City of Revelstoke

Climate Adaptation Scanning and Planning Workshop:

Summary of Dialogue and Ideas for Action

Draft Report
January 3rd, 2012

COLUMBIA BASIN TRUST
a legacy for the people

This project is part of Columbia Basin Trust's
Communities Adapting to Climate Change Initiative

www.cbt.org/climatechange

Table of Contents

SUMMARY OF PRIORITY CLIMATE IMPACTS AND ACTIONS 3
INTRODUCTION 4
BACKGROUND 4
PROJECTED CLIMATE CHANGES 5
LOCAL OBSERVATIONS 6
PRIORITY CLIMATE IMPACTS 7
Priority Impacts from Public Workshop 7
Priority Impacts from Local Government Workshop 7
CLIMATE ADAPTATION ACTIONS FOR REVELSTOKE 8
Wildfires 8
Tourism and Recreation 8
Infrastructure and the Built Environment 10
Water Supply 12
SUMMARY OF PUBLIC WORKSHOP 15
Forests and Ecosystems 16
Water 17
Food Security 18
Extreme Events 19
NEXT STEPS 20
APPENDIX A: WORKSHOP PARTICIPANTS AT LOCAL GOVERNMENT WORKSHOP 21
APPENDIX B: WORKSHOP PROCESS 22

Summary of Priority Climate Impacts and Actions

<table>
<tr><th>Wildfires</th><th>Tourism / Recreation</th><th>Infrastructure</th><th>Water Supply</th></tr>
<tr><td rowspan="4">Implement enhanced wildfire risk mapping and updated wildfire protection recommendations from Community Wildland Fire Protection Committee</td><td>Incorporate climate change into future plans</td><td>Develop Stormwater Management Plan</td><td>Implement water metering</td></tr>
<tr><td>Conduct tourism market research</td><td>Ensure adequate water for fire response</td><td>Develop water conservation education program</td></tr>
<tr><td rowspan="2">Develop economic diversity and balance strategy</td><td>Develop Illecillewaet Flood Management Plan</td><td>Develop Watershed management plan</td></tr>
<tr><td>Consider climate change in future development</td><td>Conduct leak detection and repair</td></tr>
</table>

Introduction

This document summarizes the results of a climate adaptation Scanning and Planning workshop held in the City of Revelstoke on November 4, 2011. The workshop methodology for the local government workshop represents the learning from the first years of the Communities Adapting to Climate Change Initiative (CACCI) and condenses a year-long planning process into one-day. As such, the workshop was a rapid assessment and not intended to result in the development of a concrete climate adaptation plan. The workshop was designed to engage key stakeholders in thinking about the potential impacts of climate change, to prioritize the most significant risks facing the community and identify actions to increase Revelstoke's resiliency to those risks. The workshop was attended by 13 participants representing a variety of community interests (see Appendix A). This document is an output of the workshop. A more detailed summary of the workshop process is included as Appendix B.

Prior to the local government workshop, a public workshop was held on the evening of November 3, 2011. The public workshop was designed to inform and engage the broader public in a discussion about the potential impacts and adaptive responses to climate change in Revelstoke. The public workshop complements the local government workshop, however the process and outcomes of the workshops were different and the two workshops are summarized separately.

Background

Columbia Basin Trust (CBT) supports communities in the Columbia Basin to adapt to local climate change impacts through its Communities Adapting to Climate Change Initiative (CACCI). CACCI helps communities increase their resiliency to the potential impacts of climate change at the community level.

In 2006, CBT engaged the Pacific Climate Impacts Consortium (PCIC) to conduct climate change projections for the Columbia Basin. Results of this research were shared with communities and between 2008 and 2010 five communities completed climate change adaptation planning plans – Kimberley, Elkford, Rossland, Castlegar and Kaslo/RDCK Area D.

The intent of the current phase of CACCI, Phase 3, is to work with these five communities to implement their adaptation plans and to engage 10 new communities in adaptation planning. CACCI developed a one-day climate adaptation Scanning and Planning workshop intended to share current climate science and initiate a community-based dialogue on potential impacts and adaptive actions to increase local resiliency. CACCI offers technical support and funding to participating communities.

