



Land use planning in a changing climate: roles and responsibilities

Prepared by Dr. Andr anne Doyon,
Associate Professor, School of Resource and Environmental Management
Associate Dean Undergraduate, Faculty of Environment
Simon Fraser University (SFU)

For the Pacific Institute for Climate Solutions

April 2026

Table of Contents

| | |
|--|-----------|
| 1. Land use planning in a changing climate | 3 |
| 1.1. Land use planning: An introduction | 3 |
| 2. Land use planning, housing, and climate risk and adaptation..... | 5 |
| 3. Climate risk in British Columbia | 7 |
| 3.1. Wildfires..... | 8 |
| 3.2. Drought and water shortage | 8 |
| 3.3. Extreme heat | 9 |
| 3.4. Flooding..... | 10 |
| 3.5. Coastal areas and sea-level rise..... | 10 |
| 4. Review of government climate risk and adaptation..... | 11 |
| 4.1. Federal climate risk and adaptation | 11 |
| 4.2. Provincial (BC) climate risk and adaptation | 13 |
| 4.3. Local government (BC) climate risk and adaptation | 16 |
| 5. Land use planning for climate risks in British Columbia..... | 18 |
| 5.1 Wildfire | 20 |
| 5.2 Drought and water shortage | 21 |
| 5.3 Extreme heat..... | 22 |
| 5.4 Flooding..... | 22 |
| 5.4.1 Riparian areas | 24 |
| 5.5 Coastal areas and Sea-level Rise (SLR)..... | 25 |
| 6. Conclusion..... | 25 |

1. Land use planning in a changing climate

Land use planning is a priority area for governments in British Columbia (BC). Land use planning – where and how communities develop and ecosystems are cared for – plays a pivotal role in both exacerbating and responding to climate risk. Land use planning is complex and must consider how to align the diverse priorities of decision makers and land users, which meets the needs of current and future generations of humans and natural ecosystems. This is further complexified by the short- and long-term impacts of climate change. This can lead to competing priorities, timelines, and incentives, especially when costs of (in)action transcend political jurisdictions, or when regulatory frameworks are misaligned at various orders of government. In these scenarios, short-term economic gains can often compete with long-term risk and sustainability and wellness goals.

This report presents a synthesis and analysis of land use planning roles and responsibilities across BC with particular focus on climate risk and adaptation. It begins with an introduction to land use planning within the context of BC. This report is primarily focused on the settler-colonial government context. First Nations governments, communities, and individuals have engaged in land use planning since time immemorial and play important roles in responding to climate change, but these efforts are mostly outside of the scope of this report. Next, a synthesis of academic, government and industry research on land use planning, housing, and climate risk and adaptation is offered. Then, federal, provincial (BC), and local government approaches to climate risk and adaptation are reviewed. Finally, three specific risks in BC – water, wildfire, and extreme heat – are analyzed, and examples of current land use planning approaches for each risk are given.

1.1. Land use planning: An introduction

Land use planning in Canada is a multifaceted process involving federal, provincial/territorial, and local governments, along with First Nations, Metis, and Inuit, and stakeholders. It guides the development and use of land while balancing various needs, including environmental protection, economic development, and community well-being.

The Canadian Constitution interprets planning as a provincial or territorial responsibility. Provinces and territories have created planning frameworks and legislation to direct planning practices, processes, and powers across the province or territory, and within local governments. Municipalities and regional districts in BC are empowered by provincial legislation (Community Charter, Local Government Act, and Vancouver

Charter) to govern in a wide range of areas, including land use planning. Local government governance and powers focus specifically on how municipal councils and regional district boards organize, operate, provide services and make themselves accountable to their communities. Local government land use planning establishes land use patterns, which are implemented through policy tools.

Land use planning is responsible for:

- Long-term visioning of spatial/land use change over time while anticipating environmental, economic, and social impacts and analyzing the compatibility of different land uses
- Setting frameworks and principles to guide and regulate the location and nature of development, infrastructure, and servicing

Planning is normally divided into two types of activities: strategic and statutory. Strategic planning sets the direction for how land and water resources are managed to achieve the goals of a community (these include economic, environmental, social, and cultural goals). Statutory planning, also known as legal or regulated planning, involves using legally binding documents and tools, to guide and control land use and development. However, land use planning is better understood across of spectrum of time (short vs. long), scale (site, neighbourhood, city/region), and regulation (mandatory or voluntary), where both strategic and statutory approaches are used to achieve desired outcomes. Below are relevant policy tools used by governments and planning offices to guide the development and use of land.

| Policy Tools | |
|---|---|
| Strategic policy planning | Regional growth strategies (RGS), official community plans (OCP), Housing Needs Reports, or other issue-specific planning documents that are forward thinking in direction to guide land use planning and development. |
| Area or topic specific policy planning | Interpretive secondary or neighbourhood plans, area structure plans, and area redevelopment plans translate the intentions of the comprehensive plans noted above into more tangible, indicative terms. |
| Regulatory tools | Land-use bylaws, zoning bylaws, heritage and environmental legislation, building bylaws, and subdivision servicing bylaws establish legal obligations and sanctions for actions associated with relevant plan implementation. |
| Programs and projects | Asset management plans. Infrastructure and public works that should be consistent with, and advance, with relevant plan’s goals and objectives. |

| | |
|----------------------------|---|
| Financial tools | Development cost charges (DCCs), amenity cost charges (ACC), inclusionary zoning (IZ), density bonusing (DB), etc. |
| Complementary tools | Plans and policies created and managed by other departments and communication and education programs that should be consistent with relevant plans. |

2. Land use planning, housing, and climate risk and adaptation

Climate change is leading to more frequent, and more extreme weather events and hazards around the world. The impacts of climate change are predicted to worsen over the coming decades. Already there is significant impact of these events, and a changing climate more broadly, on housing around the world. This includes the increased number of dwellings that face damage or destruction from events like floods and fire, as well as the negative quality of life impacts for occupants due to more extreme weather events such as heat waves. Climate change hazards and outcomes have a range of social, financial, and environmental impacts for individuals, as well as wider communities. While an individual or a community might be able to rebuild or recover after a one-off event, it is the repeated events that are putting increasing strain on communities.

