

Campbell River Community Climate Adaptation Plan



City of
**Campbell
River**

2020

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The City of Campbell River would like to acknowledge ICLEI Canada for providing technical guidance throughout the project. Using ICLEI’s Building Adaptive and Resilient Communities (BARC) methodology, the *Together for Climate* team worked in a collaborative capacity to develop a comprehensive Community Climate Adaptation Plan for Campbell River. Seven other local governments across Vancouver Island were simultaneously engaged in ICLEI Canada’s *Together for Climate* project and shared resources, as well as successes and challenges throughout the initiative.

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Executive Summary

Over the past few decades, climate change has accelerated at an unprecedented rate, causing grave concern amongst the scientific community. In October 2018, the Intergovernmental Panel on Climate Change stated that there may be as little as 10 to 12 years to slow greenhouse gas (GHG) emissions and limit global temperature increase to 1.5° C.¹ To limit warming, there must be “rapid and far-reaching” transitions in how we use our lands, energy, industry, buildings, transportation and design our cities.¹

In 2018, the City of Campbell River was selected as one of eight local governments on Vancouver Island to engage in a collaborative adaptation planning process called the *Together for Climate* project, with technical support from ICLEI Canada. The approach centred around a series of workshops utilizing the expertise of key stakeholders including municipal staff, various levels of governments, First Nations, health professionals, academia, school district representatives, non-profit organizations, utilities, and business. This two-year initiative resulted in the creation of a robust, municipally driven and community-supported climate adaptation plan guided by localized climate science and impacts, a vulnerability and risk assessment, and priority actions to enhance resilience against current and future climate risks.

The foundation of the Community Climate Adaptation Plan (CCAP) is defined by 13 overarching objectives pertaining to the natural and built environment, health and community wellbeing, the economy, and enabling actions:

- 1. Improve the resilience of infrastructure by reducing damage and disruptions associated with a changing climate.*
- 2. Generate awareness and monitoring of changing climate conditions to build support for adaptation.*
- 3. Support residents in proactively managing privately owned property to adapt to temperature and precipitation changes, more frequent and severe extreme weather, and sea level rise.*
- 4. Apply green infrastructure practices and principles to better manage impacts of climate change.*
- 5. Actively manage ecological assets by protecting natural areas and ecosystems.*
- 6. Enhance and protect the community’s tree canopy from impacts of climate change.*
- 7. Improve public safety and preparedness to climate-related events.*
- 8. Protect populations in vulnerable situations from impacts of extreme weather.*
- 9. Generate awareness and monitoring of changing climate conditions to safeguard human health.*
- 10. Create awareness of changing climate conditions, encourage local businesses and organizations to plan for climate-related risks, and identify opportunities to support economic resilience.*
- 11. Increase the knowledge of climate change adaptation impacts and programming within the corporation and community.*
- 12. Establish a coordinated governance, communications, and monitoring framework for the CCAP.*
- 13. Maximize collective impact against climate change through partnerships with local First Nations.*

The project team developed 33 direct initiatives that identify supporting actions, lead and supporting organizations, estimated timelines and costing, and potential indicators to monitor progress. The purpose of the CCAP is to provide a roadmap for Campbell River to prepare itself for the consequences of a changing climate, while identifying new opportunities for action as climate science evolves. Successful implementation will require a commitment of resources over time, along with integrating climate change planning into existing decision-making processes across City departments, and throughout the greater community. The CCAP will require periodic review to ensure it remains relevant and up-to-date as climate science evolves.

Our Vision for Campbell River

Campbell River has significantly increased adaptive capacity by ensuring natural, social, and built community assets maintain their integrity in the face of a changing climate, while integrating climate action across the organization.



1.0 Introduction

Climate change poses the greatest environmental challenge of our time. An overwhelming 97 percent of scientists agree that climate change presents unprecedented risks to society and the ecosystems upon which we all depend for survival.² The Intergovernmental Panel on Climate Change (IPCC) 2018 Special Report *Global Warming of 1.5° C* declared that by 2017 human-induced warming had already reached about 1° C above pre-industrial levels. At the current rate, the world will likely reach human-induced global warming of 1.5° C between 2030 and 2052.¹

Risks posed by global warming are further complicated by the time lag associated with climate change. For example, the world's oceans store the greatest amount of heat energy; however, this stored heat takes time to impact air temperature or climate-related conditions on land. This time lag means that even if society takes immediate steps to curb all greenhouse gas emissions (GHGs), we would still be committed to approximately 1.3° C of warming.^{1,3}

The reality is that human-accelerated climate change has produced widespread impacts that will now have unavoidable consequences in the future. Campbell River is no exception. In recent decades, the city has witnessed changes to precipitation and temperature, coastal erosion, and an increase in the instances and intensity of extreme weather events; all of which have resulted in economic, environmental, and societal costs to the community. Therefore, while mitigation actions are important in curtailing potentially disastrous changes, they are not sufficient. The world is being urged to maintain average warming of 1.5° C, necessitating the requirement for adaptation. However, it should be noted that even under the scenario of 1.5° C average warming, significant damages and costs can still be anticipated.¹

Now more than ever, various levels of government, business, stakeholders, institutions, and individuals all share an opportunity, and a responsibility, collectively to advance adaptation efforts that address changing local conditions. The City of Campbell River recognizes that it must enhance community resiliency to safeguard ecological, built, and societal assets that make our coastal community so unique. Proactive planning will help prepare the community for the ongoing challenges that will inevitably arise in the future, and is a priority supported by Mayor and Council. The strategy going forward is outlined in this Community Climate Adaptation Plan (CCAP).

The purpose of the CCAP is to build resilience and adaptive capacity among multiple stakeholder groups to deal with future climatic events. While mainstreaming climate adaptation into municipal planning comprises part of the plan, a central tenet of the CCAP is that it is community supported – meaning that some actions outlined in the plan are co-owned and implemented by external organizations. Adaptation measures derived from cross-jurisdictional collaboration between diverse stakeholders forms the basis of this plan.

1.1 Together for Climate Project

ICLEI Canada's *Together for Climate* project helped mobilize Campbell River's Community Climate Adaptation Plan. *Together for Climate* was a two-year initiative that engaged eight communities across Vancouver Island to develop climate adaptation strategies. This project builds local capacity within each community to engage with local stakeholders and receive input from a wide range of experts. The *Together for Climate* project also provided participating communities with the opportunity to come together at three provincial workshops to share their challenges and successes, while connecting them to a broader network of practitioners working on climate adaptation across the province and country.



ICLEI Canada's Building Adaptive and Resilient Communities (BARC) program was used to guide *Together for Climate* participants through Milestones 1–3 of a five-milestone planning framework that supports municipal climate change adaptation. The process involved identifying local climate impacts, a community risk and vulnerability assessment, and a participatory approach to action planning to reduce vulnerability and increase resilience to projected climatic changes. Each phase of the project built on the previous. This process resulted in a robust, community-informed and supported adaptation planning document that was articulated and developed by a diverse stakeholder group. More information about ICLEI's BARC program and the methodology for plan development can be found in 'Section 3: Our Process'.

1.2 Campbell River and Together for Climate

Campbell River has already begun to witness a number of impacts resulting from climate change. For instance, the rising frequency and intensity with which severe wind and storm events occur have led to prolonged power outages, ferry cancellations, shoreline erosion, damage to infrastructure, and tree failure. In recent years, BC Parks has had to repair damage caused by two trail related landslides affecting the highly utilized Elk Falls Canyon View trails as a result of increased precipitation and high winds.

Flooding is also a major concern for the Campbell River community, given that a large area of the community lies within a floodplain. Both the Quinsam and Campbell Rivers have experienced flooding, resulting in the loss of popular riverside trails and facilities. Due to king tide events combined with heavy rains, Campbell River has experienced storm drain failure, transportation network closures, and damage to properties.

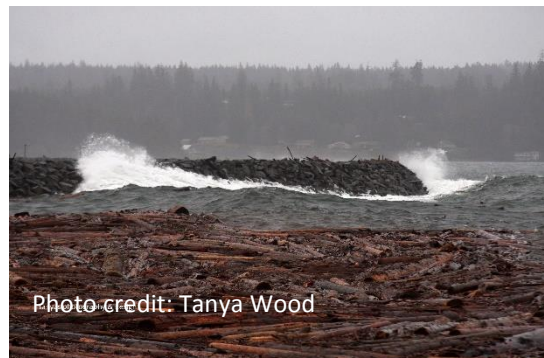


Photo credit: Tanya Wood

Changes in precipitation and temperature have become the new normal, with records being broken more frequently. According to Environment Canada, the spring of 2020 saw approximately half the normal amount of rainfall between the beginning of March and end of May, reaching a record high temperature of 27.5° C on May 10th.⁴ Moreover, in 2019 BC Hydro indicated that low runoff from the Campbell River was poised to break records going back 60 years, based on the water supply forecast between February and September.⁵

Summer is now often accompanied by hotter, drier spells, with watering restrictions in place to ensure sufficient water pressure and supply, and an increasing numbers of forest fires. Campbell River is increasingly under air quality advisories as wildfire smoke from other regions of the Province and farther afield has blanketed the community for prolonged periods, posing significant public health risks to residents. The summer of 2018 was a testament of this when BC's level of air pollution was deemed unhealthy by standards of the World Health Organization.⁶



Photo credit: Christopher Pouget

Communities across Canada are taking the initiative to respond to the global threat of climate change. Notwithstanding the fact that senior levels of government will play a crucial role in helping cities adapt to a changing climate, municipalities have great influence over the extent to which climate adaptation takes place, and how it is implemented.⁷ Campbell River recognizes the importance of advancing action locally to minimize both immediate and future impacts of climate change.

The Community Climate Adaptation Plan provides a practical roadmap to steer Campbell River in preparing for and responding to actual and future projected localized impacts of climate change. This document provides a high-level overview of the following items:

- Federal, Provincial, and Municipal policy context around climate change
- Local climate change projections and impacts
- Development of the plan using ICLEI Canada's BARC methodology
- Summary of themes, objectives and actions identified to enhance adaptive capacity across Campbell River
- Considerations for plan implementation

The CCAP is intended to serve as a living document that identifies new opportunities for action as climate science evolves over time. To achieve successful implementation, the plan will require a commitment of resources over time, along with integrating climate change planning into existing decision-making processes across departments, and throughout the greater community. As such, it will need to be reviewed periodically to ensure it remains relevant and up-to-date.

2.0 The Science of Climate Change

The climate system is complex, comprising many interrelated and interacting components. Climate is the result of a culmination of various biogeophysical factors over a long period of time and differs from weather.³ Climate change can be simply defined as any change in global or regional climate patterns over time and can be caused both by natural factors and human activity.^{8,9} Although natural variation has characterized the Earth's climate system for millions of years, the past 10,000 (the Holocene epoch) have been relatively stable – until recently.

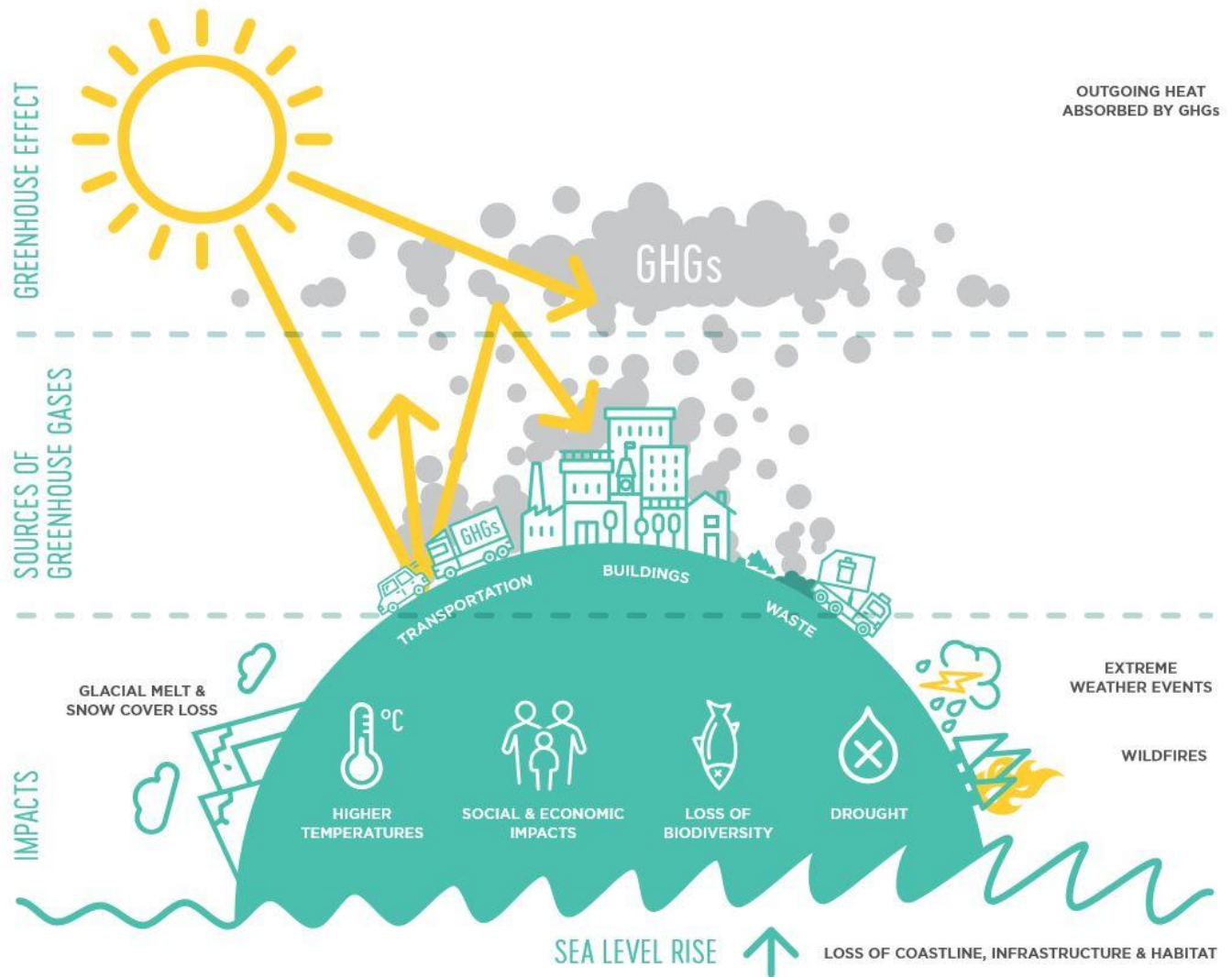


Figure 1. Image representing the sources, mechanisms, and impacts of climate change. Image retrieved with permission from the City of Victoria's Climate Leadership Plan (2018).¹⁰

Human activities are having a direct impact on the Earth's climate, and changes in climate from the late 1800s onwards can be increasingly attributed to these activities.¹¹ The two main ways that anthropogenic activities are affecting the Earth's climate are through changes in land-use (e.g., deforestation and agriculture) and the combustion of fossil fuels (e.g., carbon-based energy sources).³ Burning fossil fuels (e.g., coal, oil, natural gas) releases carbon dioxide (CO₂) and other GHGs into the atmosphere. Carbon dioxide is one of the most significant greenhouse gas emissions; CO₂ is a heat-trapping gas that builds up in the atmosphere over time and functions like a blanket, trapping in heat that would otherwise be lost to the upper layers of the atmosphere.^{8,3} This "blanket effect" is causing the planet's atmosphere to warm, which disrupts the stability of the climate system. Although CO₂ is necessary for life, the role of CO₂ in the climate system goes beyond plants taking it in and humans breathing it out (what we can refer to as 'regular' CO₂); burning fossil fuels puts more CO₂ into the atmosphere than the system can handle (we can refer to this as 'rampant' CO₂). Rampant CO₂ can build up in the Earth's atmosphere and oceans, leading to a series of ecological and climatic problems (see Figure 1).⁸

In October 2018, the Intergovernmental Panel on Climate Change (IPCC) released its most urgent report to date, stating that the global community may have as little as 10 to 12 years to slow GHG emissions and limit global temperature increase to 1.5° C.¹ To limit warming, there must be "rapid and far-reaching" transitions in how we use our lands, energy, industry, buildings, transportation and design our cities.¹ Now more than ever, it is crucial that cities work together to protect human and natural systems through innovation and collaboration. The IPCC recommends a mix of adaptation and mitigation options to limit global warming to 1.5° C, implemented in a participatory and integrated manner.¹

It is important to note the role that uncertainty plays in the study of climate change, and any science field. While the exact outcomes of climate change are difficult to predict with absolute certainty, it is not a question of 'if' impacts are occurring, but rather 'when'.¹² There is a high degree of scientific consensus (>97 percent) surrounding both anthropogenic climate change and the associated risks.^{8,1} The risks associated with climate change are increasing globally, which will have unequivocal impacts on local businesses, schools, hospitals, and other important services. If we act now, we can significantly lessen the severity of climatic risks.¹¹



2.1 Global and National Climate Change

Since the Industrial Revolution in the late 1800s, the Earth's atmospheric temperature has increased by 1° C, due largely to burning fossil fuels.¹¹ With the persistence of fossil fuel extraction and continued significant changes in land-use, warming is expected to continue accelerating. Earth's average surface temperature in 2018 was the hottest year on record, and 2019 the second warmest year on record.¹³ As of 2019, the five warmest recorded years have occurred during the past five years, and the 20 warmest years on record have occurred over the past 22 years.¹⁴

Aligning with global trends, Canada's climate has been warming over the past six decades, with average temperatures over land increasing by 1.5° C between 1950 -2010.¹⁵ This rate of warming is almost double the global average reported over the same period, meaning an increase of 2° C globally could result in a 3-4° C change in Canada. Average temperatures in Canada exceeded the historical baseline (1961-1990) in 2011 and 2012 by 1.5° C and 1.9° C, respectively. Additionally, Canada is experiencing the predicted trends in variability in precipitation, leading to generally wetter winters and prolonged periods of summer drought. Extreme precipitation events are also likely to become more intense and more frequent. Recent studies show that a 1-in-20-year storm event are likely to become 1-in-10-year storm events by the 2050s.¹⁵

Canada possesses the longest coastline in the world. These thousands of kilometers of coastline make up the backbone of many identities and cultures within this country, including Indigenous peoples who have lived on and stewarded the land and waters for thousands of years. Climatic impacts to Canada's coast include sea level rise, coastal erosion, ocean acidification, storm surges and coastal inundation, which all have significant implications on ecosystems, coastal infrastructure, and economies (e.g., fishing communities).⁹ However, knowledge of climate risks is increasing in many coastal communities around the country, recognizing the need to adopt adaptation measures to address the complexity of changes within these socioecological systems.



2.2 Climate Change in British Columbia and Projections for Campbell River

Climatic changes in British Columbia vary significantly from region to region, but general climate projections include increasing temperatures, sea level rise, and increasing frequency of extreme and variable weather events.¹⁶ The province of BC has conducted a provincial risk assessment to inform decision making and climate change planning processes. The top identified high risks include wildfires, seasonal water shortages, heat waves, ocean acidification, glacier loss, and long-term water shortages.¹⁶ Given that climatic impacts vary greatly across regions, it is important to develop an understanding of localized climate change impacts. Many tools that have been developed to help guide local and regional community planning processes, including the Pacific Climate Impacts Consortium (PCIC) tool called *Plan2Adapt* and the *Climate Atlas of Canada* tool, among others.^{17,18}

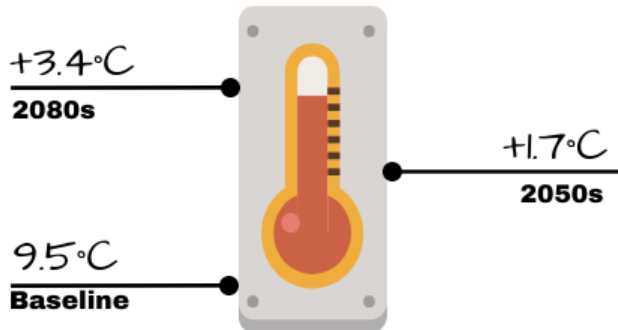
All around the world extreme weather events are occurring more frequently – which aligns with predictions made by scientists many decades ago.¹² Recent events in and around the City of Campbell River, including flooding, winter storms, and other extreme weather events are also consistent with these global predictions. Such events highlight the need to integrate climate change into the municipal planning framework in order to safeguard built, natural, and social systems within the city. Local climate change projections are essential to understanding the implications of climatic variability on key municipal services and industry sectors that support Campbell River citizens. A greater understanding also enables local solutions to emerge and be tailored to meet these unique needs.

