

British Columbia Disaster and Climate Risk and Resilience Assessment

Summary for policymakers
October 2025

Land acknowledgement

The Ministry of Emergency Management and Climate Readiness (EMCR) and the Ministry of Energy and Climate Solutions (ECS) gratefully recognize the First Nations territories across the province on which we collectively work toward a more resilient and sustainable future. We also respectfully acknowledge that the writing of this report took place on the territories of the Lək̓ʷəŋən Peoples; the Songhees and Xwsepsum First Nations; the W̱SÁNEĆ Peoples, represented by the Tsawout, Pauquachin, Tsartlip and Tseycum and Malahat First Nations; and the Squamish, Tsleil-Waututh and Musqueam First Nations. This risk and resilience assessment has been informed by work from across over 200 First Nations, spanning seven different language families (Wakashan, Salishan, Tsimshianic, Athabaskan-Eyak-Tlingit/Na-Dene, Ʒaat Kil/Ʒaayda Kil, Ktunaxa and Algonquian). Since time immemorial, these Nations have been stewards of the land and waters, and have protected their diverse cultures, traditional practices, teachings and oral histories.

We are grateful to the First Nations, Métis and Inuit living in B.C., and hold our hands up to the diversity of Indigenous expertise and the leadership they offer. First Nations Peoples are guided by the spirit and voice of the land and water, and their rights and responsibilities over generations to their territories. It is their deep knowledge and relationships with the land that position First Nations as leaders in disaster and climate risk reduction.

Through this work, we were reminded that First Nations, Métis and Inuit are disproportionately impacted by disaster and climate events due to a history of colonialism, the consequences of which continue to be felt by Indigenous Peoples and communities to this day. As we work to understand and address climate and disaster risk, we are committed to strengthening collaboration with First Nations to find more holistic and equitable solutions.

The First Nations Committee on Disaster and Climate Risk expresses respect for the active role of the land itself, and the Ancestors who shaped our world today and who continue to guide future generations. We, the First Nations Committee, centre the land to acknowledge Mother Earth's agency, voice and spirit, and our ongoing relationship of reciprocity with all of Creation.

Table of Contents

Land acknowledgement	2
1.0 Introduction	4
2.0 Climate overview	8
3.0 Hazard summaries	11
4.0. Value area summaries	25
5.0 Extreme event scenarios	49
6.0 Next steps	63

Cover Image: Coastline view on the Sunshine Coast, B.C.

Province of B.C. (2025), British Columbia Disaster and Climate Risk and Resilience Assessment: Summary for Policymakers. Report prepared for the Government of British Columbia, Victoria, B.C. Accessible at: <http://climatereadybc.gov.bc.ca/pages/dcrra>.



Sechelt. Province of B.C., 2008

1.0 Introduction

What's in this document

This document provides a summary of the Provincial Disaster and Climate Risk and Resilience Assessment (DCRRA)—and is intended for policy and decision-makers. It provides a high-level overview of key information and insights from the Provincial DCRRA, including summaries

of each hazard and value area, and the extreme event scenarios. It includes information on climate change influence, as well as the disproportionate impacts on equity-deserving populations.

Additional information in the Provincial DCRRA:

Throughout this summary document are references to chapters in the full technical report where more information can be found. To access the full report and other

supporting products, please visit the Disaster and Climate Risk and Resilience Assessment page on ClimateReadyBC: climatereadybc.gov.bc.ca/pages/dcrra.

Context

The Provincial DCRRA is a key step in understanding and addressing the diverse disaster and climate risks across B.C. It introduces a structured approach to assessing risk and resilience across interconnected systems, providing baseline information to guide strategic efforts in disaster and climate risk reduction and resilience building. It analyzes six priority hazards—riverine flood, coastal flood, extreme heat, wildfire, earthquake, drought and water

scarcity—plus a multi-hazard scenario.

This work was led by the Ministry of Emergency Management and Climate Readiness (EMCR) and the Ministry of Energy and Climate Solutions (ECS),¹ and was developed with input from over 200 internal and external subject matter experts, as well as the First Nations Committee on Disaster and Climate Risk, who collaborated on the development of the assessment process and products.

First Nations Committee on Disaster and Climate Risk

The First Nations Committee on Disaster and Climate Risk (or “the Committee”) is a diverse, collaborative group of 14 First Nations members and representatives, including allies and staff, who shared guidance, perspectives and lived experience on provincial disaster and climate risk. There are over 204 First Nations in B.C. with diverse teachings, governance systems and traditions both across and within communities. The Committee does not represent all of this diversity. However, it seeks to amplify First Nations perspectives and ways of being on the journey to upholding Rights and Title, honouring ancestral knowledge, and engaging in equitable disaster and climate risk and resilience planning. The Committee is connected to the culture and spirit of the land and the ancestral knowledge, wisdom, perspectives and traditions that inform emergency management, climate adaptation and mitigation, and how to live in right relations with all living beings. It is this interconnected knowing and worldview that informs how the Committee has guided the Provincial DCRRA process.

Inherent Rights and Title inform First Nations distinct relationships with and responsibilities to their territories. First Nations laws, legal orders and jurisdictions today are still intact in their unceded territories. The Committee builds on the work of many First Nations to define, fight for and protect these rights.

1. Within the Ministry of Environment and Climate Change Strategy, this work was led by the Climate Action Secretariat (CAS). In November 2024, CAS moved to the newly created Ministry of Energy and Climate Solutions.

Approach

The Provincial DCRRRA takes a values-based approach to risk and resilience assessment, guided by the question: “How do disaster or climate-related events impact what we value?” The framework identifies six interconnected

value areas—natural environment; built environment; society, cultures and relationality; health and wellbeing; economy and governance—to assess risk, resilience and impacts of priority hazards.

For many First Nations, the natural environment and biodiversity have value and form the foundation of the entire system, providing the fundamental conditions of clean air, water and food production necessary for human health and wellbeing. Human societies are built upon these natural systems, with social connections and cultural practices shaping our interactions with the environment and each other. Our built environment, including buildings and infrastructure, both depends on and impacts natural resources while providing services crucial for modern life. The economy is intricately linked to all of these elements, relying on resources, human capabilities and infrastructure to function and, in turn, influencing environmental health, social dynamics and the development of the built environment. Governance, including the mechanisms of policies and regulations, plays a critical role in creating an enabling environment for managing these interconnections.

- First Nations Committee on Disaster and Climate Risk

Gin 'wáadluwan gud ahl kwáagiidang (Northern)

Gina 'waadluxan gud ad kwaagiida (Southern)

“Everything depends on everything else”

Xaad Kíl (Northern dialect—Haida) translation provided with permission of the Xaad Kil Nee Language Department

Southern dialect translation provided, with permission, by Trent Moraes and Dana Moraes

Risk and resilience

Risk is the potential for adverse consequences to something of value, where the occurrence and degree of an outcome is uncertain. The concept of resilience encourages us to identify where our strengths lie and to build the capacity to better deal with the impacts of shocks and stresses.

Since time immemorial, First Nations have been caretakers of the lands and waters, cultivating deep connections, understandings and ways of being in relation to changing natural conditions. They have always managed, responded to and learned from natural hazards, developing and evolving their knowledge to mitigate risk and build resilience over millennia.



Additional information in the Provincial DCRRA:

- Provincial DCRRA context and methodology (Ch. 1.1)
- Provincial DCRRA framework (Ch. 1.3)
- Provincial DCRRA Glossary

2.0 Climate overview

Climate change intensifies risks

Climate change is increasing and intensifying disaster and climate risks in British Columbia. Nearly all climate model projections over all future emissions scenarios, spanning the 2050s and beyond, point to significant changes

for B.C. These changes include warmer winters; hotter summers; longer dry spells in summer; increased precipitation in fall, winter and spring; and increased severity in precipitation and storms.

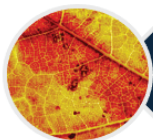
Broad features of climate projections for B.C. that are robust across climate models and scenarios from mid-century (circa 2050s) onward. [Provincial DCRRA Chapter 2, Figure 2.1.1.]



Warmer winters and fewer days below freezing



Hotter summer days with more frequent heatwaves



Less rainfall and longer dry spells in the summer



More precipitation in the fall, winter and spring



Increased severity of precipitation and storm events

This report uses the standard suite of global climate models used for international and national climate assessments which comes from the Coupled Model Intercomparison Project (CMIP), a co-ordinated global effort to understand past and future climate change. These models use different estimates, called “emissions scenarios,” of how greenhouse gas emissions may change in the future.

The annual average surface temperature in B.C. is rising much faster than global trends. Since 1948, it has risen 1.7°C in B.C., with greatest warming in winter (+3.2°C) and smallest in fall (+0.8°C). Future climate projections in the Provincial DCRRRA technical report focus on global warming level (GWL) and consider the potential impacts under 2.5°C and 4.0°C of warming. For example, if the GWL reaches 2.5°C, average and extreme temperatures would rise by +2.7°C and +3.4°C, respectively. If GWL reaches 4.0°C, then B.C. average and extreme temperatures are projected to increase by +4.8°C and +7.7°C, respectively.

Ultimately, these projections are important due to the hazards (such as heatwaves, floods, etc.) and impacts that can result from these changes in climate. Climate change influences the hazards considered in the Provincial DCRRRA, often through multiple climate variables. For example, low seasonal precipitation,

Global warming levels

Climate projection information is often presented using emission scenarios (high, medium or low emissions) and future time periods (for example: 2050s, 2080s). Global warming levels are an alternative way to present climate projection information that focuses on magnitude of global temperature change, as opposed to focusing on the precise timing of warming under different scenarios. Since the severity of climate change-induced impacts tends to scale with GWL, presenting climate projections in this way is a useful approach for impact and risk assessments. If temperatures increase more slowly than expected, the described impacts can be expected later. If they increase more quickly than expected, the described impacts can be expected earlier.

together with high temperatures, can lead to both drought and wildfire hazards.

Temperature: At the projected increase of 2.5°C (predicted to occur in approximately the 2050s), extreme heat events become possible or likely over about half the province and almost certain in some areas. At 4°C of warming (approximately the 2080s), extreme heat events become likely to almost certain throughout most of the province.

Precipitation: Total annual precipitation and annual maximum precipitation are both expected to increase due to climate change, as well as the increased frequency of extreme precipitation events that can lead to both increased riverine flooding and urban flooding. Historically, riverine flooding is B.C.'s most frequent and costly hazard. Some of B.C.'s most productive agricultural lands, as well as a significant percentage of infrastructure and essential services, are in floodplains.