However, it is not just the financial cost of recovery - which is worsening - but the social impacts of individuals and communities who must deal with the mental health and wellbeing challenges that come from these issues. Additionally, there are environmental impacts from damaged dwellings, and the materials required to rebuild or fix them, as well as decisions around where and how to build are now exacerbating many of these issues. Areas that were not identified as being in flood or fire zones now find themselves experiencing these events due to changes to natural environments, and such events are no longer restricted to 'traditional' periods of time. For example, BC's wildfire 2023 season started earlier and remained active well into autumn. Given an uncertain future, new ways are needed to adapt and provide resilient and sustainable communities within the context of a changing climate. There are examples of how to do this across different regions of the world, see [A Transition to Sustainable Housing](#).

With pressures to build more housing stock, especially affordable housing, during a period of financial restraint and uncertainty, building climate resilient communities may seem expensive, but the long-term costs and benefits should outweigh the short-term costs. In addition to delivering new climate resilient communities, attention needs to go

to the existing building stock as well. While most discussions surrounding building retrofits have been in relation to decarbonization, the reasons for retrofits need to be expanded to include climate resilience, as well as understanding opportunities for co-benefits. In fact, the [Pembina Institute](#) found that decreasing emissions through decarbonization retrofits can also help make communities more resilient to extreme weather and temperatures.

The most affordable home is the one that does not have to be rebuilt. The value of insured losses due to climate change has gone up significantly in the past few years. An article in [Insurance Business](#) stated that global insured losses exceeded US\$140 billion in 2024, with events such as the floods in Valencia, Spain, hurricanes in Florida, USA, and wildfires in BC. In 2025, the [Insurance Bureau of Canada](#) reported \$8.5 billion in insured damage caused by severe weather, the highest ever, and some 42 per cent higher than the previous record set in 2016. Since 2019, Canada has seen a 115 per cent increase in the number of claims for personal property damage and a 485 per cent increase in the costs for repairing and replacing personal property.

[Scholars](#) have identified housing as being positioned at a critical juncture for adaptation planning yet, according to an article in [The Globe and Mail](#), building and planning systems are ill-prepared for a changing climate. Within the context of climate adaptation, [Carrie and Lesnikowski](#) write, changes to housing may include “measures to improve physical resilience to floods, storms, and extreme heat in new construction or through retrofits, responsible land use planning to ensure [that] future housing development occurs in low-risk areas, and ensuring an adequate supply of affordable and quality housing to help citizens cope with climate-related impacts.”

To deliver climate resilient communities, new housing needs to be future proofed. This means planning for future climates. At a minimum, this calls for the use of the best evidence of future climate outcomes for the assumed mid-point of a dwelling’s life. In many jurisdictions, building code requirements are at best using current climate data and at worse are using historical climate data, which means new housing is not fit for purpose in terms of climate resiliency. Policy makers need to prioritize the integration of future climate data into building codes and planning schemes to ensure that new housing will perform well now, and into a changing future.

This is changing in Canada. For the [National Model Codes](#), the committee on [Climate Change Adaptation](#) has started developing requirements in response to the changing climate in the areas of overheating, durability and resistance to deterioration, high winds and tornadoes, permafrost zones, wildland urban interface, and flood-resistant design in

buildings. In BC, the focus has been on climate mitigation efforts with the [Energy Step Code](#) and [Zero-Carbon Step Code](#), provincial legislation under the [BC Building Code](#), that that sets establishes minimum energy efficiency performance requirements, and establishes a framework for emissions-intensity requirements of new buildings, respectively.

For existing housing, policy makers and climate resilient housing advocates need to develop a clear metric around what climate resilient housing is, including what future time period is covered within this consideration. In addition, the speed of change is critical given that most of the housing around the world is unlikely to be fit for purpose in relation to a changing climate. To support these efforts, an appropriate retrofit industry needs to be developed that is not just focused on decarbonization but also interlinked with resiliency. This must be done quickly, but also with the right checks and balances to ensure it does not result in housing with defects and poor-quality housing. Governments and industry will need to work together to scale up the type of skills, technologies, and materials to deliver climate resilient communities.

Climate resilience may not be realistic in some locations. Planning for future climate impacts may mean that either building new or retrofitting existing housing should not be done. For example, in the Australian state of New South Wales, the state government is buying back some housing in areas that have been exposed to repeated significant flooding through the [Resilient Homes Program](#). On the Hawai'ian Island of Maui, the government adopted new [Shoreline Rules](#) that restrict development on land with the highest erosion rates, and these rules also impact rebuilding efforts in the town of Lahaina, which was devastated by wildfires in 2023. For both new housing and existing housing, the building and planning systems need to work together. Climate resilience needs to consider not only how to build and retrofit, but where to build.

3. Climate risk in British Columbia

As part of its [Preliminary Strategic Climate Risk Assessment](#) in 2019, the province identifies the greatest risks to BC were severe wildfires, drought and water shortage, heat waves, ocean acidification, and glacier loss; other risks identified that could result in significant consequences included severe river flooding and severe coastal storm surge. This report reviewed wildfires, drought and water shortages, heat waves, and flooding, including river (fluvial), stormwater (pluvial), and coastal (king tide and sea-level rise), as they relate to land use planning.

3.1. Wildfires

In BC, since 2010, the trend in both total costs to suppress and fight wildfires, and the total approximate hectares burned have been significantly increasing. Over the past eight years, BC has faced some of its worst fire seasons in history, and wildfire risk is projected to increase. Climate change is causing warmer and drier conditions which will lead to more frequent, and higher severity fires. In addition, decades of fire prevention and suppression have built up forest fuels which has increased the potential of high-risk crown fires.