The *Climate Atlas of Canada* tool has been used to access downscaled climate data for the City of Campbell River. The data represented in the infographics below (Figures 2, 3, 4) highlights the projected impacts of climate change for Campbell River (Refer to Appendix D for a summary table of the data). Information included in the infographic represents an ensemble approach, which incorporates a combination of 24 different global climate models (GCMs) using a high-emissions (RCP 8.5) scenario.¹⁸ The GCM data used for the Climate Atlas were originally obtained from the Pacific Climate Impacts Consortium.^{17,18}

Sea level rise data is retrieved from the Natural Resources Canada Report, “*Canada’s Marine Coasts in a Changing Climate*”.⁹ Specific local modelling has also been carried out as part of Campbell River’s *Rising Seas* initiative. The parameters used in this report include temperature, precipitation, frost-free days, and relative sea level rise. Key findings include increased temperature, increased precipitation in fall, winter, and spring, and increased intensity of rainfall. In addition, sea levels and ocean and stream temperatures are expected to rise.¹⁷

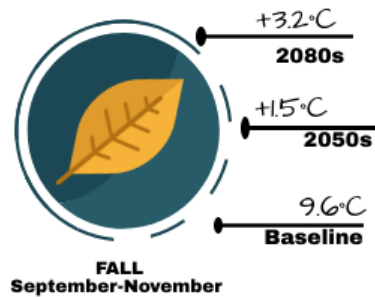
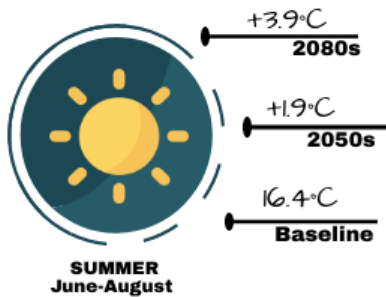
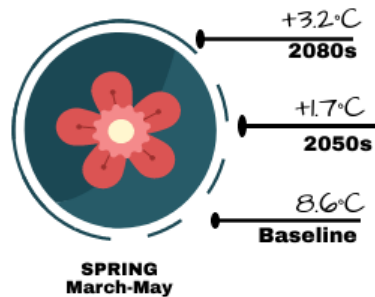
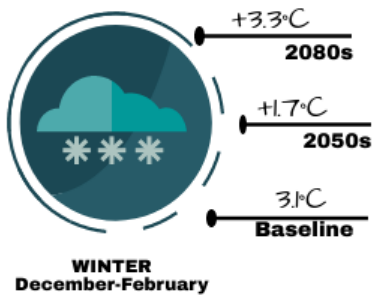
Campbell River Future Climate Change Projections

Projected Change from Baseline (1976-2005)



ANNUAL MEAN TEMPERATURES

Mean, minimum & maximum daily temperatures are projected to increase in every season.



MEAN SEASONAL TEMPERATURES

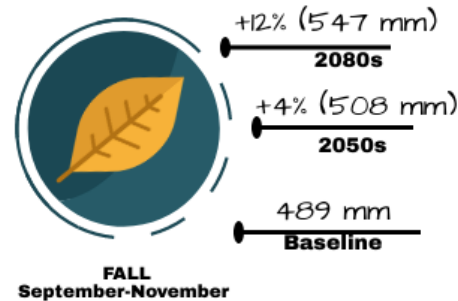
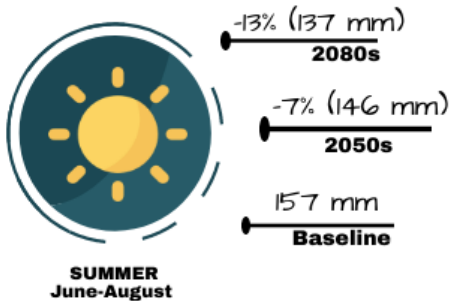
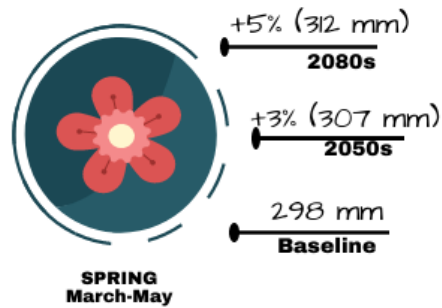
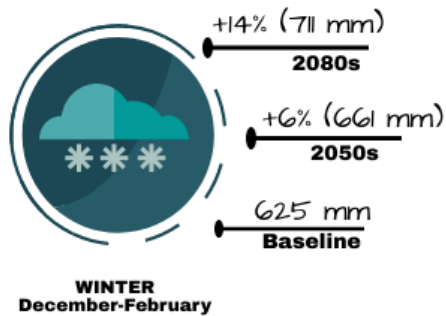
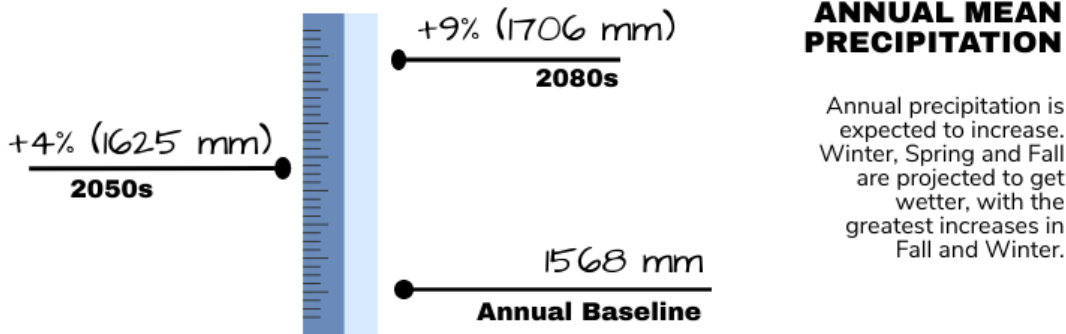


FROST-FREE DAYS

Frost-free days are expected to significantly increase over the long-term.

Figure 2. Graphic representation of temperature-related climate projections for Campbell River.

Campbell River Future Climate Change Projections



SEASONAL MEAN PRECIPITATION



Precipitation will fall at a faster rate (mm/h)



Shorter storms will have an increasingly high intensity



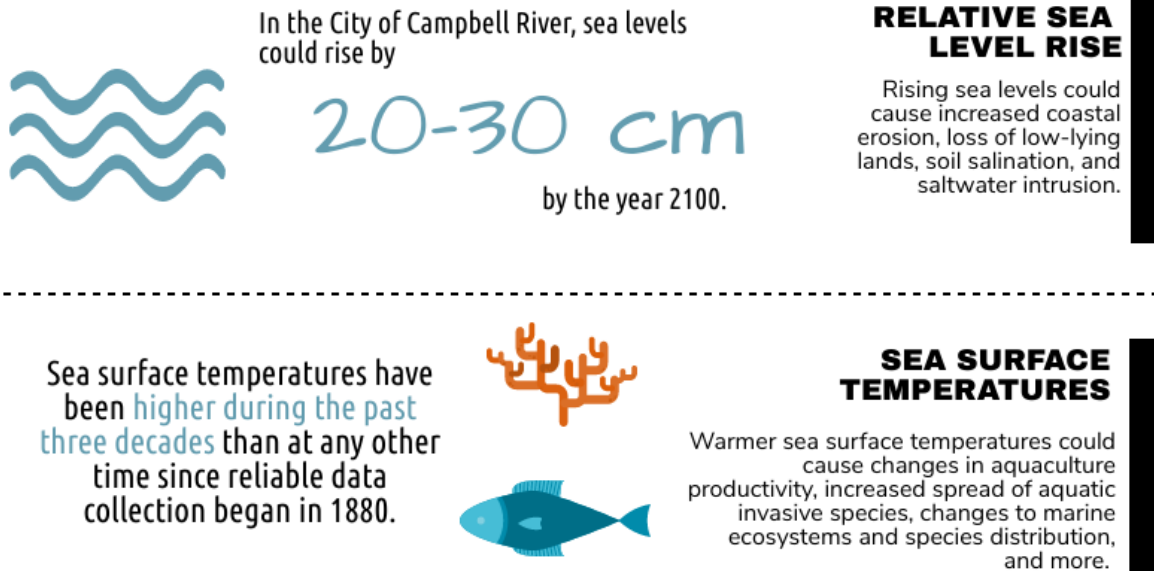
Return periods of heavy storms will shorten, meaning increased frequency

HEAVY PRECIPITATION EVENTS

Precipitation events in general are projected to become more intense and extreme.

Figure 3. Graphic representation of precipitation-related climate projections for Campbell River.

Campbell River Future Climate Change Projections



Sources:

Canadian Climate Data and Scenarios Network - Government of Canada

Lemmen, D.S., Warren, F.J., James, T.S. and Mercer Clarke, C.S.L. editors (2016): Canada's Marine Coasts in a Changing Climate; Government of Canada, Ottawa, ON, 216, 248p.

Pacific Climate Impacts Consortium. (2020). Plan2adapt tool. Retrieved from <https://services.pacificclimate.org/plan2adapt/app/>

Prairie Climate Centre. (2019). Climate Atlas of Canada, version 2 (July 10, 2019). Retrieved from <https://climateatlas.ca>

Figure 4. Graphic representation of ocean and sea level rise-related climate projections for Campbell River.

2.3 Adaptation vs. Mitigation

The impacts of climate change are being experienced around the globe.^{1,3} As we have now learned, some of these impacts are irreversible, regardless of mitigation efforts to reduce atmospheric GHG concentrations. Therefore, adaptation to climate change is considered an essential component of climate change planning. Adaptation planning can aid in reducing the degree to which climate change is already occurring and improve local resilience in responding to future events.

Climate change adaptation refers to initiatives or actions taken to adjust ecological, social, and economic systems in response to actual or expected climatic change and the resulting local impacts. It occurs along a continuum from anticipatory adaptation to reactive adaptation. Anticipatory adaptation is the most appropriate and proactive approach to building resilience among and within local communities because of the uncertainties associated with climate change. In the municipal context, adaptation

measures may focus on, but are not limited to, changing individual behaviour, updating municipal bylaws and policies to protect the natural environment, and improving physical infrastructure.

On the other hand, climate change mitigation refers to the implementation of policy, regulatory, and project-based measures that contribute to the stabilization or reduction of GHGs concentrations in the atmosphere. These include clean air bylaws, building retrofits to conserve energy, economic approaches and instruments (e.g., price incentive to cut emissions) and transitioning to low-carbon energy sources.

The effects of climate change are wide ranging and will require a diversity of responses. While mitigation efforts work to contain the long-term impacts of global warming, adaptation is needed to address climate change impacts that are already happening. Adaptation is not meant to replace or undermine mitigation efforts. Rather, adaptation works in conjunction with mitigation to bolster local government's continued efforts in protecting and enhancing the wellbeing of its citizens and ensuring the responsible management of local resources and municipal services.

ADAPTATION = managing the unavoidable
MITIGATION = avoiding the unmanageable

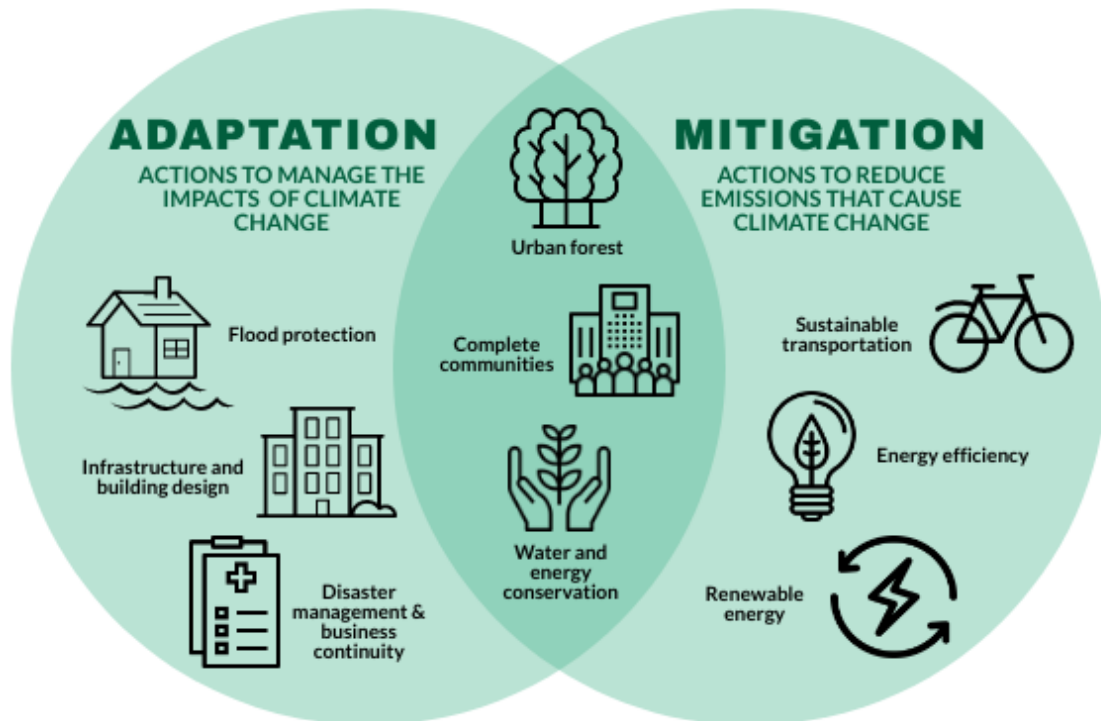


Figure 5. Adaptation and Mitigation diagram, ICLEI Canada, 2019

2.4 Policy Direction on Adaptation

International, federal, and provincial governing bodies can set standards, provide strategic focus, and offer potential funding streams for adaptation. The federal government acts as the overarching voice on climate leadership in Canada. A strong commitment to climate action at the federal level (e.g., signing international agreements) is more likely to positively influence climate leadership at local levels of government. While top-down leadership is important in setting the stage for climate adaptation, local governments can play a significant role in inspiring change at the community level.

2.4.1 Federal Policy Direction on Adaptation

Canada was one of 195 countries to sign the *Paris Agreement* in December 2015. The Agreement aims to keep the global temperature rise to below 1.5° C above pre-industrial levels. With respect to adaptation, the *Paris Agreement* aims to enhance local adaptive capacity and resilience while reducing vulnerability to global climate change in ways that align with a country's own national objectives.^{19 20}

The Government of Canada has also produced several policy documents that support and guide the country's position on climate change adaptation. For example, in 2016 the Government of Canada released its *Pan Canadian Framework on Clean Growth and Climate Change*, which includes adaptation considerations and actions to improve climate resiliency; notwithstanding the scientific criticisms leveled at the concept of "clean growth".^{21,22,23,24} Major focus areas include building climate resilience through infrastructure, protecting and improving human health and well-being, and reducing climate-related hazards and disaster risks. The framework also recognizes the important role that Canadian municipalities will play in implementing climate solutions locally.

2.4.2 Provincial Policy Direction on Climate Adaptation

In 2019, the Province of British Columbia (BC) completed a *Preliminary Strategic Climate Risk Assessment for BC* as a first step in better understanding province-wide climate-related risks and to help develop appropriate measures to address those risks.

The assessment is being used to inform a provincial climate preparedness and adaptation strategy to help protect people, communities, and businesses from the impacts of climate change (set to be released in late 2020). While the risk assessment is not intended to be used as a prediction of future events, it can act as a tool to evaluate the likelihood and potential consequences of each event happening in the future to understand the level of risk posed in order to help the province prepare.

KEY FINDINGS OF THE PROVINCIAL ASSESSMENT:

- The greatest risks to B.C. are severe wildfire season, seasonal water shortage, heat wave, ocean acidification, glacier loss, and long-term water shortage.
- Other risks that have the potential to result in significant consequences include severe river flooding and severe coastal storm surge, although these events are less likely to occur.
- Nearly all risk event scenarios (except moderate flooding and extreme precipitation and landslide) would have major province-wide consequences in at least one category.

2.4.3 City of Campbell River's Commitment to Climate Change

The City of Campbell River has a number of policy directives that support climate change efforts. In 2012, Council approved the Sustainable Official Community Plan (SOCP), a document that provides objectives and policies to guide decisions that foster the long-term vision and goals of Campbell River. The plan sets direction in areas such as preservation of the environment, economic development, land use planning, growth management, housing, infrastructure, transportation, energy, and emissions management, for example.

The SOCP contains a number of actions that speak to incorporating climate change adaptation into municipal planning:



4.2 Prepare for climate change adaptation.

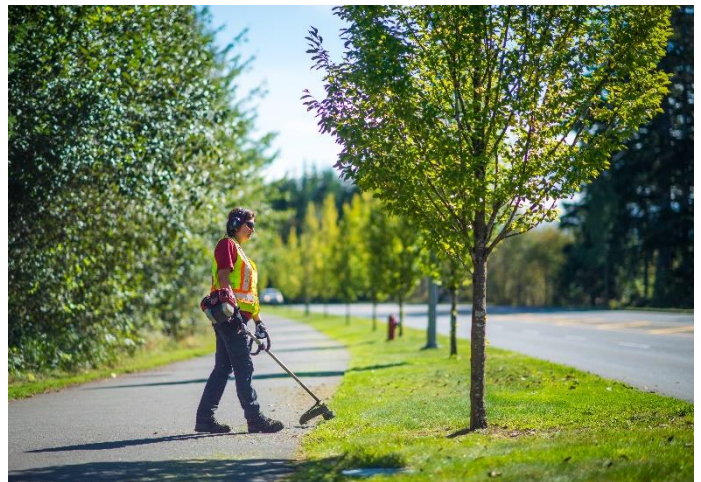
4.2.1 The City will develop strategic directions for climate change adaptation.

4.2.2. The City will ensure that corporate directions and corresponding plans, infrastructure development, and capital projects consider climate change adaptation measures.

4.2.3 The City will work to assess and develop policy and a best practice approach for the management and protection of areas susceptible to coastal inundation. This may include an increased focus on asset management and the use of development permit and land use regulation tools.

Furthermore, the Desired Outcomes for Our Parks & Natural Environment states:

By 2020: Climate change adaptation measures are incorporated into municipal planning.



The City's 2008 Community Integrated Sustainability Plan also addresses the need to incorporate climate change adaptation considerations into City operations:

Chapter 5, Action 28: Develop an inventory of vulnerabilities associated with a changing climate and measures for climate adaptation.

In 2008, the City signed onto the Province of B.C.'s *Climate Action Charter*, otherwise known as *Bill 27*. As such, Campbell River commits to measuring and reporting annual Greenhouse Gas (GHG) emissions and taking steps towards creating a complete, compact, and energy efficient community. In addition, measures must be taken to achieve carbon neutrality across corporate operations. Each year, the City of Campbell River participates in the *Climate Action Revenue Incentive Program*, a conditional grant program that provides funding to local governments equivalent to one hundred percent of the carbon taxes directly paid. Funding is then redirected by the municipality toward areas that support GHG reduction measures, addressing climate impacts, and making progress on achieving *Climate Action Charter* goals.

In an effort to meet the objective of achieving carbon neutrality throughout municipal operations, the City introduced the Carbon Neutral Plan in 2011. The plan provides a road map for Campbell River to reduce GHG emissions at the corporate level in order to fulfill the City's commitment to the *BC Climate Action Charter*.

