Farmers, growers and foresters' perspectives on the physical impacts of climate change	This research provided insight into the perspectives of farmers, growers and foresters on adaptation and resilience by developing customised questions for the rural decision-makers survey conducted by Manaaki Whenua Landcare Research.	Yes	No
Social Vulnerability Assessment	This report provides insights at the territorial authority level into who is most at risk from coastal flooding, both directly or through isolation, and looks across available census data to explore why they may have heightened social vulnerability.	Yes	Yes
National Climate Hazard Exposure Census	The exposure census built a large dataset of exposure to climate hazards, including coastal, inland groundwater, extreme rainfall, landslides and drought. For each hazard, the exposure census describes how it interacts with an element of exposure – population, buildings, and land cover – under different climate scenarios out to 2100 down to a territorial authority level.	No	Yes
The cascading risks of climate change in infrastructure and agriculture	This work focused on the examples of cascading risks from extreme rain and wind on infrastructure and from drought, with a particular focus on the agricultural sector. It was intended to help better visualise and understand how effects from these hazards cascade through a system.	No	Yes

4.3 Consideration of opportunities

Climate change may present opportunities as well as potential adverse consequences. For example, warmer average temperatures may prevent some winter deaths and illnesses. Such opportunities are rare, but important to factor into risk assessments and planned adaptation actions.

The first risk assessment in 2020 presented opportunities as distinct units of analysis. The Commission has not taken this approach in the second assessment. Instead, opportunities have been factored into the overall consideration of each sector/topic area. For example, the potential to take advantage of changing weather patterns in farming is included in the analysis of the pastoral agriculture and horticulture risks.

This approach recognises the complexity of human and ecological systems and the fact that even when climate change presents opportunities in some sectors or systems, it is likely to

also present risks in the same systems. Actions to harness opportunities should be informed by an understanding of these wider risks, and vice versa, to avoid unintended consequences or maladaptation.

4.4 Equity considerations

One of the factors the Commission must take into account in the risk assessment is how the effects of climate change are distributed across society. There are a range of circumstances and characteristics that can mean some people are more likely to experience harm from climate change than others, and less able to change their circumstances to cope. This uneven distribution of impacts is likely to worsen unless adaptation policies, plans and actions are designed to address them.

In the second risk assessment, the Commission initially included a specific equity risk in the People, health and communities domain. Three types of factors emerged that determine how climate change impacts are distributed and how adaptation actions can respond.

- **Distributional factors**: how fairly (or not) the impacts of climate change and benefits of adaptation are spread across society.
- **Procedural factors**: who is recognised and able to participate in decision-making about climate change and adaptation, and whose interests are reflected.
- **Systemic factors**: the underlying causes that sit behind these differences, such as lower incomes, poor housing, or health and disability challenges.

Instead of treating equity as a standalone risk, the Commission developed risk scoring criteria that could be used to embed a focus on equity and distributional factors into the evaluation of all the risks in the assessment.

4.5 Relevant international obligations and other domestic risk assessments

The Commission must take into account Aotearoa New Zealand's relevant obligations under international agreements and how the risk assessment aligns or links with any other relevant national risk assessments produced by central government entities. Commission staff undertook desk-based reviews to inform both these considerations.

The review supported the Commission's previous assessment that Aotearoa New Zealand has international obligations that require evidence of a planned approach to adaptation. This includes the commitments through the United Nations Framework Convention on Climate Change (UNFCCC) and the Sendai Framework for Disaster Risk Reduction. Aotearoa New Zealand is also a signatory to the Paris Agreement under the UNFCCC, which commits countries to take action on adaptation, and to track the progress of that action (Article 7).

The review of other national risk assessments produced by central government agencies identified seven relevant assessments and evaluated their alignment with the risk

assessment, including the National Risk and Resilience Framework[9] and the Natural Hazards Portal.[10] These assessments share common hazards such as severe weather, flooding, drought and wildfire, and highlight risks amplified by climate change. They also included many similar risks such as governance gaps, fiscal vulnerabilities, infrastructure risks and public perception of climate hazards, providing helpful context to the analysis of the risk assessment.

The results of both these reviews were discussed by the project team and considered qualitatively as part of the assessment and prioritisation of risks.

4.6 Different approaches to considering cascading risks

The team working on the risk assessment explored multiple angles to incorporate consideration of cascading risks, including:

- the completion of a risk analysis template for a specific cascading risk in the Built environment domain
- commissioning of causal loop diagrams to illustrate two particular cascades
- commissioning additional advice on cascading risk archetypes
- developing a method to factor indirect and cascading relationships between risks into the scoring and prioritisation of risks.

All these angles have been used in the write-up of the Full assessment report and the Priorities for action report.

4.7 Limitations

This sets out key methodological/evidence limitations to the risk assessment.

Gaps in data and evidence

Analysts identified and recorded key gaps in the evidence base for understanding both the severity and policy readiness of each risk as part of the evidence gathering and analysis phase of the assessment. There is generally a lack of consistently available quantitative adaptation evidence across the full range of risks and domains considered in this assessment. The Commission will use and share the information gathered about key gaps to encourage the development of a stronger evidence base in preparation for the next risk assessment in 2032.

Quantification of risk severity

Some climate risk assessments use quantitative metrics to ensure equivalency in risk severity scores between different risks, for example, specifying the number of buildings damaged, deaths, species affected, or percentage of GDP impacted at different severity levels from minor to extreme. While this was attempted in the first risk assessment in 2020, a lack of consistently available quantitative adaptation evidence across the full range of risks

in the assessment makes it challenging to support the use of metrics like this and still achieve equivalency.

There is also inherent subjectivity embedded in the selection of such measures, which involve decisions about how many deaths are equivalent to a percentage reduction in GDP, for example, or how many extinct or threatened species are equivalent to the loss of 100 buildings.

For this reason, the Commission developed consistent qualitative risk severity criteria across all domains for the 2026 assessment, with detailed guidance for how to apply them in each. While quantitative indicators were not formally assessed, quantitative evidence was documented where available and used as an input. This approach could be revisited in future assessments as the evidence base develops. Recent international assessments have used a mix of qualitative and quantitative criteria.

Cut-off dates

The analysis and scoring stages of the assessment took place in 2025. Risk assessment templates were completed by mid-year and reviewed by experts in July and August. Draft risk scores were reviewed by experts in September. Templates and scores were finalised by 31 October 2025. No new information influenced the analysis or scoring of individual risks after this date.

The Commission identified significant risks in late 2025 and entered the write-up and production phase of the assessment in early 2026. Inevitably, there were developments and announcements relevant to the risk assessment after the analytical cutoff date of 31 October 2025. Acknowledgement of such developments and their likely importance has been included in the write-up of the Full assessment report and the Priorities for action report where possible and appropriate, up to late February 2026, but has not influenced the risk scores.

4.8 Use of artificial intelligence

Researchers at Manaaki Whenua and Nga Ngā Pae o te Māramatanga used ChatGPT as a language support tool to increase analytical efficiency in the analysis of the seven risks in Ngā mea hirahira o te ao Māori domain. All ChatGPT generated content was reviewed, edited and approved by researchers with domain knowledge in climate adaptation, Māori governance and environmental risk. The tool was not used for evaluative judgements or policy recommendations but supported productivity, consistency and clarity.

The Commission made limited use of artificial intelligence (AI) tools in the other risk domains. Some analysts used AI tools to assist with compilation, streamlining and synthesis of information, as a referencing or search tool, or to summarise content. All AI generated or summarised content was reviewed, edited and approved by staff with relevant subject matter knowledge, and AI tools were not used to draft original material, draw analytical conclusions, generate risk scores or make evaluative judgements.