Sea level: Sea level rise and risk of coastal flooding vary by location in B.C. For example, sea level could rise by over 1.5m at the mouth of the Fraser River by 2100. Rising sea levels and storm surges increase the coastal flood risk to densely populated coastline areas with infrastructure, such as major ports, airports and transportation corridors.

Temperature and precipitation:

Snowpack is the main driver of drought across most of B.C. In southern basins such as the Fraser and Columbia, snow drought is expected to occur nearly every year by mid-century. Extreme fire weather conditions, which also reflect the interplay of temperature and precipitation, are projected to occur ~2.5 times as often by the 2100s; in the past, B.C. averaged ~11 days of extreme fire weather conditions.

The increasing frequency and severity of climate-related risks (such as floods, wildfires and heatwaves) underscore the urgency of proactive risk reduction.

Additional information in the Provincial DCRRA:

- Provincial climate overview (Appendix B)
- Hazard overviews (Ch. 2.0)
- Extreme event scenarios (Ch. 5.0)

3.0 Hazard summaries



Hazard: Riverine flood

Key insights

Floods are among the most common and often the costliest natural hazards in B.C. They are exacerbated by increased average and extreme precipitation due to climate change.

Understanding riverine floods

A riverine flood is the temporary inundation of normally dry land by water that overflows the river channel onto the

adjacent floodplain. The factors affecting riverine floods vary considerably across B.C.'s six major river basins (Fraser, Columbia, Peace, Skeena, Stikine and Liard) due to diverse topography and climatic zones. Typically, floods occur in the spring in the mountainous regions of B.C. and in the fall and winter on the coast; however, they can occur at any time.

Riverine flooding on First Nations lands and waters

Today, riverine floods are exacerbated by broader land-use practices, planning and climate change. First Nations have deep knowledge and relationships to areas impacted by floods and know that floodplain areas are important ecosystems that present many gifts from the Creator. First Nations people once placed themselves strategically on the land to exist in relation to natural cycles. This knowledge of the land and strategic placement ensured protection against the environment and safety from other people, as well as supported social gathering and food security. The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) recognizes Indigenous Peoples rights to their traditional territories, which includes floodplains.

- First Nations Committee on Disaster and Climate Risk

Exposure to riverine flood hazard

Results from the Provincial DCRRA hazard exposure analysis include:

- Over 600,000 people are situated in flood-prone areas in B.C., posing significant risks to lives, livelihoods, and the physical and mental health of people living in these areas
- 16% of businesses and 16% of provincial critical infrastructure are within areas exposed to riverine flood inundation for a 1-in-200-year flood

Climate change influence:

- Total annual precipitation and annual maximum precipitation are expected to increase in B.C. Climate models assuming a high emissions scenario project annual precipitation increases of 9% by the 2050s and 13% by the 2080s
- At 4°C global warming, B.C. could experience a 12% increase in overall precipitation and a 19% rise in extreme rain events, leading to more intense storms and a higher risk of flooding
- A larger fraction of precipitation is likely to fall as rain instead of snow, resulting in a steep decline in snowpack, especially in coastal and southern basins (this will change spring and summer water flows, resulting in earlier peak flows (by up to four weeks) and a reduction in peak freshet flows)

Additional information in the Provincial DCRRA:

- Past riverine flood events (Ch. 2.2)
- Disproportionate impacts (Ch. 4.1)
- Climate change influence (Appendix B)



Hazard: Coastal flood

Key insights

Rising sea levels and storm surges increase the risk to densely populated coastlines with infrastructure, such as major ports, airports and transportation corridors. Population exposure in coastal Lower Mainland is close to 10 percent (more than 200,000 people) and is expected to increase with climate change.

Understanding coastal floods

Coastal floods occur when ocean water levels rise above normal, causing the sea to inundate areas of shoreline that are typically dry. They may be caused by storm surges, high tides, tsunamis, sea level rise or wind-generated

waves. Gradual sea level rise from the melting of glaciers and polar ice sheets due to climate change will increase the impacts of coastal flooding.

Coastal flood hazard varies across B.C. coastlines, depending on factors such as geography, climate drivers and shoreline characteristics. Secondary hazards that a coastal flood event can trigger include landslides and slope instabilities, coastal erosion, soil salinization and saltwater intrusion into groundwater. A major earthquake could cause sudden land subsidence, increasing flood risks.

Coastal flooding on First Nations lands and waters

Coastal flooding is an event that happens naturally and is part of a greater system that is linked to the forests, mountains, tides and other natural cycles. First Nations have deep knowledge and relationships to areas impacted by floods and tides, such as knowing that tidal zones are important ecosystems that present many gifts from the Creator. First Nations are some of the most likely populations to be impacted by flooding due to the colonial placement and restriction of First Nations to reserves that are often placed in vulnerable locations, such as floodplains. UNDRIP recognizes Indigenous Peoples rights to their traditional territories, which includes floodplains where First Nations once lived strategically on the land and existed in relation to the natural cycles of the floodplain.

- First Nations Committee on Disaster and Climate Risk

Exposure to coastal flood hazard

Results from the Provincial DCRRA hazard exposure analysis include:

- Population currently exposed to coastal flood: 5% of the total provincial population (230,000), with the vast majority of this exposure occurring in Metro Vancouver Regional District
- The population exposure is projected to surpass 400,000 by the 2050s, due to climate change increase of hazard extent and to population growth along the coast

Climate change influence:

- Historically, coastal flooding in B.C. has been caused by the interaction of coastal shape, tidal conditions and storms, while sea level rise has not played a significant role
- Climate change has caused relative sea levels (RSL) to rise in most coastal areas (this is complicated in coastal B.C. by post-glacial vertical land movement, which varies across the region)
- At the mouth of the Fraser River, by 2050, a historical 100-year extreme sea level event is expected to occur every four to five years under all three emission scenarios

Additional information in the Provincial DCRRA:

- Past coastal flood events (Ch. 2.3)
- Disproportionate impacts (Ch. 4.1)
- Climate change influence (Appendix B)



Hazard: Extreme heat

Key insights

Today, 33 percent of the population of B.C. could be exposed to extreme heat events that pose various health risks. This increases to 98 percent of the population by the 2050s. Extreme heat events amplified by urban heat islands impose severe health risks, resulting in high levels of morbidity and increased mortality. Such events disproportionately affect seniors, low-income individuals, and those without access to cooling facilities. Climate modelling shows that extreme heat events will become increasingly frequent with global warming.

Understanding extreme heat

Extreme heat occurs with higher-than-average daytime and nighttime temperatures for a prolonged period (days). Geographical features and interactions of the natural and built environments can either amplify or decrease heat intensity and duration. Extreme heat has specific regional impacts on the health of ecosystems and people. In addition to direct health impacts, it can reduce air quality, leading to respiratory and cardiovascular issues, which can be further compounded by wildfire smoke. More work is needed to understand the long-term impacts of extreme heat on health.

Extreme heat can combine with, or flow into, other hazards. Heat experienced near large bodies of water can contribute to the formation of thunderstorms. Conversely, extreme heat is often accompanied by drier weather, increasing the risk of droughts and wildfires. Episodic extreme heat events affect short-term water supplies, while ongoing climatic warming causes deglaciation and reduced seasonal snowpacks, impacting long-term water supplies. Both of these are common and will increasingly affect B.C.'s access to fresh water.

Extreme heat on First Nations lands and waters

Extreme heat requires co-ordination between multiple government ministries to allow for early notification, public education and awareness. Decisions around extreme heat on First Nations lands and waters must have the Nations free, prior and informed consent at all levels of government (federal, provincial and municipal) in alignment with UNDRIP, which recognizes Indigenous Peoples rights to their traditional territories.

- First Nations Committee on Disaster and Climate Risk

Exposure to extreme heat

Results from the Provincial DCRRA hazard exposure analysis include:

- Population exposure to risk of extreme heat is currently about 33% and is expected to reach 98% by 2050

Climate change influence:

- With 4.0°C warming (approximately the 2080s), extreme heat events are expected to become likely to almost certain (with annual likelihood of 50% or above) over most of the province

Additional information in the Provincial DCRRA:

- Past extreme heat events (Ch. 2.4)
- Disproportionate impacts (Ch. 4.2)
- Climate change influence (Appendix B)



Hazard: Drought and water scarcity

Key insights

Prolonged periods of low precipitation or low snowpack induce drought and water scarcity. Such conditions challenge water supply systems, agriculture and ecosystem health, with long-term compounding impacts on economic and social systems.

Understanding drought and water scarcity

In B.C., drought often follows a combination of insufficient snow accumulation, extended periods of hot weather, and inadequate rainfall. Water scarcity occurs when there is insufficient water to meet human and ecosystem needs sustainably. Changes to natural systems, land-use practices, and the way we manage water can impact the severity of water scarcity. Cumulative effects of water scarcity, with increased frequency of drought events, weakens systems over time.

Drought and water scarcity on First Nations lands and waters

In the worldview of many First Nations, water is understood as a living entity and a relative with which people share relationships and responsibilities. As recognized in UNDRIP, First Nations have the right to steward, live in relationship with, and maintain responsibilities to their water relatives for future generations. In many cases, water rights of First Nations have been infringed upon; however, there are also examples of collaborative water agreements in place to navigate water scarcity. Importantly, water scarcity impacts Pacific salmon, which are central to the way of life and food security of many First Nations

- First Nations Committee on Disaster and Climate Risk

Exposure to drought and water scarcity

Results from the Provincial DCRRA hazard exposure analysis include:

- 35% of the population in B.C. and 41% of businesses are within areas where drought conditions are expected to worsen in the future due to climate change
- 74% of old growth management areas (14,000 km²), 44% of parks and protected areas (48,000 km²), and 55% of species and ecosystems at risk (210,000 km²) are within areas exposed to this hazard

Climate change influence:

- Climate models project that Southern B.C. will become increasingly drier in summer and fall, driven by rising temperatures and reduced rainfall during these seasons
- Snowpack is the main driver of drought across most of B.C. (with 2.5°C warming, snow drought is expected to impact southern B.C. more often than not; with 4.0°C warming, snow drought is expected annually in the Fraser and Columbia basins, intensifying summer water shortages in high-demand regions)
- By 2100, glacier volume in Western Canada is projected to shrink by 50% to 80%, with some smaller glaciers such as those on Vancouver Island potentially disappearing entirely by mid-century

Additional information in the Provincial DCRRA:

- Past drought and water scarcity events (Ch. 2.5)
- Disproportionate impacts (Ch. 4.3)
- Climate change influence (Appendix B)



Hazard: Wildfire

Key insights

Wildfires threaten health, ecosystems and property, and are increasing in intensity and frequency. Populations in rural and remote communities face significant barriers to evacuation and recovery. Continued expansion into the wildland urban interface (WUI) is increasing public exposure to wildfire threat, encumbering wildfire risk management planning and activities.