Communities particularly at risk are found in or near the wildland-urban interface (WUI). The WUI is the area where human development, including communities, resources, and infrastructure, meets a natural environment that is susceptible to wildfires. WUI fires are extreme wildfires in which burning structures (i.e., buildings, homes, and other physical infrastructure) are a primary source of community fire spread. In BC, the WUI covers 6.4 per cent of the total land area, or 5.5 million hectares, and is projected to increase in the future because of growing populations, climate change, and changing fire regimes. Currently, there are approximately 62,000 communities across Canada that are at risk of destruction by WUI fire.

3.2. Drought and water shortage

BC continues to get less rain and snow than usual and that has a lasting impact on water levels. Drought is a long period with below normal rain or snow that may result in a water shortage. This can impact access to potable water, growing conditions for agriculture, and fish and animal health. BC experienced severe drought in 2023 and 2024 and remains at risk in 2025. The [BC River Forecast Centre](#) found that the province had only [79 per cent of its normal snowpack level](#) by April 2025, and the snow season ended a few weeks earlier than usual. [Environment Canada's seasonal forecast](#) for BC also calls for an increasing chance of a warmer summer, and there's a possibility that drier conditions could be present moving forward, particularly in the Okanagan and the Kootenay regions.

Droughts severely impact other climate-related risks and hazards. For example, they significantly increase the risk and intensity of wildfires by drying out vegetation, making it highly flammable and easily ignited. This creates a dangerous feedback loop where drought conditions exacerbate wildfires, which in turn can worsen drought conditions. Droughts can also significantly worsen the impacts of extreme heat, leading

to longer and more intense heat waves. This is because dry soil reduces the cooling effect of evapotranspiration, allowing the land to retain more heat and exacerbate air temperatures. This combination of factors can have cascading effects on ecosystems, agriculture, and human health.

3.3. Extreme heat

In June 2021, the Pacific Northwest (BC, Washington, and Oregon) experienced a heat dome event. BC faced temperatures at least 10°C, and up to 20°C, above seasonal norms, causing over 600 excess deaths related to extreme heat – the deadliest weather-related event in Canadian history. Climate change impacts and an increasing urban population means that more people are subject to potential extreme heat exposure every year, leading to increased mortality and morbidity. In addition, annual climate surveys ([Local Government Climate Action Program](#) surveys) from local governments within the Metro Vancouver and Fraser Valley regional districts cited extreme heat and heat stress as a significant climate hazard.

The localized aspects of the urban heat island effect and its influence on extreme heat make it a challenge suited for municipal and regional governments. Municipal and regional planning offices, through their impacts on land use and design, urban greening, and overall development and built form, are well situated to respond to extreme heat. It is also worth noting that land use planning approaches to mitigate extreme heat can conflict with objectives around housing stock growth and urban densification. Careful considerations are needed to balance both objectives.

The American Planning Association released a report titled [Planning for Urban Heat Resilience](#). The report identifies planning strategies to mitigate extreme heat: urban greening, urban design, and land use. Urban greening is the implementation of increased vegetation such as parks, urban forestry and trees, green (stormwater) infrastructure, green roofs, and more. Urban greening reduces air and surface temperatures, but specific effects depend on the ecological and physical traits of vegetation. Urban design refers to built-form features that interact with the urban heat island effect, such as building technology, geometry and orientation, shade structures, and 'cool' surfaces that reduce absorption of solar radiation. Land use tool such as zoning and separation of different land uses can be used to create drastically different temperature outcomes across neighbourhoods.

3.4. Flooding

Flooding is a common occurrence in BC. Numerous conditions contribute to flooding, including heavy rain, freshet, high tides, and ice jams, as well as geomorphic processes, structural failures, and human activities. Floods can damage buildings and infrastructure, cause power outages, disrupt transportation, create landslides, and put people in danger. With climate change, more severe and frequent floods will put more communities and people at risk. Floods can happen at any time of year, traditionally the most severe floods usually occur in spring and early summer due to heavy rain and melting snow. However, spring weather is becoming unpredictable, which can lead to earlier and faster snowpack melting. BC is experiencing more storms and extreme rainfall events. These changes in the flow of water can overwhelm rivers, streams, and soil, leading to flooding and landslides.

Flooding is the most common and costly disaster in Canada. The [Insurance Bureau of Canada](#) estimates that the flooding and landslides due to the atmospheric river in November 2021 in southern BC caused \$675 million in insured damage. In addition to the extensive damage and loss of life, the lower mainland was cut off from main access routes to several areas of the province, severely impairing the economy. According to the [Canadian Climate Institute](#), the annual costs of flood damage to homes and buildings in Canada could grow three to five times by mid-century.

3.5. Coastal areas and sea-level rise

Sea level rise (SLR) is one of the many consequences of climate change that coastal cities and communities will face in the next century. SLR is caused by two factors –the melting of ice caps and the expansion of warming seawater. Sea level is predicted to rise anywhere from 0.6 to 2.2 metres by 2100. The effects of SLR have the potential to devastate coastal communities. Planning for SLR has become a necessary task for several local governments in BC, as 80 per cent of the population lives along the coast, meaning that SLR may cause direct or indirect impacts for most residents. According to the [BC Sea Level Rise Adaption Primer](#), SLR is predicted to impact 14 of 29 regional districts. At risk local governments may not have the capacity to produce comprehensive, actionable, and realistic management plans for SLR. Many have called for increased provincial action on coastal flood management relating to SLR.

Coastal wetlands provide critical benefits to BC as it pertains to SLR. This includes coastal protection, erosion control, water purification, cultural values, climate mitigation, and habitat for fish, waterbirds, and pollinators. However, a large percentage of the wetlands

in BC have been lost or degraded. Anthropogenic activity continues to threaten these ecosystems today through development pressure, SLR, climate change, and more.