Appendix 1: List of risks and how they have changed since the first assessment in 2020

2020 short risk title	2026 equivalent	Changes made for 2026 assessment	Full risk statement for 2026 assessment
Natural environment domain			
Coastal ecosystems	Coastal ecosystems	Redefined risk statement.	Risks to coastal ecosystems due to progressive and ongoing changes in temperature and precipitation, sea-level rise, extreme weather events, and associated impacts like coastal flooding and erosion.
Indigenous ecosystems and species	Indigenous biodiversity (from invasive species and pathogens)	Redefined risk statement and merged aspects to form indigenous biodiversity risk.	Risks to indigenous biodiversity from the enhanced spread of invasive pests, weeds and pathogens due to progressive and ongoing changes in temperature and precipitation and extreme weather events.
Indigenous forest ecosystems			
Species dependent on New Zealand's offshore islands			
Riverine ecosystems and species	Freshwater ecosystems	Merged to form freshwater ecosystems risk.	Risks to freshwater ecosystems due to progressive and ongoing changes in temperature and precipitation, sea-level rise, extreme weather events, and associated impacts like erosion and groundwater contamination.
Wetland ecosystems and species			
Migratory and/or coastal and river-bed nesting birds			
Lake ecosystems			

Terrestrial, freshwater and marine ecosystems	Terrestrial ecosystems	Split to form terrestrial ecosystems, freshwater ecosystems, and marine ecosystems risks.	Risks to terrestrial ecosystems due to progressive and ongoing changes in temperature and precipitation, extreme weather events, wildfires and drought.
Sub-alpine ecosystems		Merged to form terrestrial ecosystems risk.	
Oceanic ecosystem productivity and functioning	Marine ecosystems	Merged to form marine ecosystems risk.	Risks to marine ecosystems due to ocean warming, marine heatwaves, and associated impacts like ocean acidification and deoxygenation.
Carbonate-based, hard-shelled species			
People, health and communities domain			
Social cohesion and community wellbeing	Social cohesion and wellbeing (from displacement)	Redefined risk statement.	Risks to social cohesion, community and cultural wellbeing from the displacement of individuals, families and communities due to progressive and ongoing sea-level rise, extreme weather events, and associated impacts like flooding and landslides.
Physical health	Physical health	Redefined risk statement.	Risks to physical health from illness and injury due to progressive and ongoing changes in temperature and precipitation, extreme weather events, and associated impacts like flooding and groundwater contamination.
Mental health	Mental health	Redefined risk statement.	Risks to mental health, identity, and belonging from trauma, chronic stress, and anxiety due to progressive and ongoing sea-level rise, extreme weather events, and associated impacts like flooding and landslides.
	Social infrastructure and community services	New risk.	Risks to social infrastructure and community services due to progressive and ongoing changes in temperature and precipitation, sea-level rise, extreme weather events, and associated impacts like flooding and landslides.

	Ability of the emergency management system to respond	Moved from Governance domain and redefined risk statement.	Risks to the ability of the emergency management system to respond to the increasing frequency and scale of climate change impacts in Aotearoa New Zealand and the Pacific region.
Māori wellbeing (two risks)		Replaced by seven specific risks in the Ngā mea hirahira o te ao Māori domain.	Please refer to the Ngā mea hirahira o te ao Māori domain.
Cultural heritage sites		Removed but discussed in the social cohesion risk, and in the Ngā mea hirahira o te ao Māori domain.	
Exacerbating inequalities		Removed. Equity is considered throughout the analysis of risks in the second NCCRA rather than as a standalone risk.	
Conflict, disruption and loss of trust in government		Moved to the Governance domain and redefined risk statement.	Please refer to the Governance domain.
Built environment			
Potable water supplies	Water infrastructure	Merged to form water infrastructure risk.	Risks to potable water, wastewater, and stormwater infrastructure due to progressive and ongoing changes in temperature and precipitation, sea-level rise, and increased extreme weather events.
Wastewater and stormwater systems			
Buildings	Buildings	Redefined risk statement.	Risks to buildings due to progressive and ongoing changes in temperature and precipitation, sea-level rise, extreme weather events, and associated impacts like flooding and wildfires.

Landfills and contaminated sites	Waste management infrastructure	Redefined risk statement.	Risks to waste management infrastructure, including landfills and contaminated sites, due to progressive and ongoing sea-level rise and extreme weather events.
Ports and associated infrastructure	Ports and airports	Merged to create ports and airports risk.	Risks to ports, airports and associated infrastructure due to progressive and ongoing changes in temperature, precipitation, wind, sea-level rise and extreme weather events.
Airports and associated infrastructure			
Linear transport networks	Road and rail networks	Redefined risk statement.	Risks to road and rail networks due to progressive and ongoing changes in temperature and precipitation, sea-level rise and extreme weather events.
Electricity infrastructure	Electricity and telecommunications networks	Redefined risk statement and added telecommunications component.	Risks to electricity and telecommunications infrastructure due to progressive and ongoing changes in temperature, precipitation, and wind, sea-level rise, extreme weather events, and associated impacts like wildfires.
	Electricity supply	New risk.	Risks to the security of electricity supply due to progressive and ongoing changes in precipitation, temperature, and wind and extreme weather events.
Governance			
Institutional arrangements	Enduring adaptation governance	Redefined risk statement.	Risks to enduring and equitable adaptation decision-making from governance failures exacerbated by the increasing frequency and severity of climate hazards.
Maladaptation	Effective adaptation implementation	Merged to create effective adaptation implementation risk.	Risks to timely and effective adaptation implementation from operational constraints exacerbated by the increasing frequency and severity of climate hazards.
Delayed adaptation			
Lack of implementation of adaptation policy			

Ability of democratic institutions to follow democratic decision-making processes	Legitimacy of democratic institutions (from contested climate decision-making)	Redefined risk statement.	Risks to the social legitimacy of democratic institutions from contested adaptation decision-making exacerbated by the increasing frequency and severity of climate hazards.
Breach of Te Tiriti o Waitangi/ The Treaty of Waitangi obligations	Ability to uphold Te Tiriti o Waitangi/The Treaty of Waitangi in adaptation governance and implementation	Redefined risk statement.	Risk to the Crown's ability to uphold Te Tiriti o Waitangi / Treaty of Waitangi in adaptation governance and decision-making from unclear roles, mandate, and resourcing, exacerbated by the increasing frequency and severity of climate hazards.
Governments and businesses from litigation		Removed.	
Ability of the emergency management system to respond		Moved to People, health and communities domain.	Please refer to People, health and communities domain.
Economy and finance			
Governments from economic costs	Central and local government funding	Redefined risk statement.	Risks to central and local government funding from economic impacts associated with lost productivity, disaster relief expenditure and unfunded contingent liabilities due to progressive and ongoing changes in precipitation and temperature, sea-level rise, and extreme weather events.
Financial system	Stability of the financial system	Redefined risk statement.	Risks to the financial system from instability exacerbated by the increasing frequency and severity of climate hazards.
Insurability of assets	Insurability of assets	Redefined risk statement.	Risks to the insurability of assets (including increasing premiums and insurance retreat) due to increased extreme weather events and progressive and ongoing sea-level rise.