Understanding wildfire

Wildfire is a frequent and natural ecological phenomenon in B.C., as well as in many other regions across Canada and around the world. Wildfire is a critical ecological process in many ecosystems,

and many indigenous plants and animal populations adapt to specific kinds and frequencies of fires, or fire regimes. When wildfire ignites near communities or grows to a size where containment is not possible, it may threaten public safety, property, infrastructure and the economy. Wildfire that involves the combination of vegetation and human development is a WUI fire.

In B.C., over the last 10 years, approximately 58 percent of wildfires have been started by lightning strikes, while the remainder have resulted from human activities. Human-caused wildfires may result from industrial activity, equipment use, vehicle fires, railway operations, utility infrastructure, escaped campfires, escaped open burning or other activities.

Wildfire on First Nations lands and waters

In the worldview of many First Nations, wildfires can cause both social-ecological hazards and benefits to humans and all living beings. Cultural burning is a First Nations practice of maintaining and stewarding land and has been enacted by First Nations for generations. First Nations fire stewardship can support ecosystem diversity, reduce fire risk by decreasing fuel loads, and improve food security. While awareness of cultural burning and other diverse risk mitigation strategies is becoming more recognized, colonial barriers continue to exist, impeding First Nations rights and jurisdiction to steward their land, as recognized in UNDRIP. Today, there is a need for increased public education on prescribed burns and other risk mitigation efforts.

- First Nations Committee on Disaster and Climate Risk

Exposure to wildfire

Results from the Provincial DCRRA and the hazard exposure analysis include:

- The 2021 Provincial Wildfire Threat Analysis (PSTA) indicates that 45% of Crown (public) land in B.C. is at a high or extreme threat of wildfire, and that 28% is at a moderate threat
- On Crown land, 12% of the population is exposed to a moderate to extreme threat of wildfire (150,000 people out of 1.4 million people living on Crown land who were analyzed in the PSTA)
- 23% of critical facilities on Crown land and 9% of businesses on Crown land are also exposed to wildfire
- First Nations communities are disproportionately impacted by adverse health and economic impacts of wildfire (while just 5% of Canada's population is Indigenous, First Nations communities make up approximately 42% of wildfire evacuees)

Climate change influence:

- Changing climate conditions, past forestry practices, over-suppression of wildfire, exclusion of Indigenous burning practices and prescribed fire, invasive insect infestations, and disease have significantly impacted forest health, contributing to larger and more frequent wildfires that exhibit extreme and difficult to control fire behaviour
- Models project extreme fire weather conditions to occur about 2.5 times as often by the end of the century (compared to the 1980s which averaged 11 days of extreme fire weather conditions)

Additional information in the Provincial DCRRA:

- Past wildfire events (Ch. 2.6)
- Disproportionate impacts (Ch. 4.4)
- Climate change influence (Appendix B)



Hazard: Earthquake

Key insights

High-consequence earthquakes, particularly in southwestern B.C., pose severe risks to human safety, infrastructure and economic stability. A single magnitude 9 earthquake has the potential for human and economic losses that could exceed the combined losses from all disasters experienced in B.C. over the past 200 years.

Understanding earthquakes

Earthquakes are the intense and sometimes damaging shaking of Earth's surface because of fault rupture and stress release within the ground. The active plate boundary in western B.C. has generated some of the world's largest earthquakes. Although less frequent compared to other hazards, a single great or major earthquake (of magnitude 7 or larger) can inflict many injuries and fatalities, induce significant economic losses, have long-term impacts on jobs and economic growth, and could cause failure of Canada's insurance industry. Smaller, strong earthquakes inflict significant local risk to people and assets throughout the province.

When a fault ruptures, seismic waves agitate the ground. The intensity and duration vary with distance from the rupture and local ground conditions. Softer sediments, like those in river deltas and filled land (such as the Fraser River Delta and False Creek) amplify shaking. Earthquake shaking causes buildings and infrastructure to vibrate, potentially causing damage or collapse. Damage is particularly severe to structures that have been built prior to current seismic design codes; in particular, older unreinforced masonry and concrete structures are vulnerable. Intense ground shaking can last from seconds to minutes (megathrust earthquakes), and major earthquakes may be followed by numerous strong aftershocks.

Various vulnerable populations endure disproportionate impacts. These include individuals who live in vulnerable buildings or who have limited access to insurance and financial means to recover from impacts. It also includes people in remote communities with limited or vulnerable access routes.

Earthquakes on First Nations lands and waters

First Nations have deep knowledge and relationships with areas that may be impacted by earthquakes, and UNDRIP recognizes Indigenous Peoples rights to their traditional territories. First Nations Knowledge and stories tell the history of earthquakes and are a potential source to inform risk and resilience. Many different types of earthquakes can occur, with varying degrees of impact on the environment and infrastructure. They can cause immense damage as well as after-effects such as landslides, floods, fires and tsunamis. Most earthquakes are a natural occurrence, but they can also result from human activities such as fracking. There is a need for more earthquake awareness and for improved reach of alerting systems in B.C.

- First Nations Committee on Disaster and Climate Risk

Exposure to earthquakes

Results from the Provincial DCRRA hazard exposure analysis include:

- Earthquake hazard poses a threat to human life through damage to buildings and infrastructure, and disruption of transportation and critical services and utility operations such as power and water
- 92% of the population in B.C. is exposed to seismic hazards including ground shaking, liquefaction and seismically triggered landslides

- 90% of the businesses in B.C. and 76% of critical facilities are exposed to seismic hazards

Climate change influence:

- The changing climate increases the chance of an earthquake occurring during a climate hazard event (such as extreme temperatures and drought) and the potential for secondary hazards (such as landslides, floods and fires)

Additional information in the Provincial DCRRA:

- Past earthquake events (Ch. 2.7)
- Disproportionate impacts (Ch. 4.5)
- Climate change influence (Appendix B)



Hazard: Multi-hazard

Key insights

Many combinations of B.C.'s diverse hazards can occur simultaneously, with some hazards potentially triggering or amplifying others, exacerbating hazard threat severity and resultant consequences. Multi-hazard events are not limited to natural hazards. The damage and disruption they cause to the built environment can create additional hazards and impacts to people, to infrastructure, to the economy and to the natural environment.

Understanding multi-hazards

“Multi-hazard” describes the interaction of several hazards that may occur simultaneously or cumulatively over time, creating interrelated effects between the dangers or the consequences of each hazard or overlapping hazards. When natural hazards are connected or overlap, their impacts can build on each other—turning a single event into something much larger. Some hazards are innately tied together (for example, a tsunami following an earthquake, or a flood and landslides coming after severe rainfall).

Other hazards are cascading. For example, drought exacerbating a wildfire situation and intensifying overland flooding by degrading the soil's ability to absorb water, leading to increased surface runoff when heavy rain occurs. Some hazards may co-occur by chance, especially when considering longer duration hazards. For instance, because a drought may last for years, there is a significant chance that another unrelated hazard such as an earthquake may occur over this period. Understanding these chains of events helps to better anticipate potential compounding risk and to develop more resilient strategies to manage and mitigate such risk in a changing climate.

For singular events, there are relatively well-documented processes for analyzing hazards. However, multiple hazards may interact in complex ways, with unexpected effects and impacts. Understanding the interactions of multiple hazards and their consequences is essential to addressing systemic risk, avoiding maladaptation and enabling comprehensive risk assessment, resilience planning and resource allocation.

Multi-hazard events on First Nations lands and waters

From a First Nations worldview, all hazards are connected and rooted in the Earth. Multiple and compounding hazards are exacerbated by climate change and resource extraction, with First Nations often facing greater impacts. These complex events can deepen trauma and inequality, affecting the ability to live in self-determined ways. First Nations rights to steward their land, as recognized in UNDRIP, and First Nations-led, holistic climate solutions are vital—and this knowledge must be shared with future generations.

- First Nations Committee on Disaster and Climate Risk

Exposure to multi-hazards

Key exposure insights from the Provincial DCRRA include:

- The potential for a region to experience two or more interacting hazards is generally related to its geological and physiographical properties
- The landscape of British Columbia makes certain pairs of the six priority hazards possible: earthquake and tsunami, earthquake and riverine flooding due to dike failure, extreme heat and wildfire, drought and wildfire, and wildfire and riverine flooding due to change to the land cover as vegetation and soils are burned

Climate change influence:

- Climate change is making many hazards more frequent, severe and longer lasting (in B.C., projections show hotter, drier summers with more heatwaves and longer dry spells, alongside wetter fall, winter and spring seasons with more intense storms)
- These shifting patterns increase the risk of hazards that can trigger or worsen others—such as heatwaves fuelling wildfires or storms causing landslides and floods
- Climate change also alters the timing and overlap of hazards; longer droughts, extended wildfire season and more intense storms raise the chances of hazards occurring at once or back-to-back

Additional information in the Provincial DCRRA:

- Past multi-hazard events (Ch. 2.8)
- Disproportionate impacts (Ch. 4.6)
- Climate change influence (Appendix B)

4.0. Value area summaries



Value area: Natural environment

Key insights

Ecosystems are both vulnerable to and critical for mitigating hazards. Wetlands, forests and coastal areas provide natural defences but are under increasing threat from climate impacts.

Understanding the natural environment

The natural environment in British Columbia includes diverse ecosystems—

such as forests, grasslands, wetlands, rivers and marine waters—that support biodiversity and provide vital ecosystem services: regulating, provisioning and cultural benefits that nature provides for people. These lands and waters are deeply connected to First Nations identities, rights and responsibilities, and have sustained people and species for thousands of years.