4. Review of government climate risk and adaptation

Historically, Canada has spent significantly more money on mitigation compared to adaptation. The [Intact Centre on Climate Adaptation](#) have reported that since 2015, the federal government has committed \$42 billion toward reducing greenhouse gas emissions and \$1.9 billion to adaptation, however the federal government [claims](#) to have committed \$6.6 billion to adaptation since 2015. Either way, much more money and policy are needed for adaptation efforts. Similar trends exist at the provincial level in BC, and as a result, the local government level as well.

This section provides an overview of climate risk and adaptation approaches, including policies and programs, by the federal, provincial (BC), and local governments. The findings presented below began with a review of existing (overt) adaptation policies from the different levels of government. Then, policies related to land use, and building and housing were reviewed for inclusion or connections to climate risk and adaptation. For the provincial government section, specific risk or hazard policies were reviewed (e.g., flood and fire), as well as province-wide First Nations-led programs. For the local government level, rather than reviewing specific policies, the section provides a description of the types of adaptation policies developed at that level.

4.1. Federal climate risk and adaptation

The federal government has taken a funding and capacity building approach to climate risk and adaptation as it pertains to housing (infrastructure) and local government actions toward that end. Critiques of the federal government's efforts include:

- Lack of the inclusion of climate resilience in the 2024 Housing Plan.
- Need to identify hazards in relation to communities and new developments.
- Need for national disaster insurance.

The first broad climate change strategy was the 2016 [Pan-Canadian Framework on Clean Growth and Climate Change](#). Adaptation and climate resilience were acknowledged as important, with emphasis on future actions from federal and provincial/territorial governments. The emphasis was on knowledge translation, building climate resilience through infrastructure, protection and improvement of human health and well-being,

supporting vulnerable regions, and reductions in climate-related hazards and disaster risks. However, housing was only discussed as it relates to climate mitigation (e.g., energy efficiency).

[*Climate Actions for a Health Environment and Healthy Economy*](#) was released in 2020 and updated in 2022. It included a large allocation (\$4.4. billion) towards the Canadian Mortgage and Housing Corporation (CMHC) to provide loans for home retrofits for energy efficiency and climate resilience, citing risks such as floods and heat waves. There was also recognition of lower-income households, noting that this funding would support lower-income homeowners and rental properties for low-income renters.

CMHC also produced research on [*Housing and Climate Change*](#), with the aim to communicate the ways climate change can affect housing and ways to work towards a more resilient future. The website includes highlights, as well as research reports, with an emphasis on cost effective interventions and solutions.

In 2023, the [*National Adaptation Strategy*](#) (NAS) was published. This serves as the big picture strategy upon which more frequent action plans (e.g. 2024 National Climate Action Plan), are published at least every five years. The NAS notes risks to physical infrastructure (such as homes) from floods and wildfires, as well as the disproportionate impacts on marginalized and underserved populations and communities, many of which lack capacity and resources to prepare to climate changes, as well as the greater likelihood of living within places that are more exposed to climate impacts (e.g., flood risk zones, urban heat island effect). Thus, important housing goals include minimizing disruption to lives/jobs, and long-term housing solutions. There are also goals for greater information sharing for hazards, as well as community-level resilience, prevention, and mitigation plans. Longer-term indicators are also developed for household adaptation and disaster resilience.

The 2024 [*National Climate Action Plan*](#) lists federal actions to implement objectives from the NAS. Current priorities include: reducing wildfire risk, research, and resilience innovation; increasing flood resilience by mapping, identification, and dissemination of information, flood insurance; and increasing funding for general climate modelling and research.

In the 2024 federal budget, more substantial funding items include community-based adaptation, wildfire research and resilience, and general funding for disaster adaptation and mitigation in communities. More targeted (smaller) investments include funding for remote and smaller Indigenous communities, funding to the CMHC to prepare for

national flood insurance program, and for development of warning systems for extreme weather (focusing on floods and storm surges).

Also released in 2024 is the [Canada Green Building Strategy](#), which complements the NAS. The Green Building Strategy has a strong focus on affordability and increasing suitable housing stock by reducing energy costs and greenhouse gas emissions. The strategy includes content on the need to retrofit existing buildings, building 'green' from the start, as well as choosing alternatives to fossil fuel heating equipment (i.e., heat pumps), which will help Canada achieve its net-zero commitments by 2025. From an equity perspective, the [Canada Greener Homes Affordability Program](#) includes funding for retrofits to support low-median income to reduce monthly energy bills. There is also acknowledgement of the need to build stronger to better equip communities to withstand the effects of climate change, the strategy states: "... climate resilience considerations – including locating, planning, designing, managing, adapting, operating and maintaining buildings infrastructure – and current and projected climate change impacts must be kept in mind."

4.2. Provincial (BC) climate risk and adaptation

The BC government plays a crucial role in climate risk and adaptation by developing strategies, supporting local governments and First Nations, and investing in initiatives to build resilience across the province. This includes developing comprehensive strategies, providing funding and guidance to local governments, and collaborating with various sectors to address climate impacts. Critiques of BC's government climate risk and adaptation efforts often center on a perceived lack of adequate risk assessment, insufficient integration of adaptation into policies, and concerns about the province's ability to meet emissions reduction targets. Some critics also highlight a lack of coordination and clear responsibilities across various agencies, as well as concerns about the strength and scope of the province's adaptation plans.

The central platform or hub for provincial government information on climate risk and adaptation is [Climate Ready BC](#). This is where different strategies and policies are set out and made available. It includes information on the government's action regarding emergency management and climate readiness, seven hazards (floods, wildfires, extreme heat, tsunamis, earthquakes, drought and water scarcity, extreme cold and winter storms) have their own portal pages with information on risks, maps, tools, funding, other programs, and case studies. Another summary page with information on climate-related risks (this time wildfire, water scarcity/drought, heat waves, ocean

warming/acidification, flooding/sea level rise, ecosystem change) is available on the [How B.C. is preparing for climate change](#) website.

Focused on local government action, the [BC Climate Action Toolkit](#) is a web resource that provides communities with tools, resources, and information to help them reduce greenhouse gas emissions and build resilience to climate change. It supports an integrated approach to planning and land use management, encouraging both climate change mitigation and adaptation.