The *Community Energy and Emissions Plan* (CEEP) was also adopted by Council in 2011, and revised in 2016, to meet both the legislative requirements of the *Official Community Plan* and to support objectives within the *Climate Action Charter*. Acting as a strategy for becoming a low-carbon community, the plan provides direction on planning processes within the City and broader community that promotes energy efficiency and reduced GHG emissions. Examples of actions achieved to date include a green roof retrofit at City Hall, establishment of a community energy retrofit rebate program, education and outreach to maximize building sector impact, expansion of electric vehicle charging infrastructure, and increasing new building efficiency through incentives to support the BC Energy Step Code.

The City also participated in the national Smart Energy Communities Scorecard Program by QUEST Canada, which provides a comprehensive assessment methodology for municipalities to conduct a self-assessment of community and corporate energy performance across a range of functions and sectors, and compare with peers.

In 2018, Campbell River launched a multi-year planning initiative called *Campbell River Rising Seas*. The aim of the project was to assess community risks associated with 0.5 m and 1 m of global average sea level rise. The project unfolded in four phases:

- 1) Gather information to assess the scale and nature of sea level rise risks to the community
- 2) Complete technical studies of key locations with possible responses
- 3) Seek input from the public
- 4) Develop plan and guidelines based on technical recommendations and community preferences

In 2020, Council adopted the *Sea Level Rise Action Plan*; a long-term planning tool to guide community wide adaptation over the next 30 years. The plan considers the uncertain timing in which sea levels will rise over time. Priority actions are strategically planned to ensure future development and land use decisions in vulnerable areas consider sea level rise, large scale adaptation projects are incorporated

into other planned construction or implemented as needed, to allow time to assess the rate of sea level rise, and that relevant scientific information is monitored so plans can be updated to reflect current data.

In their *2020-2023 Strategic Plan*, Council has identified the environment as a strategic priority, and more specifically climate change. Developing a climate adaptation plan is one of many ways in which City Council intends to address climate change. Other objectives include:

- 1) *Advancing Energy Reduction, Water Conservation, and Invasive Plants program*
- 2) *Advancing the Urban Forest Management Plan*
- 3) *Developing a Tree Protection Bylaw*
- 4) *Developing an Environmentally Sensitive Areas Policy*
- 5) *Developing a Drinking Water Source Protection Plan*
- 6) *Supporting the development of a regional organics' facility*
- 7) *Promoting a region-wide contract of curbside waste removal*
- 8) *Conducting technical reviews of proposed industrial waste sites*



3.0 Our Process

The City of Campbell River, through the *Together for Climate* project, followed the framework of ICLEI Canada’s Building Adaptive and Resilient Communities (BARC) program, moving through Milestones 1–3 of a 5-milestone municipal climate change planning process. This is a comprehensive planning methodology that guides municipalities through the process of researching and assessing climate impacts, plan development, action-setting, implementation planning, and monitoring and review strategies (see Figure 6). For Campbell River, the outcome of working through Milestones 1 – 3 has informed the creation of the Community Climate Adaptation Plan.



Figure 6. ICLEI Canada's Building Adaptive and Resilient Communities Basic Milestone Framework



3.1 Milestone One: Initiate

Within this milestone, communities identify stakeholders to examine existing regional climate science and future projections, followed by a brainstorming exercise to identify potential climate change impacts.

3.1.1 Stakeholder Identification in Campbell River

Climate change is expected to have impacts on a wide-range of sectors in and around Campbell River, from agriculture and fisheries, to infrastructure, planning and land-use, to human health and wellbeing¹⁶. As such, community stakeholders were identified by the City to participate in the adaptation planning process, representing a range of organizations that can play a key role in local resilience and service delivery (see Table 1). The project team provided subject matter knowledge and expertise, while ensuring that the CCAP aligned with community needs.

Table 1. Stakeholder list for Campbell River Climate Action Planning.

BC Ferries	Island Health
BC Hydro	North Island College
Campbell River Environment Committee	School District 72
Campbell River & District Chamber of Commerce	Strathcona Regional District
Department of Fisheries and Oceans	Vancouver Island University
Greenways Land Trust	We Wai Kai Nation
Homalco First Nation	



3.1.2 Impact Identification

In November 2018, ICLEI Canada facilitated a workshop to capture how climate change will affect the built, natural, and social and economic systems based on local climate projections for the region.

Impact statements consider projected climatic threats and their effects on a range of systems. During the workshop, project participants worked in groups to devise impact statements for the built environment, natural environment, social systems, and economic systems, while considering the specific climate changes Campbell River may experience. The group identified 50 impacts which were used to inform a subsequent vulnerability and risk assessment, where these impacts were further refined and prioritized.

Impact statements are intended to capture:



- A climatic threat/change (e.g., rising temperatures)



- The outcome of the climatic change (e.g., extreme heat event)



- The consequences associated with this outcome (e.g., heat stress)

3.2 Milestone Two: Research

The second milestone is meant to develop further a community's understanding of climate change impacts and the major service areas which are likely to be most acutely affected. Within this milestone, a municipality will scope the climate change impacts for the region and conduct both a vulnerability and risk assessment.

3.2.1 Vulnerability Assessment

Vulnerability, or the degree to which a system is susceptible to the impacts of climate change, is a function of sensitivity and adaptive capacity. Sensitivity is defined as the degree to which a system is affected by climatic conditions (e.g., temperature increases) or a specific climate change impact (e.g., increased flooding). On the other hand, adaptive capacity is defined as the ability of built, natural, and social systems to adjust to climate change. Examples of increasing adaptive capacity include moderating potential damages, taking advantage of opportunities, and coping with the consequences of climate change. A vulnerability assessment also necessitates an understanding of both biophysical and socioeconomic conditions within a community as factors that influence sensitivity and adaptive capacity of a particular system or area.

$$\text{Vulnerability} = \text{Sensitivity \& Adaptive Capacity}$$

To summarize, a vulnerability assessment determines how susceptible we are to a changing climate (e.g., heatwaves, extreme weather, sea level rise) and how prepared we are for those changes. For example, urban trees may be affected by longer periods of summer drought. However, if most urban tree species are not sensitive to longer periods of drought, and there is a plan to replace highly sensitive tree species with drought-tolerant native tree species, then the vulnerability is low. Conversely, if most city trees *are* sensitive to prolonged summer drought conditions, and there is not a feasible replacement plan in place, then the vulnerability is high.

In February 2019, an online questionnaire was sent to local stakeholders to assess Campbell River's vulnerability to the climate change impacts that were identified in the first workshop. The outcome of the vulnerability assessment resulted in 12 low-vulnerability impacts either being removed or combined

with pre-existing impacts to create an updated list of 36 impact statements. The results provided a foundation for prioritizing which impacts could affect the community the most. It also served to inform action prioritization during the action-planning phase of the project.

3.2.2 Risk Assessment: Top Climate Risks to Campbell River

Analyzing risk is a key step in climate adaptation planning. A local workshop involving a variety of stakeholders and local experts was held in March 2019 to determine Campbell River’s level of risk to the 36 impact statements. Like the vulnerability assessment, the risk assessment process was used to further prioritize which risks are most pertinent to plan for. During the workshop, participants were asked to assess the consequences of each climate impact statement using the 12 criteria outlined below in Table 2.

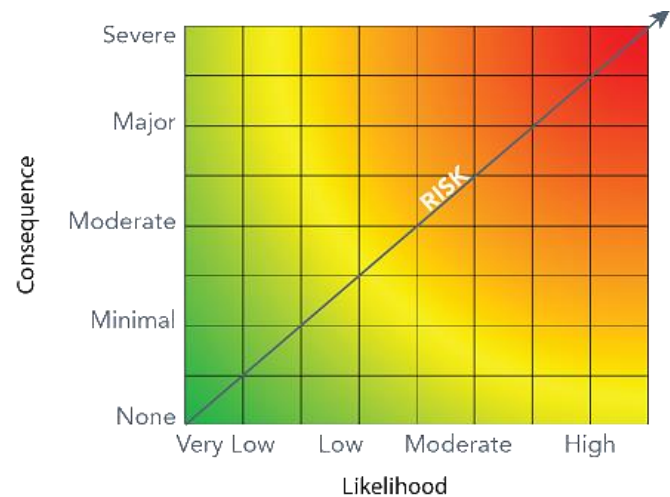


Figure 7. Graphic representation of risk

Risk is a function of likelihood and consequence. Whereas likelihood refers to the probability of a projected impact occurring either slowly over time or as a recurring event, consequence looks at the known or estimated ramification(s) of a particular climate change impact as it relates to the built, social, and natural environment. As likelihood scores for impact statements were pre-determined by the project team, the focus of this working session was to assign consequence scores for each of the 12 factors in the risk assessment consequence criteria below. The outcome of the working session resulted in an overall risk score for each impact statement.

Table 2. Risk assessment consequence criteria

Social	Economic	Environmental
Public Health & Safety	Property Damage	Air
Displacement	Local Economy & Growth	Water
Loss of Livelihood	Community Livability	Soil
Cultural Aspects	Public Administration	Ecosystem Function

The most significant climate risks to Campbell River are summarized below. Table 3 presents the top identified climate risks and Table 4 presents the lower ranked risks. All identified risks are based on stakeholder participation in workshops to date, additional information collected through online surveys and correspondence, interviews with local experts, and consultation with the *Together for Climate* team and City staff. Defining risk is intended to be an iterative process. Therefore, as climate science evolves and new risks emerge over time, the risk assessment process should be revisited and re-evaluated every five years.

Table 3. Top climate risks for Campbell River













	Impact Statement	Risk Rating
	Sea level rise and more extreme rainfall events causing stormwater system back up and impacting sewer systems.	Medium-high
	Sea level rise and extreme rainfall events causing coastal erosion, affecting public and private development/property (e.g. Ostler Park, Tyee Spit) and escarpments along the foreshore.	Medium-high
	Hotter and drier summers increasing PM 2.5, ground-level ozone, allergens, and smoke, leading to poor air quality.	Medium-high
	Rising annual temperatures causing introduction of new insects and pests (e.g. Pine Beetle, Douglas-fir Tussock moth, Gypsy Moth).	Medium-high
	Rising annual temperatures and hotter, drier summers threatening native species habitat and biodiversity (e.g. pollinators).	Medium-high
	Rising river temperatures impacting fish mortality (e.g. 5 species of salmon).	Medium
	More extreme weather events impacting transportation network (e.g. access to bridges to North Island, BC Ferries, access for emergency response).	Medium
	More extreme storms and wildfire events impacting tourism.	Medium
	Rising ocean temperatures increasing ocean acidification, resulting in loss of aquatic species (e.g. local molluscs).	Medium
	More extreme rainfall events increasing turbidity in watershed, affecting water quality.	Medium

Table 4. Risks identified as medium-low priority.

	Impact Statement	Risk Rating
	Rising ocean temperatures impacting aquaculture, the fishing industry, and recreational activities.	Medium-low
	More extreme weather events negatively impacting community well-being (e.g. health of populations in vulnerable situations, access to recreation, social gathering spaces).	Medium-low
	More extreme rainfall events impacting fish spawning habitat (e.g. gravel restoration, erosion, turbidity).	Medium-low
	Sea level rise and more extreme rainfall events flooding coastal infrastructure (e.g. critical infrastructure like fire hall, and also recreation amenities).	Medium-low
	Hotter and drier summers increase the risk of wildland-urban interface fire in Campbell River (e.g. McIvor Lake, Beaver Lodge Lands), creating direct impacts to the community. There is also risk of fires in the surrounding regions that could affect the City's emergency response capacity.	Medium-low
	Hotter, drier summers impacting water supply and availability for competing uses (e.g. hydro power, agriculture, domestic use with growing population and development). Availability is also impacted by increased potential for wildfires and resulting impact on water quality.	Medium-low
	More extreme weather events exacerbating impacts from dam breach or causing overland flooding from overspill.	Medium-low
	Rising annual temperatures increasing pathogens and vector borne diseases.	Medium-low
	Hotter, drier summer conditions causing more windfall and damage to trees during wind events.	Medium-low
	Rising annual temperatures reducing snowpack and accelerating glacial melt, implicating downstream ecosystems.	Medium-low
	More extreme weather events causing damage to utility infrastructure, leading to electricity disruption.	Medium-low
	More extreme rainfall events increasing risk to infrastructure from erosion/slope failure (e.g. hospital, highway escarpment).	Medium-low

3.2.3 Top Climate Risks to First Nations Communities

The top climate risks for any given region will vary based on a community’s geographic location, proximity to natural hazards such as the ocean or heavily forested areas, and the position of critical infrastructure and services. Taking these factors into consideration, Table 5 below highlights the top risks to each First Nations community in Campbell River. Although these risks fall outside the jurisdiction of the City of Campbell River, government to government relations and climate adaptation partnership opportunities can contribute to effective risk management.

Additional dialogue should take place between the City of Campbell River and the local Nations (Homalco, We Wai Kai, Wei Wai Kum, Tlowitsis) to carry out an action planning process and determine how the City can best support action implementation in a way that honours Indigenous sovereignty and autonomy. This ‘next step’ has been captured as an enabling action in the CCAP (refer to the Climate Action Implementation Tables in Appendix A).

Table 5. Top risks of climate change for First Nations reservations in Campbell River




	Impact Statement	Risk Rating
	Hotter, drier summers increasing risk of wildland-urban interface fire on Homalco reserve.	Medium
	Increasing wildfire risk impacting infrastructure and culturally significant areas on We Wai Kai reserve.	Medium
	Sea level rise and more extreme rainfall events impacting Wei Wai Kum infrastructure and culturally significant sites (e.g. longhouses, cemetery, administration office).	Medium





Photo credit: CTV News, Vancouver Island

3.3 Milestone Three: Plan

The third milestone provides guidance on how to establish a vision, set adaptation goals and objectives, identify adaptation options, and examine possible constraints and drivers to various actions. From there, a community will draft a Local Adaptation Strategy. Baseline data is collected and recorded, financing and budget issues are considered, an implementation schedule is drafted, organizational responsibilities are determined, and indicators for measuring progress and effectiveness are identified in the Plan.

3.3.1 Action Planning and Implementation Considerations for Campbell River

Following the results of the Vulnerability and Risk Assessments, stakeholders embarked on an action identification process during a workshop held by ICLEI Canada in September 2019. The project team developed a list of suggested adaptation actions that the City of Campbell River, local partners, and the community could undertake to address prioritized risks.

In January 2020, a final workshop was held which focused on action implementation planning. It is important to develop a realistic picture of how actions can be implemented in practice. Considerations for effective adaptation implementation in Campbell River involved including actions that:

- Are implementable within the City of Campbell River and surrounding area (e.g. integration of actions into pre-existing work plan budgets, opportunities to secure grant funding and/or partner with other organizations, or future resourcing needs are taken into consideration during financial planning)
- Address the priority impacts of climate change or extreme weather
- Include non-municipal partners on planning and implementation



Photos (top and bottom): Together for Climate workshop participants working collaboratively through the climate adaptation planning process. The culmination of these efforts has resulted in this Community Climate Adaptation Plan for Campbell River, BC.



Beyond these considerations, workshop participants compiled action implementation tables which contained information regarding action justification, current initiatives and policies that align with the action, additional supporting actions, lead and supporting organizations/departments, timing, costing, baseline, and monitoring metrics. After the workshop, municipal and ICLEI staff worked to integrate stakeholder feedback and further refine the tables to represent implementation-ready actions (refer to Appendix A).

The following section outlines the key themes, objectives, and actions that have been identified as priority areas for Campbell River.

4.0 Themes, Objectives, and Actions

The Community Climate Adaptation Plan is organized by five themes which include the built environment, natural environment, community health and wellbeing, economy, and enabling actions. Each theme area contains a summary of its respective objectives and primary actions that were developed by the *Together for Climate* project team. Actions focus on addressing Campbell River's priority climate-related risks and impacts. Implementation tables are described in further detail within 'Section 5.1 Action Implementation Tables' below, and the long-list of implementation tables can be found in Appendix A.



4.1 Built Environment

Climate change drivers such as increasing temperatures, variability in precipitation, increased occurrence of extreme weather events, and sea level rise all have implications for various infrastructure throughout Campbell River. The City owns and maintains numerous types of built assets including road networks, sewer and storm drain systems, buildings providing key services, and a water treatment facility. Given the wide array of assets that fall within the auspices of the municipality, the City of Campbell River plays a central role in ensuring that existing infrastructure withstands the impacts of a changing climate. Equally important will be to ensure that future infrastructure is planned and built in a robust and resilient manner to weather the new reality.



Objective 1 Improve the resilience of infrastructure by reducing damage and disruptions associated with a changing climate.

- **Action 1.1** Conduct an infrastructure risk assessment to determine priority risks to assets under climate projections.



- **Action 1.2** Develop plans to protect infrastructure and/or relocate sites based on risk.
- **Action 1.3** Study storm water system vulnerability under climate change, and plan for upgrades to accommodate future precipitation projections.
- **Action 1.4** Establish a Flood Management Bylaw.
- **Action 1.5** Increase severe weather resiliency of docking facilities, including planned upgrades.
- **Action 1.6** Proactively prevent damage to trees and power lines.

Objective 2 Generate awareness and monitoring of changing climate conditions to build support for adaptation

- **Action 2.1** Establish a monitoring system for current and future precipitation intensities, reservoir levels, river flows/levels and sea level rise, sharing information so that data can inform planning decisions in City and community.
- **Action 2.2** Create a sea level rise education tool.

Objective 3 Support residents in proactively managing privately owned property to adapt to temperature and precipitation changes, more frequent and severe extreme weather, and sea level rise.

- **Action 3.1** Explore potential regulatory and financial mechanisms to increase pervious surfaces and rainwater management at the homeowner, subdivision, new commercial and light industrial levels.

Objective 4 Apply green infrastructure practices and principles to better manage impacts of climate change.

- **Action 4.1** Increase use of green infrastructure on public and private property.



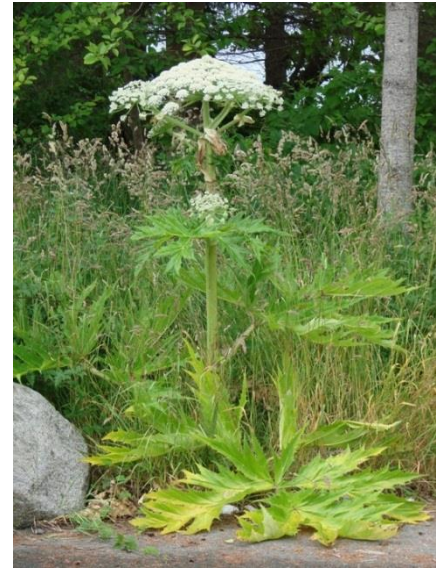
Photo credit: Global News





4.2 Natural Environment

The City of Campbell River is surrounded by immense natural beauty; from its diverse marine life and rugged coastlines, to its network of trails and parks, and the idyllic views of mountain peaks that span the area. Unfortunately, the very fabric upon which society depends for survival is at risk as a result of a changing climate. Native ecosystems and biodiversity are challenged as nutrient and energy flows, phenology and availability of resources becomes threatened. Ecosystems are being stretched beyond their natural adaptive capacity through more frequent extreme weather and disturbance events such as wildfires, floods, and drought. In response, ecosystem protection and enhancement must be made a priority by considering the cumulative impacts of climate change on natural systems.



Objective 5 Actively manage ecological assets by protecting natural areas and ecosystems.

- **Action 5.1** Review and update guidelines or requirements for erosion and run-off prevention
- **Action 5.2** Move toward establishing an Integrated Watershed Management approach to improve the health and resilience of the watersheds.
- **Action 5.3** Develop a framework for monitoring and evaluation of ecosystem health and ecosystem services, identifying risks due to climate impacts and extreme weather.
- **Action 5.4** Increase education for City staff and community on invasive species and pests, continue to manage areas of invasive species within the City's parks and public spaces, proactively prepare for emerging invasive species threats, and develop consolidated invasive species strategy/policy.
- **Action 5.5** Identify opportunities to support viable conditions for marine habitat and species.
- **Action 5.6** Reduce riparian harm and strengthen protection through policy tools and guidance.
- **Action 5.7** Develop an Environmentally Sensitive Area Management policy.
- **Action 5.8** Determine limits to tourism in sensitive areas and shut down vulnerable areas during high-risk periods.