Businesses and public organisations	Businesses and public organisations (from supply and distribution disruptions)	Redefined risk statement.	Risks to businesses and public organisations from supply chain and distribution network disruptions due to progressive and ongoing changes in temperature and precipitation, sea-level rise, and extreme weather events.
Land-based primary sector		Moved to sectors relying on the natural environment domain.	Please refer to the Sectors relying on the natural environment domain.
Tourism			
Fisheries			
Sectors relying on the natural environment			
Land-based primary sector	Pastoral agriculture	Moved from the Economy domain and disaggregated to create separate risks.	Risks to pastoral productivity and animal health due to progressive and ongoing changes in temperature and precipitation, sea-level rise, extreme weather events, and associated impacts like enhanced spread of pests and diseases.
	Horticulture		Risks to horticulture productivity due to progressive and ongoing changes in temperature and precipitation, sea-level rise, extreme weather events, and associated impacts like enhanced spread of pests and diseases.
Tourism	Tourism	Moved from the Economy domain.	Risks to the seasonality, accessibility, and viability of the tourism sector due to progressive and ongoing changes in temperature and precipitation, sea-level rise, and extreme weather events.
Fisheries	Fisheries	Moved from the Economy domain.	Risks to fisheries and aquaculture due to extreme weather events, ocean warming, marine heatwaves, and associated impacts like contamination and ocean acidification.
Indigenous forest ecosystems	Forestry	Moved from Natural environment domain and redefined risk statement.	Risks to managed and production forestry due to progressive and ongoing changes in temperature and precipitation, extreme weather events, wildfires and enhanced spread of pests and diseases.

Ngā mea hirahira o te ao Māori			
Māori wellbeing (two risks in the 'Human' domain)	Loss of access to taonga species	Two Māori wellbeing risks in the 'Human' domain replaced with seven specific risks in the Ngā mea hirahira o te ao Māori domain.	Risks of loss of access to taonga species, including kai and culturally significant plants, due to the effects of climate change.
	Damage to Māori infrastructure		Risks to Māori infrastructure due to climate hazards disrupting access and function, and uneven policy, planning and recovery work.
	Economic losses for Māori in primary industries		Risks of economic losses in Māori primary industries due to climate-related hazards and biosecurity threats.
	Disruption to tikanga and hapū/iwi identity		Risks of disruption to tikanga and hapū/iwi identity due to climate change-related relocation and hazards.
	Loss of indigenous knowledge systems		Risk of loss of Indigenous knowledge systems due to harm to ecosystems and sites of knowledge transfer.
	Legal exclusion and governance failures for Māori		Risk of legal exclusion and governance failures by undermining iwi/Māori authority in climate adaptation.
	Increased Māori health vulnerabilities		Risks of increased climate-related physical and mental health and disability vulnerabilities for iwi/Māori.

Appendix 2: Risk assessment template

NCCRA analytical template: <Risk [Domain]>

Ref:	NCCRA 2026	Status:	Draft
Domain(s):	<E.g. Natural environment>		
Author:			
Last updated:		QA:	

Using this template:

- Complete one NCCRA analytical template for each risk.
- There are two parts to the template, each starts with drafting guidance (for risk severity, and policy readiness).
- Highlighted text includes guidance on the **level of detail** we are looking for in each section, and **examples**. Replace that highlighted text with your assessment. You should aim to cover all the key elements listed, although there are some exceptions where certain sections of the template may not apply to all risks.
- **Reference** the information with end notes (full citation) and save the references.
- **Save** each completed template in the correct folder.

Part one: Risk severity

Drafting guidance:

- **Information gathering**: Please use the first National Climate Change Risk Assessment as a starting point and *update and add* to the information as needed. You may also want to refer to the reference list at the end of the report if you are struggling to find information on a particular risk.
- Other key sources of information will be academic journal articles, IPCC AR6 (particularly the Australasia chapter), the new MfE downscaled climate projections, National Science Challenge research reports (for example, Deep South or Resilience to Nature's Challenges), the work done by Aotearoa Circle on sector-specific climate change scenarios, information from researchers, commissioned studies by councils and government agencies, etc.
- In particular, you will want to look for sources of information that have come out since 2020 (when the first NCCRA was published), as this will help to get a sense of how the risks we face or our understanding of them may have changed since the publication of the first NCCRA.

- **Definition of risk**: risk is the interaction between hazard, exposure and vulnerability (sensitivity and adaptive capacity).

- **Assessment criteria**: You are asked to assess the current and future risk (or opportunity) and its consequences.
  - *Future risk* should be assessed using evidence for mid-century (ideally 2050) and the end of the century (ideally 2090), and that ideally relates to global warming levels (GWLs) equivalent to 1.5°C and 2/2.5°C (mid-century) and 2°C and 3/3.5°C (end of century).
  - These GWLs are consistent with low and high emissions pathways such as SSP1–2.6 and SSP3–7.0, but what's important for us to consider from an adaptation perspective is the climate impact of these scenarios (with SSP1–2.6 having a comparatively low climate impact and SSP3–7.0 having a comparatively high climate impact).
  - However, it's okay if the information doesn't correspond exactly to those timeframes and GWLs. What's important is that we have information that corresponds to both a low climate impact scenario and a high climate impact scenario, for both the middle of the century and the end of the century.

Time horizon	Global Warming Level	Corresponding scenarios
2050	GWL1.5 (low impact) GWL2/2.5 (high impact)	SSP1–2.6 (low emissions) SSP3–7.0 (high emissions)
2090	GWL2 (low impact) GWL3/3.5 (high impact)	SSP1–2.6 (low emissions) SSP3–7.0 (high emissions)

- **Timeframe, scenario/GWL, uncertainty and tail-end risks**: You need to report the time period and scenario/GWL for the evidence cited, and document the uncertainty. Please capture and report on any tail-end risks, including low-probability high-consequence extremes (events).
- **Writing style**: Text from this template will be used as the basis for chapter text. You can write as bullet text using full sentences, or as short paragraphs. It is okay to use sub-headings where needed to organise your text.
- Keep your language as plain as you can, avoiding technical terms and abstractions when possible.

Assessment of risk severity

Risk Summary	Key elements to cover: • Summarise the risk and what elements it includes. • Identify the sub-risks that make up the risk. • Identify any elements that are out of scope for this risk. Examples: "New Zealanders are already experiencing physical health impacts from climate hazards such as wildfire, floods, heatwaves, droughts and storms (Jones et al, 2014b). These hazards are projected to increase in frequency and severity." "Sub-risks include direct and indirect risks to physical health from extreme weather events such as heatwaves, wildfires and flooding, direct risks to physical health from zoonotic and water-borne diseases, indirect risks to physical health from the impact of drought and heavy rainfall events on water availability and quality."
Climate hazards that drive this risk	☐ Sea level rise and coastal flooding ☐ River and surface flooding ☐ Shoreline change and coastal erosion ☐ Storms, and extreme rain and wind ☐ Changing rain and wind patterns ☐ Heatwaves, cold snaps and rising average temperatures ☐ Drought and dry spells ☐ Wildfires and changing fire weather ☐ Ocean warming and acidification ☐ Landslides ☐ Other – please specify:

Exposure – Current, 2050 and 2090	This is likely to be the longest section (multiple paragraphs, up to a page in length). Key elements to cover: • What is Aotearoa New Zealand's current exposure to the risk? • What is Aotearoa New Zealand's exposure to the risk projected to be in mid-century (ideally 2050) for GWLs of approximately 1.5°C and 2/2.5°C? • What is Aotearoa New Zealand's exposure to the risk projected to be by the end of the century (ideally 2090) for GWLs of approximately 2°C and 3/3.5°C? • How much uncertainty is there in the available information? • Are there any significant changes in the information since the first NCCRA? Note: Don't get too hung up on finding information that corresponds exactly to the timeframes and global warming levels listed. What's important is that we have information that corresponds to both a low emissions scenario and a high emissions scenario, for both the middle of the century and the end of the century. Examples: "X number of buildings are currently exposed to coastal flooding for a 1% AEP (annual exceedance probability[2]) event." "X number of buildings will be exposed to coastal flooding for a 1% AEP event with 20cm of sea level rise." "Under 3 degrees of warming globally, at 2090 X number of buildings will be exposed to coastal flooding." "Under warming of about 2 degrees Celsius from pre-industrial temperatures, a 1-in-20-year drought could occur at least twice as often in eastern parts of New Zealand." What we aren't looking for: "Under **RCP 4.5**, X number of buildings will be exposed to coastal flooding." "Under **SSP3-7.0**, X number of buildings will be exposed to coastal flooding."
Sensitivity and adaptive capacity	This section should also contain multiple paragraphs, up to a page in length. Key elements to cover: • How sensitive are relevant individuals, communities, systems, networks or other things New Zealanders value to the risk, and what is their adaptive capacity to respond to the risk? • How much uncertainty is there in the available information? • Are there any significant changes in the information since the first NCCRA? Examples: "The Health National Adaptation Plan, released by the Ministry of Health in October 2024, notes that the groups most affected by climate change impacts include young people, rangatahi, children and future generations, Māori, Pacific peoples, disabled people, rural populations and people living with high levels of socioeconomic deprivation." "Communities whose livelihoods depend on the natural environment are sensitive to events which disrupt those livelihoods."

[2] Annual Exceedance Probability (AEP) is the probability of a certain sized flood occurring in a single year.

	"The ability to adapt is affected by socioeconomic factors such as age, gender, social networks and social capital." "In general, people living in poverty are more sensitive to the impacts of climate change hazards." "Horticulture is very sensitive to water availability at critical times of the growing season." "Ecosystems and species with greater tolerance to periodic exposure to saline waters, and those with some degree of dispersal ability, are likely to have a greater adaptive capacity." "The sensitivity of linear transport networks to extreme weather depends on the physical condition of the assets, local ground conditions, and design of the infrastructure itself."
Does this risk have significant impacts for iwi/Māori?	Aim for 1–3 paragraphs. Key elements to consider: • Is the risk of particular significance to Māori? • Does the risk particularly relate to Māori interests, values and practices? • There is some information on this in the first NCCRA, and the report *He huringa āhuarangi, he huringa ao: a changing climate, a changing world* may also be useful. Examples: "The risk of exacerbating existing inequities and creating new and additional inequities will have a disproportionate impact on Māori, due to the socioeconomic disparities between Māori and non-Māori communities."
Compounding or cascading factors[3]	Aim for 1–3 paragraphs. Key elements to cover: • How does the risk interact with other risks? • Is the risk a result of other risks, or is it a risk that will drive other risks? • Please refer to specific risks (not just general domains) that influence or are influenced by the risk. Examples: "Risk to the terrestrial environment will impact the risks to livestock agriculture and horticulture, which will have flow on effects for the risks to the economy and to mental health." "Road networks provide critical access to lifeline utilities (power, water, gas, telecommunications, health care) and other essential services. Any disruption to transport can lead to significant cascading consequences for people, such as making it more difficult to access emergency medical care." "The interaction between climate hazards, social cohesion and community wellbeing has the potential to increase the vulnerability of people and their communities to climate change. Loss of land and households will exacerbate physical and mental health issues, affect peoples' sense of belonging and identity, and perpetuate inequity, adversely impacting social cohesion."

[3] Cascading effects (of climate change) are the effects that flow on from a primary hazard to compound and affect many systems in a dynamic sequence.

Socioeconomic trends that may exacerbate the risk	Aim for 1–3 paragraphs. Key elements to consider: • Document any social, economic or demographic trends that could increase or decrease the severity of the risks (noting that for some risks, there may not be any trends that impact their severity). This backgrounder may be useful in considering socioeconomic trends. Examples: "Aotearoa New Zealand has an ageing population, which will exacerbate the risks to physical health from climate change over time. Older people (aged 65 or older) are more vulnerable to climate hazards, particularly changes in temperature (extreme heat) and extreme weather events."
Climate thresholds and tipping points that may exacerbate the risk	Aim for 1–3 paragraphs. Key elements to consider: • Document thresholds, whether biophysical thresholds, engineering, performance or policy thresholds, that could impact the severity of the risk (for example, where adaptive capacity of the element at risk might be exceeded)[4]. Does exceedance of these vary over scenarios or across projections (uncertainty)? • Document tipping points, which refer to critical thresholds in a system that, when exceeded, can lead to a significant change in the state of the system, often with an understanding that the change is irreversible. More information is available here (ice sheet collapse and changing ocean circulation are of particular relevance for this risk assessment). Examples: "Tipping points may be reached with the ice sheets, which will exacerbate sea level rise and impact many risks." "Extreme heat causes buckling of rail lines when XX temperatures are reached."
Possible interactions with climate mitigation actions	Aim for 1–3 paragraphs. Key elements to consider: • Document any possible interactions with climate mitigation actions. Is the climate mitigation action likely to increase or decrease the magnitude of the risk/opportunity? Could the climate change risk or opportunity make the climate mitigation action easier or harder to achieve? Examples: "If pine trees are planted in areas that will become increasingly at risk from wildfires, this would mean areas of forest used to absorb emissions could be lost to wildfire (which would also release greenhouse gases). This could impact the country's ability to meet its emissions budgets and target."
Regional differences	Aim for 1–2 paragraphs. Key elements to consider: • Are there significant regional differences in exposure, sensitivity and/or adaptive capacity? • Is the risk particularly elevated in an individual region(s), such that it would increase the overall scoring for the risk?

[4] For example, in assessing the impacts of increased environmental temperatures, threshold temperatures might be established when asset behaviour significantly changes

	• Note: we expect that this won't be the case for most risks. If it is not the case for your risk, you can mark this section Not Applicable. Examples: "Erosion in Gisborne, drought in Canterbury, Northland, Hawke's Bay."
Data gaps	Aim for 1–3 paragraphs or a short bullet point list. Key elements to cover: • Are there significant gaps in evidence for this risk? In terms of exposure, sensitivity and adaptive capacity for each of the hazards that impact the risk. • Is the risk likely to be more consequential than the available information would suggest? • Are there data gaps that were highlighted in the first NCCRA that still haven't been addressed? Examples: "There are gaps in knowledge in terms of understanding the specific vulnerability of a wider range of individual ecosystems and species."
Sources of information considered	Key elements to cover: • List the sources of information you consulted in pulling together the information in this section of the template. • Include sources of information that weren't useful to you as well as sources that were. Examples: • The first National Climate Change Risk Assessment • IPCC Sixth Assessment Report Australasia chapter • He huringa āhuarangi, he huringa ao: a changing climate, a changing world Deep South research papers (list them).
Confidence level	Aim for 1–2 paragraphs. Key elements to cover: • Summarise the strength, quality and quantity of the available evidence for this risk. • Summarise the level of agreement within the evidence for this risk. • Note that we will make a formal assessment of confidence at a later date, ensuring consistency in how the confidence level is assessed across all the risks. Examples: "There is robust evidence and a high level of agreement that climate change will adversely impact the physical health of New Zealanders. More evidence is needed around the impacts and their geographical spread."
Summary of risk severity	Key elements to cover: • Brief overall summary of risk severity evidence. • Any key points that might influence the assessment. • Consider key differences in risk elements (exposure, sensitivity, etc.) for mid-century vs end of century and low emissions vs high emissions. Does exposure (and therefore risk) change significantly depending on timeframe and global warming level, or is the risk less sensitive to changes in scenarios?