Projected Climate Changes

Climate trends in the Columbia Basin Region show an increase in mean annual temperature of approximately 1 to 2.0°C between 1901 and 2004. More warming has occurred in the winter months relative to summer, and average annual precipitation has increased 4 per cent per decade, over that same period. In Revelstoke, between 1961 and 1990, the average temperature was 6.7°C, average summer precipitation was 200mm, and average winter snowfall was 351 cm. The table below summarizes projected climate changes for the Revelstoke area.

Climate element	Climate 'normals' for Revelstoke (1961-1990)[1]	Projected future change in the Columbia-Shuswap[2]		
		By 2020s	By 2050s	By 2080s
Average temperature (range)[3]	6.7°C	+1.0°C (+0.6 to +1.5)	+1.8°C (+1.2 to +2.7)	+2.7°C (+1.7 to 4.2)
Average summer precipitation (mm)	200	-3% (-8% to +4%)	-7% (-17% to +1%)	-8% (-22% to +1%)
Average winter snowfall (cm)	351	-2% (-10% to +5%)	-6% (-12% to +5%)	-6% (-21% to +1%)

[1] Source: National Climate Data and Information Archive. Canadian Climate Normals 1961-1990. www.climate.weatheroffice.gc.ca
[2] Projections are from the Pacific Climate Impacts Consortium Plan2Adapt Tool - http://plan2adapt.ca/plan2adapt.php
[3] The range values represent the low and high ends of the expected range (i.e., the 10th and 90th percentile of the set)

Local observations

Participants at the local government workshop were asked to discuss some of the changes in weather and climate they have observed that might be related to climate change. The following is a summary of these observations, in no particular order:

- decreased precipitation;
- decreased spring run-off from Greeley Creek;
- decreasing glaciers;
- drier conditions and increased dust;
- earlier fire events and increased crown;
- fewer songbirds;
- haze at high altitudes;
- improved air quality;
- increase in invasive species;
- increased nighttime temperatures;
- lakes no longer freeze (Arrow Lakes);
- later frost;
- less snow in the valley;
- longer and more extreme rain events;
- longer dry periods;
- more erratic and unpredictable weather cycles;
- more rain precipitation;
- more scavenging birds;
- more sporadic fire and wet/dry events;
- reduced snowpack;
- vegetation changes at higher elevations; and
- warmer winters with more rain after heavy snow.

At the public workshop, participants also discussed some of the changes in weather and climate that have been observed that might be related to climate change. The following is a summary of these observations, in no particular order:

- increase in pine beetle and other pests;
- lakes no longer freeze;
- later onset of fall;
- less snow at lower elevations;
- lower snowline;
- milder winters;
- more erratic weather patterns;
- more haze in upper atmosphere;
- no ice on the Thompson River during summer months;
- reduced sub-surface water; and
- shrinking glaciers.

Priority Climate Impacts

Priority Impacts from Public Workshop

Based on local observations, a presentation on climate science and discussion of potential climate impacts, participants at the public workshop identified the top four risks facing the community:

1. forests and ecosystems;
2. water;
3. food security; and
4. extreme events.

Community members at the public workshop explored future climate conditions to 2050 and the environmental and community impacts as well as potential actions.

Priority Impacts from Local Government Workshop

Results of the public workshop were shared with participants during the local government workshop, and the climate charts were hung on the wall for reference.

Based on local observations, a presentation on climate science and group discussions of potential climate impacts, participants identified their top four risks or opportunities. The priority risks were taken forward to the action planning stage and local actions were identified to increase Revelstoke's resiliency to these potential climate impacts. The most significant climate risks facing the community were identified as:

1. **Wildfires:** potential increase in the frequency and severity of wildfires and potential interface fires leading to risks to human life, ecosystems and infrastructure.

2. **Tourism/ Recreation:** decreased winter tourism due to lack of snow, with the potential for an extended summer tourism season.