Objective 6 Enhance and protect the community's tree canopy from impacts of climate change.

- **Action 6.1** Conduct a tree canopy assessment to determine trees vulnerable to wind damage, changing temperature patterns, and other climate impacts.





Photo credit: Christopher Pouget



4.3 Community Health and Wellbeing

There are many direct and indirect social impacts of climate change that affect public health and safety, community well-being, livability, and cultural identity. For example, increasing temperatures can lead to more frequent and severe wildfires, increasing the risk of respiratory conditions through the elevated levels of fine particulate matter (PM_{2.5}) in the air. Additionally, changes in precipitation can lead to heavy rainfall and flooding, creating ideal conditions for mould growth, which is also linked to respiratory complications.

Climate change is exacerbating pre-existing vulnerabilities within social systems and disproportionately impacting certain groups, depending on factors such as marginalization, vulnerability, access to services, natural resource-reliance, exposure to climate hazards, socioeconomic status, and pre-existing levels of distress. As such, climate change inequality highlights the need to place equity at the centre of planning processes.

Global and local food systems are also witnessing the pressures of climate change through increased instances for drought, placing inherent stress on food security and human health. The City of Campbell River will continue to prioritize the health, safety, and well-being of its community members through equitable, transparent, and proactive planning and response.

Objective 7 Improve public safety and preparedness to climate-related events.

- **Action 7.1** Plan for redundancy of critical routes for emergency response and flow of goods and services.

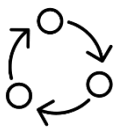
- **Action 7.2** Develop a strategy to monitor, plan for, and mitigate flooding due to dam breach.
- **Action 7.3** Build community capacity for personal preparedness and to reduce health risks associated with extreme weather.
- **Action 7.4** Implement the Community Wildfire Protection Plan.
- **Action 7.5** Create, review, and update Emergency Response and Recovery Plans relative to Campbell River's climate hazards.

Objective 8 Protect populations in vulnerable situations from impacts of extreme weather.

- **Action 8.1** Establish more designated and accessible areas of refuge from extreme weather events.
- **Action 8.2** Develop networks of support for populations in vulnerable situations including seniors, youth, and those experiencing homelessness.

Objective 9 Generate awareness and monitoring of changing climate conditions to safeguard human health.

- **Action 9.1** Communicate climate change-influenced health risks to the community.



4.4 Economy

Climate change is already contributing to financial losses at global, national, and local scales; the impacts of intense wildfires, flooding, and changes in weather patterns can have significant consequences for the local economy. In Canada, more has been spent on disaster recovery in the six years between 2009 and 2015, than in the previous 39 years combined ²⁵. It is important to raise collective awareness around the importance of planning for climate change in a positive and proactive manner, such as developing business continuity plans and using human ingenuity to identify new opportunities in response to changing circumstances. Building adaptive capacity and flexibility into the local tourism sector and other important industries will strengthen local resilience within the community through its commitment to climate action.



Objective 10 Create awareness of changing climate conditions, encourage local businesses and organizations to plan for climate-related risks and identify opportunities to support economic resilience.

- **Action 10.1** Support tourism sector in understanding the changing climate, sector-specific risks, and identifying opportunities to adapt and diversify.
- **Action 10.2** Support local businesses (i.e. fishing industry) in identifying and mitigating climate-related risks.



4.5 Enabling Actions

Enabling Actions are initiatives that are required to build capacity and foster continued integration and monitoring of adaptation into daily business and decision-making. In other words - not just the “what” but also the “how” - institutionalizing the capacity to do adaptation planning. For the City of Campbell River, this involves incorporating climate change considerations into both municipal planning and operations to advance the CCAP. Moreover, enabling actions also govern the implementation and monitoring of the CCAP to ensure progress is made, tracked, and reported.

Objective 11 Increase the knowledge of climate change impacts and adaptation initiatives within the corporation and community.

- **Action 11.1** Develop a climate change communications strategy for the community of Campbell River.
- **Action 11.2** Integrate climate change adaptation into day-to-day decision making and practices at the City.

Objective 12 Establish a coordinated governance, communications, and monitoring framework for the CCAP.

- **Action 12.1** Monitor and track implementation of the Community Climate Adaptation Plan and report on progress annually or biennially.

Objective 13 Maximize collective impact against climate change through partnerships with local First Nations.

- **Action 13.1** Facilitate further dialogue with local First Nations to go through an action planning process and determine how the City can best support action implementation in a way that honours Indigenous sovereignty and autonomy.



5.0 Implementation and Governance

This CCAP is intended to guide the City of Campbell River and community partners to prepare for the impacts of climate change. As such, a strong focus on implementation, governance, and monitoring is essential to the Plan's success. Changes to federal and provincial legislation and regulations, as well as technological advances, are anticipated over the plan horizon; this will impact the long-range strategies, underscoring the importance of implementing a systematic and periodic review and making the required adjustments to the CCAP.

5.1 Action Implementation Tables

The *Together for Climate* project team has developed detailed implementation tables for each adaptation action to help facilitate advancement of the Community Climate Change Adaptation Plan. Action implementation tables are intended to be a working document, requiring further refinement as implementation progresses. Updates may be required to reflect changes to policy, staff or financial resources, and emerging climatic threats necessitating urgent action.

Action implementation tables can be referenced in Appendix A of this document. For each action, the implementation table consists of:

- **Action Name** – Name of the identified action
- **Scope/Imperative** – Description and justification for the action
- **Risks Addressed** – Specific risks identified derived from risk assessment that the action seeks to address
- **Supporting Actions** – Any actions that would need to be taken in order to complete the above action
- **Lead Organization(s)** – Organization(s) and/or City department(s) that will lead implementation
- **Supporting Organization(s)** - Organization(s) and/or City department(s) that will support implementation
- **Costing** – Cost estimate for implementation the action, including ongoing operations and maintenance costs
- **Anticipated Timing** – When implementation would begin
- **Monitoring and Evaluation Metrics** – Indicator(s) for measuring progress toward objective
- **Baseline** – Current information available or required to help measure changes in identified indicators
- **Mandate** – Action is already supported in an adopted plan or has received previous Council direction.
- **Next Steps** – Immediate next steps that the City and/or external organization(s) will take to pursue this action



5.2 Oversight and Governance

The intention of the CCAP is that it will be ‘municipally-led and community supported’, meaning that while the City will play a leadership role, responsibilities for action implementation are shared with stakeholders and the community more broadly. This approach also enables the City to leverage community resources in implementing actions that are beyond its purview. A potential governance structure for implementation is outlined below.

Environmental Advisory Committee

Upon adoption of the plan, it is suggested that advancing the CCAP actions and objectives be formalized within the Environmental Advisory Committee’s annual work plan. As a requirement, the committee could guide implementation by making recommendations to Council on priority items and providing a progress report on those actions each year.

City Departments

The best opportunities to improve Campbell River’s climate resiliency is to embed vulnerability considerations and adaptation responses into existing capital projects, Master Plan documents, as well as into program and policy development. To support this, one of the actions within the CCAP aims to develop learning opportunities for City staff to integrate adaptation into day-to-day decision making and practices.

Photo credit: Destination Campbell River



Priority will be given to actions that can be mainstreamed into current work plans and existing operations such as community infrastructure development, capital projects, asset management, and emergency planning. Additional prioritization of actions may be determined by:

- actions that are a political priority
- actions that correspond with and are identified within other plans (e.g. Urban Forest Management Plan, Sea Level Rise Action Plan)
- actions that become more urgently necessary from a community health perspective as increasing impacts from climate change continue to be experienced

Priority actions identified by the stakeholder group and/or council, or individual departments will need to be investigated, and a champion identified who can coordinate cross-departmental project plans. Climate Action Implementation Tables developed by the *Together for Climate* team provide a clearer implementation structure for each adaptation goal and should be referred to by individual departments (Appendix A).

Individual departments playing a lead or supporting role for a specific action will need to determine whether synergies exist within current operational budgets when assessing feasibility of implementation. If an action cannot be integrated within a pre-existing work plan budget, or grant funding opportunities cannot be secured, departments responsible for advancing the action will need to consider bringing forward an annual budget request to council.

External Organizations

It is the hope of this plan that partner organizations either playing a lead or supporting role for an action will share responsibilities around implementation if they have the capacity and resources to do so. The stakeholder group will also have the opportunity to reconvene and provide updates on the progress of the CCAP.

5.3 Monitoring and Reporting

It is recommended that an annual or biennial report outlining progress be provided to council. At present, individual departments are responsible for tracking progress of work plans within their purview. However, this does not always result in effective long-term implementation of plans once adopted. There are two potential solutions to address this issue:

Option 1: Corporate-wide Implementation Reporting Overseen by a Specific Department

An identified City Department such as Long Range Planning could play an oversight role in acquiring departmental progress updates and consolidating data into an annual report to Council. For example, in the City of Barrie each lead department is responsible for reporting on the progress of implementation for their assigned Action-Specific Action



Plans. The City of Barrie has developed a reporting template for departments to complete annually and tracks information such as budget, timelines, sub tasks, and evaluation of indicators or identification of new indicators as a means of measuring progress.²⁶ The City of Campbell River could also adopt this approach, where departments could submit progress reports to the lead department, who then compiles the data into a report. A draft CCAP Reporting Template is available in Appendix B.

Option 2: Formalize within the EAC Work Plan as a Reporting Requirement

As previously mentioned, advancing the CCAP actions and objectives could be formalized within the Environmental Advisory Committee's annual work plan. This would take the form of a direction for the EAC to incorporate a statement regarding CCAP implementation into its required annual progress report to Council.

5.4 Funding

As the CCAP is municipally-driven and community supported, the City of Campbell River plays a vital role in addressing adaptation. As nearly 60% of Canada's core infrastructure such as roads, water and wastewater systems are owned by municipalities, local government has significant influence over the degree to which climate adaptation is implemented.²⁷ The City also has a responsibility to put measures in place that will protect both the wellbeing of its citizens, and the natural environment upon which we depend, from the impacts of climate change.

Financial resourcing will be required to implement actions that cannot be successfully mainstreamed into existing work plans. Public Safety Canada estimates that for every dollar invested in climate change adaptation, \$3 - \$5 is saved in recovery costs.²⁸

External Funding Options

To reduce costs associated with action implementation, the City should explore external funding streams for potentially eligible adaptation initiatives. There are multiple project grants from external agencies that support municipal climate change adaptation, some of which include:

- Federation of Canadian Municipalities (e.g. Municipalities for Climate Innovation Program; Green Municipal Fund; Municipal Asset Management Program);
- Environment & Climate Change Canada (e.g. EcoAction Community Funding Program)
- Infrastructure Canada (e.g. Disaster Mitigation and Adaptation Fund; Gas Tax Fund);
- Natural Resources Canada (Building Regional Adaptation Capacity and Expertise Program);
- Impact Assessment Agency of Canada (e.g. environmental assessment funding);
- TD Friends of the Environment Foundation Grant;
- Tree Canada (Community Tree Grants);
- Columbia Basin Trust (e.g. Environment Grants);
- Real Estate Foundation of BC

It will be important for City staff and external agencies to continually monitor and research new funding opportunities as they change often.

Internal Tools to Fund Adaptation

A major barrier to adaptation across Canada is the limited financial capacity for municipalities to collect revenue.^{29, 30} However, the City can leverage innovative and emerging tools to help fund, finance and incentivize climate adaptation initiatives. The table below summarizes internal financial mechanisms available to the municipality.

Table 6. Financial mechanisms available to municipalities for funding climate adaptation*

Financing Tools	Funding Tools	Local Incentives to Promote Adaptation
<ul style="list-style-type: none"> Borrowing 	<ul style="list-style-type: none"> Property taxes 	<ul style="list-style-type: none"> Development cost charge (DCC) reductions
<ul style="list-style-type: none"> Reserve funds Climate bonds and green bonds 	<ul style="list-style-type: none"> Tax levy Local improvement charges (LICs) 	<ul style="list-style-type: none"> Revitalization tax exemptions (RTEs) Natural area tax exemptions
<ul style="list-style-type: none"> Tax increment financing (TIF) 	<ul style="list-style-type: none"> User fees 	<ul style="list-style-type: none"> Local improvement charge (LIC) financing
<ul style="list-style-type: none"> Revolving loan Funds (RLF) 	<ul style="list-style-type: none"> Development cost charges (DCCs) 	<ul style="list-style-type: none"> Density for benefit agreements (DBAs)

5.5 Communication, Education, and Outreach

As a number of actions within the Community Climate Adaptation Plan encompass communication, education, and outreach, this will inherently take place throughout implementation. Furthermore, upon adoption of the plan, communication, education, and outreach should be embedded within the fabric of how business is done at the corporate level. For example, when making policy recommendations to council, the CCAP should be referenced. The plan will also be advertised online once endorsed by council. The City may wish to facilitate public engagement sessions to support actions identified in the plan, or during future updates to the plan.

5.6 Plan Review Schedule

It is suggested that an implementation progress report be provided to council on an annual or biennial basis. A formal review of the plan should be conducted every five years to gauge whether actions are improving adaptive capacity, and to account for potential new climate threats. The review process should ensure that current climate science, risks and vulnerabilities, and public feedback are articulated into new recommendations of the CCAP.

* Source: ACT-SFU, 2019; Update: Paying for Urban Infrastructure Adaptation in Canada. An Analysis of Current and Emerging Instruments for Local Governments.

5.7 Next Steps

The next steps will consist of the City of Campbell River and partner organizations implementing actions of the CCAP according to the implementation tables and setting up structures for monitoring and reporting. Priority will be given to actions that can be incorporated into current work plans and existing operational budgets. Planning for mid-to-longer term actions will also need to begin while taking into consideration future budgeting and work plan capacity. Advancing adaptation actions will ultimately be contingent upon resources and council priorities.



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*The scope of Hazard Risk and Vulnerability Assessments will vary in technical nature as they are sector/area specific.

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7.0 Appendices

Appendix A: Climate Action Implementation Tables

BUILT ENVIRONMENT



Objective 1: Improve the resilience of infrastructure by reducing damage and disruptions associated with a changing climate.

Action 1.1	Conduct an infrastructure risk assessment to determine priority risks to assets and high hazard low-lying areas under climate projections.
Scope/Imperative	<ul style="list-style-type: none"> • Further studies as needed based on results of Hazard Risk and Vulnerability Assessment* • Required updated Hazard Risk and Vulnerability Assessment for the City
Risks addressed	B2, B3, B4, B8, B13 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> • Utilize Hazard Risk and Vulnerability Assessment (HRVA) results to determine high-level risks. Further studies will be determined as needed based on results of HRVA. <ul style="list-style-type: none"> ○ Ensure that green infrastructure is included in the evaluation of infrastructure risks • Determine Council's tolerance to service reductions as part of overall risk assessment • Utilize outputs from City of Campbell River's Sea Level Rise project to inform risks to coastal assets • Based on outputs of risk assessment studies, the City may consider a re-assessment of design criteria for major infrastructure (e.g. 100 and 200 year storms) • Provide resources and templates for property owners in the community to assess climate risk
Lead Organization(s)	<p>City of Campbell River: Long Range Planning & Sustainability Department, cross-departmental Asset Management Group Ministry of Transportation and Infrastructure Strathcona Regional District First Nations Communities</p> <ul style="list-style-type: none"> • Each of the organizations would complete their own risk assessment independently
Supporting Organization(s)	<p>City of Campbell River: Finance BC Hydro First Nations</p>

*The scope of Hazard Risk and Vulnerability Assessments will vary in technical nature as they are sector/area specific.

Costing	\$\$\$ - \$100,001 - \$500,000
Anticipated Timing	ONGOING TARGET 2022-2027 (Incorporate into budget based on resourcing)
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> Regular review every 2 years once completed Total losses (dollar value) due to weather related events incurred by the City
Baseline	<ul style="list-style-type: none"> Initial Sea Level Rise inventory of assets-at-risk and 2017 shoreline photo survey provides baseline data regarding sea level rise.
Mandate	<p>Community Wildfire Protection Plan (2020)</p> <p>Sea Level Rise Action Plan (2020)</p> <ul style="list-style-type: none"> 4.1 Regulation/Policy Updates 4.2 Technical Studies/Capital Works Projects
Next Steps	<ul style="list-style-type: none"> Ensure that risk assessments are incorporated into asset management planning Project scoping or green natural asset program and presentation to Council for funding

Action 1.2	Develop plans to protect infrastructure and/or relocate sites based on risk.
Scope/Imperative	<ul style="list-style-type: none"> Hazard Risk and Vulnerability Assessment (Identify sites at risk through HRVA) Sea level rise – implications Official Community Plan review Development Permits <p>Scope to be decided based on following outcome of Hazard Risk and Vulnerability Assessment</p>
Risks addressed	B2, B3, B10, B13 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> Share residential and commercial adaptation best practice trainings and resources with builders, developers, residents etc. Review options to relocate and/or protect infrastructure from risk areas Modify maintenance schedules and monitoring where needed
Lead Organization(s)	City of Campbell River: Long Range Planning & Sustainability and Operations Departments Ministry of Transportation and Infrastructure Strathcona Regional District
Supporting Organization(s)	Consultants as needed
Costing	\$\$ - \$50,001 - \$100,000
Anticipated Timing	OTHER: future budget request item (2022 or later) to consider HRVA program every 5 years, and/or integrate within future asset management program
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> Asset management practices will likely dictate how HRVAs should be conducted and establish indicators
Baseline	<ul style="list-style-type: none"> Current condition surveys Initial sea level rise inventory of assets at risk survey (2017)



Mandate	<p>Sea Level Rise Action Plan (2020)</p> <ul style="list-style-type: none"> • 4.1 Regulation/Policy Updates <p>Community Wildfire Protection Plan (updated 2020)</p> <ul style="list-style-type: none"> • Action 14 • Section 5: Risk Management and Mitigation Factors. Risk mitigation options. <p>Urban Forest Management Plan (2015) – 4. Visions, Principles, and Objectives</p> <p>B. Protect Existing Canopy Cover - Action 18/19 C. Develop a Tree Care Program - Action 20. G. Integrate the Urban Forest into Watershed, Stormwater, and Flood Management – Action 37</p> <p>One of the drivers behind new Fire Hall Location (currently located within the inundation flood zone and is at risk of flooding in the event of a dam breach upstream on the Campbell River).</p>
Next Steps	Initiate Hazard Risk and Vulnerability Assessments in 2021

Action 1.3	Study stormwater system vulnerability under climate change, and plan for upgrades to accommodate future precipitation projections.
Scope/Imperative	<ul style="list-style-type: none"> • Hazard Risk and Vulnerability Assessment • Current design criteria (rainfall data) is old and may not reflect current/future patterns – results in undersized storm systems and flooding
Risks addressed	B8, B10 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> • Determine feasibility of adaptations and upgrades to stormwater systems including pump stations • Re-assess design criteria for major infrastructure (e.g. 100- and 200-year storms) • Update Rainfall IDF Curves included in City’s design standards • Monitor rain gauge data trends • Update ISMPs and ensure implementation
Lead Organization(s)	City of Campbell River: Operations (Roads and Drainage) and Development Services Departments
Supporting Organization(s)	City of Campbell River: Long Range Planning & Sustainability Department BC Hydro Environment Canada Department of Fisheries and Oceans First Nations
Costing	\$\$\$\$ - >500,000
Anticipated Timing	<ul style="list-style-type: none"> • TARGET 2022-2027
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> • Indicators to be determined as implementation progresses
Baseline	<ul style="list-style-type: none"> • ISMPs and subsequent technical reports



Mandate	<p>Sea Level Rise Action Plan (2020)</p> <ul style="list-style-type: none"> • 4.2 Technical Studies/Capital Works Projects <p>Urban Forest Management Plan (2015) – 4. Visions, Principles, and Objectives</p> <p>G. Integrate the urban forest into watershed, stormwater and flood management</p>
Next Steps	<ul style="list-style-type: none"> • Commence data collection • Investigate policy to ensure climate change is incorporated into City procedures