Part two: Policy readiness

Drafting guidance:

- This section assesses the degree to which existing and planned adaptation actions will contribute to addressing the risk.
- **Information gathering**: As a starting point, refer to the IEB six-monthly reporting and the first National Adaptation Plan Progress Assessment (Chapters 6, 7, 8 and 9 in particular).
- Document the changes in adaptation action that have occurred since the first NCCRA was published.
- Document the potential reduction in future risks (or the realisation of future opportunities) from the planned adaptation actions in place. This should also consider if government action involves potential maladaptation, or could result in lock-in of risks.
- For the section 'Other actions signalled', please list (in bullet form) any other actions signalled or indicated, but not yet announced by a Minister or in an official government document.

Assessment of policy readiness

What policies and actions are currently in place to support adaptation to this risk?	Key elements to cover: • List the current or planned (confirmed) adaptation policies and actions that contribute to addressing the risk. • Group actions according to the actor – e.g. central government, local government, private sector, communities, iwi/Māori. • Consider whether the actions listed might have co-benefits or may interact negatively with climate mitigation actions. Examples: "An adaptation framework is being developed." "X councils have developed coastal hazards tools and maps." "X councils have an adaptation plan in place or under development."
Other actions signalled	Key elements to cover: • List any other adaptation actions signalled or indicated but not yet announced. Please include the source of this information. • If there are no actions which fall into this category, mark this box Not Applicable. Examples: "MfE has indicated in a conversation that they may be doing a piece of work on the risks to XX. This has not been officially confirmed yet."
What other adaptation actions could be taken to address this risk?	Key elements to cover: • Summarise adaptation actions that could significantly contribute to addressing this risk.

	• Describe potential adaptation actions that could be taken, but do not be prescriptive on new policy. • Document the evidence on possible actions. • Consider whether the actions identified might have co-benefits or may interact negatively with climate mitigation actions. Examples: "Buildings can be raised to be above flood levels in urban areas that use nature-based solutions to better cope with flood events." "Farmers can provide shelter for livestock to help reduce the impact of heat waves on animal health."
Do the policies and actions that are currently in place appropriately consider the specific effects on iwi and Māori?	Key elements to cover: • Do the planned policies and actions take into account the specific effects of climate change on iwi and Māori, and do they recognise and take into account Māori perspectives? Examples: "The Māori Climate Platform is being developed in partnership with tangata whenua to assist Māori-led climate action, planning and solutions. A Ministerial Advisory Committee was appointed to engage with Māori and lead the design phase of the platform, but based on announcements in Budget 2024, the future of the platform remains uncertain."
What are the barriers to adaptation?	Key elements to cover: • Summarise any key barriers in relation to this risk that are contributing to a lack of action or are inhibiting or delaying action to address the risk. Examples: "Common challenges to adaptation relate to institutional and legislative settings, clarity around how the costs of adaptation and loss will be shared and met, and access to data, information and tools."
Policy horizon	Key elements to cover: • Is there potential lock-in of risks or loss of opportunities, particularly in the coming six years? • Describe whether or not addressing the risk requires long lead times, meaning that action would need to start earlier to avoid locking in the risk. Examples: "Without a clear mandate to avoid development in locations that will become increasingly exposed to natural hazards as the climate changes, we will continue to build in these locations and lock in future exposure to the risks."
What is the shortfall – what are the benefits to further action in the next six years?	Key elements to cover: • Considering the potential reduction in future risks / realization of future opportunity from the planned adaptation in place, assess if there is a shortfall where planned adaptation actions will fail to fully address the risk (and how large the shortfall is). List what further actions could be taken in the next six years that would contribute to reducing this risk.

	Examples: "There are no actions in the first National Adaptation Plan specifically targeted at addressing the risks of exacerbating existing inequities and creating new and additional inequities due to differential distribution of climate change impacts. The actions included in the plan that relate to this risk are all indirect, and therefore unlikely to adequately address the risk." "A funding framework is needed that sets out how to share costs for the range of potential adaptation options, including nature-based solutions, hard engineered solutions, or relocation."
Data gaps	Key elements to cover: • Are there significant gaps in evidence of actions being undertaken for this risk? • Provide these as a short bullet point list. Examples: "There is a lack of publicly available information regarding adaptation actions being undertaken by the private sector."
Sources of information considered	Key elements to cover: • List the sources of information you consulted in pulling together the information in this section of the template. Include sources of information that weren't useful to you as well as sources that were.
Summary of policy readiness	Key elements to cover: • Brief overall summary of policy readiness evidence. • Any key points that might influence the assessment.

Appendix 3: Risk severity assessment criteria

	Description of likely impacts			
Overall impact rating	**Minor**	**Moderate**	**Major**	**Extreme**
	Minor and infrequent losses and damages	Moderate and/or recurring losses and damages	Large and/or frequent losses and damages	Very large and/or very frequent losses and damages
	No significant disturbance of system functionality.	Moderate disturbance of system functionality.	Major and/or long-term disturbance of system functionality.	Total and/or irreversible loss of system functionality.
	Temporary and/or very slow onset impacts.	Medium term and/or slow onset impacts.	Long term and/or rapid onset impacts.	Permanent and/or very rapid onset impacts.
	Unlikely to pose systemic risk.	Some potential to pose systemic risk.	Potential for impact thresholds or local tipping points to be reached, posing systemic risk.	High potential for impact thresholds or local tipping points to be reached, very likely to pose systemic risk.

Domain-specific guidance to apply the criteria is provided on the following pages.

Guidance to apply the criteria in the People, health and communities domain	**Extent, duration, and frequency of likely impacts** Limited and infrequent impacts on physical health, physical safety or mental health in some communities, which are of short duration. Low/minimal short-term impacts on patterns of daily activity and behaviour. Happiness, satisfaction and quality of life of individuals in some communities are mildly affected for a short period. **Ability to recover from likely impacts** Isolated and short-term disruption to education, employment and community services, which can quickly be recovered from. Coping capacity of communities unlikely to be exceeded (or only a small number). **Likely equity impacts** Limited impacts on social, cultural, and physical health and wellbeing which are unlikely to reinforce existing inequities and/or disproportionately impact Māori or other groups.	**Extent, duration, and frequency of likely impacts** Moderate lasting and/or frequent impacts on physical health, physical safety or mental health in several communities. Moderate medium-term impacts on patterns of daily activity and behaviour. Happiness, satisfaction and quality of life of individuals in some communities are moderately affected for a short to medium period or mildly affected for a longer period. **Ability to recover from likely impacts** Moderate disruption to education, employment and community services, which will take time to recover from. Coping capacity of many communities exceeded. **Likely equity impacts** Moderate impacts on social, cultural, and physical health and wellbeing which could reinforce existing inequities and/or disproportionately affect Māori or other groups.	**Extent, duration, and frequency of likely impacts** Physical health, physical safety and wellbeing significantly and frequently compromised in many communities over the long-term. Major long-term impacts on patterns of daily activity and behaviour. The happiness, satisfaction and quality of life of communities are affected in a major way over a medium to long period of time. **Ability to recover from likely impacts** Prolonged disruption to education, employment and community services, from which it may not be possible to recover. Coping capacity of most communities exceeded. **Likely equity impacts** Significant impacts on social, cultural, and physical health and wellbeing which are likely to strengthen existing inequities and/or disproportionately affect Māori or other groups.	**Extent, duration, and frequency of likely impacts** Health, safety and wellbeing severely and frequently compromised in most communities or the whole of society over a long period. Patterns of daily activity and behaviour unable to continue (long-term disruption). The happiness, satisfaction and quality of life of communities are severely and affected over a long period of time, perhaps permanently. **Ability to recover from likely impacts** Permanent disruption to education, employment and community services, from which it will be impossible to recover. Coping capacity of all communities exceeded. **Likely equity impacts** Severe and enduring impacts on social, cultural, and physical health and wellbeing which are almost certain to reinforce existing inequities and/or

	Effects are not likely to be concentrated on locations/communities already experiencing or recovering from climate impacts. **Likely impacts on te ao Māori** Some disruption of tikanga and hapū/iwi identity and loss of indigenous knowledge systems.	Effects could be concentrated on locations/communities already experiencing or recovering from climate impacts. **Likely impacts on te ao Māori** Moderate disruption of tikanga and hapū/iwi identity and partial loss of indigenous knowledge systems.	Effects likely to be concentrated on locations/communities already experiencing or recovering from climate impacts (probably multiple locations). **Likely impacts on te ao Māori** Major disruption of tikanga and hapū/iwi identity and substantial loss of indigenous knowledge systems.	disproportionately affect Māori or other groups. Effects almost certain to be concentrated on multiple locations/communities already experiencing or recovering from climate impacts. **Likely impacts on te ao Māori** Extreme disruption of tikanga and hapū/iwi identity and significant or complete loss of indigenous knowledge systems.