BC's [Climate Preparedness and Adaptation Strategy](#) was a short-term (2022-2025) strategy summarizing and building on existing policies, while setting up future policies. Heatwaves, flooding, wildfires are specific hazards named, with overall goals of enhancing resilience. Information and identification of hazard risk, including, both how and where they are likely to occur. Extra mention is made for wildfires and flood management. Extreme heat preparation is under health and wellness, though heat pumps were mentioned as a specific strategy. The ability of buildings to provide resilience is noted and linked to a climate ready-economy and infrastructure. There is a large focus on energy efficiency (and a portal for different initiatives in this realm), and specific mention of a knowledge and capacity building project lead by BC Housing called [Mobilizing Building Adaptation and Resilience](#) (MBAR).

MBAR intends to build a knowledge base and capacity for local projects to increase resilience, focusing on the design, construction, operation, and renovation of residential buildings. Specific named hazards are air quality (e.g. from wildfires/ozone), extreme temperatures, storms, flood events, fire and wildfires, as well as earthquake performance. The types of buildings include residential buildings, care facilities/other institutional, and specific types of housing (seniors, social, Indigenous). BC Housing has also prepared a [climate ready housing design guide](#) for new builds and retrofits (while acknowledging ongoing development of federal and provincial standards/tools), focusing on multi-family housing (BC Building Code Part 3 typologies). The guide has resilience strategies and approaches for warmer temperatures/extreme heat, as well as wildfires and impacts on air quality, and includes draft materials for flooding, seismic events/slope hazards, wind/storms, snowfall, and chronic stressors.

The [BC clean buildings portal](#) largely focuses on energy efficiency, but there are also funding, innovation, and data provision (e.g. from [PCIC](#) for use in planning for new buildings). For building improvements, this includes funding and financial information, as well as the development of an [existing buildings renewal strategy](#) (focusing on regulation) to help ensure resilience to earthquakes, wildfires, heat waves, and floods.

Recognizing the growing intensity and frequency of floods, the provincial government published the [BC Flood Strategy](#) in Spring 2024, which is a roadmap for action through 2035. The roadmap calls for better understanding of flood risk (including developing floodplain mapping, conducting a flood risk assessment, and raising awareness) followed by improving flood risk governance (integrated flood management, cross-jurisdictional collaboration, and updating of legislation/regulation/policies, as well as technical guidance) to improve flood resilience. The plan's vision notes the disproportionate risks faced by different vulnerable groups, especially Indigenous peoples residing in reserves and urban areas that are primarily located in floodplains. In terms of investment and funding, the government announced in 2025 that there would be no new funding to implement the strategy. Yet, the strategy includes goals for ongoing hazard risk mitigation, a multi-generational approach to reducing flood risks in development and land use (avoidance) while also increasing flood accommodation, protection, or community-led managed retreat where appropriate.

BC's [FireSmart Strategic Plan](#) aims to build wildfire resiliency and reduce the negative impacts of wildfires, by providing evidence, education, structure, access, collaboration, and engagement. Insofar as this relates to homeowners, this means educating and incentivizing homeowners to participate in FireSmart efforts and programming to increase resiliency. Other informational strategies associated with wildfires and development include developing a framework for dealing with wildland urban interface areas such as through risk assessments and mapping, which can be found on the [Wildland urban interface risk class maps](#) website.

BC's impact assessment legislation includes climate change mitigation and adaptation but does not use that terminology, the focus is on GHG emissions. An example of this is [Environmental Assessment Act](#) Section 25 (2) (h) greenhouse gas emissions, including the potential effects on the province being able to meet its targets under the [Greenhouse Gas Reduction Targets Act](#).

BC [Environment Assessment Office's](#) [Guidance for the Selection of Valued Components and Assessment of Potential Effects](#) states that proponents must review Climate Action Plans during scoping and during the development of the description for existing conditions (i.e., proponent must evaluate their project's effect on provincial and federal GHG emissions).

In 2019, BC completed a [Preliminary Strategic Climate Risk Assessment](#), which evaluated the various climate change events that could occur in BC and the associated consequences.

Wildfires, water shortage, heat wave, ocean acidification, glacier loss, and long-term water storage are the greatest risks identified. In 2020, the government released the [Hazard, Risk and Vulnerability Analysis \(HRVA\) Toolkit Expansion](#), which supports communities with hazard identification and provides guidance on public educational resources, bylaw and building code enforcement, incentive programs, emergency response practices, etc. In addition, the [Climate Preparedness and Adaptation Strategy](#) mentions BC's [River Forecast Centre](#), which reports on current and future streamflow conditions and flood hazards.

The BC government recently conducted an updated [disaster and climate risk and resilience assessment](#). In parallel, BC has replaced the Emergency Program Act with the [Emergency and Disaster Management Act \(EDMA\)](#), which will require local authorities to conduct risk assessments that include climate change, Indigenous Knowledges, and disproportionate impacts. The HRVA Toolkit and local government emergency management plans will be updated to reflect the new assessment.

The last approach is not from the provincial government but is a provincial-focused approach from the [First Nations Leadership Council](#). The [BC First Nations Climate Change Strategy](#) is a document aiming to set a foundation for different communities to establish their climate response, while working with the Crown and other partners. A few themes link to communities and (housing) infrastructure. 'Housing and Buildings' (Theme 4.3) includes objectives for housing and buildings that are culturally appropriate, energy efficient, and resilient to climate change, efficient; also aiming to address systemic inequities for housing services (on and off reserve) as part of resiliency and climate change; this means strengthening managing and capacity to build homes and buildings in self-determined ways. Technical strategies such as exploration of passive homes, home design certification programs, technical standards for buildings, and overall education and awareness speak to the recognition of the importance of buildings in addressing climate hazards. 'Emergency Response' (Theme 4.5) includes improving First Nation-led management and preparedness to respond to climate impacts/risks/emergencies, including adaptation measures to floods, wildfires, and other climate hazards. Climate Plans/Monitoring/Assessment has objectives for ensuring that communities develop their own strategies/action plans/assessments/monitoring to inform their own response and planning.