Action 1.4	Establish a Flood Management bylaw.
Scope/Imperative	Establish flood construction levels for flood prone areas from marine and river flooding, taking into account up to 1m of sea level rise. The Province of BC’s Flood Hazard Area Land Use Management guidelines encourage municipalities to develop floodplain bylaws based on projections of 1 metre of sea level rise by 2100 (BC Ministry of Water, Land and Air Protection, amended 2018). Implementing legislation would help protect human health, safety, and property from periodic flooding and future sea level rise.
Risks addressed	B4, B8, B10, B13 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> • Commission official floodplain mapping to amend current flood plain • Develop permit guidelines for flood protection in areas vulnerable to sea level rise (OCP amendment) and adjust other DP guidelines as necessary • Dictate Flood Construction Levels (FCLs) and the minimum height for electromechanical systems • Inform residents about Flood Construction Levels (FCLs) and minimum height for electromechanical systems
Lead Organization(s)	City of Campbell River: Long Range Planning & Sustainability Department
Supporting Organization(s)	City of Campbell River: Development Services Department (including Building Services)
Costing	\$ <\$50,000
Anticipated Timing	TARGET 2020
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> • Creation of flood plain bylaw (e.g., evaluated based on whether or not the bylaw has been adopted within the suggested timeframe).
Baseline	N/A
Mandate	<p>Sea Level Rise Action Plan (2020) – 4.1 Regulation/Policy Updates</p> <ul style="list-style-type: none"> • 4.1.1 Implement Flood Construction Levels <p>Official Community Plan (2012) – Schedule B, Development Permit Area Guidelines</p> <ul style="list-style-type: none"> • Hazard Conditions DP Area
Next Steps	<ul style="list-style-type: none"> • Commission official flood plain mapping



Action 1.5	Increase severe weather resiliency of docking facilities, including planned upgrades.
Scope/Imperative	Coastal infrastructure will be subject to several potential hazards due to climate change, including sea level rise, increased winds, coastal erosion, increased storm magnitudes and frequency, increased wave action, and coastal inundation, rendering it less usable or damaged. New docking facilities or upgrades to existing facilities must incorporate the long-term effects of climate change to ensure safety and durability of infrastructure.
Risks addressed	B3 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> • Develop floodplain Bylaw, update Development Permit Area including possibility of introducing a Sea Level Rise DP area, update Subdivision and Development Servicing Bylaw, update Foreshore memorandum of understanding with DFO • As part of BC Ferries' Terminal Development Plan, a new berth has been identified in the longer term (12+ years) for the Campbell River terminal.
Lead Organization(s)	BC Ferries Local Harbour Authorities Private wharf owners
Supporting Organization(s)	City of Campbell River: Development Services, Operations, Long Range Planning & Sustainability Departments
Costing	Unknown
Anticipated Timing	OTHER: Unknown
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> • Monitoring metrics to be determined as implementation progresses
Baseline	<ul style="list-style-type: none"> • Baseline data to be determined as implementation progresses
Mandate	BC Ferries Terminal Development Plan (in progress)
Next Steps	<ul style="list-style-type: none"> • BC Ferries to develop a Flood Protection Guidelines to provide guidance on future construction projects

Action 1.6	Proactively prevent damage to trees and powerlines through continued management and communication.
Scope/Imperative	It is important to actively prune street and park trees in order to address safety concerns, ensure tree health & vitality, and promote disease control. Protecting the health of trees requires long-term planning, ongoing maintenance, and short-term crisis management. The City will continue to actively prune at-risk trees and liaise with community organizations to manage tree risks to powerlines.
Risks addressed	N9 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> • Expand the City's Tree Bylaw to mandate the clearing of trees by powerlines that will fail in windstorms or extreme weather events • Educate community on tree health, tree pruning, and types of trees to plant under powerlines on private property • Proactively manage high risk trees and areas on publicly owned lands • Ensure continued communication between BC Hydro and City Arborists to share information
Lead Organization(s)	City of Campbell River: Parks Department BC Hydro

*The scope of Hazard Risk and Vulnerability Assessments will vary in technical nature as they are sector/area specific.



Supporting Organization(s)	N/A
Costing	\$\$\$ - \$100,001 - \$500,000
Anticipated Timing	ONGOING
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> • Number of trees pruned per year • Number of trees inspected per year • Number of trees planted per year
Baseline	Baseline data as informed by the City's Urban Forest Management Plan
Mandate	<p>Creation of City Arborist position</p> <p>Strategic Plan (2020-2023)</p> <ul style="list-style-type: none"> • Develop Tree Protection Bylaw <p>Urban Forest Management Plan (2015-2035)</p>
Next Steps	Begin developing a Tree Protection Bylaw

Objective 2: Generate awareness and monitoring of changing climate conditions to build support for adaptation

Action 2.1	Establish a monitoring system for current and future precipitation intensities, reservoir levels, river flows/levels and sea level rise to inform planning decisions for the community and City.
Scope/Imperative	<p>There is also a real concern about increased volumes and stream flashiness in the creeks over all due to increased development throughout watersheds. These high-volume events have the potential to harm habitat, erode banks, cause channel migration in areas where there is no room for the stream to move, causing flooding and impacting public and private property. High volume events are expected to increase with climate change.</p> <p>Current initiatives supporting this action:</p> <ul style="list-style-type: none"> • School based weather station network includes information on current precipitation intensities; 10 SD72 schools are part of program • Share information and develop process. Locations include: <ul style="list-style-type: none"> ○ Carihi, Cortez, Discovery passage, EDM, Miracle Beach, Ocean Grove, Penfield, Phoenix, Ripple Rock, Sayward, Timberline – Island Weather Network • One approved City-owned stream level logger in 2020 for Willow Creek (located near the estuary) and one rain gauge to be mounted on the roof of a City facility
Risks addressed	B2, B3, B4, B8 (Refer to Reference List of Climate Risks by ID on page 84)



Supporting Actions	<ul style="list-style-type: none"> Consult with a hydrologist/hydrological engineer to help determine resource gaps, locations of stream level loggers, and overall approach to establishing a successful monitoring system for reservoir levels, river flows/levels and sea level rise <ul style="list-style-type: none"> Install more rain gauges around the City to collect rainfall data Continue to investigate the utility of stream level loggers for creeks. Install new loggers where appropriate to assess stream carrying capacity and flooding potential. Identify areas where private and public lands would be at most risk in order to develop policies to guide prevention and mitigation
Lead Organization(s)	City of Campbell River: Long Range Planning & IT Departments BC Hydro Strathcona Regional District (potential co-applying for grant applications)
Supporting Organization(s)	Department of Fisheries and Oceans Greenways Land Trust Streamkeepers First Nations A-Tlegay Fisheries Society
Costing	<p>\$\$ - \$50,001-\$100,000 – Capital for each project \$\$\$ - \$100,001 - \$500,000 – Capital for all projects; annual operational costs and analyzing data</p> <p>Estimate does not include maintenance</p>
Anticipated Timing	ONGOING (existing) INITIATE 2020 (Data loggers)
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> Collection of 1-2 years of data and subsequent re-evaluation of hydrological modelling in light of initial data collection. 2-year review and as issues arise
Baseline	<ul style="list-style-type: none"> This action seeks to establish baseline data for hourly rainfall in CR and continuous flow monitoring in Willow Creek Sea Level Rise initiative will create baseline information for City of Campbell River BC Hydro possesses baseline data on flows in the Campbell River Existing SD72, BC Hydro and Environment Canada records
Mandate	<p>Sea Level Rise Action Plan (2020) – 4.2 Technical Studies/Capital Works Projects</p> <ul style="list-style-type: none"> 4.2.4 – 21. Establish ongoing data collection and monitoring (January 2020 – January 2050) <p>Integrated Community Sustainability Plan (2008) – Chapter 15. Water Priority Actions Going Forward</p> <ul style="list-style-type: none"> 10. Implement a watershed activity monitoring and outreach program (for drinking watershed) <p>Integrated Stormwater Management Implementation Plan (2008)</p> <ul style="list-style-type: none"> Planning and Analysis Policy and Regulation
Next Steps	<ul style="list-style-type: none"> Install City operated rain gauge and flow monitor Establish data sharing protocol with BC Hydro, SD72, and City Departments



Action 2.2	Create a sea level rise education tool.
Scope/Imperative	<ul style="list-style-type: none"> To help property owners/potential purchasers understand future risks associated with waterfront property and establish the extent to which sea level rise is a collective community-wide issue.
Risks addressed	B8, B10, B13 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> Refer to priority actions section of SLR plan to provide information on regulatory/policy updates, technical studies/capital works projects, capacity building, etc. Consider working with local school district to continue to connect with students and ensure they are aware of local challenges and proposed solutions Develop materials to support new and re-development projects and share broadly to ensure ongoing community understanding, and in particular, with business and private property owners in potentially affected areas. <ul style="list-style-type: none"> E.g. videos explaining long-term plans and animate potential solutions
Lead Organization(s)	City of Campbell River: Long Range Planning & Sustainability and Communications Departments
Supporting Organization(s)	N/A
Costing	\$ <\$50,000
Anticipated Timing	COMPLETE 2022 OTHER: as needed and depending on the evolution of SLR, local conditions and new information
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> Surveys at workshops Periodic City satisfaction surveys
Baseline	<ul style="list-style-type: none"> SLR 2018/2019 public consultation – participant feedback Sea Level Rise technical studies
Mandate	Sea Level Rise Action Plan (2020) – 4.3 Capacity Building
Next Steps	<ul style="list-style-type: none"> Hold year-end review of SLR Action Plan implementation progress and report to Council

Objective 3: Support residents in proactively managing privately owned property to adapt to temperature and precipitation changes, more frequent and severe extreme weather, and sea level rise.

Action 3.1	Explore potential regulatory and financial mechanisms to increase pervious surfaces and rainwater management at the homeowner, subdivision, new commercial and light industrial levels.
Scope/Imperative	The City's Integrated Stormwater Management Plans cite the provincial storm water planning guide: Healthy watersheds on Vancouver Island are typified by having greater than 65% forested land and less than 10% impervious surfaces. It is desirable to keep healthy watersheds for all of the ecosystems services they provide including provisioning and habitat functions, regulation functions and information functions.



	When the ISMPs were created (roughly between 2004 and 2005), most of the watersheds were at or near the 65% / 10% threshold.
Risks addressed	B2, B3, B4, B13 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> • Research other municipal stormwater parcel tax incentive programs for best management practices and assess whether this approach will be suitable in Campbell River • Determine appropriate method for assessing stormwater utility fee, including flat rates, tiered flat rate, property area, zoning, % impervious surfaces, etc. • Conduct public outreach and communications campaign regarding the development of the stormwater parcel tax • Incentivize private property source controls through credit, for items such as: <ul style="list-style-type: none"> ○ Downspouts discharging to pervious area, infiltration trench or rain garden; ○ Sump pump discharging to pervious area, infiltration trench or rain garden; ○ Pervious pavement driveways; and ○ Various low impact development features and stormwater controls for industrial, commercial and institutional (ICI) properties • Set target % for pervious/porous surfaces • Research feasibility of implementing green infrastructure wherever possible • Explore a pilot project through the Municipal Natural Assets Initiative • Zoning Bylaw Develop and review new design standards
Lead Organization(s)	City of Campbell River: Long Range Planning & Sustainability, Development Services, Finance, Operations (Roads & Drainage) and IT (GIS) Departments
Supporting Organization(s)	Stewardship community
Costing	\$\$ - \$50,001 - \$100,000
Anticipated Timing	TARGET 2022-2025
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> • Recalculate the summary parameter tables from the ISMPs. These tables summarize hydrologically significant landscape features and the ISMP notes that these tables are useful in measuring the extent of urban disturbance and its associated risk within a watershed. Parameters include: <ul style="list-style-type: none"> • Total (watershed) Area • Total Impervious Area • Total Developed Area • Cleared Forest Area • Replanted/Regenerating Forest Area • Mature Forest Area • Riparian Area • Wetland Area • Length of Open Channel Watercourses • Length of Closed Channel Watercourses (storm drains) • Length of Ditches • With regards to frequency of evaluation, stats in ISMP (e.g., for Willow Creek) could be recalculated every time the City gets new aerial survey (every 3 years). These measures should be tied into the measurements for canopy cover as part of the urban forest management plan. These two areas of focus must reference one another and collect data comparably.



Baseline	<ul style="list-style-type: none"> The baseline data are the above referenced ISMP hydrologically significant landscape feature measurements as well as data on canopy cover previously collected as part of the City’s urban forest management plan inventory.
Mandate	<p>Refresh Downtown Campbell River (2017)</p> <ul style="list-style-type: none"> Principles for Infrastructure Design <p>Urban Forest Management Plan (2015) – 4. Visions, Principles, and Objectives G. Integrate the urban forest into watershed, stormwater, and flood management – Action 38</p> <p>Official Community Plan Guidelines (2012) - Schedule B, Development Permit Area Guidelines</p> <p>Integrated Stormwater Management Plans (for various urban watersheds)</p>
Next Steps	<ul style="list-style-type: none"> Complete Housing Growth Review stormwater analysis Finalize Housing Growth Strategy Review subsequent amendments to Zoning Bylaw, DCC Bylaw, S&DS Bylaw, etc.

Objective 4: Apply green infrastructure practices and principles to better manage impacts of climate change

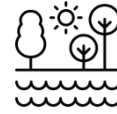
Action 4.1	Increase the use of green infrastructure on public and private property.
Scope/Imperative	Also referred to as Low Impact Development, green stormwater infrastructure intercepts, absorbs, and holds stormwater, helping reduce the amount of runoff entering sewers during rain events. By absorbing rain where it falls, it decreases the untreated runoff discharged into water bodies from combined sewer system overflow events. It can also help manage the impacts of severe weather, particularly from increased precipitation. Expanding the use of green infrastructure on public and private property can contribute to more effective stormwater management, improved ecosystem health, improved public health, and potential economic savings.
Risks addressed	B2, B8, B10, B13, B14 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> Integrate recommendations and green infrastructure options with new guidelines, policy, and standards, including: <ul style="list-style-type: none"> Procurement Policy Zoning bylaw Development Permit guidelines ISMPs Set City-wide targets and key performance indicators for tree canopy, green space, rainwater management, and permeable surfaces Expand public education on green infrastructure retrofitting for private property (e.g. residential, commercial, and/or industrial) Incorporate natural assets into the City’s corporate Asset Management Plan Restore natural areas and green spaces with climate-resilient native vegetation and tree species, prioritizing areas vulnerable to climate impacts (e.g. heat, flooding, habitat loss, etc.).



	<ul style="list-style-type: none"> Promote green/white roofs or introduce legislation requiring green/white roofs for large buildings Incorporate green infrastructure options into Phase 3 of Highway 19A upgrades Develop Environmentally Sensitive Areas Council Policy Amend Subdivision and Development Servicing Bylaw Update Integrated Stormwater Management Plans
Lead Organization(s)	City of Campbell River: Parks, Development Services, Operations, Long Range Planning & Sustainability, Finance and Purchasing Departments
Supporting Organization(s)	Greenways Land Trust
Costing	\$\$\$ - \$100,001 - \$500,000
Anticipated Timing	ONGOING
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> Percent permeable/impermeable measurement Canopy/vegetation cover Dollar value of Natural Assets inventoried
Baseline	<ul style="list-style-type: none"> Analysis of building/development permits UFMP canopy cover Stream report cards Budget given to “Green” projects / tree planting outreach programs
Mandate	<p>Integrated Stormwater Management Plan (2011)</p> <ul style="list-style-type: none"> Environmental Protection & Enhancement, Pilot Projects, Policy and Regulation <p>Sea Level Rise Action Plan (2020)– 4.1 Regulation/Policy</p> <p>Urban Forest Management Plan (2015) – 4. Visions, Principles, and Objectives</p> <p>A. Increase canopy cover within the Urban Containment Boundary to 40% by 2060</p> <p>G. Integrate the urban forest into watershed, stormwater and flood management</p> <p>I. Engage and partner with the community to build ownership of the urban forest</p> <p>Future Natural Asset Management Plan</p> <p>Official Community Plan (2012) – Schedule B, Development Permit Area Guidelines</p>
Next Steps	<ul style="list-style-type: none"> Refer to green infrastructure and natural asset management plan action next steps.



NATURAL ENVIRONMENT



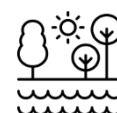
Objective 5: Actively manage ecological assets by protecting natural areas and ecosystems.

Action 5.1	Review and update guidelines or requirements for erosion and run-off prevention.
Scope/Imperative	<p>With respect to turbidity and water quality, too much sediment is washing off some development and land disturbance sites, usually via the storm drainage system, and into the receiving environment (ditches, creeks, the ocean). Run-off can also increase as a result of high water volume in the storm drains from impervious surfaces. Too much water all at once with storm events, as well as the shorter term water quality impacts of construction development should be considered, as potential for erosive processes downstream or the point of entry.</p> <ul style="list-style-type: none"> • The City has Design Standards that guide erosion and sediment control planning and the City reviews erosion and sediment control plans that are submitted as part of the engineering drawing set to development services • The City also has the Environmental Protection Bylaw which has a section on fouling watercourses and the storm drainage system • Targets for turbidity leaving a site have already been defined and are supposed to be measured by the environmental monitors working at development sites. • The City is working with developers to improve their Erosion & Sediment Control plans • Currently, there is a gap in Erosion & Sediment Control planning when individual lots are built out at the building permit level. It is unclear at the City, which department should be overseeing this.
Risks addressed	B2, B8, B13, B14 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> • Explore the potential of installing water quality monitoring stations along creeks and rivers in partnership with the Department of Fisheries and Oceans • Develop outreach and education materials for property owners along slopes regarding techniques to minimize erosion and increase water infiltration • Modeling erosion within the banks of the various water bodies in the Watershed • Review and update ISMP, particularly in light of new development since the ISMP was prepared
Lead Organization(s)	City of Campbell River: Long Range Planning & Sustainability and Development Services (including Development Engineering and Building Services) Departments
Supporting Organization(s)	City of Campbell River: Water Department Greenways Land Trust Department of Fisheries and Oceans
Costing	\$ <\$50,000
Anticipated Timing	ONGOING



Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> • Stormwater system performance • Incidences of erosion events • Turbidity readings • Temperature readings • Zooplankton sampling • Presence of contaminants
Baseline	<ul style="list-style-type: none"> • Integrated Stormwater Management Plans offer qualitative information on creek conditions at the time of writing, forming a high level baseline dataset. • DFO has some water quality data on most of the local creeks from the late 1990s, some seasonal information from the Stream stewards that run fences, and some temperature data on a few systems from the late 1990s • DFO has 20 years of records for Simms Creek and 5 years for Haig Brown Kingfisher and Casey Creeks • DFO has extensive water quality, quantity and temperature data for Campbell and Quinsam Rivers
Mandate	<p>Official Community Plan Guidelines (2012) – Schedule B, Development Permit Area Guidelines</p> <ul style="list-style-type: none"> • General Environment Development • Streamside Development • Estuary Development • Watershed Development • Hazard Conditions Development <p>Subdivision and Development Servicing Bylaw (No. 3419, 2010)</p> <ul style="list-style-type: none"> • Part 4: Stormwater Systems & Management – 4.7 • Part 5: Subdivision and Development Works and Services – 5.1 <p>Marine Foreshore Habitat Assessment and Restoration Plan (2011) – Section 7: Action Plan</p> <p>Measures to Protect Fish and Fish Habitat, Department of Fisheries and Oceans</p> <ul style="list-style-type: none"> • Ensure Property Sediment Control
Next Steps	<ul style="list-style-type: none"> • Complete stream report cards exercise • Conduct SWOT analysis of current system of regulation and guidance