First Nations Committee definition: Natural environment

The natural environment is made up of the relationships around us, including the interconnection and interdependence between all elements, creating a continuum of relations, family, stories, songs, names, guidance, teaching and morals of the ecosphere: animals, plants, humans, lands, oceans, rivers and air. All of these beings are part of the same entity and have equal worth; humans have the same worth as a cedar tree, bear or salmon. First Nations have distinct, inherent relationships and rights to their land that informs their way of life, ceremony, governance, laws and oral histories. First Nations inherent rights uphold and maintain their relationships and responsibilities to the land. The United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) upholds First Nations rights and responsibilities to steward and conserve their lands, territories and resources (UNDRIP, Article 29.1).

- First Nations Committee on Disaster and Climate Risk

With over 50,000 species, B.C. has the highest biodiversity in Canada. A healthy environment supports essential functions like clean water, food, medicine and natural spaces, while also maintaining cultural and spiritual connections—especially for First Nations communities. Globally, there is growing recognition that protecting nature is critical for community wellbeing and economic stability. Ecosystem degradation threatens not just the environment, but also financial systems and societal resilience.

Efforts in B.C. reflect this awareness, from valuing ecosystem services economically to policies aimed at protecting land and water. The Province is developing a framework to safeguard biodiversity and ecosystem health while honouring commitments to Indigenous rights and stewardship.

Key findings:

- Ecosystem health is crucial for risk reduction; preserving and restoring natural spaces like wetlands and forests enhances resilience by mitigating hazards and supporting cultural connection to the land
- Climate change and its influence on extreme drought and water scarcity have a particular impact on ecosystems and their services:

74% of old growth management areas (14,000 km²), 44% of parks and protected areas (48,000 km²), and 55% of species and ecosystems at risk (210,000 km²) are within areas that will be exposed to extreme drought conditions in the future due to climate change

Risks to the natural environment

Hazards such as floods, earthquakes, landslides, wildfires and more put the natural environment at risk. Drivers of risk include habitat loss and various modes of resource use and extraction, pollution and contamination, invasive species and biodiversity loss, climate change and impacts on ecosystem resilience, barriers to cultural and spiritual connections to land, and cumulative impacts on ecosystem services.

The Provincial DCRRA project developed risk statements that identify key risks posed by the six hazards to each value area. For the natural environment, hazards contribute risks to:

- Terrestrial and freshwater biodiversity and ecological processes because of impacts to soil quality, air quality, water quality, species and habitat condition

- Material alterations to the hydrological function of watersheds and aquifers because of shifts in the amount, timing and temperature of flows and groundwater recharge functions
- Coastal and marine biodiversity and ecological processes because of impacts to species and habitat condition
- Communities because of impacts on the quality and quantity of provisioning services, regulating services and cultural ecosystem services
- Nature and cultural heritage because of changes to land stewardship during and after disaster and climate events

Resilience pathways

A resilient natural environment evolves with changing conditions in the long term, supported by holistic, climate change-informed ecosystem stewardship that upholds First Nations rights and title, and honours Indigenous Knowledge systems, practices and protocol. It can recover and regenerate after disaster and climate events, ensuring the continued balance of natural systems.

Protecting ecosystems is a critical component of building resilience against disaster and climate risk. As B.C. and the world face an unprecedented rise in natural hazards driven by climate change and other factors, safeguarding the natural environment is no longer an option—it is essential. Developing resilience pathways that prioritize ecosystem protection not only helps to mitigate disaster risk but also strengthens climate adaptation efforts while supporting long-term sustainability.

Resilience pathways focus on:

- Implementing ecosystem-based adaptation strategies that leverage natural systems to reduce climate risks and enhance resilience
- Conserving biodiversity and managing habitats to enhance ecosystem health and resilience to climate change
- Promoting sustainable land and water management practices that increase the adaptive capacity of natural systems
- Adopting climate-smart agriculture and community water supply practices and developing resilient food and water systems

- Implementing preparedness and monitoring systems to detect and respond to climate-related impacts on natural systems
- Strengthening capacity among local communities, Indigenous groups and resource managers to understand and use equity-driven, nature-based measures for risk reduction, climate adaptation and mitigation
- Integrating disaster risk management and climate adaptation into policies, planning and decision-making processes related to natural resource management, land-use planning and environmental protection

Additional information in the Provincial DCRRA:

- Natural environment overview (Ch. 3.1)
- Natural environment risk statements (Ch. 3.1)
- Natural environment risk drivers (Ch. 3.1)
- Natural environment resilience pathways (Ch. 3.1)



Value area: Built environment

Key insights

Critical infrastructure is at risk, and aging infrastructure in urban and rural areas exacerbates the impacts of extreme events, particularly from riverine flooding, earthquakes, wildfire, water scarcity and drought.

Understanding the built environment

The built environment includes buildings and infrastructure—such

as transportation, energy, water and communication systems—that support the health, safety and economic activity of a city, town or region. It provides the physical foundation for daily life in large and small urban and rural areas, shaping how people live, work and interact. These systems deliver essential services, support communities and economies, and play a key role in climate adaptation and disaster resilience.

First Nations Committee definition: Built environment

First Nations built environment comes from the ancestors, Creator, Mother Earth and land stewards—and includes natural, traditional, modern and sacred structures. Unceded territories have been cared for and maintained by land stewards prior to colonization and continue to be cared for today to create resilient and functional environments and built structures. For First Nations, built environment refers to the lands and waters that are stewarded for health, healing and connection alongside ceremony sites, camps, cabins, pit houses and longhouses. Built environment also refers to modern structures that are built to support positive outcomes—structures that are comfortable, safe and built in a healthy and sustainable manner. Colonial-built structures often contribute to ongoing inequities of First Nations by removing access to land without adhering to UNDRIP or the principle of Free, Prior and Informed Consent (FPIC). First Nations have a right to self-determination, including determining the built environment on their territory.

- First Nations Committee on Disaster and Climate Risk

The increasing complexity, interdependency and scale of infrastructure networks make them more challenging to protect and underscore the importance of resilience. Some assets are concentrated in urban centres and others stretch widely and support connections within and outside the province. This variability results in different vulnerabilities. Direct impacts of natural hazards and climate change on the built environment often affect what we value in other important areas. The built environment provides life-sustaining services, such as access to shelter, water and energy, and supports transportation, mobility and economic activities.

Key findings:

- Infrastructure vulnerabilities, especially in aging systems, exacerbate the impacts of hazards, particularly from riverine flooding, earthquakes, water scarcity and drought—most notably in urban areas and remote communities
- Critical infrastructure is particularly at risk; key consequences include disruption of lifeline services, negative health outcomes, and impacts on social cohesion
- Urban areas face compounded risks from population growth and insufficient resilience planning; in WUI areas, wildfires pose significant risks to the built environment

Risks to the built environment

Disruptions to infrastructure—such as energy, transport, water and communications—can severely impact essential services. As these systems are increasingly complex and interconnected, they are more vulnerable and harder to protect. Technological advances improve services but also introduce new risks, highlighting the need for resilient networks that can quickly recover to ensure service continuity to communities across the province.

Drivers of risk include urbanization and population growth, land use and environmental changes, building and infrastructure standards, governance and policy limitations, infrastructure interdependencies, resource management and water control, and inadequate maintenance and adaptation of protective structures.

The Provincial DCRRRA developed risk statements that identify key risks posed by the six hazards to each value area. For the built environment, hazards may contribute risks to:

- Safe, adequate and functional buildings and facilities for all indoor uses because of damage to structures, equipment and servicing infrastructure
- Safe and reliable transportation options because of damage

to vehicles and transportation infrastructure

- Safe and reliable potable water because of damage to the water source, supply and treatment systems
- Reliable wastewater and stormwater management because of damage to treatment facilities, linear infrastructure and green infrastructure
- Safe and reliable energy systems (for example, petroleum refineries, oil and gas processing facilities, hydrogen production, ammonia production) because of impacts to energy infrastructure and increased demand
- Reliable communications options because of impacts to communications and energy infrastructure and increased demand
- Reliable regional waste management systems because of damages to receiving facilities and infrastructure, and excessive debris and other waste that needs processing
- Functionality of the green infrastructure because of damages to the components or whole structure
- Industrial safety because of damages to facilities resulting in hazardous spills (such as chemical, biological waste or radiation release, fire and explosion)

- Reliable information and technology services

Resilience pathways

A resilient built environment includes systems and components designed, constructed and maintained with an appropriate level of consideration of the hazards that may occur during their lifespan and with considerations for future generations' use. Elements of the built environment are able to adapt not only to changes to the natural environment but also to changes in best practices in design and the evolving needs of society.

Effective asset and infrastructure management must go beyond traditional life cycle planning to prioritize resilience in the face of disaster and climate risks. A proactive, system-wide approach ensures that the built environment will continue to support essential services even, or perhaps especially, when facing challenges. This includes integrating key resilience pathways across all sectors. They are:

- Infrastructure hardening and upgrading—applying measures to reinforce or upgrade physical structures to withstand extreme weather, disasters and hazard events
- Redundancy and diversification—ensuring that critical services and systems have backup options

- Advanced planning and risk assessment—conducting regular risk assessments and creating detailed plans
- Technology integration and data utilization—applying measures to create real-time monitoring and establishing smart predictive analytics
- Consideration of risk mitigation in sustainable design—prioritizing the use of sustainable, resilient materials, energy-efficient design, and incorporating green infrastructure solutions
- Deliberation for adaptive design components—considering components of infrastructure systems that are more readily repairable or replaceable or that enhance resilience to a variety of hazards
- Community engagement and inclusive planning to ensure that needs and interests are reflected
- Robust maintenance and inspection to ensure that assets and systems remain functional
- Policy and funding support to incentivize and prioritize resilient practices

Additional information in the Provincial DCRRA:

- Built environment overview (Ch. 3.2)
- Built environment risk drivers (Ch. 3.2)
- Built environment risk statements (Ch. 3.2)
- Built environment resilience pathways (Ch. 3.2)



Value area: Society, cultures and relationality

Key insights

Exposure to disaster and climate events can exacerbate existing inequities, lead to new inequities, and compound the disproportionate impacts experienced by systemically marginalized communities, including Indigenous communities. Strengthening resilience requires centering Indigenous Knowledge and supporting community-led solutions rooted in local priorities and lived experience.

Understanding society, cultures and relationality

Society, cultures and relationality reflect the values, relationships and

shared practices that shape life in B.C., aiming to protect health, wellbeing, safety and social equity. This value area emphasizes social justice, decolonization, Indigenization and inclusion. It recognizes that human and more-than-human (multiple species and processes) relationships, cultural identity and community resilience are interconnected. Social and cultural systems influence how people respond to risks such as climate change, which must be addressed with attention to systemic inequities, marginalization and discrimination. Relationality is a living, place-based practice rooted in connection, responsibility and mutual respect.