4.3. Local government (BC) climate risk and adaptation

In BC, local governments are required to develop and maintain several key plans, including [OCPs](#), [RGSs](#), and [Housing Needs Reports](#), to guide planning and land use

decisions. These plans are crucial for ensuring that communities have sufficient housing, address social needs, and manage their environmental impact. In terms of climate action, RGSs and OCPs must have targets, policies, and actions proposed for the reduction of greenhouse gas emissions. Local governments must also plan for natural hazards in the OCPs and in their emergency management plans. However, local governments are not mandated to have policies or actions to adapt to climate change.

Climate action often lacks coherence and consistent support from local governments, which speaks to the fragmentation of plans and strategies, as well as the needs and resources that these types of initiatives require. While all local governments are signatories to the [Climate Action Charter](#) and participate in the [Local Government Climate Action Program](#) (LGCAP), only 47 of the 161 municipalities and 10 out of the 28 regional districts have climate action plans. A holistic understanding of how jurisdictions are preparing for climate hazards requires an understanding of how individual plans and policies express different strategies that integrate to form what scholars call “network of plans.” Networks of plans are the collection of plans that have additive and interconnecting goals and mechanisms to guide urban development, ranging in scale from the comprehensive level to smaller, more issue-specific plans. However, for most local governments, climate hazards often do not have a specific “owner” or office, which creates a large barrier to action. This also makes it difficult to review local government approaches to climate risk and adaptation as there is no established set of plans or programs to review. Below are examples of the types of plans developed by local governments in BC.

Climate action plans guide local governments in reducing greenhouse gas emissions and becoming more resilient to climate change. It outlines specific actions and targets to achieve these goals, considering local contexts and needs. These plans often include inventories of existing emissions, reduction targets, and strategies for implementation, including resource allocation. These plans are often developed by municipalities to address climate change both at the local level and in alignment with provincial or national targets.

Climate adaptation plans are a comprehensive, community-specific plan developed by local governments to prepare for and respond to the impacts of climate change. These plans assess potential impacts of extreme weather events like floods and wildfires and identify actions to increase resilience to a changing climate.

Emergency management plans are mandated by the provincial government to address a range of potential emergencies. These plans are crucial for ensuring effective response,

recovery, and risk mitigation efforts. These plans are standardized through the [BC Emergency Management System](#) (BCEMS) to promote consistency and facilitate inter-agency cooperation. While these plans are not explicitly adaptation focused, the new [EDMA legislation](#) is trying to mainstream climate change in emergency management.

A fire resilience plan is a strategic framework that helps communities prepare for, respond to, and recover from wildfires. It typically includes risk assessment, wildfire prevention, and emergency planning. These plans are often based on the principles of [FireSmart](#), which emphasize education, legislation, development considerations, interagency cooperation, emergency planning, and vegetation management.

An extreme heat plan is a document that outlines strategies and actions to mitigate the risks of extreme heat events on the public health and safety of residents. These plans typically include measures to prevent heat-related illnesses and deaths and often address specific populations like the elderly and those with underlying health conditions.

A coastal adaptation plan is a strategic document that outlines how a coastal local government will prepare for and mitigate the impacts of climate change, particularly sea level rise and increased flooding. These plans typically involve a mix of public engagement, technical analysis, and engineering solutions to build resilience and protect communities.

Flood (preparedness) plans or integrated flood management plans are comprehensive strategies for local governments to manage flood risks within their jurisdictions. These plans involve a range of actions, from preventing floods to responding to them effectively. They include assessing flood hazards, implementing preventative measures, and preparing for and responding to flood events.

5. Land use planning for climate risks in British Columbia

The Government of Canada, in a 2012 report titled [Land Use Planning Tools for Local Adaptation to Climate Change](#), identified land use planning as one of the most effective processes to facilitate local adaptation to climate change. Existing processes and tools assist in minimizing risks from the predicted impacts of increased wildfires, floods, and other natural hazards due to a changing climate. The tools outlined in this section provide examples of how to plan for and respond to climate risks and natural hazards in BC.

This section included tools that can be used for multiple hazards, while the other sections include hazard-specific responses.

Zoning bylaws

Zoning bylaws are used to regulate land use, dividing areas into zones (e.g., residential, commercial, industrial, agricultural) to dictate what can be built and where. They mandate specific regulations, including building height, size, location (setbacks), and density. Zoning bylaws can also be used to regulate development for specific hazards or climate risk. For example, a wildfire bylaw can mandate additional sprinkler protection, access for emergency response, and fuel management on public and private property.

Development Permit Areas (DPAs)

DPAs are specific zones designated by local governments in their OCPs to guide, restrict, or regulate development. They can also be used to protect development from risks like landslides, wildfires, flooding, and erosion. DPAs are mostly applicable to new developments and may require additional time and expertise to review and approve permit applications. DPAs also apply to existing land or properties if they are altered or subdivided. Examples of DPAs used for environmental protection and climate risk include Natural Hazard, Hazardous Conditions, Riparian, Foreshore, Creek Hazard, Coastal Hazard, and Wildfire.

DPAs can be used to:

- Inform the specific development regulations for protections of the natural environment, its ecosystems, and biological diversity
- Require setbacks from sensitive ecosystems to maintain undeveloped corridors or riparian areas
- To create buffers in low-lying areas and force new development to be elevated or designed for flooding or sea level rise
- To control or decrease density or intensity near riparian areas, wetlands, or coastal zones warranting protection
- To control new developments in areas of high fire risk, including include requirements for building materials and standards, landscaping, and site considerations

Conservation zoning

The primary purpose of conservation lands is to conserve and manage important habitat for the benefit of regionally or internationally significant fish and wildlife species. Conservation zoning can be used to require setbacks from sensitive ecosystems and coastal areas to maintain undeveloped corridors and control or decrease density or intensity near the areas warranting protection. This can be a simple way to prevent development in sensitive areas but is only applicable to undeveloped areas.