Action 5.2	Move toward establishing an Integrated Watershed Management Plan approach to improve the health and resilience of watersheds.
Scope/Imperative	<ul style="list-style-type: none"> • All local watersheds and the regional watersheds that feed into them • City is currently undertaking a revised Source Water Protection Plan (a component of an Integrated Watershed Management Plan)
Risks addressed	N2, N4, B1/N11, N7, B14, B7, N10, C3 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> • Establish a Source Water Protection Plan • Support an update to Coastal Watershed Assessment • Identify existing initiatives that support collaborative watershed management • Support regional/community-wide watershed stewardship initiatives



	<ul style="list-style-type: none"> • Update Development Permit Guidelines in OCP to align with Watershed Management Plan • Update Watershed Management Plan • Review of subdivision and development servicing bylaw • Update Integrated Stormwater Management Plan
Lead Organization(s)	City of Campbell River Strathcona Regional District
Supporting Organization(s)	Greenways Land Trust Stream Steward Committee Ministry of Forests, Lands, Natural Resource Operations and Rural Development Treaty Nations
Costing	\$\$ 50,000 - \$100,000
Anticipated Timing	TARGET 2023-2027
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> • Water Quality Monitoring • Streamside Report Cards
Baseline	<ul style="list-style-type: none"> • Establishment of Integrated Watershed Management Committee
Mandate	<p>Drinking Watershed Management Plan (2001)</p> <ul style="list-style-type: none"> • Established a Drinking Water Committee <p>Official Community Plan (2012)</p> <ul style="list-style-type: none"> • Schedule A, Chapter 15. Water Responsibility • Schedule B, Development Permit Area Guidelines <ul style="list-style-type: none"> ○ Watershed DP Area
Next Steps	<ul style="list-style-type: none"> • Identify existing initiatives that support collaborative watershed management within the Region

Action 5.3	Develop a framework for monitoring and evaluation of ecosystem health and ecosystem services, identifying risks due to climate impacts and extreme weather.
Scope/Imperative	<p>We are in exceptional global ecological overshoot and ecological footprint analysis indicates that BC life styles are too big (not sustainable). Scaling back the collective economy/footprint is imperative to maintain human existence.</p> <ul style="list-style-type: none"> • Municipal Natural Assets Initiative • Urban Forest Management Plan • Stream Report Cards • Integrated Storm Watershed Management Plans • Ecological footprint Analysis
Risks addressed	N2, N4, N5, N6, N7, N12 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> • Continue to expand the number of key performance indicators for ecosystem health and ecosystem services • Implement recommendations in the ecosystems and species at-risk sea-level rise report for the marine shoreline • Monitor watershed temperature trends and identify options for lowering temperature through restorative actions • Support the development of stream report cards • Implement the Urban Forest Management Plan



	<ul style="list-style-type: none"> • OCP environmental Development Permit application, review and improvement • Develop an Environmentally Sensitive Areas Council policy and integrate monitoring and evaluation considerations
Lead Organization(s)	City of Campbell River: Long Range Planning & Sustainability and Parks Departments
Supporting Organization(s)	Department of Fisheries and Oceans Province of BC <ul style="list-style-type: none"> • Greenways Land Trust
Costing	\$\$ - \$50,001 - \$100,000
Anticipated Timing	TARGET 2021
Monitoring and Evaluation Metrics	Metrics as determined in the Municipal Natural Asset Program.
Baseline	<ul style="list-style-type: none"> • Municipal Natural Assets Initiative • Stream Report Cards underway • Urban Forest Management Plan • Foreshore Plan • Integrated Storm Water Management Plans • Baseline ecological inventories (Nunns Creek Ecological Inventory, Baikie Island Inventory, Estuary Management Plans) Conservation Data Centre and other government websites mapping
Mandate	Sea Level Rise Action Plan (2020) <ul style="list-style-type: none"> • 4.1 Regulation/Policy • 4.2 Technical Studies/Capital Works Projects Urban Forest Management Plan (2015) – 4. Visions, Principles, and Objectives <ol style="list-style-type: none"> I. Engage and partner with the community to build ownership of the urban forest Council Resolution No. 19-0282 <ul style="list-style-type: none"> • THAT the Environmental Advisory Committee be directed to review the City's Official Community Plan streamside development permit area guidelines and make recommendations to Council.
Next Steps	<ul style="list-style-type: none"> • Complete stream report cards • Complete current environmental regulation updates Develop ESA policy and link to other strategic plans e.g. SLRAP, UFMP and CCAP

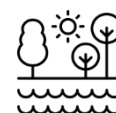
Action 5.4	Increase education for City staff and community on invasive species and pests, continue to manage existing areas of invasive species within the City's parks and public spaces, proactively prepare for emerging invasive species threats, and develop consolidated invasive species strategy/policy.
Scope/Imperative	<ul style="list-style-type: none"> • Invasive species are an impending threat to ecosystems around the globe; local ecosystem responses to changes in land-use, development, and climate change need to be mapped for the area • Needs additional resources to have a decent impact in appreciable timescales, especially re: knotweed
Risks addressed	N5, N6 (Refer to Reference List of Climate Risks by ID on page 84)

Supporting Actions	<ul style="list-style-type: none"> • Implement the City of Campbell River Invasive Plant Management and 5-year Implementation Plan • Update the Environmental Protection Bylaw invasive species section as needed • Increase education and outreach to the community on invasive species and pests <ul style="list-style-type: none"> ○ Develop fact sheets for residents on how to manage invasive species on their properties. ○ Engage with community stakeholders for dissemination of educational materials. • Add additional capacity to Early Detection Rapid Response with organizations looking at invasive or problematic species • Work across jurisdictional boundaries with local government partners and environmental non-government organizations to map, monitor, and remove invasive species and pests. • Continue to liaise with the Invasive Species Council of BC's Local Government Invasive Species Network (LGISN) to share information about, identifying needs for and sharing lessons learned from invasive species management programs and projects. • Develop an Environmentally Sensitive Areas Council policy
Lead Organization(s)	City of Campbell River: Long Range Planning & Sustainability and Parks Departments Greenways Land Trust Coastal Invasive Species Committee
Supporting Organization(s)	Strathcona Regional District Invasive Species Council of BC
Costing	\$ <\$50,000
Anticipated Timing	ONGOING: some actions are ongoing TARGET 2021
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> • Plan in place • Funding • Ten percent of treated sites to be monitored annually for presence or absence of priority invasive plants and for efficacy of treatment. Use an IAPP monitoring record and upload into IAPP for future management decisions. • Based on site monitoring, adjust treatment plans accordingly for increased treatment efficacy. Sites found with 100% treatment efficacy (update IAPP survey record to plant not found) may no longer require treatment, however should continue to be monitored for presence/absence of priority invasive plants every 3-5 years in perpetuity.
Baseline	<ul style="list-style-type: none"> • Existing invasive species programs (e.g., Knotweed, Scotch broom, Yellow-flag iris, Giant Hogweed) with Greenways and City • Greenways' activities in community
Mandate	<p>Official Community Plan (2012) – Schedule A, Chapter 6. Parks & Natural Environment</p> <p>Environmental Protection Bylaw (No. 3551, 2014 Consolidated to 3674, 2018)</p> <ul style="list-style-type: none"> • Part 5 <p>Urban Forest Management Plan (2015)</p> <ul style="list-style-type: none"> • Section 4 - Vision, Principles & objectives • Action 45



	<p>Integrated Community Sustainability Plan (2011)</p> <ul style="list-style-type: none"> • Environmental Health <p>Invasive Species Management & 5 Year Implementation Plan (2015)</p> <ul style="list-style-type: none"> • 2.1 Management Components – Step 1. Public Outreach • 6.3 Strategic Management • 6.7 Education and Collaboration <p>Council Resolution No. 18-0164 THAT Council approve the communications strategy, as attached to the Director of Planning’s March 23, 2018 report, to support the Environmental Protection Amendment Bylaw No. 3674, 2018 to regulate noxious weeds and invasive plants.</p> <p>Council Resolution No. 18-0311 THAT the Environmental Protection Amendment Bylaw No. 3674, 2018 be adopted; AND THAT Public Nuisance Amendment Bylaw No. 3675, 2018 be adopted; AND THAT Ticketing for Bylaw Offences Amendment Bylaw No. 3711, 2018 be given first, second and third reading.</p>
Next Steps	<ul style="list-style-type: none"> • Revisit invasive species policy and programs and report to Council

Action 5.5	Identify opportunities to support viable conditions for marine habitat and species.
Scope/Imperative	<ul style="list-style-type: none"> • Climate change affects the long-term trends in ocean temperature and changes in seasonal cycles of warming and cooling. This can affect the amount of food and oxygen available to marine plants and animals, in addition to shifts in distribution of many species. While some species may actually fare better in future conditions, others will not be able to adapt to changing conditions fast enough. If unable to adapt or migrate to new habitats that are suitable, some species may even go extinct. Conversely, unwanted species may establish themselves in new areas, impacting existing local species as the new arrivals compete for food and can bring diseases and parasites.
Risks addressed	N4, N12 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> • Monitor watershed temperature trends and identify options for lowering temperature through restorative actions • Restoration of natural systems, especially those that can absorb carbon dioxide, e.g. salt marsh restoration, seagrass restoration • Strengthen enforcement of existing rules and legislation on waterways and fish habitats • Public education • Implement the Sea Level Rise Action Plan
Lead Organization(s)	Department of Fisheries and Oceans Ministry of Agriculture
Supporting Organization(s)	City of Campbell River: Long Range Planning & Sustainability Department Greenways Land Trust, The Nature Trust of BC, Nature Conservancy of Canada First Nations Environmental NGO such as A-Tlegay Fisheries Society and the Guardians Program
Costing	\$ <\$50,000

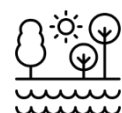


Anticipated Timing	ONGOING
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> • Number of projects identified • Number of projects planned • Number of projects in progress • Number of project completed
Baseline	<ul style="list-style-type: none"> • Any existing data pertaining to aquatic and ecological conditions
Mandate	<p>Official Community Plan (2012)</p> <ul style="list-style-type: none"> • Schedule A, Chapter 6 – Parks & Natural Environment • Schedule A, Chapter 15 – Water Responsibility • Schedule B - Development Permit Area Guidelines <ul style="list-style-type: none"> ○ Foreshore DP Area ○ General Environmental DP Area ○ Estuary DP Area <p>Environmental Protection Bylaw (No. 3551, 2014 Consolidated to 3674, 2018)</p> <ul style="list-style-type: none"> • Part 3: Watercourses and the Storm Drainage System <p>Sea Level Rise Action Plan (2020)</p> <ul style="list-style-type: none"> • Section 4 - Priority Actions <p>Campbell River Estuary Management Plan Update (2002)</p> <ul style="list-style-type: none"> • Section 5 - Proposed Campbell River Estuary Plan • 1.1 - General Policies <p>Marine Foreshore Habitat Assessment and Restoration Plan (2011)</p> <ul style="list-style-type: none"> • Section 7 - Action Plan <p>Integrated Stormwater Management Implementation Plan (2008)</p> <ul style="list-style-type: none"> • Environmental Protection & Enhancements <p>Fisheries and Oceans Canada</p> <ul style="list-style-type: none"> • Mandate and Role • Fish and Fish Habitat Protection Program • Oceans Act; Fisheries Act; Species at Risk Act; Coastal Fisheries Protection Act
Next Steps	<ul style="list-style-type: none"> • Complete Stream Report Cards project • Establish dialogue with Department of Fisheries and Oceans and Ministry of Agriculture

Action 5.6	Reduce riparian harm and strengthen protection through policy tools and guidance.
Scope/Imperative	<ul style="list-style-type: none"> • Precedent/justification for action: Flood impacts, property damage, human safety, and environmental protection • Environmental Protection Bylaw • Riparian Areas Protection Regulations
Risks addressed	N2, N4, N7, B1/N11 (Refer to Reference List of Climate Risks by ID on page 84)

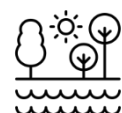


Supporting Actions	<ul style="list-style-type: none"> • Widen riparian zones (e.g. around Campbell River Estuary and urban creeks) through changes to Bylaws, Provincial Riparian Areas Protection Regulation and DFO rules • Monitor and report on downstream effects of reduced snowpack and increased glacial melt to identify protection measures • Public education (e.g. targeted mail-outs, campaign with Greenways) • Establish Environmentally Sensitive Areas Management Council policy • Develop riparian zone health checklist to assess current and future state of riparian areas • Encourage landowners to plant vegetation along rivers and creeks through incentives/tree planting programs
Lead Organization(s)	City of Campbell River: Long Range Planning & Sustainability and Development Services Departments Department of Fisheries and Oceans Strathcona Regional District
Supporting Organization(s)	Province of B.C. BC Hydro Greenways Land Trust Strathcona Regional District
Costing	\$ <\$50,000
Anticipated Timing	<ul style="list-style-type: none"> • TARGET 2021
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> • Riparian health scores for streams and rivers
Baseline	<ul style="list-style-type: none"> • State of the existing riparian habitat (where known)
Mandate	<p>Strategic Plan (2020-2023) – Environment</p> <ul style="list-style-type: none"> • Develop an Environmentally Sensitive Areas Policy <p>Subdivision and Development Servicing Bylaw (Bylaw No. 3419, 2010)</p> <ul style="list-style-type: none"> • 1. Walkways, Greenways, Trails & Bikeways • 4. Stormwater Systems & Management • 5. Erosion & Sediment control <p>Official Community Plan – Schedule B, Development Permit Area Guidelines</p> <ul style="list-style-type: none"> • Estuary Development • Watershed Development • Sensitive Ecosystem Inventory Sites <p>Urban Forest Management Plan (2015-2035)</p> <ul style="list-style-type: none"> • 4. Vision, Principles, and Objectives <p>Integrated Stormwater Management Implementation Plan (2008)</p> <ul style="list-style-type: none"> • Environmental Protection & Enhancement <p>Agriculture Plan (2011)</p> <p>4.2.4. Resourcing the Industry - Section 1</p> <p>Integrated Community Sustainability Plan (2011)</p>



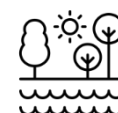
	<ul style="list-style-type: none"> • Environmental Health <p>Stream Report Cards</p> <p>Council Resolution Number: 19-0282</p> <ul style="list-style-type: none"> • THAT the Environmental Advisory Committee be directed to review the City's Official Community Plan streamside development permit area guidelines and make recommendations to Council.
Next Steps	<ul style="list-style-type: none"> • Complete Stream Report Cards • Complete EAC review • Provide options to Council

Action 5.7	Develop an Environmentally Sensitive Area Management Policy
Scope/Imperative	<ul style="list-style-type: none"> • Too much time spent by staff daily with this in an ad hoc manner • Legal advice to undertake policy development in order to clarify and budget for consistent service delivery and management of natural areas • Desirable to recognize the importance and services provided by City-owned ESAs • Numerous requests/concerns from residents • Provide clarity and consistency to property owners and other groups in terms of City service levels for ESAs
Risks addressed	B1/N11, B2, B3, B4, N2, N4 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> • Explore acquisition of additional property to put into Environmentally Sensitive Areas to assist in climate change adaptation for natural areas • Provide green infrastructure to protect private property and municipal assets. • Environmental Advisory Committee to play a role in policy development and scope, including enforcement strategy for encroachments.
Lead Organization(s)	City of Campbell River: Long Range Planning & Sustainability, Property Services, Roads, Parks, Development Services, and Bylaw Services Departments
Supporting Organization(s)	Greenways Land Trust
Costing	\$ <\$50,000 – for developing the policy. Subsequent implementation and enforcement may incur higher costs.
Anticipated Timing	TARGET 2021
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> • Create an inventory of locations – staff and external stakeholders (e.g., Greenways Land Trust) could compile a lot of known locations to be addressed • Locations and issues/services need to be addressed, measurements of the area of restored or reclaimed ESA land • Issues include channel/bank movement, hazard trees, encroachment, invasive species, flooding, beaver management, log debris jams, dumping
Baseline	<ul style="list-style-type: none"> • A lot of information on ESA encroachments and issues already exists in the planning files (e.g. visual surveys from creek surveys)



Mandate	<p>Waterfront Property Acquisition Strategy (2015)</p> <p>Sea Level Rise Action Plan (2020)</p> <ul style="list-style-type: none"> Section 7. Create Natural Asset Management Plan (2020-2022) <p>Urban Forest Management Plan (2015-2035)</p> <ul style="list-style-type: none"> Vision, Principles, and Objectives <p>Integrated Community Sustainability Plan (2011)</p> <ul style="list-style-type: none"> Environmental Health <p>Estuary Management Plan Update (2002)</p> <ul style="list-style-type: none"> Section 1 - Estuary Management Plan Polices <p>Strategic Plan (2020-2023)</p>
Next Steps	<ul style="list-style-type: none"> Confirm funding during 2020 fall budgeting Program into 2021 work plan

Action 5.8	Determine limits to tourism in sensitive areas and shut down vulnerable areas during high risk periods.
Scope/Imperative	<ul style="list-style-type: none"> To protect people, wildlife, environment Mitigate risk for emergency services having to step in and deal with an emergency Currently situational dependent Tourism organization coordinates to release info via communication channels Application to UBCM for 2020 intake for Wildfire Evacuation Route Planning in progress (Regional Application with City of Campbell River, Wei Wai Kum, We Wai Kai, Homalco and support from SRD)
Risks addressed	C4, C7, C11 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> Engage with the tourism industry and local business representatives regarding adaptive actions to prepare for extreme weather events and wildfire. Examples may include: <ul style="list-style-type: none"> Incorporating wildfire smoke events into emergency response and business continuity plans; Preparing production schedules and work assignments with potential business interruptions in mind, especially if located in a high impact area; Closing outdoor areas during high-risk periods (e.g. campgrounds, etc.); Using fire-retardant materials in constructions, maintenance, and upkeep of built assets; etc. Work with BC Parks and other organizations (Province) to provide information on dry conditions, active fires, FireSmart tips, high risk areas, flooding areas, etc.
Lead Organization(s)	City of Campbell River: Fire, Long Range Planning & Sustainability, Operations, and Economic Development Departments Destination Campbell River BC Parks/Province



Supporting Organization(s)	Destination BC Destination Campbell River City of Campbell River: Communications Department Media Province/Ministry of Forests Chamber of Commerce
Costing	\$ <\$50,000
Anticipated Timing	OTHER: Situational
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> • In emergency response plan for City and Regional District • Ongoing reviews and updates • Situational
Baseline	<ul style="list-style-type: none"> • Confirm in Emergency Response Plan
Mandate	<p>Community Wildfire Protection Plan (2020)</p> <ul style="list-style-type: none"> • Develop a wildfire specific emergency response plan <p>Fire Services Bylaw No. 2612, 1997</p> <ul style="list-style-type: none"> • 5.05: Evacuation <p>Wildfire Act</p>
Next Steps	<ul style="list-style-type: none"> • Initiate discussions • Program into work plans

Objective 6: Enhance and protect the community's tree canopy from impacts of climate change.

Action 6.1	Conduct a tree canopy assessment to determine trees vulnerable to wind damage, changing temperature patterns, and other climate impacts.
Scope/Imperative	The City's Urban Forest Management Plan uses canopy cover as its principal metric. It requires periodic measurement in order to assess progress. Other metrics refer to other often harder-to-determine urban forest characteristics. Climate change may affect the health of the urban tree canopy, and adaptation responses are required to address changing circumstances.
Risks addressed	N9 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> • Periodical aerial photo survey updates • GIS map of trees that are vulnerable
Lead Organization(s)	City of Campbell River: IT and Parks Departments (Arborist)
Supporting Organization(s)	Contractor for aerial photograph surveys Greenways Land Trust
Costing	\$ <\$50,000 – Low cost, some staff time to analyze. Aerial photo surveys are conducted for other purposes and are funded/conducted outside of this project.
Anticipated Timing	ONGOING OTHER: Canopy cover updates to follow release of new set of aerial photos – approximately every three years on an ongoing basis



Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> • Canopy Cover: Seek a canopy cover update every three years. • Tree Protection: Monitor number/type of permit, plus enforcement-related actions on an annual basis • Arborio cultural assessments
Baseline	<ul style="list-style-type: none"> • Original canopy cover assessment forming basis of Urban Forest Management Plan • 2019/2020 update is latest reference point • Arborio cultural assessments
Mandate	<p>Urban Forest Management Plan (2015-2035)</p> <p>Strategic Plan (2020-2023)</p> <ul style="list-style-type: none"> • Develop Tree Protection Bylaw <p>Environmental Advisory Committee Resolution: THAT the EAC recommends that Council moves forward with public consultation regarding a draft Tree Protection Bylaw.</p>
Next Steps	<ul style="list-style-type: none"> • Integrate program into Arborists' work plan

COMMUNITY HEALTH AND WELLBEING



Objective 7: Improve public safety and preparedness to climate-related events.