First Nations Committee definition: Society, cultures and relationality

First Nations Peoples are deeply connected to the land and all living beings, guided by the belief that everything has spirit, soul and purpose. These relationships ground First Nations inherent rights to self-determination, sovereignty and governance, expressed through ceremony, language, law and ancestral wisdom. Cultural practices thrive when supported by cultural, physical and emotional safety and equity—spaces free from harm where diverse Indigenous Knowledge systems are respected and colonial impacts are acknowledged. First Nations lifeways are sustained through reciprocal responsibilities to land, sacred places and all relations, ensuring cultural continuity for future generations.

- First Nations Committee on Disaster and Climate Risk

Within emergency and disaster settings, it can be challenging to build community safety through the promotion of tolerance; respect for diversity; and equitable access to food, shelter, medical care, safety and other resources. Disruptions to society and cultural practices can have detrimental effects on community resilience and wellbeing, with disproportionate impacts to equity and sovereignty-seeking populations. By fostering social connectedness, providing equitable services and supports, respecting cultural diversity, and nurturing the connection to the land and the environment, communities can build resilience in the face of disaster and climate risks, while also creating conditions that promote physical, mental, spiritual and emotional wellbeing for all members.

Key findings:

- Social cohesion and culture are disrupted by displacement and recovery challenges
- Indigenous communities are disproportionately impacted and face unique cultural losses
- Indigenous Knowledge and community-driven solutions are critical for building resilience that reflects local knowledge, priorities and contexts

Risks to society, cultures and relationality

Each hazard has a unique impact on society and cultures. Still, the main drivers of negative impacts are evacuations and displacements, both during disaster events and in the longer term. These can disrupt social relationships, access to social services, a sense of belonging, cultural practices and land-based relationships. In addition, exposure to disaster and climate events has the potential to exacerbate pre-existing inequities and new inequities can emerge, intensifying the disproportionate impacts that systemically marginalized communities experience during and after significant events.

Drivers of risk include social inequity that erodes social support, capital and connectedness; barriers to accessing reliable and equitable social services; disrupted connection to place and access to safe living environments; impacts to the ability to uphold and foster cultural customs and norms; limited accommodation for maintaining connections with pets and livestock; disruption to learning spaces and norms; impacts on food security; and uneven access to equitable communications infrastructure and systems.

The Provincial DCRRRA developed risk statements that identify key risks posed by the six hazards to each value area. For society, cultures and relationality, hazards contribute risks to:

- Social cohesion and connectedness because of loss of communication infrastructure or inequitable access to informational updates and safety directives; loss of community gathering and distribution sites and/or the ability to access them due to loss of built and/or transportation infrastructure; and separation of people from communities due to displacement, evacuation and relocation
- Reliable and equitable social service delivery because of capacity loss to provide population-specific services in a timely, equitable, accessible and culturally sensitive manner
- Safe, affordable, accessible and equitable temporary and longer term living environments, because of damage or destruction to various types of housing demand that outstrips stock and services without sufficient capacity to meet people's needs when events increase these demands
- Fostering and maintaining cultural, spiritual and religious identities, customs and norms because of destruction or inaccessibility of spiritual sites; significant cultural events; religious, spiritual and cultural artifacts; and displacement, evacuation and relocation of the personnel and communities associated with these spaces
- Cultural continuity and connection to land and water for Indigenous Peoples because of impacts to traditional lands and waters, sites of ceremony, Indigenous Knowledge and practices, and ways of life that embody Indigenous worldviews
- Maintenance of healthy human-animal-ecosystem relationships because of impacts to animal care and transportation structure, feed, veterinary services and personnel to care for companion animals, sport animals, and livestock
- Education access and intergenerational knowledge sharing because of impacts to facilities, community gathering sites and the people involved in teaching and learning
- Food security, food sovereignty, and social and cultural connectivity because of impacts to water and food services and social, cultural or spiritual sharing of food and water
- Implementation and upholding of the UNDRIP and First Nations rights and title because of the impact on land, water and air

- Community safety and social stability because of impacts to communications infrastructure and inadequate risk communications protocols

Resilience pathways

In a resilient future, all people have the resources, support, capacities and access to maintain social connections before, during and after disaster and climate events. Transformative recovery is enacted to promote system-level change; to build back with wisdom; to promote improved community, society, cultures and relationality; and to enhance equity, diversity and inclusion. There are opportunities for enhancing cultural competencies and integrity across the society to strengthen understanding and respect for diversity. Society and cultural services can provide safe, timely and equitable support for communities that are able to anticipate disasters and can help systemically marginalized groups to

withstand and respond to the variety of intersecting hazards they may experience.

Society, cultures and relationality are intrinsically linked to community resilience. A strong society is characterized by diversity, fosters a sense of belonging, meets the diverse needs of culturally informed social supports, and creates pathways for connectedness. This is rooted in the values of trust, reciprocity and redistribution. Pathways to resilience include:

- Considering issues of agency, inclusiveness, reconciliation, accessibility and non-discriminatory participation in planning for risk mitigation, response and recovery
- Taking an equity lens to society, cultures and relationality—there is no one-size-fits-all approach to disaster and climate risk management

Additional information in the Provincial DCRRA:

- Society, cultures and relationality overview (Ch. 3.3)
- Society, cultures and relationality risk drivers (Ch. 3.3)
- Society, cultures and relationality risk statements (Ch. 3.3)
- Society, cultures and relationality resilience pathways (Ch. 3.3)



Value area: Health and wellbeing

Key insights

Hazards have diverse and widespread implications for health and wellbeing. Disaster and climate events exacerbate health inequities and increase illness and mortality.

Understanding health and wellbeing

Health is the realization of thriving, equitable and culturally relevant states. Health and wellbeing are shaped by cultural perspectives and a wide range of social, economic and environmental factors—known as the determinants of health. The World Health Organization (WHO) defines health as complete physical, mental and social wellbeing, not just the absence of illness.

First Nations Committee definition: Health and wellbeing

Indigenous Peoples have long recognized the deep connection between human health and the health of the environment. From the worldview of many First Nations, the health of the Earth, communities and individuals are interconnected and dependent on one another. “Wellbeing” refers to the state of being happy, healthy or prosperous, which requires First Nations to have the ability to participate in ceremonial and cultural events, language revitalization and learning, stewardship and governance, and to be able to access culturally appropriate foods, education and employment. Good health and wellbeing are critical for resilient communities, particularly in the face of disaster and climate events. UNDRIP upholds Indigenous rights to develop and determine their health, practice traditional health protocols, and access health services.

- First Nations Committee on Disaster and Climate Risk

Human health is intricately linked to the health of our environment, and its protection relies on health-supporting measures within and beyond the health sector, understanding the perspectives and experiences of diverse communities, and a commitment to the long-term resilience and wellbeing of current and future generations. By recognizing the interconnected nature of health across the other value areas, disaster and climate risk management strategies can adopt a holistic approach that prioritizes the protection of health and wellbeing while simultaneously building resilience across all aspects of society and the natural environment.

Key findings:

- Disaster and climate events exacerbate health inequities and increase mortality
- Marginalized populations experience disproportionate physical and mental health impacts
- The health risks of disaster and climate events can be reduced by centering health in disaster and climate risk management across all sectors

Risks to health and wellbeing

Protecting people's health and wellbeing is a key objective in disaster and climate risk management. Good health and wellbeing are foundational to fostering a resilient society and, reciprocally, the protection of health and wellbeing against disaster and climate events depends on the presence of resilient societies and health systems. Communities with higher levels of physical and mental health are better equipped to prepare for, respond to and recover from disaster and climate events. Investing in public health initiatives, promoting healthy lifestyles, and addressing underlying determinants of health can strengthen a community's resilience and adaptive capacity.

Drivers of risk include physical health and exposure to hazards, mental health and psychosocial wellbeing, healthcare access and infrastructure, and systemic inequalities.

The Provincial DCRRA developed risk statements that identify key risks posed by the six hazards to each value area. For health and wellbeing, hazards may contribute risks to:

- Physical health because of direct exposure to hazards, and the

impacts of those hazards on environmental conditions

- Psychosocial health and spiritual wellbeing because of stressful consequences experienced during or in anticipation of a hazard event
- Health service provision because of impacts to the healthcare workforce and operations
- Health-supporting infrastructure because of disruption or damage caused by the hazards

Resilience pathways

Resilience for health and wellbeing sees all people having the appropriate capacities, resources and access to information to prepare for and respond to disaster and climate events—and in the face of long-term climate change. A resilient health sector entails a robust, adaptable, culturally safe system that can effectively anticipate, withstand and respond to the increasing severity and frequency of disaster and climate events in affected areas, without disruptions to healthcare services in other locations.

Reducing health risks from disaster and climate events requires strong climate action and risk management. Building resilient, healthy communities calls for

co-ordinated efforts across all sectors, governments, health authorities, NGOs, communities and First Nations. This includes strengthening healthcare systems, supporting the health of first responders and emergency management staff, developing hazard-resilient facilities, and addressing the broader determinants of health. Across B.C., cross-sectoral work is underway to enhance health sector resilience through climate mitigation, adaptation and disaster risk reduction.

Resilience pathways focus on:

- Upholding Indigenous Knowledge systems, practices and self-determination, which recognize the interconnections between human health and the environment through individuals, communities, lands, waters and ecosystems
- Embracing intersectoral collaboration and centering health in disaster and climate risk management action across sectors, ministries and all levels of government
- Prioritizing disaster and climate-resilient health facilities and investing in resilient infrastructure for healthcare facilities located in high-risk areas

- Implementing risk assessments, research and monitoring to support planning, preparedness and response to hazard events
- Proactive health emergency management with strong collaboration and partnerships, consideration of cultural safety, and understanding of risks to cultural and spiritual health
- Developing, expanding and enhancing early warning systems to provide the public, health system staff and healthcare facilities with time to prepare for potential impacts
- Enhancing workforce capacity and education to anticipate, prevent, prepare for and manage climate-related health risks

Additional information in the Provincial DCRRA:

- Health and wellbeing overview (Ch. 3.4)
- Health and wellbeing risk drivers (Ch. 3.4)
- Health and wellbeing risk statements (Ch. 3.4)
- Health and wellbeing resilience pathways (Ch. 3.4)



Value area: Economy

Key insights

Economic impacts of disaster and climate events are far-reaching, disrupting key industries, straining public resources, and leading to significant direct and indirect economic losses province-wide.