Conservation covenants

Conservation covenants are agreements between the government and landowners that protect sensitive or important habitat on a property from future disturbance, including wildfires and floods. Conservation covenants are often obtained as a condition of rezoning or subdivision. These can be treated as charitable gifts eligible for tax receipts or decrease the property value and thus property taxes.

5.1 Wildfire

There is an urgent need to plan for fire. Increased wildfire risk combined with an expanding WUI poses significant threats to many local governments in BC including property losses, evacuation orders, economic and employment losses, and psychological distress. Planning can help address these challenges and create more adaptive and resilient communities. Through planning documents, processes, and tools, communities can mitigate risk and increase resilience to coexist with wildfire. Examples of land use planning responses for wildfire are provided below:

Community wildfire protection/resilience plans

Community wildfire protection and community wildfire resilience plans are the primary mechanism for wildfire risk reduction planning in BC and are supported by the provincial [Community Resiliency Investment program](#). The plans identify wildfire risks to communities, potential consequences and impacts, and opportunities to reduce wildfire risk.

FireSmart guidelines

[FireSmart guidelines](#) come from both the federal and provincial government to mitigate wildfire risk and increase neighborhood resilience. FireSmart provides design guidelines for homeowners, neighborhoods, and communities to address wildfire hazard factors in

vegetation management, building and development, and emergency planning. The guidelines provide integrated design guidelines across multiple levels of planning; however they are difficult to enforce, and there is homeowner apprehension in rural communities.

FireSmart's Home Ignition Zone

The [Home Ignition Zone](#) is the area within 30 metres of home and structures. Local DPAs can be amended in accordance with BC's [FireSmart's Home Ignition Zone guidelines](#). It is made up of three priority areas: The Immediate Zone, Intermediate Zone, and Extended Zone. The Immediate Zone bans plants, debris, or other combustible materials; gravel, brick, and non-combustible materials are acceptable. The Intermediate Zone only permits low-growing, fire-resistance plants and require mowed/well-maintained lawns throughout fire season. The Extended Zone requires removal of small coniferous trees, tree branches within 2 meters of the ground, and any dead or decaying plant matter.

5.2 Drought and water shortage

Land use planning plays a crucial role in mitigating the impacts of drought and water shortages by influencing both water supply and demand. Land use planning must account for reduced water availability due to drought, including impacts on agriculture, ecosystems, and human water supply. This involves integrating hazard and water planning, sustainable water management practices, and promoting water conservation. In addition, the cumulative impacts of various land uses and climate change impacts need to be measured and monitored to develop effective and long-term drought mitigation strategies. Examples of land use planning responses for drought and water shortage are provided below:

Water Sustainability Act

The BC [Water Sustainability Act](#) (WSA) includes provisions to manage water during drought conditions, prioritizing public health, safety, and critical environmental flows. It allows for temporary protection orders (TPOs) to regulate water diversions and storage, potentially suspending water rights of licensees to protect aquatic ecosystems. The WSA also mandates consideration of environmental flow needs and allows for restrictions on both surface and groundwater use during shortages.

Water Master Plan (WMP)

A WMP is a comprehensive, long-term strategic document (often 20–50 years) that

guides water utilities in managing, upgrading, and expanding infrastructure to meet population growth, regulatory requirements, and climate change challenges. These plans analyze current system performance, identify deficiencies in supply or treatment, and develop cost-effective, sustainable investment strategies.

Water sensitive urban design

Local government can promote features like permeable pavements, green infrastructure, and rainwater harvesting into urban development to reduce stormwater runoff and promote water infiltration; limit impervious surfaces and promote water-efficient landscaping; and promote the use of drought-tolerant plants in landscaping and restrict water-intensive landscaping practices in areas prone to drought through bylaws, DPAs, and design guidelines.

5.3 Extreme heat

In BC, [heat mitigation planning strategies](#) are found in documents such as OCPs, RGSs, area plans, climate action plans, and urban forestry strategies, and are regulated through zoning, bylaws, and DPA, or suggested through design guidelines. Unlike with flooding and fire, there are no explicit heat bylaws, development permit areas, or covenants. Instead, mentions of climate risk and extreme heat are found within other types of planning tools such as DPAs. However, on the building side of things, the BC Building Code was amended, after the Coroner's report on the 2021 Heat Dome, to require at least one living space within each new dwelling unit to be capable of maintaining an indoor temperature of not more than 26°C, achievable through either passive design measures or mechanical cooling.

5.4 Flooding

Land use planning plays a crucial role in managing flood risk by guiding development to minimize potential damage and ensure public safety. It can involve strategically directing development and critical infrastructure away from flood hazard areas and designing flood-resilient buildings and communities, or support mitigation efforts. Unfortunately, detailed spatial information (maps) on floodplains is not readily available, consistent, or up to date in BC. This makes it difficult for local governments, who are responsible for understanding their flood risk and making flood regulation decisions, to effectively manage risk. Examples of land use planning responses for flooding are provided below:

Flood maps

Flood maps show an area that may be covered by water or show where the water reaches during a specific flood event. They are critical tools that help identify potential risks and mitigate flood impacts. Flood maps provide a foundation for land use planning and government decision-making; support emergency management practices; enable flood mitigation activities like adding dikes or other infrastructure; and can empower citizens and property owners to make informed decisions related to flood risk.

Floodplain bylaw

A floodplain bylaw is a regulatory tool used by local governments to manage land development and construction within areas prone to flooding, ensuring that buildings and structures are designed to minimize risk and potential damage during flood events. It dictates where and how buildings can be constructed, including minimum building heights and setbacks from watercourses or flood-prone areas.

Building restrictions in floodplains

In BC, building restrictions in floodplains vary by local governments and can include Flood Construction Level (FCL) requirements, setbacks, and permitted uses. Local governments can develop flood hazard area bylaws and grant exemptions, ensuring consistency with [provincial guidelines](#). Specific restrictions may apply to subdivisions, new developments, and redevelopments.