Action 7.1	Plan for redundancy of critical routes for emergency response and flow of goods and services.
Scope/Imperative	<ul style="list-style-type: none"> • Official Community Plan • Hazard Development Permit Areas • Hazard Risk and Vulnerability Assessment • Completed Flood Evacuation Route Plan (2020) • Grant funding secured through UBCM for evacuation route planning as part of the Wildfire evacuation route plan (2021) – Planned for 2020
Risks addressed	B2, B3, B4 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> • Monitor and find trends in disruptions and complete risk assessments to prioritize areas to focus on <ul style="list-style-type: none"> ◦ Utilize results of a future Hazard Risk and Vulnerability Assessment • Complete Wildfire evacuation route plan (2021) • Conduct research and obtain data on evacuation status of local households – e.g. number of homes with access to own vehicle, number of residents requiring assistance, etc. • Update Master Transportation Plan to plan for redundancy of critical routes • Develop policies/standards for emergency access for new developments (e.g., of access/egress routes based on number of homes, particularly in wildfire interface areas or Wildfire Hazard DP areas) • Update OCP in particular the requirements for Wildfire Hazard DP areas. • Investigate wharves as forming critical routes for emergency response
Lead Organization(s)	Protective Services Coordinator (Strathcona Regional District/City of Campbell River) City of Campbell River: Long Range Planning & Sustainability, Fire, Transportation and Development Services Departments Ministry of Transportation and Infrastructure
Supporting Organization(s)	First Nations (Wei Wai Kum, We Wai Kai, Homalco, Tlowitsis)
Costing	\$\$\$\$ - >500,000 (Implementation – scope, cost, timing TBD following planning work)
Anticipated Timing	ONGOING
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> • Transportation network analysis • Update or creation of applicable policies/plans (e.g. OCP updated with improved requirements for Wildlife Hazard DP areas, Wildfire Evacuation Route Plan (2021), etc.)
Baseline	<ul style="list-style-type: none"> • Transportation network analysis • Sea Level Rise Estuary Report

Mandate	<p>Council approved updates be made to the Master Transportation Plan in 2020</p> <p>Sea Level Rise Action Plan (2020) – 3.1 Understanding</p> <ul style="list-style-type: none"> • Potential impacts of sea level rise • 3.1.3 Risks of Inaction <p>Community Wildfire Protection Plan Update (2020)</p> <ul style="list-style-type: none"> • Action 2: Create a wildfire specific Emergency Response Plan – (in progress, target completion 2021) <p>BC Hydro Dam Management System and Flood-Evacuation Plan</p>
Next Steps	<ul style="list-style-type: none"> • Ensure action is addressed in scheduled Master Transportation Plan update • Participate in public consultation of BC Hydro Dam Management System and Flood-Evacuation Plan (tentatively scheduled for fall of 2020)

Action 7.2	Develop a strategy to monitor, plan for, and mitigate flooding due to dam breach.
Scope/Imperative	<ul style="list-style-type: none"> • BC Hydro Electric Load Forecast 2008/09 to 2028-29 <ul style="list-style-type: none"> ○ Load forecasting is central to BC Hydro’s long-term planning, medium-term investment and short-term and operational and forecasting activities. • BC Hydro Dam Inundation Evacuation Plan • Current need to plan for current risk • Plan to upgrade dam to mitigate major risk • Once dam is upgraded, reassess remaining risks and plan for those • Hazard, Risk and Vulnerability Assessment
Risks addressed	B2, B14 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> • Continue to work with BC Hydro to monitor water levels in the reservoirs and river (ongoing) • Establish marshalling/safe shelters • Flood evacuation plan in-progress; incorporate and establish marshalling/safe shelters • Dam safety upgrades • Gauge and promote community awareness about dam risk through communications (e.g. SRD Household Preparedness Survey)
Lead Organization(s)	City of Campbell River: Operations and Fire Departments BC Hydro – upgrade dams to mitigate risk of dam breach
Supporting Organization(s)	Wei Wai Kum City of Campbell River: Long Range Planning Department Strathcona Regional District Emergency Management
Costing	\$\$\$\$ - >500,000 (\$1B for dam upgrade)
Anticipated Timing	ONGOING: Upstream dam upgrades currently underway; Construction 2023-2029 (planning/design underway); 2029: Dam Seismic upgrade
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> • Workplan tracking – updates from BC Hydro • Number of survey responses indicating preparedness for flood threat • Number of public consultation events and public emergency exercises conducted



Baseline	<ul style="list-style-type: none"> Completed Flood Evacuation Route Plan BC Hydro Flood Inundation Maps
Mandate	<p>City of Campbell River and SRD Dam Inundation Area Evacuation Plan (2019)</p> <ul style="list-style-type: none"> Public engagement session tentatively scheduled for the fall of 2020. SRD and City grant funding through EOC and ESS to prepare and conduct tabletop exercise for the City's Dam Inundation Area Evacuation Plan <p>BC Hydro Dam Seismic Update (2023-2029)</p> <p>SRD Connect Rocket</p> <ul style="list-style-type: none"> Public mass notification system for Campbell River Floodplain that people can sign up and receive notifications for in the event of an imminent flooding threat on the Campbell River. <p>SRD Flood Management Emergency Broadcasting</p> <ul style="list-style-type: none"> Notification sent to all radio stations to play message about imminent flood threat
Next Steps	<ul style="list-style-type: none"> Fire Department to request that BC Wildfire share resource list

Action 7.3	Build community capacity for personal preparedness and to reduce health risks associated with extreme weather.
Scope/Imperative	In a weather-related emergency, people may be without basic services (e.g. electricity, water) for an extended period of time. Increasing the personal preparedness of community members is integral to protecting the health and well-being of citizens and can alleviate stress on the City and Region's emergency management program.
Risks addressed	C4, C11 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> Create and share culturally appropriate and accessible programming (e.g. multiple languages, AODA compliant, etc.) about extreme heat and weather-related risks, especially for populations most vulnerable to those impacts. Partner with local businesses, community service providers, and other organizations to disseminate emergency preparedness kits Promote neighbourhood emergency preparedness planning through funding or guiding materials Expand emergency preparedness education in local schools Increase human and financial resources within the City to manage this initiative
Lead Organization(s)	City of Campbell River: Fire Department Strathcona Regional District Emergency Management Non-Profit Organizations working with priority populations in vulnerable situations Community Organizations
Supporting Organization(s)	School District 72 Vancouver Island Health Authority City of Campbell River: Long Range Planning & Sustainability, and Recreation and Culture Departments KDC – Mobile Outreach Health Unit Support Services
Costing	\$\$ - \$50,001 - \$100,000 (potential for grant funding for planning process)
Anticipated Timing	<ul style="list-style-type: none"> OTHER: Not currently in long term financial plan



Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> Secure funding to establish a plan Secure funding to provide ongoing resource allocation to maintain
Baseline	<ul style="list-style-type: none"> Vancouver Island Health Authority to provide impact data on smoke particulate related to wildfire Vancouver Island Health Authority to provide public information on Heat/Cold related risks Point in Time Homelessness Count to understand how many people are living unsheltered and more vulnerable to extreme weather.
Mandate	<p>Urban Forest Management Plan (2015-2035)</p> <p>FireSmart Manual (FireSmart education materials available online and on City Website. FireSmart vegetation guide to landscaping completed Q2 2020, CWPP updated and completed Q1 2020)</p> <p>Official Community Plan (2012) – Schedule B, Development Permit Area Guidelines (need to update Wildlife Hazard DP areas to improve FireSmart requirements)</p> <ul style="list-style-type: none"> Interface Fire Hazard DP Area
Next Steps	Initiate discussions

Action 7.4	Implement the Community Wildfire Protection Plan.
Scope/Imperative	<ul style="list-style-type: none"> Current Community Wildfire Protection Plan and the FireSmart Vegetation Guide to Landscaping was completed in Q1 & Q2, 2020 A forest fire in the watershed could impact water storage and water quality. Recommended measures for development in interface areas Access routes based on the number of homes/construction materials/FireSmart initiatives
Risks addressed	B7, B1/N11, N10, C3 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> Provide information and public awareness on how to prevent wildfire (e.g. fuel management) Increase awareness of active fires through social media Share information about buildings with HVAC systems the community can use during poor air quality events Review lessons learned from other communities experiencing wildland urban interface fires Share FireSmart vegetation guide online Establish a fuel mitigation plan based on CWPP recommendations Update OCP related to Hazard DP areas for Interface fires Integrate source protection (supply and water quality) into future Community Wildfire Protection Plan update
Lead Organization(s)	City of Campbell River: Fire, Long Range Planning & Sustainability, Water, Parks, Development Services and Recreation and Culture Departments
Supporting Organization(s)	BC Wildfire Strategic Natural Resources SRD Emergency Program First Nations (Wei Wai Kum, We Wai Kai, Homalco)



Costing	\$\$\$ - \$100,001 - \$500,000 (Fuel mitigation – pending application to UBCM Community Resiliency Investment Program)
Anticipated Timing	TARGET 2021 (Fuel mitigation planned for 2021)
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> Review Community Wildfire Protection Plan every 5 years Update Official Community Plan and Hazard Development Permit Areas related to Wildland Interface Areas
Baseline	<ul style="list-style-type: none"> Existing Community Wildfire Protection Plan (2015) Current Hazard Development Permit Areas related to Wildland Interface (OCP) Outdated
Mandate	<p>Official Community Plan (2012)</p> <ul style="list-style-type: none"> Schedule A, Chapter 6. Parks & Natural Environment Schedule B, Development Permit Area Guidelines <ul style="list-style-type: none"> Interface Fire Hazard DP Area (planning in progress to update OCP related to Wildland Interface Areas) <p>Community Wildfire Protection Plan (2020)</p>
Next Steps	<ul style="list-style-type: none"> Program DP Guideline review into 2021 work plan

Action 7.5	Create, review, and update Emergency Response and Recovery Plans relative to Campbell River's climate hazards.
Scope/Imperative	<ul style="list-style-type: none"> There is a current gap in community resiliency plans and recovery plans Ensures the City of Campbell River has appropriate up to date response and recovery plans for all hazards, emergencies and natural disasters including but not limited to flooding, seismic events, wildfire, hazardous material/environmental events, storms, sea level rise, pandemics, etc.
Risks addressed	B7, N10, C3, C4(Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> Complete the City's Hazard Risks and Vulnerability Assessment Continue to develop Business Continuity and Resiliency plans for all City services following HRVA completion Engage with residents and community service providers about personal preparedness and critical service delivery Encourage community organizations, local organizations, businesses, and institutions to review and update Business Continuity Plans Engage with community and regional stakeholders to identify duties, responsibilities and response protocols strengthening collaboration and coordination Promote opportunities for small businesses to learn about emergency management
Lead Organization(s)	City of Campbell River: Fire Department Strathcona Regional District Emergency Management
Supporting Organization(s)	Emergency Management BC First Nation Communities Campbell River Chamber of Commerce City of Campbell River: Economic Development Department
Costing	\$\$ - \$50,001 - \$100,000
Anticipated Timing	ONGOING (Initiate after HRVA completed)



Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> • Ongoing review process • Annual review of plans • Completion of table-top exercise (annually) • Completion of full-Scale exercise (every two years)
Baseline	<ul style="list-style-type: none"> • Recovery plans require improvement. Currently little baseline data – HRVA will inform baseline data.
Mandate	<ul style="list-style-type: none"> • Emergency Plan in Place
Next Steps	Initiate discussions to scope out projects

Objective 8: Protect populations in vulnerable situations from the impacts of extreme weather.

Action 8.1	Establish more designated and accessible areas of refuge from extreme weather events.
Scope/Imperative	<ul style="list-style-type: none"> • Have a list of facilities and services/Emergency Coordinator that can be utilized in extreme weather events • Coordination Agreements in place for transportation from BC Transit • Currently identifying reception centres and muster areas and establishing agreements to occupy • Current locations do not have sufficient capacity to manage the number of people requiring refuge during extreme weather events (Salvation Army Evergreen Shelter – 22 beds + 6 additional seasonal extreme weather beds, Vancouver Island Mental Health Society Sobering and Assessment Centre – 12 beds)
Risks addressed	B7, N10, C3, C4, C11 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> • Identify a diverse inventory of accessible public areas for different weather events • Establish transportation to areas of refuge, social gathering spaces, etc. for people in vulnerable situations • Create co-location agreements to utilize areas of refuge that are not City/Regional District owned <ul style="list-style-type: none"> ○ Utilize outputs of Hazard Risk and Vulnerability Assessment to identify suitable locations • Determine whether existing emergency evacuation facilities are suitable for refuge from extreme weather • Continue partnership with BC Housing to establish permanent shelter for populations experiencing homelessness
Lead Organization(s)	City of Campbell River: Fire Department Strathcona Emergency Planning Organization First Nation Communities
Supporting Organization(s)	City of Campbell River: Long Range Planning & Sustainability, Operations, and Recreation and Culture Departments Emergency Management BC Non-profit Organizations, i.e. members of Campbell River Coalition to End Homelessness Provincial funding through EMBC, Island Health and BC Housing supporting organizations like Salvation Army and Vancouver Island Mental Health Society Business Owners SD72



	Churches First Nations Health Authority First Nation Communities
Costing	\$\$ - \$50,001 - \$100,000
Anticipated Timing	<ul style="list-style-type: none"> • ONGOING
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> • Updated Emergency Response Plans (x2) • Ongoing review – EP update every 5 years • Critical to have a City-wide Hazard Risk and Vulnerability Assessment • Records of number of people using centres during times of need
Baseline	<ul style="list-style-type: none"> • Confirm if information is included in the Emergency Plan(s) • Emergency Plan
Mandate	Official Community Plan (2012) <ul style="list-style-type: none"> • Schedule A, Chapter 7. Housing Diversity & Affordability • Schedule A, Chapter 12. Social Well-Being
Next Steps	<ul style="list-style-type: none"> • Initiate discussions and outreach to coordinate inventory of locations • Raise awareness of existing refuge centres in the community

Action 8.2	Develop networks of support for populations in vulnerable situations including seniors, youth, and those experiencing homelessness.
Scope/Imperative	<ul style="list-style-type: none"> • Necessary supports needed for climate adaptation response as people in vulnerable situations are more sensitive to impacts of climate change than the general population • To ensure a planned response is in place to support people in vulnerable situations who face barriers to accessing information and services in general • Numerous services and responses exist to support these populations that can support this work
Risks addressed	C4 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> • Establish a help-your-neighbour program to implement during extreme weather events • Working with housing and health outreach workers to identify communities and locations where people experiencing homelessness regularly shelter (indoor and outdoors) • Identify health and services outreach initiatives that could be upscaled or adapted to address service provisions to address health impacts in weather events • Work with health and service providers to understand existing support services and population information (acknowledging privacy considerations) to guide emergency responders and/or other assistance programs to reduce health impacts in extreme weather events
Lead Organization(s)	City of Campbell River: Long Range Planning & Sustainability and Fire Departments Strathcona Community Health Network
Supporting Organization(s)	Emergency Management BC BC Housing Local staff from appropriate Provincial Ministries Campbell River Community Action Team Campbell River Coalition to End Homelessness



	Seniors Network Island Health
Costing	\$ <\$50,000
Anticipated Timing	TARGET 2021
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> To expand existing service provisions and emergency plans in the community to address climate adaption considerations and responses. Updated Emergency Response Plans Ongoing review – EP update every 5 years
Baseline	<ul style="list-style-type: none"> Existing emergency response plans for local health and housing service providers
Mandate	<p>Integrated Community Sustainability Plan (2011)</p> <ul style="list-style-type: none"> Priority Actions Going Forward <p>Strategic Plan (2020-2023)</p> <ul style="list-style-type: none"> Growth Management Relationships <p>Official Community Plan (2012) – Schedule A, Chapter 7. Housing Diversity & Affordability</p> <p>Creation of a City Senior Social Planner position</p>
Next Steps	Integrate program into City departments' work plans

Objective 9: Generate awareness and monitoring of changing climate conditions to safeguard human health.

Action 9.1	Communicate climate change-related health risks to community.
Scope/Imperative	Climate change can affect health in many ways including air pollution, allergens, disease carried by vectors, food and water-borne diseases, food security, mental health, floods, extreme temperatures, and wildfire. Efforts to raise public awareness on how to address and mitigate climate change-related health impacts will increase local adaptive capacity and alleviate stress on the medical system. A component of public awareness should entail educating the public on their role in contributing to and reducing the progression of climate change in order to increase understanding around how human health is impacted. The City will continue to work with Island Health to address these issues.
Risks addressed	C1 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> Increase public awareness regarding individual and community level responses to heat events, pathogens, poor air quality, and other climate change-related impacts Engage with Island Health for best practices and educational resources for dissemination Consider who needs information (prioritize audiences, e.g. populations in vulnerable situations); who can help share information (trusted communication partners); and who has the information (reliable sources of information and new research)



	<ul style="list-style-type: none"> Consider the health and safety risks of adaptation actions (e.g. how to avoid carbon monoxide/fire as risks of backup power)
Lead Organization(s)	Island Health Ministry of Health
Supporting Organization(s)	City of Campbell River: Long Range Planning & Sustainability and Communications Departments
Costing	\$ <\$50,000
Anticipated Timing	ONGOING
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> Surveys that test public awareness and knowledge Number of formal education campaigns created Number of people reached on social media
Baseline	<ul style="list-style-type: none"> Initial survey to test public awareness and knowledge
Mandate	<p>Urban Forest Management Plan (2015-2035) Section 4 - Action 16</p> <p>Sea Level Rise Action Plan (2020)</p> <ul style="list-style-type: none"> 4.5 Adaptation Partnering <p>Integrated Community Sustainability Plan (2008) – Chapter 12. Social Well-Being</p> <p>Official Community Plan (2012) – Schedule A, Chapter 12. Social Well-Being</p> <ul style="list-style-type: none"> 12.1.2 12.4.1 <p>Climate Change Toolkit for Health Professionals (2019), Canadian Association of Physicians for the Environment</p>
Next Steps	<ul style="list-style-type: none"> Maintain ongoing partnerships with Island Health



ECONOMY



Objective 10: Create awareness of changing climate conditions, encourage local businesses and organizations to plan for climate-related risks and identify opportunities to support economic resilience.