Understanding economy

The economy includes the collective activities of individuals, institutions and communities oriented around the production, exchange and consumption of goods and services on a commercial, non-market or labour basis. Business

growth and profitability are measured through indicators such as Gross Domestic Product (GDP) growth, employment rates, trade volumes and sector-specific outputs, including natural resources, tourism, technology and real estate. Within this context, the economy refers to the organized system of human activity involved in the production, distribution and consumption of goods and services, ranging from small-scale transactions between individuals to large-scale operations involving multinational corporations and governments.

First Nations Committee definition: Economy

First Nations economic systems are grounded in First Nations worldviews and governance principles. There are diverse ways to measure First Nations economic success, including community wellbeing, spiritual health and the resilience of the natural environment. The land is not considered an asset, but a living relative. Relationships with the land must be maintained over generations through respectful, reciprocal interactions. This relational understanding influences First Nations economies to be community based, to consider sustainability for future generations, and to focus on balance and re-distribution.

- First Nations Committee on Disaster and Climate Risk

The economy in B.C. is one of the most diverse in Canada. The economic resilience of B.C., in the context of disaster and climate risk, is shaped by the Province's and the private sector's proactive measures in risk management, including business continuity planning for public and private entities. In B.C., people and economic assets are distributed unevenly across the province, with most of the population (85 percent) highly concentrated in urban areas and over 60 percent residing in the Mainland/Southwest. B.C.'s diverse economy, while not geographically determined, shows certain regional characteristics that are important in the context of disaster and climate risk. The economic sector plays a critical role in enhancing disaster and climate resilience, as it drives the allocation and restructuring of resources essential for recovery and adaptation.

Key findings:

- Direct economic losses from disaster and climate events strain provincial resources and disrupt key industries including agriculture, food systems, forestry and tourism
- Riverine floods are among the costliest hazards in B.C. with wide-ranging impacts to infrastructure, essential services and supply chains

- A single magnitude 9 earthquake has the potential for human and economic losses that exceed the combined economic losses from all disasters experienced in B.C. over the past 200 years

Risks to the economy

Disaster and climate events pose significant threats to the economy by disrupting infrastructure, supply chains and business operations. Floods, wildfires and earthquakes cause immediate physical damage, leading to costly repairs and loss of productivity across various sectors. The financial burden includes not only direct damages, but also opportunity cost and long-term economic disruptions.

Drivers of risk include workforce vulnerabilities and resilience, business preparedness and risk management, insurance availability and affordability, supply chain stability and infrastructure resilience, financial systems and economic interdependencies, and emerging trends and economic shifts.

The Provincial DCRRA developed risk statements that identify key risks posed by the six hazards to each value area. For the economy, hazards may contribute risks to:

- Sustainability and productivity of the extraction and harvesting of natural resources because of

damage and disruption to the natural environment, infrastructure systems and other supporting systems

- Productivity and output from manufacturing and processing because of direct damage and disruption to the infrastructure systems and other supporting systems
- Business and service continuity in the service sector because of damage or disruption to sites, buildings, infrastructure and elements of trade and service provision
- A reliable supply chain serving most sectors and industries because of damage and disruption to transportation systems, storage facilities and other supporting systems
- The economic wellbeing of households and workers' self-sufficiency, productivity, health and safety because of disruption to shelter, workplaces and infrastructure
- Business and operations continuity of the financial sector because of damage and disruption of critical supporting systems
- Business continuity of the insurance sector and meeting obligations to policyholders because of the rising

claims, depletion of reserves and potential insolvency, intensified by disruptions to critical infrastructure and workforce availability

Resilience pathways

In a resilient economy, most, if not all individuals, institutions and communities across all sectors of the economy are supported with resources to prevent and reduce risk and build resilience while managing chronic stresses. This includes the delivery of sufficient information and knowledge to minimize disruption and maximize opportunities for the sustainable exchange of goods and services during and after disaster and climate events. First Nations continue to bring their worldviews and principles to economic systems and sectors to reduce the impacts of extraction and to support the development of respectful relationships with natural environments.

Building community resilience is crucial to ensure strong, stable, adaptable economic pathways that can withstand the extensive disruptions and destruction caused by climate-related hazards.

Resilience pathways focus on:

- Integrating climate risk into economic planning and policy through sector-specific risk

assessment, including risks to food security, scenario planning to manage financial impacts, identifying direct and indirect loss and damages, and policy integration

- Diversifying the economy by developing new sectors, supporting small and medium enterprises, regional economic planning, and honouring diverse economic values
- Strengthening social protection systems through access to essential services, social safety nets and inclusive policies

- Fostering public-private partnerships through collaborative investment, risk-sharing mechanisms, innovation and technology transfer
- Promoting financial resilience with insurance and risk transfer tools, access to credit, and fiscal policies
- Enhancing the economic preparedness of communities
- Considering proactive adaptation spending

Additional information in the Provincial DCRRA:

- Economy overview (Ch. 3.5)
- Economy risk drivers (Ch. 3.5)
- Economy risk statements (Ch. 3.5)
- Economy resilience pathways (Ch. 3.5)



Value area: Governance

Key insights

Disaster and climate events pose co-ordination challenges and can strain governance systems. Effective response and resilience planning requires improved co-ordination, strong relationships, ancestral knowledge, and respect for First Nations right to self-determination.

Understanding governance

In B.C., the system of governance involves all of society as actors, including all governments (such as First Nations, Treaty Nations, municipal, regional, provincial and federal), regulators, Indigenous organizations, educational and research institutions, the private sector, civil society and community members of all ages and backgrounds. The relationships, roles and responsibilities, as well as arrangements made by the actors, are critical aspects of governance.

First Nations Committee definition: Governance

First Nations governance is diverse across Nations, but systems can share common elements. For many First Nations, governance is made up of inclusive, participatory systems of decision-making that emphasize stories, listening, consensus and honouring the land. Elders provide guidance and knowledge on how to honour and continue systems of governance, and exchange knowledge with the leaders of the future through youth engagement and participation in governance. Under UNDRIP, First Nations hold the right to self-determination, including their right to autonomy or self-government, as well as free prior and informed consent in decisions that affect them, their communities and territories.

- First Nations Committee on Disaster and Climate Risk

Key findings:

- Improved co-ordination across agencies and levels of government, strong relationships, ancestral knowledge, and respect of First Nations right to self-determination support effective disaster response and resilience planning
- Co-ordination and resource allocation challenges hinder effective response and recovery, underscoring the need for integrated governance frameworks
- A lack of focus on long-term risk mitigation can result in inadequate policy frameworks, insufficient resource allocation, and a reactive rather than proactive approach to risk management

Risks to governance

Governance systems can be disrupted by disaster and climate risks, which may expose vulnerabilities and weaknesses. These gaps can lead to a breakdown in relationships; potential gaps in or duplication of efforts during mitigation, preparedness, response and recovery; ill-informed or inequitable decision-making; and policies and structures that do not adequately account for the increasing challenges posed by these hazards. Drivers of risk include barriers to trust, collaboration and inclusion; lack

of clarity of roles and accountability; limited capacity and resource allocation; and challenges to fiscal resilience and inclusive decision-making.

The Provincial DCRRRA developed risk statements that identify key risks posed by the six hazards to each value area. For governance, hazards may contribute risks to:

- Reliable government operations and public service delivery because of damage to buildings and critical infrastructure, or constraint of capacity and resources to maintain services
- Emergency management systems' effective functionality to prepare for, respond to and support recovery because of the increased frequency and intensity of events, including the cascading and compounding events
- Recognizing and upholding First Nations rights, title, treaty rights and self-determination due to resource constraints
- Providing adequate support to manage the disproportionate impacts on marginalized groups during a disaster or climate event, due to inadequate resources and insufficient planning

- Long-term goals of policy and development plans due to maladaptation or inadequate risk management
- Government financial operations due to escalating costs of disaster response, recovery and resilience-building efforts, compounded by reduced income streams from tax revenues and natural resource sectors
- Reputation, relationships, collaboration and decision-making processes in governments and other organizations due to inadequate risk mitigation, preparedness, response and recovery
- Democratic elections due to impacts on the electoral processes and voter behaviour, such as disruption to electoral infrastructure and transportation options or displacement of voters
- Confidence in government process due to litigation for perceived inadequate risk mitigation and climate adaptation, preparedness, response and recovery
- Proactive risk management due to inadequate organizational capacity or frameworks (such as financial, knowledge, skill and relational capacity, and cultural competency)

Resilience pathways

In a resilient future, we all work together, as residents, organizations and governments in B.C., to build governance systems that are recognized and that uphold the rights, title and inherent authority of First Nations—with clear communications and partnerships, and defined and understood jurisdictions, roles and responsibilities. We take action before, during and after disaster and climate events to build resilience across the province and its people, ensuring that we are effectively mitigating the risks and are prepared for, can respond to and can recover quickly from these events. By building trust, respect and cultural intelligence, we aim to create a foundation of safety that informs transparent and accountable decision-making processes.

Resilience pathways focus on:

- Relationship building and collaboration with First Nations, communities, private sector, and national and international partners that leads to increased resilience
- Institutional capacity and governance with clear mandates, adequate resources and effective co-ordination mechanisms
- Knowledge and expertise, including technical expertise and integrating diverse knowledge systems

- Policy, strategy and legal frameworks that can adapt to and withstand disruptions and support proactive risk management
- Investing in and strengthening technology and infrastructure, including early warning systems
- Establishing monitoring, evaluation and adaptation mechanisms to stay responsive to evolving risks and new data
- Prioritizing and valuing environmental stewardship for future generations

Additional information in the Provincial DCRRA:

- Governance overview (Ch. 3.6)
- Governance risk drivers (Ch. 3.6)
- Governance risk statements (Ch. 3.6)
- Governance resilience pathways (Ch. 3.6)

5.0 Extreme event scenarios

For the Provincial DCRRA, one extreme plausible event was selected for each hazard, plus multi-hazard, to develop a scenario that is used to understand the impacts, consequences and interdependencies of the value areas. The extreme event scenarios are defined

by magnitude and likelihood at present, and the scenarios are also evaluated for relevant climate conditions—in most cases, two Global Warming Levels (GWL 2.5°C and 4.0°C). Confidence scores communicate the uncertainty in likelihood levels, based on the strength of evidence.