Flood Construction Level: Is the lowest elevation for building livable floor space. Anything constructed below this level has the potential of being impacted by flood waters. Buildings must be constructed above the FCL to minimize flood damage, the structure below the FCL must be wet-proofed or dry-proofed. Habitable areas cannot be below the FCL. For residential development, the underside of the lowest habitable floor or the pad height for a mobile home must be at least 0.6 meters above the FCL.

Setbacks: Setbacks are the minimum distance of a building from a watercourse or water body or from the outer boundary of a flood hazard area. For example, a setback of 30 meters may apply to certain creeks and rivers, while a 15-meter setback may apply to other watercourses. Setbacks can also account for the future erosion or migration of a stream corridor or shoreline. Restrictions on subdivision, new development, redevelopment, or building expansion can be established for an entire flood hazard area or part of one. Options range from outright prohibition of building to conditions on size, location, site design and other characteristics. Setbacks are established by bylaw.

Permitted uses: Some uses, like high vulnerability uses (hospitals, emergency services), may be prohibited or restricted in floodplains. Low vulnerability uses like parks and recreational uses may be permitted. Communities can also actively plan to direct vulnerable uses, critical infrastructure and services, and higher densities to be located outside of flood hazard areas.

5.4.1 Riparian areas

Riparian areas form the transition zone between aquatic and dry, upland habitats and generally consist as the strip of moisture-loving vegetation growing along the edge of a natural waterbody. Riparian areas must be protected in the development approvals process due to their significant impacts on water quality, bank stabilization, and reduced sedimentation, enhanced biodiversity, water cooling, and reduction in stream flow velocity (among other impacts). Development activities need be aware of their proximity to and impact on, riverine systems, with any planning approvals contingent on appropriate setbacks and restoration measures that do not generate any disturbances to these areas. Examples of land use planning responses are provided below:

Riparian Areas Protection Regulation

The provincial [Riparian Areas Protection Regulation](#) (RAPR) aims to support, direct, and assure, local governments in their efforts to successfully protect fish habitat through development regulation on riparian areas. It applies to any riparian habitat “that is affected by new residential, commercial and industrial development on land under local government jurisdiction” by affording local governments additional authorities under the [Local Government Act](#).

The RAPR empowers various planning tools with additional options to protect aquatic habitat through riparian area management and development control. Planners can utilize these tools to better manage and mitigate development and its impacts.

Streamside Protection and Enhancement Area

A Streamside Protection and Enhancement Area (SPEA) is a mandatory, undisturbed buffer zone adjacent to watercourses in BC, designated to protect fish habitat from development impacts under the RAPR. SPEAs are determined by a Qualified Environmental Professional and prohibit construction, clearing, and paving to maintain essential riparian vegetation and stream health.

Hydrological zoning

Hydrological zoning bylaws are afforded additional power under the RAPR to establish riparian protection in the form of setbacks to restrict activities when a proposed development encroaches within 30m of a waterbody or 60m of a water course ravine. This mitigates the potential for riparian area disturbances throughout all stages of the planning process.

5.5 Coastal areas and Sea-level Rise (SLR)

Jurisdiction over the coastline is shared by different levels of government in Canada, making it complicated to manage, plan, and protect. Local governments have a variety of tools available to initiate planning for SLR. However, these tools require committed staff hours, funding, and creative problem-solving. The provincial government can support local governments by updating SLR projections for 2050, 2100, and 2200, provide funding, and initiate regional and provincial-level coordination.

Following direction from the province, which advises planning for a SLR of 1.0 – 1.4 meters by 2100 and 2 meters by 2200, many coastal local governments have developed SLR strategies. These involve a range of approaches to manage the impacts of rising sea levels. These strategies broadly fall into three categories: protecting the coastline, accommodating to the changing environment, and retreating from at-risk areas.

6. Conclusion

Historically, Canada has spent significantly more money on mitigation compared to adaptation. The [Intact Centre on Climate Adaptation](#) have reported that since 2015, the federal government has committed \$42 billion toward reducing greenhouse gas emissions and \$1.9 billion to adaptation, however the federal government [claims](#) to have committed \$6.6 billion to adaptation since 2015. Either way, much more money and policy are needed for adaptation efforts. Similar trends exist at the provincial level in BC, and as a result, the local government level as well.

BC is entering a period in which climate change is reshaping the fundamental assumptions that have historically guided land use planning, infrastructure investment, and housing policy. Land use planning plays a pivotal role in both exacerbating and responding to climate risk, and the province now faces a decisive moment to align planning systems with the realities of a rapidly changing climate. The increasing

frequency and severity of wildfires, drought, extreme heat, flooding, and sea level rise demand a coordinated, forward looking policy response that integrates climate adaptation into every stage of land use decision making.

Planning systems must shift from reactive, hazard by hazard responses to proactive, integrated climate resilience. This includes updating statutory and strategic planning tools, modernizing hazard mapping, and ensuring that development decisions reflect future—not historical—climate conditions. Housing emerges as a critical policy lever. Climate resilient communities require both future proofed new construction and large scale retrofits of existing housing stock, supported by clear standards, financial mechanisms, and industry capacity. Land use planning must also guide development away from high risk areas, recognizing that in some locations, long term resilience may not be feasible.

At the governance level, there is a need for stronger provincial leadership, including clearer mandates, consistent guidance, and sustained funding for local governments and First Nations. While federal and provincial strategies provide important direction, gaps remain in implementation, coordination, and accountability. Local governments require the tools, data, and resources to operationalize adaptation at the community scale.

BC's land use planning system is one of the most powerful instruments for reducing climate risk, but its effectiveness depends on aligning legislation, policy, and practice with the accelerating pace of climate change. A coherent provincial framework—supported by updated data, integrated planning tools, and cross government coordination—is essential to ensure that communities across BC can withstand, adapt to, and thrive amid the climate challenges ahead.