Action 10.1	Support tourism sector in understanding the changing climate, sector-specific risks, and identifying opportunities to adapt and diversify.
Scope/Imperative	<ul style="list-style-type: none"> • Education and information • Strategic planning – already underway
Risks addressed	B7, N10, C3, C4, C7 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> • Work with Environment Canada to keep up to date on seasonal outlook and provide information to residents, businesses, and tourists • Liaise with Destination Campbell River to provide risk information and alternatives to tourists • Work with BC Parks and local campgrounds to communicate dry conditions, active fires, and FireSmart best practices • Work with recreation centres and local businesses to create more opportunities for indoor activities
Lead Organization(s)	City of Campbell River: Recreation and Culture, Long Range Planning & Sustainability, Communications and Economic Development Departments Strathcona Regional District Destination Campbell River Emergency Management BC BC Parks
Supporting Organization(s)	Industry Business Improvement Areas
Costing	\$ <\$50,000
Anticipated Timing	<ul style="list-style-type: none"> • ONGOING (Education)
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> • Number of communication materials/events executed (e.g. workshops, delivered mailouts, social media, etc.)
Baseline	<ul style="list-style-type: none"> • Insurance Advisory Council to provide percentage of businesses with interruption insurance in terms of number of businesses thinking long term
Mandate	<p>Chain of communication in place</p> <p>Destination Campbell River updates to Strategic Plan (currently underway)</p> <p>Official Community Plan (2012) – Schedule A, Chapter 10. Local Economy</p> <p>Community Wildfire Protection Plan (2020)</p>
Next Steps	<ul style="list-style-type: none"> • Initiate discussions

	<ul style="list-style-type: none"> • Program into work plans
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Action 10.2	Support local businesses (e.g. fishing industry, etc.) in identifying and mitigating climate-related risks.
Scope/Imperative	Climate change poses risks to businesses, both in terms of business continuity, as well as human health risks for workers and clients. Ensuring that these organizations are well equipped to handle climate-related risks specific to their company, assets, and services will improve their long-term resilience.
Risks addressed	C2 (Refer to Reference List of Climate Risks by ID on page 84)
Supporting Actions	<ul style="list-style-type: none"> • Work with local fishing charters to diversify their services and produce resilient business plans • Support update to fishing regulations as required • Establish demonstration fisheries for emerging southern species (i.e. mackerel) • Advocate for the use of climate change projections and local data to plan for changing conditions • Assist local businesses with potential transitions and/or business continuity planning • Encourage local businesses to develop adaptation strategies and to include climate risks in emergency operations protocol • Provide education on business continuity planning as it relates to climate-related risks
Lead Organization(s)	City of Campbell River: Economic Development Department Non-Profit Organizations Chamber of Commerce Industry
Supporting Organization(s)	Department of Fisheries and Oceans Destination Campbell River Province Federal government Universities Insurance companies
Costing	\$\$\$ - \$100,001 - \$500,000
Anticipated Timing	ONGOING
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> • Survey on the number of local businesses considering climate change in their business planning
Baseline	<ul style="list-style-type: none"> • N/A
Mandate	<p>Integrated Community Sustainability Plan (2011)</p> <ul style="list-style-type: none"> • 3.3 Social & Cultural vibrancy – Local food production <p>Agriculture Plan (2011)</p> <ul style="list-style-type: none"> • 4.2.4 - Resourcing the Industry
Next Steps	<ul style="list-style-type: none"> • Initiate outreach and discussions • Program into work plans

ENABLING ACTIONS



Objective 11: Increase the knowledge of climate change impacts and adaptation initiatives within the corporation and community.

Action 11.1	Develop a climate change communications strategy for the community of Campbell River.
Scope/Imperative	Education and outreach is an important component of any adaptation action – developing an overall communication strategy will assist the City of Campbell River to ensure all climate change education and outreach is succinct and aligned.
Risks addressed	Enablings
Supporting Actions	<p>Actions to support this initiative may include:</p> <ul style="list-style-type: none"> • Update the climate change webpage on the City’s website, which outlines localized projections, risks, CCAP and ongoing programming • Establish dashboard for climate action measures and progress and publish online • Develop infographics and other visual mediums of communicating climate change risks and potential adaptive actions • Continued climate change presentations and booths at public events • Develop a climate change-specific email address for the City to manage community questions/inquiries
Lead Organization(s)	City of Campbell River: Long Range Planning & Sustainability and Communications Department
Supporting Organization(s)	City of Campbell River: IT Department
Costing	\$ <\$50,000
Anticipated Timing	TARGET 2021
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> • Number of questions/inquiries from the public • Number of visitors to City’s climate change webpage • Number of events where climate change presentations were delivered or information booths were set up
Baseline	N/A
Mandate	N/A
Next Steps	<ul style="list-style-type: none"> • Determine key messages, framing, and audience for communications strategy

Action 11.2	Integrate climate change adaptation into day-to-day decision making and practices at the City.
Scope/Imperative	Efforts will be made to increase City staff knowledge of climate change adaptation, local impacts, and ways to integrate climate change considerations into municipal service delivery.

Risks addressed	Enabling
Supporting Actions	<p>Actions to support this initiative may include:</p> <ul style="list-style-type: none"> • Update template for Council reports to include section on climate change analysis. • Ensure that future Asset Management Plan and budgeting accounts for climate risks and the costs/benefits of adaptation measures to protect and maintain vulnerable assets. • Update Request for Proposal template to include section for consultant to identify ways that climate change considerations will be incorporated into deliverables. • Include Community Climate Adaptation Plan strategies in annual work plans. • Advocate for increased staff participation in climate change-related events, conferences, etc. • Explore professional development opportunities for City staff to integrate climate change into ongoing, sector-specific initiatives (e.g. Asset Management, Engineering, Communications, etc.) • Provide Hazard Identification and Risk Assessment course for City staff delivering services on the ground • Leverage internal and external financial solutions that incorporate adaptation measures into operating and capital project budgets.
Lead Organization(s)	City of Campbell River: Long Range Planning & Sustainability Department
Supporting Organization(s)	City of Campbell River: Cross-Departmental Asset Management Team, Purchasing, Finance, Human Resources, Legislative Services and lead departments tied to specific actions in the CCAP
Costing	\$ < \$50,000
Anticipated Timing	TARGET 2021
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> • Number of climate change-related professional development opportunities taken by City staff • Number of climate change-related staff events/communications delivered/year • Inclusion of climate change impacts and/or adaptation requirements in procurement processes • Number of adaptation-related projects funded per year • Dollars allocated to adaptation-related projects
Baseline	<ul style="list-style-type: none"> • N/A
Mandate	<p>Sustainable Official Community Plan – Chapter 4. Sustainable Campbell River: Policy Framework & Climate Action</p> <ul style="list-style-type: none"> • 4.2.1 The City will develop strategic directions for climate change adaptation. • 4.2.2 The City will ensure that corporate directions and corresponding plans, infrastructure development, and capital projects consider climate change adaptation measures. <p>Sustainable Official Community Play - Desired Outcomes for Our Parks & Natural Environment</p> <ul style="list-style-type: none"> • By 2020: Climate change adaptation measures are incorporated into municipal planning.
Next Steps	<ul style="list-style-type: none"> • Determine key departments/areas of focus for targeted outreach and engagement



Objective 12: Establish a coordinated governance, communications, and monitoring framework for the CCAP.

Action 12.1	Monitor and track implementation of the Community Climate Adaptation Plan and report on progress annually or biennially.
Scope/Imperative	The City will track implementation and report to Council and the public on the progress towards achieving the City's commitment to climate change
Risks addressed	Enabling
Supporting Actions	<p>Actions supporting this initiative may include:</p> <ul style="list-style-type: none"> • Preparing annual or biennial reports to Council to provide an update on the status of implementation. • Request that departments submit CCAP annual progress report using established reporting template to an identified City Department such as Long Range Planning & Sustainability, enabling consolidation of data into a Council report • Identify climate change adaptation champion within the City or individual departments to spearhead coordination of action implementation and tracking of progress • Option to formalize CCAP within Environmental Advisory Committee's work plan, tracking progress of action recommendations to Council through annual reporting regime.
Lead Organization(s)	City of Campbell River – Long Range Planning & Sustainability Department
Supporting Organization(s)	City of Campbell River – Council, Environmental Advisory Committee
Costing	Staff time
Anticipated Timing	TARGET 2021
Monitoring and Evaluation Metrics	<ul style="list-style-type: none"> • Completion of annual or biennial reports
Baseline	N/A
Mandate	N/A
Next Steps	Create annual workplan informed by the Community Climate Adaptation Plan

Objective 13: Maximize collective impact against climate change through partnerships with local First Nations.

Action 13.1	Facilitate further dialogue with local First Nations to go through an action planning process and determine how the City can best support action implementation in a way that honours Indigenous sovereignty and autonomy.
Scope/Imperative	Initial engagement occurred with local Nations to identify potential impacts and risks to these communities as part of the development of the CCAP. However, further engagement and conversation with these groups should continue in order to determine the role the City can play in supporting and empowering these communities in the immediate, short and long-term.
Risks addressed	Enabling



Supporting Actions	<ul style="list-style-type: none"> • Re-establish and further relationships with the local Nations • Connect with key local representatives where appropriate • Participate in action-planning work shops with the nations including a review of preliminary identified risks • Identify areas where the City can provide a supporting role in building resilience
Lead Organization(s)	City of Campbell River – Long Range Planning & Sustainability Department
Supporting Organization(s)	
Costing	Staff time
Anticipated Timing	TARGET 2020
Monitoring and Evaluation Metrics	Monitoring metrics to be determined as implementation progresses.
Baseline	N/A
Mandate	N/A
Next Steps	Reach out to identified First Nations representatives to pursue further dialogue.




Reference List: Climate Risks by ID

B2	More extreme rainfall events increasing risk to infrastructure from erosion/slope failure (e.g. hospital, highway escarpment).
B3	More extreme weather events impacting transportation network (e.g. access to bridges to North Island, BC Ferries, access for emergency response)
B4	More extreme weather events causing damage to utility infrastructure, leading to electricity disruption
B8	Sea level rise and more extreme rainfall events flooding coastal infrastructure (e.g. critical infrastructure like fire hall, and also recreation amenities)
B10	Sea level rise and more extreme rainfall events causing stormwater system back up, impacting sewer systems as well
B13	Sea level rise and extreme rainfall events causing coastal erosion, affecting public and private development/property (e.g. Ostler Park, Tyee Spit) and escarpments along foreshore
B14	More extreme weather events exacerbating impacts from dam breach or causing overland flooding from overspill
N2	More extreme rainfall events impacting fish spawning habitat (e.g.) gravel restoration, erosion, and turbidity)
N4	Rising watershed temperatures impacting fish mortality (e.g. 5 species of salmon)
N5	Rising annual temperature causing introduction of new insects and pests (e.g. Pine Beetle, Douglas-fir Tussock moth; Gypsy moth) or changing population patterns of native species
N6	Rising annual temperatures and hotter, drier summers threatening native species habitat and biodiversity (e.g. pollinators)
N7	Rising annual temperatures reducing snowpack and accelerating glacial melt, implicating downstream ecosystems
N9	Hotter, drier summer conditions causing more windfall and damage to trees during wind events
B1/N11	More extreme rainfall events increasing turbidity in watershed, affecting water quality
N12	Rising ocean temperatures increasing ocean acidification, resulting in loss of aquatic species (e.g. local molluscs)
C1	Rising annual temperatures increasing pathogens and vector borne diseases
C2	Rising ocean temperatures impacting aquaculture, the fishing industry, and recreational activities
B7/N10/C3	Hotter and drier summers increase the risk of wildland-urban interface fire in Campbell River (e.g. McIvor Lake, Beaver Lodge Lands), creating direct impacts to the community. There is also risk of fires in the surrounding regions that could affect the City's emergency response capacity
C4	More extreme weather events negatively impacting community well-being (e.g. health of populations in vulnerable situations, access to recreation, social gathering spaces, mental health)
C7	More extreme storms and wildfire events impacting tourism
C11	Hotter and drier summers increasing PM 2.5, ground-level ozone, allergens, and smoke, leading to poor air quality

Appendix B: Community Climate Adaptation Plan Reporting Template

REPORTING TEMPLATE

	City of Campbell River Community Climate Adaptation Plan	Reporting Year: YYYY
	Annual Progress Reporting Template	Date Completed: yyyy-mm-dd

OVERVIEW

Action Name: Name as written in Implementation Plan	Associated Objective: What objective does this action fall under?
Lead Department: As indicated in implementation plan	Lead Department Key Contact: Name
Supporting Department: As indicated in implementation table	Status: Completed, Ongoing, Pending, Not Started
Action Summary: Provide a short summary on work to date, issues, or changes to the action overall.	

ACTION TASKS (FROM IMPLEMENTATION TABLES)

List the supporting actions identified in the implementation plan, and report on their current status.

Task Description	Status	Start Date	Completion Date	Forecasted Cost	Actual Cost To-Date	Details/Comments
	Completed, Ongoing, Pending, Not Started, Omitted	MM/YYYY (forecasted or actual)	MM/YYYY (forecasted or actual)	\$0.00	\$0.00/TBD	Provide additional details regarding the status of this supporting action. If not being implemented, provide rationale.
	Completed, Ongoing, Pending, Not Started, Omitted	MM/YYYY (forecasted or actual)	MM/YYYY (forecasted or actual)	\$0.00	\$0.00/TBD	Provide additional details regarding the status of this supporting action. If not being implemented, provide rationale.
	Completed, Ongoing, Pending, Not Started, Omitted	MM/YYYY (forecasted or actual)	MM/YYYY (forecasted or actual)	\$0.00	\$0.00/TBD	Provide additional details regarding the status of this supporting action. If not being implemented, provide rationale.

*The scope of Hazard Risk and Vulnerability Assessments will vary in technical nature as they are sector/area specific.

Appendix C: Glossary of Terms

Adaptation: Includes any initiatives or actions in response to actual or projected climate change impacts and which reduce the effects of climate change on built, natural and social systems.

Adaptive Capacity: The ability of built, natural and social systems to adjust to climate change (including climate variability and extremes), to moderate potential damage, to take advantage of opportunities, or to cope with the consequences.

Baseline: A climatological baseline is a reference period, typically three decades (or 30 years), that is used to compare fluctuations of climate between one period and another. Baselines can also be called references or reference periods.

Climate: The weather of a place averaged over a period of time, often 30 years. Climate information includes the statistical weather information that tells us about the normal weather, as well as the range of weather extremes for a location.

Climate Change: Climate change refers to changes in long-term weather patterns caused by natural phenomena and human activities that alter the chemical composition of the atmosphere through the build-up of greenhouse gases which trap heat and reflect it back to the earth's surface.

Climate Change Atlas of Canada: The Climate Atlas of Canada is an interactive tool that combines climate science, mapping, and storytelling to depict expected climatic changes across Canada to the end of the century. The 250-layer map is based on data from 12 global climate models. Users are shown a baseline period of warming trends by region that spans from 1950 to 2005 and can toggle between two future projection periods, 2021 to 2050 and 2051 to 2080.

Climate Projections: Climate projections are a projection of the response of the climate system to emissions or concentration scenarios of greenhouse gases and aerosols. These projections depend upon the climate change (or emission) scenario used, which are based on assumptions concerning future socioeconomic and technological developments that may or may not be realized and are therefore subject to uncertainty.

Climate Change Scenario: A climate change scenario is the difference between a future climate scenario and the current climate. It is a simplified representation of future climate based on comprehensive scientific analyses of the potential consequences of anthropogenic climate change. It is meant to be a plausible representation of the future emission amounts based on a coherent and consistent set of assumptions about driving forces (such as demographic and socioeconomic development, technological change) and their key relationships.

Ensemble Approach: An ensemble approach uses the average of all global climate models (GCMs) for temperature and precipitation. Research has shown that running many models provides the most realistic projection of annual and seasonal temperature and precipitation than using a single model.

Extreme Weather Event: A meteorological event that is rare at a place and time of year, such as an intense storm, tornado, hail storm, flood or heat wave, and is beyond the normal range of activity. An extreme weather event would normally occur very rarely or fall into the tenth percentile of probability.

Greenhouse Gas (GHG) Emissions: Greenhouse gases are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of thermal infrared radiation, emitted by the Earth's surface, the atmosphere itself, and by clouds. Water vapour (H₂O), carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), ozone (O₃), and chlorofluorocarbons (CFCs) are the six primary greenhouse gases in the Earth's atmosphere in order of abundance.

Climate Impact: The effects of existing or forecast changes in climate on built, natural, and human systems. One can distinguish between potential impacts (impacts that may occur given a projected change in climate, without considering adaptation) and residual impacts (impacts of climate change that would occur after adaptation).

Impact Statement: Climate-related impact statements are concise statements that outline locally-relevant projected threats and how those changes are expected to affect the built, natural, social, and economic systems of the municipality.

Mitigation: The promotion of policy, regulatory and project-based measures that contribute to the stabilization or reduction of greenhouse gas concentrations in the atmosphere. Renewable energy programs, energy efficiency frameworks and substitution of fossil fuels are examples of climate change mitigation measures.

Representative Concentration Pathways: Representative Concentration Pathways (RCPs) are four greenhouse gas concentration (not emissions) trajectories adopted by the IPCC for its fifth Assessment Report (AR5) in 2014. It supersedes Special Report on Emissions *Scenarios* (SRES) projections published in 2000.

Resilience: The capacity of a system, community or society exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structure.

Risk: The combination of the likelihood of an event occurring and its negative consequences. Risk can be expressed as a function where $\text{risk} = \text{likelihood} \times \text{consequence}$. In this case, *likelihood* refers to the probability of a projected impact occurring, and *consequence* refers to the known or estimated outcomes of a particular climate change impact.

Sensitivity: Measures the degree to which the community will be affected when exposed to a climate related impact. Sensitivity reflects the ability of the community to function (*functionality*) as normal when an impact occurs.

Populations in Vulnerable Situations: Acknowledging that people-first language is an inclusive and respectful way to discuss priority groups, for the purpose of this Plan populations in vulnerable situations refers to groups including, but not limited to, older adults, children and youth, people with health challenges, hard to reach populations/individuals, people with diverse abilities, and people experiencing homelessness.

Vulnerability: Vulnerability refers to the susceptibility of the community to harm arising from climate change impacts. It is a function of a community's sensitivity to climate change and its capacity to adapt to climate change impacts.

Weather: The day-to-day state of the atmosphere, and its short-term variation in minutes to weeks.

Appendix D: Summary Table of Climate Projections for Campbell River

RCP 8.5				
Climate Variable [†]	Season	Projected Change from 1961-1990 Baseline		
		Baseline (1976-2005)	2050s (2021-2050)	2080s (2051-2080)
1. Temperature (°C)	Annual	9.5°C	+1.7°C	+3.4°C
	Winter	3.1°C	+1.7°C	+3.3°C
	Spring	8.6°C	+1.7°C	+3.2°C
	Summer	16.4°C	+1.9°C	+3.9°C
	Fall	9.6°C	+1.5°C	+3.2°C
2. Frost-free days (days)	Annual	225 days	+54 days	+92 days
3. Precipitation (%)	Annual	1568 mm	+4% (1625 mm)	+9% (1706 mm)
	Winter	625 mm	+6% (661 mm)	+14% (711 mm)
	Spring	298 mm	+3% (307 mm)	+5% (312 mm)
	Summer	157 mm	-7% (146 mm)	-13% (137 mm)
	Fall	489 mm	+4% (508 mm)	+12% (547 mm)
4. Precipitation as Snow (%)	Annual	-39%	-50%	-58%
	Winter	-39%	-52%	-61%
	Spring	-28%	-34%	-50%
5. Growing Degree-days (degree-days)	Annual	+334 degree-days	+613 degree-days	+1070 degree-days
6. Heating Degree-days (degree-days)	Annual	-508 degree-days	-949 degree-days	-1490 degree-days
7. Relative Sea level rise [‡]	20-30 cm by 2100 [§]			
8. Water temperatures	Increasing at varying degrees in ocean and streams			

[†] Data for the first three climate variables retrieved from Prairie Climate Centre's Climate Atlas Report for Campbell River (2019); Data for variables 4-6 retrieved from Pacific Climate Impacts Consortium 'Plan2Adapt' tool.

[‡] Sea level rise data retrieved from Province of BC Sea Level Rise Adaptation Primer (2013); Province of BC Amended Flood Hazard Area Land Use Management Guidelines; and Lemmen, D.S. and Warren, F.J. (2016). Synthesis. In D.S. Lemmen, F.J. Warren, T.S. James, and C.S.L. Mercer Clarke (Eds.), Canada's Marine Coasts in a Changing Climate, p. 17-26. Ottawa, ON: Government of Canada.

[§] Lemmen, D.S. and Warren, F.J. (2016). Synthesis. In D.S. Lemmen, F.J. Warren, T.S. James, and C.S.L. Mercer Clarke (Eds.), Canada's Marine Coasts in a Changing Climate, p. 17-26. Ottawa, ON: Government of Canada.