Guidance to apply the criteria in the Natural environment domain	**Extent, duration, and frequency of likely impacts** Minimal and infrequent local or regional impacts on ecosystems, species, and/or biologically important attributes. Minimal localised impacts on recreation and/or aesthetics. **Ability to recover from likely impacts** Short-term losses/minimal declines in the ecological integrity/stability of a small number of sensitive or vulnerable ecosystems (including protected natural areas – marine, freshwater or terrestrial). **Likely equity impacts** Limited impacts on people's access and connection to the natural environment which are unlikely to reinforce existing inequities and/or disproportionately impact Māori or other groups. Effects are not likely to be concentrated on locations already experiencing or recovering from climate impacts.	**Extent, duration, and frequency of likely impacts** Sustained and/or frequent local or regional impacts on ecosystems, species and/or biologically important attributes. Sustained localised impacts on recreation and/or aesthetics. **Ability to recover from likely impacts** Sustained localised or shorter-term regional declines in the ecological integrity/stability of sensitive or vulnerable ecosystems, including protected natural areas (marine, freshwater and terrestrial). **Likely equity impacts** Moderate impacts on people's access and connection to the natural environment which could reinforce existing inequities and/or disproportionately affect Māori or other groups. Effects could be concentrated on locations/communities already experiencing or recovering from climate impacts.	**Extent, duration, and frequency of likely impacts** Significant, widespread and frequent regional or national impacts on ecosystems, species, and/or biologically important attributes. Sustained regional impacts on recreation and/or aesthetics. **Ability to recover from likely impacts** Significant ecosystem instability and/or species declines at the regional or national level. Regional/medium term reduction in the ecological integrity/stability of most protected natural areas (including marine protected areas). **Likely equity impacts** Major impacts on people's access and connection to the natural environment which are likely to strengthen existing inequities and/or disproportionately affect Māori or other groups. Effects likely to be concentrated on locations/communities already experiencing or recovering from climate impacts (probably multiple locations).	**Extent, duration, and frequency of likely impacts** Severe, widespread, and near constant regional or national impacts on ecosystems, species, and/or biologically important attributes Sustained and severe national impacts on recreation and/or aesthetics. **Ability to recover from likely impacts** Major and widespread instability in natural ecosystems, resulting in significant loss of community composition, structure and function. Impacts result in major ecosystem instability and serious loss of species. **Likely equity impacts** Significant and enduring impacts on people's access and connection to the natural environment which are almost certain to reinforce existing inequities and/or disproportionately affect Māori or other groups. Effects almost certain to be concentrated on multiple locations/communities already experiencing or recovering from climate impacts.

	Likely impacts on te ao Māori Reduced access to key taonga species in some areas, but no disruption to tikanga and iwi/hapū identity. No impact on opportunities to practice indigenous knowledge systems.	**Likely impacts on te ao Māori** Loss of access to key taonga species and moderate disruption to tikanga and iwi/hapū identity. Reduced opportunities to practice indigenous knowledge systems.	**Likely impacts on te ao Māori** Widespread loss of access to key taonga species and major disruption to tikanga and iwi/hapū identity. Significantly reduced opportunities to practice indigenous knowledge systems.	**Likely impacts on te ao Māori** Collapse of key taonga species and significant disruption to tikanga and iwi/hapū identity. Breakdown of indigenous knowledge systems.

Guidance to apply the criteria in the Sectors relying on the natural environment domain	**Extent, duration, and frequency of likely impacts** Limited impact on productivity, profitability, financial losses, livelihoods, consumer behaviour, reputation, or asset values. **Ability to recover from likely impacts** Limited loss of asset values, natural capital, and/or productive capacity, which can quickly be recovered from. **Likely equity impacts** Limited economic and social impacts which are unlikely to reinforce existing inequities and/or disproportionately impact Māori or other groups. Effects are not likely to be concentrated on locations/communities already experiencing or recovering from climate impacts. **Likely impacts on te ao Māori** [NOTE: Based on draft analysis in the Ngā mea hirahira o te ao Māori domain, specific criteria to capture te ao Māori impacts were not proposed in this domain beyond what is included above under likely equity impacts].	**Extent, duration, and frequency of likely impacts** Moderate and/or frequent impact on productivity, profitability, financial losses, livelihoods, consumer behaviour, reputation, or asset values. **Ability to recover from likely impacts** Moderate loss of asset values, natural capital, and/or productive capacity, which will take time to recover from. **Likely equity impacts** Moderate economic and social impacts which could reinforce existing inequities and/or disproportionately affect Māori or other groups. Effects could be concentrated on locations/communities already experiencing or recovering from climate impacts. **Likely impacts on te ao Māori** [NOTE: Based on draft analysis in the Ngā mea hirahira o te ao Māori domain, specific criteria to capture te ao Māori impacts were not proposed in this domain beyond what is included above under likely equity impacts].	**Extent, duration, and frequency of likely impacts** Major and frequent impacts on productivity, profitability, financial losses, livelihoods, consumer behaviour, reputation, or asset values. **Ability to recover from likely impacts** Major loss of asset values, natural capital, and/or productive capacity from which it may not be possible to recover. **Likely equity impacts** Major economic and social impacts which are likely to strengthen existing inequities and/or disproportionately affect Māori or other groups**.** Effects likely to be concentrated on locations/communities already experiencing or recovering from climate impacts (probably multiple locations). **Likely impacts on te ao Māori** [NOTE: Based on draft analysis in the Ngā mea hirahira o te ao Māori domain, specific criteria to capture te ao Māori impacts were not proposed in this domain beyond what is included above under likely equity impacts].	**Extent, duration, and frequency of likely impacts** Severe and frequent impacts on productivity, profitability, financial losses, livelihoods, consumer behaviour, reputation, or asset values. **Ability to recover from likely impacts** Severe loss of asset values, natural capital, and/or productive capacity from which it will be impossible to recover. **Likely equity impacts** Significant and enduring economic and social impacts which are almost certain to reinforce existing inequities and/or disproportionately affect Māori or other groups. Effects almost certain to be concentrated on multiple locations/ communities already experiencing or recovering from climate impacts. **Likely impacts on te ao Māori** [NOTE: Based on draft analysis in the Ngā mea hirahira o te ao Māori domain, specific criteria to capture te ao Māori impacts were not proposed in this domain beyond what is included above under likely equity impacts].