Additional information in the Provincial DCRRA:

- Risks from extreme events (Ch. 5)
- Library of critical events (Ch. 5.8)

Scenario: Riverine flood

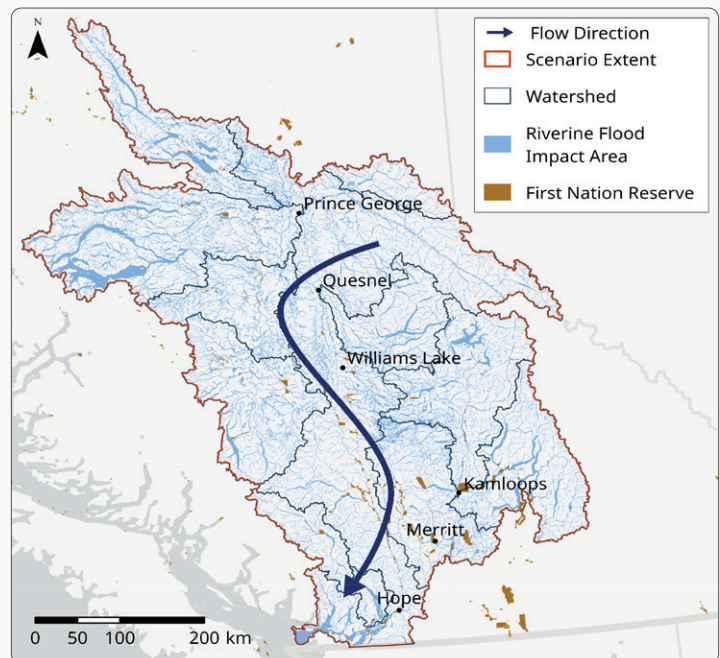
Scenario:

Severe spring riverine flood in the Fraser River watershed

Event summary

In May, unseasonably warm temperatures cause rapid melting of an above-average early spring snowpack, followed by significant rainfall. Runoff from combined snowmelt and rainfall exceed the capacity of small streams and rivers, resulting in a major flood

event. Peak flooding is reached within 24 hours, and water levels remain high for multiple days. Landslides, debris flows and bank erosion may also occur.



Event likelihood

- Annual likelihood of this event: Remote (< 1%)
- Likelihood in the span of 10 years: Moderate (2% to < 10%)
- Confidence in likelihood: High

Influence of climate change on likelihood

- Annual likelihood at 2.5°C global warming level: Moderate (2% to < 10%)
- Annual likelihood at 4°C global warming level: Moderate (2% to < 10%)
- Confidence in likelihood with climate change influence: Medium

Spring floods will continue to impact the region and are significantly influenced by climate change. Likelihood ranks above refer to an event occurring in the Fraser watershed; however, the likelihood of this type of event occurring somewhere across the province in a given year is higher.

Key impacts and consequences:

- Disruptions to transportation, infrastructure and supply chains, with widespread economic impact
- Community inundation, widespread property damage, disruption of critical infrastructure, and prolonged evacuation of residential and commercial areas
- Mud, debris and pollutants induce health hazards and food and water insecurity
- Heightened vulnerability for equity-deserving groups in flood-prone areas due to systemic barriers to recovery resources

Additional information in the Provincial DCRRA:

- Riverine flooding scenario (Ch. 5.1)

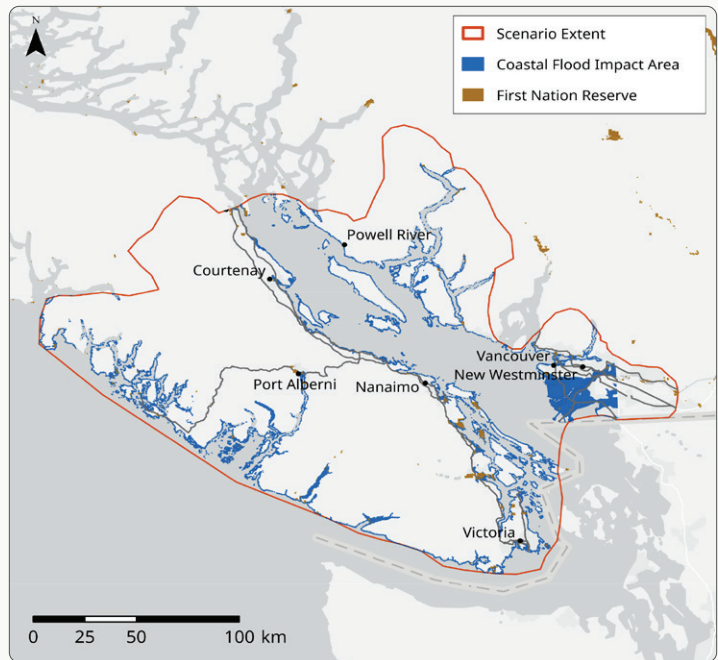
Scenario: Coastal flood

Scenario:

Winter storm and high-tide flood on southwest coast

Event summary

In late December, the southern coast of B.C. and Vancouver Island experience an intense winter storm characterized by extremely strong winds, heavy rainfall, large waves and storm surge. The combination of storm surge and very high tides results in a greater than 200-year return period event. Floodwaters breach coastal flood protection structures such as dikes, sea walls and natural



barriers. Intense wave action, storm surge and heavy rainfall trigger erosion and landslides along steep coastal cliffs. Swells and waves carry debris that cause further damage to coastal infrastructure.

Event likelihood

- Annual likelihood of this event: Remote (< 1%)
- Likelihood in the span of 10 years: Moderate (2% to < 10%)
- Confidence in likelihood: High

Influence of climate change on likelihood

- Annual likelihood at 2.5°C global warming level: High (10% to 20%)
- Annual likelihood at 4°C global warming level: Frequent (< 50%)
- Confidence in likelihood with climate change influence: Medium

Key impacts and consequences:

- Evacuations, displacement and relocation of community members, lasting days to weeks
- Disruption in tourism, fisheries and shipping industries; major seaports and airports; and access to isolated coastal communities
- Implications for social cohesion and connectedness, access to resources and services, and ways of life

Additional information in the Provincial DCRRA:

- Coastal flooding scenario (Ch. 5.2)

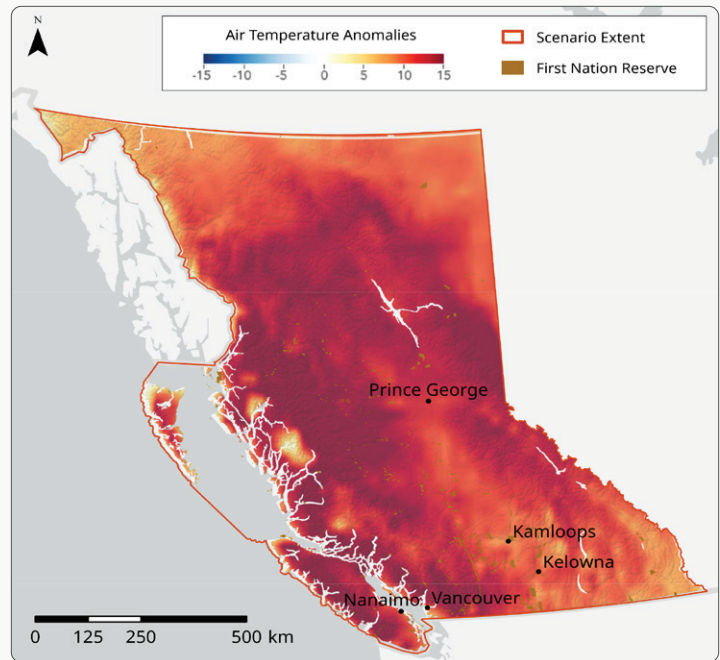
Scenario: Extreme heat

Scenario:

Summer heatwave in Pacific Southwest B.C.

Event summary

After a cooler-than-average spring, a high-pressure system stalls over almost all of B.C. From June 16 to 23, temperatures in the Southwest British Columbia region increase day over day. By June 24, a heat warning is issued by Environment and Climate Change Canada. On June 25, forecasts call for substantive day-over-day temperature



increases until June 29, peaking at 34°C during the daytime and dropping to only 19°C overnight. On June 30, a seven-day period begins in which temperatures progressively return to seasonal norms.

Event likelihood

- Annual likelihood of this event: Remote (< 1%)
- Likelihood in the span of 10 years: Moderate (2% to < 10%)
- Confidence in likelihood: Low

Influence of climate change on likelihood

- Annual likelihood at 2.5°C global warming level: Remote (2% to 10%)
- Annual likelihood at 4°C global warming level: Moderate (10% to 50%)
- Confidence in likelihood with climate change influence: Medium

Key impacts and consequences:

- Health risks for vulnerable populations including older adults, people with health conditions, and those without access to cooling
- Healthcare systems are under pressure due to increased emergency visits and hospitalizations
- Increased wildfire risk from hot, dry conditions
- Stress on ecosystems affects wildlife, aquatic species and plants
- Damage to infrastructure such as roads, rail lines and power systems
- Service disruptions in areas like schools, transport and public events
- Economic costs from higher energy use, reduced productivity and environmental impacts

Additional information in the Provincial DCRRA:

- Extreme heat scenario (Ch. 5.3)

Scenario: Drought and water scarcity

Scenario:

Multi-year drought across B.C.

Event summary

After a summer of average temperatures and precipitation in B.C., the fall has little rainfall and snow. This marks the beginning of a five-year period of extremely low warm-season precipitation and well-above-average, year-round air temperatures across B.C.



Snowfall and snowpack consistently remain well below the historical average over this period, and average air temperatures consistently remain high.

