

# Bay of Plenty Regional Climate Change Risk Assessment | Appendix A

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## 1 Methodology

The Bay of Plenty Climate Change Risk Assessment has been carried out in accordance with Ministry for Environment (MfE) guidance document for local climate change risk assessments<sup>1</sup>.

The project was carried out in phases between September 2021 to January 2023 including the following key steps:

- Getting started and setting up the assessment
- Risk identification
- Detailed risk assessment
- Geospatial exposure assessment
- Perspectives on climate change risks to Māori.

### 1.1 Risk identification

A risk identification process was undertaken to identify climate change risks to the region. This was done through engagement with stakeholders representing a broad range of interests and sectors (across infrastructure providers, natural environment specialists, key regional economic sectors, health sector etc), as well as iwi/Māori stakeholders. Stakeholders were approached to participate in:

- a survey to identify risks for the region (41 respondents, October 2021)
- an invitation to attend an in-person workshop (22 participants), online workshop (29 participants), or online hui (22 participants). All workshops and hui were held in November 2021.

The risks identified in this process formed the basis of the detailed risk assessment.

### 1.2 Detailed risk assessment

The detailed risk assessment was carried out to validate and rate the risks identified in the risk identification phase. This process was done primarily through focussed online workshops with targeted representatives / subject matter experts. 18 workshops were held to discuss and rate risks to each sector, with some topics having more than one workshop. There were 86 participants representing 42 organisations across these 18 workshops. A list of workshops and workshop attendees are included in Section 1.5. The fully documented risk assessment which includes risk ratings and supporting description/justification is included in Appendix B.

The approach to rating risk followed the methodology outlined in the MfE guide to local climate change risk assessments. This uses a qualitative rating of exposure, sensitivity and adaptive capacity (Figure 1.1). Where:

**Exposure** refers to the presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected by a climate hazard.

**Sensitivity** refers to the degree to which an element at risk is affected, either adversely or beneficially, by climate variability or change. Sensitivity relates to how the element will fare when exposed to a hazard, which is a function of its properties or characteristics.

**Adaptive capacity** refers to the ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences. It relates to how easily/efficiently an element at-risk can adapt (autonomously) or be

assessments. Wellington: Ministry for the Environment.

<sup>1</sup> Ministry for the Environment. 2021. A guide to local climate change risk

adapted (planned) when exposed to a climate hazard. Again, this is a function of an at-risk element’s properties or characteristics.

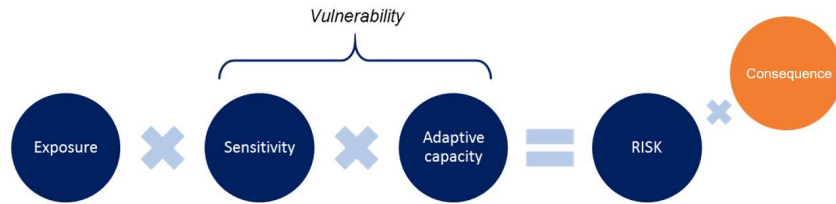


Figure 1.1: Risk equation used to rate risk

The notable exception to this method was in the documentation of risks to health. Climate related health risks are highly uncertain due to the relationship with a range of socio-demographic factors, incidence of drivers of health risks (e.g. disease incidences or incursion), demographics and pre-existing vulnerabilities or inequities. Due to these complexities, health risks have been identified and described, but have not been rated. Indicators of social vulnerability can be used to identify where health risks may be higher. Indicators of social vulnerability have been identified in Volume 1, Section 3.

Major consequences/ key material implications were captured that relate to the identified risks. These were documented across social, economic, environmental and cultural (individual and collective) wellbeing as defined in Table 1.1.

Table 1.1: Wellbeing categories and definitions

Wellbeing	Definition
Social	Involves individuals, their families, whanau, hapū, iwi, and a range of communities being able to set goals and achieve them, such as education, health, the strength of community

	networks, financial and personal security, equity of opportunity, and rights and freedoms.
Economic	Looks at whether the economy can generate the employment and wealth necessary to provide many of the requirements that make for social well-being, such as health, financial security, and equity of opportunity.
Environmental	Considers whether the natural environment can sustainably support the activities that constitute healthy community life. This covers areas such as air quality, fresh water, uncontaminated land, and control of pollution and mitigation of the effects of climate change.
Cultural	Looks at the shared beliefs, values, customs, behaviours and identities reflected through language, stories, visual and performing arts, ceremonies and heritage that make up our communities.

### 1.3 Perspectives on climate change risks to Māori

Risks to Māori form a key focus of this Bay of Plenty Climate Change Risk Assessment. As an initial step in understanding these risks, a series of workshops and hui were undertaken in late November 2021 (22 participants attended the hui ). These hui/workshops captured a range of risks, themes and broader narratives relating to climate change and iwi/Māori interests in the Bay of Plenty.

Following the Phase 1 hui, and subsequent discussions with interested participants of the hui, an approach for documenting Māori perspectives on climate risks was developed consisting of:

- **Literature review:** A literature review of nationally available studies was combined with region specific demographics to present wider risks to Māori in the region.

- **Case studies:** Case studies of two marae within the Bay of Plenty were documented. These outline the main climate risks to those specific hapū/whanau, and provide context on what this means to their communities. The case studies can be found in Volume 1 and Appendix C.

## 1.4 Geospatial exposure assessment

An exposure assessment was undertaken to understand the quantity and spatial distribution of the following risk elements for which spatial datasets were available. Risk elements and the source of data are identified in Table 1.2.