Guidance to apply the criteria in the Economy and finance domain	**Extent, duration, and frequency of likely impacts** Limited economic and financial impacts on families and households, whānau, hapū and iwi, firms and markets, financial markets and/or international connections. Short-term/minor increases in local and central government costs and/or decreases in revenue. **Ability to recover from likely impacts** Limited loss of asset values, changes in business revenues and costs, household incomes, and/or employment, which can quickly be recovered from. **Likely equity impacts** Limited economic and financial impacts which are unlikely to reinforce existing inequities and/or disproportionately impact Māori or other groups. Effects are not likely to be concentrated on locations/communities already experiencing or recovering from climate impacts.	**Extent, duration, and frequency of likely impacts** Moderate and/or frequent economic and financial impacts on families and households, whānau, hapū and iwi, firms and markets, financial markets and/or international connections. Moderate increases in local and central government costs and/or decreases in revenue, which may require reprioritisation of spending. **Ability to recover from likely impacts** Moderate loss of asset values, changes in business revenues and costs, household incomes, and/or employment, which will take time to recover from. **Likely equity impacts** Moderate economic and financial impacts which could reinforce existing inequities and/or disproportionately affect Māori or other groups. Effects could be concentrated on locations/communities already experiencing or recovering from climate impacts.	**Extent, duration, and frequency of likely impacts** Major and frequent economic and financial impacts on families and households, whānau, hapū and iwi, firms and markets, financial markets and/or international connections. Major increases in local and central government costs and/or decreases in revenue, which will be difficult to manage alongside other spending pressures. **Ability to recover from likely impacts** Major loss of asset values, changes in business revenues and costs, household incomes, and/or employment, from which it may not be possible to recover. **Likely equity impacts** Major economic and financial impacts which are likely to strengthen existing inequities and/or disproportionately affect Māori or other groups**.** Effects likely to be concentrated on locations/communities already experiencing or recovering from climate impacts (probably multiple locations).	**Extent, duration, and frequency of likely impacts** Severe, frequent, and widespread economic and financial impacts on families and households, whānau, hapū and iwi, firms and markets, financial markets and/or international connections. Severe increases in local and central government costs and/or decreases in revenue, which will be very difficult to manage alongside other spending pressures. **Ability to recover from likely impacts** Severe loss of loss of asset values, changes in business revenues and costs, household incomes, and/or employment, from which it will be impossible to recover. **Likely equity impacts** Significant and enduring economic and financial impacts which are almost certain to reinforce existing inequities and/or disproportionately affect Māori or other groups. Effects almost certain to be concentrated on multiple locations/communities already experiencing or recovering from climate impacts.

	Likely impacts on te ao Māori [NOTE: Based on draft analysis in the Ngā mea hirahira o te ao Māori domain, specific criteria to capture te ao Māori impacts were not proposed in this domain beyond what is included above under likely equity impacts].	**Likely impacts on te ao Māori** [NOTE: Based on draft analysis in the Ngā mea hirahira o te ao Māori domain, specific criteria to capture te ao Māori impacts were not proposed in this domain beyond what is included above under likely equity impacts].	**Likely impacts on te ao Māori** [NOTE: Based on draft analysis in the Ngā mea hirahira o te ao Māori domain, specific criteria to capture te ao Māori impacts were not proposed in this domain beyond what is included above under likely equity impacts].	**Likely impacts on te ao Māori** [NOTE: Based on draft analysis in the Ngā mea hirahira o te ao Māori domain, specific criteria to capture te ao Māori impacts were not proposed in this domain beyond what is included above under likely equity impacts].

Guidance to apply the criteria in the Built environment domain	**Extent, duration, and frequency of likely impacts** Isolated and/or short-term infrastructure service disruption, including access to buildings (e.g. homes, schools, hospitals), and/or causing minimal adverse social, cultural, or environmental impacts. Minor damage or a small number of homes or businesses may be lost or displaced. **Ability to recover from likely impacts** No permanent damage: some minor restoration work required. Most homes and businesses can remain in place. **Likely equity impacts** Limited impacts on infrastructure service provision and access to key locations which are unlikely to materially reinforce existing inequities or disproportionately impact Māori or other groups.	**Extent, duration, and frequency of likely impacts** Many moderate and/or short-term infrastructure service disruptions OR some medium-to long-term disruptions in limited locations, and/or causing some adverse social, cultural, or environmental impacts. Moderate damage or loss of homes, businesses, and other key locations. **Ability to recover from likely impacts** Moderate ability to recover post-event: damage to infrastructure is recoverable by maintenance and minor repair. Permanent relocation required for some homes, businesses, or other key locations on a local or regional scale. **Likely equity impacts** Moderate impacts on infrastructure service provision and access to key locations which could reinforce existing inequities and/or disproportionately affect Māori or other groups. Effects could be concentrated on locations/communities already	**Extent, duration, and frequency of likely impacts** Widespread short-to-medium-term disruptions to infrastructure services OR permanent loss of infrastructure in limited locations, and/or causing significant adverse social, cultural, or environmental impacts. Major/extensive and frequent damage or loss of homes, businesses, and other key locations. **Ability to recover from likely impacts** Significant damage to infrastructure and buildings requiring major repair over a long period of time. Permanent relocation required for a significant number of homes, businesses or other key locations on a regional or national scale. **Likely equity impacts** Major impacts on infrastructure service provision and access to key locations which are likely to strengthen existing inequities and/or disproportionately affect Māori or other groups**.** Effects likely to be concentrated on locations/communities already	**Extent, duration, and frequency of likely impacts** Widespread, long-term service disruption. Loss of infrastructure support and translocation of service to other sites, and/or causing severe social, cultural, or environmental impacts. Widespread, frequent, and extreme damage resulting or total loss or displacement of homes businesses, and other key locations. **Ability to recover from likely impacts** Extreme/severe permanent damage to and/or complete loss of infrastructure and its service. Permanent relocation required for a very large number of homes, businesses, or other key locations on a national scale. **Likely equity impacts** Significant and enduring impacts on infrastructure service provision and access to key locations which are almost certain to reinforce existing inequities and/or disproportionately affect Māori or other groups.

	Effects are not likely to be concentrated on locations/communities already experiencing or recovering from climate impacts. **Likely impacts on te ao Māori** Limited damage to Māori infrastructure including marae, papakāinga, and urupā, but no disruption to tikanga and iwi/hapū identity.	experiencing or recovering from climate impacts. **Likely impacts on te ao Māori** Moderate damage to Māori infrastructure including marae, papakāinga, and urupā, and moderate disruption to tikanga and iwi/hapū identity.	experiencing or recovering from climate impacts (probably multiple locations). **Likely impacts on te ao Māori** Major damage to Māori infrastructure including marae, papakāinga, and urupā, and major disruption to tikanga and iwi/hapū identity.	Effects almost certain to be concentrated on multiple locations/communities already experiencing or recovering from climate impacts. **Likely impacts on te ao Māori** Significant damage to Māori infrastructure including marae, papakāinga, and urupā, and significant disruption to tikanga and iwi/hapū identity.