Event likelihood

- Likelihood of this event occurring in B.C.: Remote
- Confidence in likelihood: High

Influence of climate change on likelihood

Influence specific to consecutive snow drought (three years, southern B.C.):

- Annual likelihood: Moderate (2% to 10%)
- Annual likelihood at 2.5°C global warming level: Moderate (2% to 10%)
- Annual likelihood at 4°C global warming level: Moderate to High (9% to 20%)
- Confidence in likelihood with climate change influence: Medium

Key impacts and consequences:

- Rural, Indigenous and vulnerable communities may face disproportionate hardships due to both limited access to water and fewer adaptation resources
- Reduced water availability affects irrigation for crops and livestock—lowering yields, increasing food prices, and threatening farm viability
- Drier conditions fuel more frequent and intense wildfires
- Aquatic habitats and salmon populations are endangered by low streamflow and higher water temperatures, disrupting ecological balance
- Tourism, forestry and agriculture risk long-term financial impacts due to water scarcity and environmental degradation
- Increased risks of respiratory illness and waterborne disease due to reduced water and air quality
- Continued drought accelerates glacier melt and depletes snowpack, compromising long-term water storage and increasing future drought vulnerability

Additional information in the Provincial DCRRA:

- Drought and water scarcity scenario (Ch. 5.4)

Scenario: Wildfire

Scenario:

Wildland urban interface fire

Event summary

A low snowpack, prolonged drought, low spring precipitation and warm temperatures result in a very active wildfire season across the province. By the summer, wildfire resources are stretched. On August 1, “Wildfire A” ignites in a remote forested area and expands rapidly. Within five days, it becomes the region’s largest fire. A cold front on August 7 brings strong winds and lightning, pushing the fire toward a community and starting “Wildfire B” and “Wildfire C.” Driven by wind and terrain, the new fires spread rapidly,



damaging hundreds of structures and prompting the evacuation of nearly 40,000 people. By late summer, all three fires are under control.

This scenario includes a populated area of 100 km along a transportation corridor, representing settlement patterns throughout B.C.

Event likelihood

- Annual likelihood of this event: Moderate (2% to 10%)
- Likelihood in the span of 10 years: High to Frequent (18% to 65%)
- Confidence in likelihood: High

Influence of climate change on likelihood

- Annual likelihood at 2.5°C global warming level: High (10% to 30%)
- Annual likelihood at 4°C global warming level: High (10% to 40%)
- Confidence in likelihood with climate change influence: Medium

Key impacts and consequences:

- Evacuation, recovery and rebuilding resources may not reach all groups equally, worsening pre-existing social and economic disparities. Neighbouring communities are strained due to the sudden influx of evacuees
- Community displacement, property loss and fear cause emotional distress and long-term psychological impacts on residents
- Homes, businesses, schools, roads, and utilities and communications infrastructure are damaged or destroyed, disrupting daily life and essential services
- Local economies suffer from business closures, tourism decline and agricultural losses—some of which may be permanent
- Smoke and poor air quality exacerbate respiratory and cardiovascular conditions, especially in vulnerable populations
- Damage to culturally significant landscapes, artifacts and heritage sites affects local and Indigenous identities
- Forests, wildlife habitats and watersheds are degraded or lost, which can alter biodiversity and increase the risk of landslides or flooding
- Fires can compromise water infrastructure and contaminate natural water sources with ash and debris

Additional information in the Provincial DCRRA:

- Wildfire scenario (Ch. 5.5)

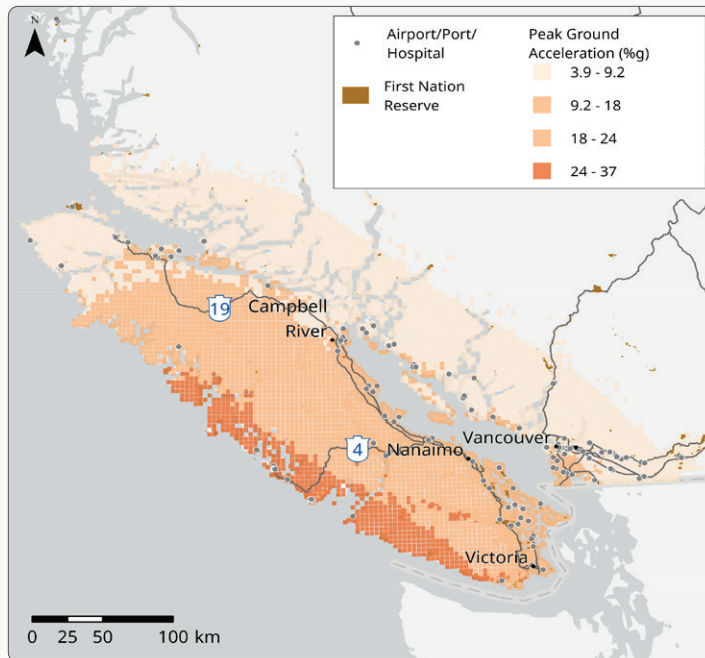
Scenario: Earthquake

Scenario:

Cascadia Megathrust M9.0
Earthquake during wildfire season

Event summary

On a summer morning during wildfire season and an extreme heatwave, a magnitude 9.0 megathrust earthquake strikes offshore of Vancouver Island. Intense, long-lasting shaking is felt across Vancouver Island, the Lower Mainland and into northern California. A tsunami reaches the west coast within 10 to 20 minutes and affects communities along the coasts of Vancouver Island and the Lower Mainland. The earthquake induces additional hazards including landslides,



liquefaction and urban fires. Evacuees, responders and people without power or water become more vulnerable to the extreme heat. Wildfires that are already burning limit provincial and regional response capacity. Powerful aftershocks—some surpassing magnitude 7.0—continue for months and impact urban regions on Vancouver Island.

Event likelihood

- Annual likelihood of this event: Remote (< 1%)
- Likelihood in the span of 10 years: Moderate (2% to < 10%)
- Likelihood in the span of 30 years: Moderate (2% to < 10%)
- Likelihood in the span of 50 years: High (10% to 20%)
- Confidence in likelihood: High

Influence of climate change on likelihood

- Not Applicable

Key impacts and consequences:

- Widespread building damage, tsunamis and secondary hazards result in injury, loss of life and large-scale displacement (about 18,000 buildings are severely damaged or destroyed during the main seismic event, over 10,000 people are injured, and 3,400 people die)
- Landslides are triggered on steep slopes such as those of Vancouver's North Shore and the Sea to Sky Highway, impeding access to and from remote communities
- Homes, bridges, roads, power lines and water systems are destroyed or severely damaged, disrupting services and access
- Trauma, grief and uncertainty affect individuals and communities long after the initial event
- Loss of businesses, jobs and tourism, as well as long-term rebuilding costs, damage regional and provincial economies
- Emergency response and recovery is hampered by damage, environmental instability, demand surges and limited access to isolated communities (heat, smoke and fires further complicate and limit response efforts, as do the ongoing impacts from the tsunami and aftershocks)
- Transport and logistics disruptions delay the delivery of food, water, fuel and essential supplies
- Hospitals and clinics may be overwhelmed, under-resourced or structurally compromised
- Damage to heritage sites, cultural landmarks and gathering places erodes identity and cohesion

Additional information in the Provincial DCRRA:

- Earthquake scenario (Ch. 5.6)

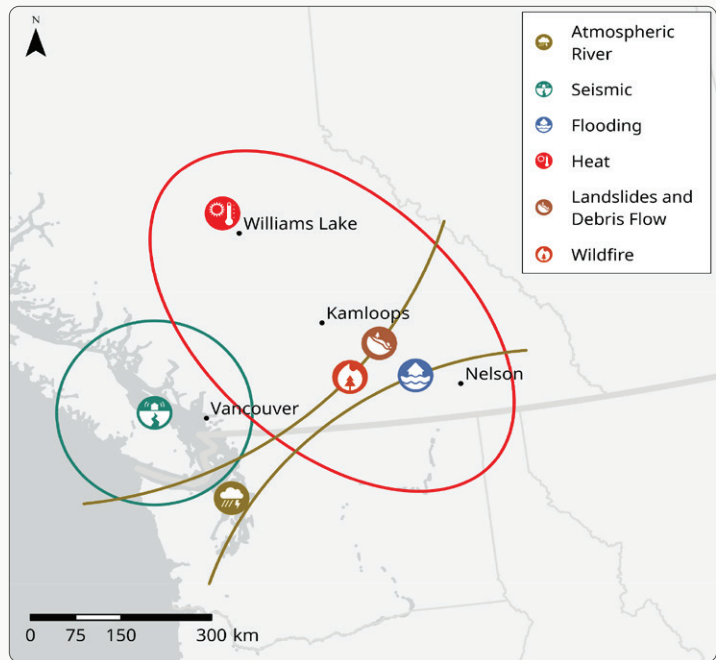
Scenario: Multi-hazard

Scenario:

Multi-hazard event including drought, heat, wildfire, floods and a moderate earthquake

Event summary

Following a two-year drought, a large heat event occurs across the province in July, setting conditions for a wildfire that ignites in late July. The wildfire remains uncontrolled throughout August, and the region and province are affected by the closure of Highway 3. As the wildfire season across the province comes to a close in the fall, the southern part of the province experiences significant rainfall across the region. In mid-November, the Similkameen River floods. Due to damage from the summer wildfires, water is not



absorbed into the landscape and flows off quickly, creating steep creek hazards. In late November, before permanent repairs to flood- and landslide-damaged structures and infrastructure are completed, the Lower Mainland suffers a magnitude 6 earthquake in the Strait of Georgia. This causes light to moderate damage across the Lower Mainland and the east coast of Vancouver Island.

Event likelihood

- Annual likelihood of this event: Remote (<1%)
- Likelihood in the span of 10 years: Low (1% to <2%)
- Confidence in likelihood: High

Influence of climate change on likelihood

- Not assessed

Key impacts and consequences:

- The consecutive hazards disrupt medical services, damage facilities and cause staff shortages
- Long-term displacement, isolation, education gaps and social stress heighten physical and mental health risks, especially for vulnerable populations
- Complex policies and frameworks hinder proactive and equitable disaster responses, while overlapping crises erode community trust
- The cumulative effect of the earthquake, wildfire and flood severely damages buildings, transportation networks and pipelines, causing long-term closures and disrupting supply chains, both regionally and nationally
- Forests, soil and wildlife face slow recovery and adaptation challenges, with a risk of local extinctions due to habitat loss

Additional information in the Provincial DCRRA:

- Multi-hazard scenario (Ch. 5.7)

6.0 Next steps

This assessment represents a first step in understanding and managing risk and resilience in the province of B.C. Additional work is planned to build on this assessment, including:

- **Future risk and resilience assessments**, considering additional hazards and assessments of risk and resilience at a more granular scale
- **Guidance for risk and resilience assessments** to support consistent and systematic approaches to understanding risk and resilience that align with the Emergency and Disaster Management Act (EDMA)
- **Collaboration to integrate diverse worldviews, relationships and contexts**, including influencing values and what is perceived as being at risk
- **Exploring ways to incorporate lived experience** and to engage with disproportionately impacted people and communities
- **Building on the strengths-based approach** started in this provincial assessment by continuing to explore traits that enhance resilience to disaster and climate risks