**Table 1.2: Element dataset sources for geospatial assessment**

Geospatial map element	Data source (year sourced)
Archaeological sites	Bay of Plenty Regional Council (2022)
Building footprints	Toitū Te Whenua LINZ Data Service (2022)
Flood defences	Bay of Plenty Regional Council (2022)
Groundwater allocation	Bay of Plenty Regional Council (2022)
Landfills (HAIL sites)	Bay of Plenty Regional Council (2022)
Marae	Bay of Plenty Regional Council (2022)
Social deprivation	EHINZ (2022)
Three waters	Bay of Plenty Lifelines Group (2019)
Road	Bay of Plenty Lifelines Group (2019)
Rail	Bay of Plenty Lifelines Group (2019)
Airport	Toitū Te Whenua LINZ Data Service (2022)
Land use	Land Cover Database LRIS portal (2022)

Table 1.3 summarises the hazards, data sources and scenarios used for assessing risk element exposure. Other hazards were not included in the geospatial assessment due to no data being available.

The assessment was undertaken using spatial software (GIS), where risk elements were overlaid on top of the hazard datasets to quantify their exposure.

This information was then used to inform the hazard exposure ratings within the risk assessment framework, where relevant.

**Table 1.3: Hazard dataset sources for geospatial assessment**

Hazard	Data source	Scenarios
River and surface flooding	Local government. No modelling data available for: <ul style="list-style-type: none"> <li>• Rotorua Lakes District</li> <li>• Kawerau District</li> </ul>	Best available information sourced from district councils. These combined to provide multiple scenarios across the region including: <ul style="list-style-type: none"> <li>• 1% AEP (2130) RCP 8.5 1.25 m SLR</li> <li>• 1% AEP (2050)</li> <li>• 1% AEP (2090)</li> <li>• 2% AEP (2115)</li> <li>• Flood plains and overland flow paths.</li> </ul>
Coastal erosion	Coastal edge proximity buffer (generated by Tonkin and Taylor)	<ul style="list-style-type: none"> <li>• 20 m inland (present day)</li> <li>• 50 m inland (mid-term)</li> <li>• 100 m inland (long-term)</li> </ul>
Coastal flooding	NIWA 2019 coastal inundation datasets	<ul style="list-style-type: none"> <li>• 1% AEP + 0 m SLR (present day)</li> <li>• 1% AEP + 0.3 m SLR (mid-term)</li> <li>• 1% AEP + 0.9 m SLR (long-term)</li> </ul>

## 1.5 Workshop participants

Phase 2 engagement June-Sept 2022

### Engagement planning

#### heritage /archaeological sites

Monday, 29 August 2022 1:30 pm-2:30 pm

Individual consultation

HeritageNZ

#### Energy generation

Monday, 7 Sept 2022 1:30 pm-2:30 pm

Individual consultation

Manawa energy

Transpower

#### Waste

Wed 1 June 10:00 - 12:00

9 participants

Opotiki District Council

Western Bay of Plenty

Whakatane District Council

Tauranga City Council

Kawerau District Council

Rotorua Lakes Council

#### 3 waters

Wed 8 June 10:00 - 12:00 & follow up call

10 participants

Tauranga City Council

Western Bay of Plenty

Whakatane District Council

Opotiki District Council

#### Transport 1 - roads

Thurs 9 June 10:00 - 12:00

8 participants

Waka Kotahi

Tauranga City Council

Western Bay of Plenty

Whakatane District Council

Opotiki District Council

Bay of Plenty Regional Council

#### Transport 1 - rail

Individual consultation

Kiwirail

#### Transport 2 - airports

30 August 2022 10:30 - 12:30

5 participants

Whakatane Airport

Tauranga Airport

Rotorua Airport

#### Transport 3 - ports

Friday, 26 August 2022 10:00 am-11:30 am

Individual consultation

Port of Tauranga

#### Flood management

Tues 28 June 2022 2-4pm

4 participants

Bay of Plenty Regional Council

#### Groundwater, water source, water quality

Thurs 30 June 2022 1-3pm

2 participants

Bay of Plenty Regional Council

#### Coastal and marine ecosystems and species

Fri 17 June 2022 1-3pm

12 participants

Department of Conservation

Bay of Plenty Regional Council

Waikato University

Forest and Bird

Tauranga City Council

#### Freshwater (Riverine, wetlands, lakes)

Tues 14 June 2022 10.30-12.30pm

4 participants

Forest and Bird

Bay of Plenty Regional Council

#### Terrestrial ecosystems and species

Tues 21 June 2022 1.30-3.30

6 participants

Tauranga City Council

Forest and Bird

Bay of Plenty Regional Council

Department of Conservation

#### Biosecurity

Thursday 23 June 2022 10am-12pm

7 participants

Forest and Bird

Bay of Plenty Regional Council

Department of Conservation

Tauranga City Council

Wildlands

#### Tourism/business

Fri 1 July 10:30-12:30

12 participants

Whakatane District Council

Tauranga City Council

Bay of Plenty NZ

Priority One

Follow up consultation

RotoruaNZ

#### Agriculture

Wed 15 June 10:30-12:30

2 participants

Fonterra

Pukeaurifarms (Beef and Lamb)

#### Horticulture

Thurs 16 June 10:30-12:30

9 participants

Zespri

Seeka

NZ Avocado

NZKGI

Trevelyan

#### Forestry

Wed 22 June 10:30-12:30

3 participants

Red Stag Timber

Scion Research

Jeff Tombleson & Associates

#### Fisheries

Wed 29 June 10:30-12:30

7 participants

Aquaculture Direct

BOPRC

Fish and Game

Waikato University

Teohu

Apanui