Guidance to apply the criteria in the Governance domain	**Extent, duration, and frequency of likely impacts** Some minor impacts on decision-making functions, service delivery, and community resilience, at the local level. Some tensions within or between levels of government with some impact on public trust. **Ability to recover from likely impacts** Recovery possible using existing institutional settings or decision-making processes, no enduring structural or relational/reputational damage. **Likely equity impacts** Decision-making and service provision do not materially reinforce existing inequities or disproportionately impact Māori or other groups. Decision-making and service provision do not materially concentrate impacts on locations/communities already experiencing or recovering from climate impacts	**Extent, duration, and frequency of likely impacts** Moderate and/or frequent impacts on decision-making functions, service delivery and community resilience, at the local or regional level. Rising tensions within or between levels of government compromising public trust and leading to unrest and litigation. **Ability to recover from likely impacts** Recovery requires policy or organisational change, but existing mandates and relationships remain largely intact, with some reputational damage. **Likely equity impacts** Decision-making and service provision may reinforce existing inequities or disproportionately affect Māori or other groups. Decision-making and service provision may concentrate impacts on locations/communities already experiencing or recovering from climate impacts	**Extent, duration, and frequency of likely impacts** Major and frequent multifunctional impacts on decision-making functions, service delivery and community resilience, at a regional or national level. Partial institutional failure significantly impacting public trust and leading to major and frequent unrest and loss of social cohesion. **Ability to recover from likely impacts** Restoration requires legislative reform, cross-government intervention, or rebuilding of governance relationships. Entrenched misalignment or distrust present. **Likely equity impacts** Decision-making and service provision are likely to strengthen existing inequities or disproportionately affect Māori or other groups. Decision-making and service provision are likely to concentrate impacts on locations/communities already experiencing or recovering from climate impacts.	**Extent, duration, and frequency of likely impacts** Extreme multifunctional, cascading and compounding impacts at the national level, that compromise the ability of all levels of government to govern and provide services. Severe institutional failure causing near total loss of public trust, and leading to frequent community unrest, violence, major disruption, and/or threats to the rule of law. **Ability to recover from likely impacts** Governance failure has led to irreversible decisions. System legitimacy or authority is no longer recoverable through standard processes. **Likely equity impacts** Decision-making and service provision are almost certain to reinforce existing inequities or disproportionately affect Māori or other groups in significant and enduring ways. Decision-making and service provision are almost certain to concentrate impacts on locations/communities

	Decision-making processes are largely inclusive. **Likely impacts on te ao Māori** Exclusion from planning may constrain effective response; Māori-led strategies are under-resourced.	Decision-making processes partially exclude or disadvantage some groups. **Likely impacts on te ao Māori** Exclusion from planning may constrain effective response; Māori-led strategies are under-resourced	Highly exclusionary decision-making processes amplify structural inequities. **Likely impacts on te ao Māori** Compounding exclusion across systems; Māori governance sidelined as climate risks grow.	already experiencing or recovering from climate impacts. Deep, systemic exclusion leading to failure of democratic processes. **Likely impacts on te ao Māori** Compounding exclusion across systems; Māori governance sidelined as climate risks grow

Appendix 4: Policy readiness assessment criteria

Policy readiness scorecard

Assessment of policy readiness for the risk

Policy readiness criteria (based on different dimensions) – used to evaluate the likely policy readiness for this risk

	No significant gaps/Minor (for assessment of policy shortfall)	**Moderate gaps**	**Significant gaps**	**Insufficient**
Policy rating (all domains)	**Policy coverage** The risk is well covered and no significant gaps in policy/action remain. Policies respond well to the risk. Risk is clearly addressed in one or more policies and/or plans (national, local, etc) with direct actions. **Readiness to implement / deliver** Policies and plans have clear mandates, resourcing, and capable institutions. Implementation is likely to proceed effectively. Mandate, funding, and lead agencies are clear and active.	**Policy coverage** Aspects of the risk are covered, but some gaps in action remain. Policies and actions only partially respond to this risk. Policy mentions or touches the risk but lacks depth, detail or mandate. **Readiness to implement / deliver** Some delivery risks present – e.g., unclear mandate, uneven capacity (regional variation), or coordination issues, but partially supported. Some delivery underway, but gaps in mandate or uneven support.	**Policy coverage** Some important aspects of the risk are not well covered, and gaps in policy and action remain. Policy has not responded well to some important aspects of this risk. Some related policy exists but doesn't target this risk well. **Readiness to implement / deliver** Major delivery shortfalls. For example, institutional fragmentation, unclear responsibilities, lack of resources. Implementation is unlikely without significant changes. Fragmented responsibility, unclear mandate, or missing delivery structures.	**Policy coverage** The risk is not well covered, and very significant gaps in policy and action remain. Policy is either absent or has not responded to this significant risk. Risk is not mentioned or has no relevant national-level policy. **Readiness to implement / deliver** No realistic pathway for implementation. Lacks mandate, funding, and institutional support. Cannot be delivered under current conditions. No mandate, funding, or mechanism for delivery.

	Policy shortfall – minor/insignificant Policies, plans, and actions, if fully delivered, would substantially address the risk. Only minimal risk remains. Risk largely mitigated by full implementation.	**Policy shortfall – moderate** Some risk would remain despite full implementation – for example, limits to policy scope, residual exposure. Some exposure remains (e.g., slow uptake, vulnerable populations).	**Policy shortfall – major** Policies, plans and actions would leave major parts of the risk unaddressed, even if implemented as intended. Major impacts would still occur due to limitations in scope or reach.	**Policy shortfall – extreme** Implementation would not reduce the risk meaningfully. Risk to people, systems or assets remains extremely high. Even with full implementation, core risk is not reduced.

Appendix 5: Instructions for scoring indirect and cascading risks

Scoring indirect risks and identifying high-consequence cascades

Introduction

All the risks we are considering within the risk assessment are connected, if not directly, through a connection to another risk. The risk templates broadly cover all these factors, but for scoring, we are choosing to consider direct and indirect components of a risk separately. Separating the direct and indirect components of a risk allows us to systematically consider where it fits into a broader system and how mitigating it may affect other risks.

Instructions

To identify indirect and cascading risks, we will look at how one risk could mitigate another. This will try to capture both the upstream and downstream consequences of a risk.

For your risk, identify connections to other risks by looking at the following:

If we mitigate the risk to [add risk here], it will also mitigate risks to…

And

It would mitigate risks to [add risk here] if we mitigate risk to...

For the connections, we will score the potential for your risk to mitigate another using the following criteria in **Table A5.1**.

Table A5.1: Scoring criteria

Blank/0 – no or very low potential	Fully mitigating this risk has **no or insignificant** influence on another risk
1 – low potential	Fully mitigating this risk will cause a **minor reduction** in the other risk
2 – medium potential	Fully mitigating this risk will cause a **moderate reduction** in the other risk
3 – high potential	Fully mitigating this risk will cause at least a **major reduction** in the other risk

For each score, please document the logic with a short note.

Appendix 6: Expert review groups

The following people served on the expert review groups for each domain the Commission analysed and agreed to their names being published. They were selected for their expertise related to the risks in the domain, ability to look across the whole domain and provide a broad view (including knowledge and understanding of relevant considerations for iwi/Māori), and experience of providing similar services.

Natural environment

Jenny Christie, Ministry for the Environment

Anna Berthelsen, Cawthron Institute

Doug Booker, Earth Sciences New Zealand

Sandra Velarde Pajares, WSP New Zealand Ltd

Becky Shanahan, Pattle Delamore Partners Ltd

Sectors relying on the natural environment

Anita Wreford, Lincoln University

Michelle Sands, Horticulture NZ (at the time of participation)

Kiri Goulter, Consultant

Norman Ragg, Cawthron Institute

Built environment

Cathy Bebelman, Auckland Transport

Casimir MacGregor, BRANZ

Rowan Dixon, WSP New Zealand Ltd

Conrad Zorn, University of Auckland

James Hughes, Tonkin + Taylor

People, health and communities

Alex Macmillan, Ōtākou Whakaihu Waka University of Otago

Kylie Mason, Massey University

Debbie Early, Bluewater Endeavours

Sarah Fergusson, ICOMOS

Darren Ngaru King, Consultant

Economy and finance

Ilan Noy, Te Herenga Waka–Victoria University of Wellington

Belinda Storey, Climate Sigma

Feng Hu, Director, silkroad.earth

Jen Gratton, ANZ

Governance

Jonathan Boston, Te Herenga Waka—Victoria University of Wellington

Paula Blackett, Urban Intelligence

Bryn Gandy, Consultant

Rahul R Chopra, Principal Engineer – Risk and Resilience, ARHA

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