3. **Infrastructure:** municipal infrastructure, other than water supply infrastructure affected by floods, avalanches, landslides, wildfires and other natural events.

4. **Water Supply:** Uncertainty about future water supply. Potential decrease in water availability and inability to meet demand.

Climate Adaptation Actions for Revelstoke

Below is a summary of the actions identified during the local government workshop to increase Revelstoke's resiliency to the priority risks identified above - wildfires, tourism and recreation, infrastructure and water supply.

Wildfires

Projected increases in summer temperatures, along with reductions in summer precipitation, are likely to create drier forest conditions and increase the risk of interface wildfires in the City of Revelstoke. Wildfires have the potential to cause a variety of impacts such as damage to infrastructure, loss of life, forestry sector impacts, and road and transportation closures. The potential risk of wildfires was identified as a high priority at the workshop.

The City's Community Wildland Fire Protection Committee (the Committee) has completed enhanced wildfire risk mapping and updated wildfire protection recommendations for the City. As many members of the Committee were not present at the workshop, this topic was not explored. However, it was agreed that wildfires are a priority risk and that wildfire risk reduction and climate change adaptation planning and action should be closely linked. The priority risk reduction recommendations from the Committee are:

1. protect the city water supply and water system;
2. create strategic fuel breaks;
3. reduce risks on Revelstoke Mountain Resort (RMR) lands; and
4. work with Columbia Shuswap Regional District (CSRD) on Begbie Bench risk reduction.

Revelstoke Fire Rescue Services is the lead for this process, in partnership with the City's Planning Department, BC Ministry of Forests, Lands and Natural Resource Operations, Parks Canada, BC Hydro, CSRD, and RMR.

Tourism and Recreation

Projected increases in winter temperature could have negative impacts on snow-based winter tourism in Revelstoke, including downhill and nordic skiing. Less snow, particularly at lower elevations, may increase the need to make artificial snow at RMR, increasing pressure on the local water supply. More extreme and variable weather conditions, including wildfires, could lead to increased risks to tourists and recreationists. The potential increase in wildfires could also negatively affect the visual quality of the landscape and lead to more access restrictions and closures. In summer months, temperature increases could enhance tourism and recreation opportunities, by prolonging the summer season.

1. Incorporate climate change into tourism and recreation management and development plans

As tourism plays an increasingly important role in Revelstoke's local economy, the City will need to ensure that tourism management plans and development decisions are consistent with future climate projections. To ensure this link, future tourism management plans and development decisions should incorporate a discussion on potential impacts and responses to climate change. Existing tourism businesses should be encouraged to do the same as part of regular business planning.

Stakeholders:	• city (lead) • province • RMR
Timing:	• short term
Barriers and Opportunities:	Barriers: • knowledge of impacts and adaptations • acceptability from businesses and developers
Cost/Benefit:[4]	• win-win: enhanced longevity of tourism businesses and recreation assets • low regret

2. Conduct tourism market research

To ensure a diverse local tourism economy that is resilient to the potential impacts of climate change, the City should undertake tourism market research to ensure a clear link between potential tourism markets and tourism/recreation options for Revelstoke. The research should consider opportunities to exploit foreign tourism markets, with an understanding of how foreign climatic conditions may change in Revelstoke's key tourism markets and what that means for product diversification opportunities in Revelstoke, particularly in the summer season.

Stakeholders:	• city (economic development lead) • Chamber of Commerce • Resort Accommodation Association
Timing:	• short term • ongoing updates
Barriers and Opportunities:	Barriers: • lack of funding • lack of expertise - need to hire consultant
Cost/Benefit:	• win-win: economic benefits of increased tourism by identifying niche tourism opportunities • no regret

[4] The cost-benefit of each action could be:

- win-win: actions that minimize the climate threat, but also have other social, environmental or economic benefits;
- no regret: actions that are justified under existing climate conditions; and/or
- low regret: actions for which the costs are relatively low, and benefits relatively large if projected changes occur.

3. Develop economic diversity and balance strategy

The City should undertake and implement an economic diversification and balance strategy to ensure the local economy, including the tourism economy, remains resilient.

Stakeholders:	• city (economic development lead) • residents • businesses • province • Union of British Columbia Municipalities (UBCM)
Timing:	• short term
Barriers and Opportunities:	Barriers: • lack of funding
Cost/Benefit:	• win-win: economic benefits • no regret

Note: At the public workshop, tourism and recreation were also identified as important community attributes that may be at risk from climate change. Impacts to the forestry sector and forest ecosystems include a potential for increased forest closures, due to extreme events and wildfires, which could have overall negative impacts on tourism and recreation.

Infrastructure and the Built Environment

Potential impacts of climate change including more frequent and extreme weather events and more rain in the winter months are likely to increase risks to municipal infrastructure and the built environment in Revelstoke. Planning for routine maintenance and capital upgrades of municipal infrastructure will need to consider these changes.

1. Develop stormwater management plan

There is a need to assess current and planned infrastructure for stormwater management and make a plan for routine maintenance and capital upgrades that take climate change impacts into account.

Stakeholders:	• city staff and decision makers • resort and developers • CSRD
Timing:	• short term (within 1 year)
Barriers and Opportunities:	Barriers: • lack of funding – plan and implementation cost Opportunities: • grants available • opportunity to rehabilitate streets
Cost/Benefit:	• no regrets

2. Ensure adequate water for fire response

Increased risk of wildfire is a significant impact of climate change. There is a need to assess availability of adequate water for fire response given potential drier late summer conditions indicated by climate change projections.

Stakeholders:	• city (lead) • FortisBC • BC Hydro • RMR • CSRD • Parks Canada • province
Timing:	• short term - 1 to 2 years
Barriers and Opportunities:	Barriers: • cost Opportunities: • UBCM grants
Cost/Benefit:	• no regret

3. Develop flood management plan for Illecillewaet River

Climate change projections indicate a likelihood of more intense rainfall and more precipitation falling as rain in the winter months, suggesting an increase in rain on snow events. These changes may increase the risk of flooding of the Illecillewaet, Columbia, and other rivers. In particular, flooding of the Illecillewaet may cut off portions of the City from key services, such as the hospital. The potential risk of the Illecillewaet flooding is not fully understood. A Flood Management Plan is needed to assess river morphology and potential flood risk.

Stakeholders:	• city • FortisBC • CSRD • BC Hydro • province
Timing:	• medium term
Barriers and Opportunities:	Barriers: • complex/ expensive process • not a local priority Opportunities: • available grants • opportunity to engage public and stakeholders
Cost/Benefit:	• low regret

4. Consider climate change in future development

New building construction and development should take into consideration the potential impacts of climate change such as rain on snow events, freeze-thaw cycles and hotter summers. These changes should be considered in building design guidelines and revisions of the Subdivision Servicing Bylaw, Building Bylaw and Official Community Plan, including the designation of Development Permit Areas.

Stakeholders:	• city • property owners • tenants • community
Timing:	• medium term – ongoing
Barriers and Opportunities:	Barriers: • cost • staffing Opportunities: • integrate mitigation with adaptation • reduce cost and energy • educate community
Cost/Benefit:	• win-win • no regret

Water Supply

Increased temperatures and shifting precipitation patterns create uncertainty about Revelstoke's future water supply. Potential changes could reduce the availability of water for domestic, recreation, irrigation, fire fighting and generating hydroelectricity. The result could be an inability to meet peak water demand in future years.

1. Water metering

Given future uncertainties about water supply and demand, water conservation measures are needed in Revelstoke. One option to work towards water conservation is to install commercial and residential water meters and charge water users based on water usage. This measure could be implemented through development of a municipal water metering bylaw.

Stakeholders:	• city staff and council – bylaw • property owners / citizens • province – incentives • CBT
Timing:	• Short. 1-3 years.
Barriers and Opportunities:	Barriers: • property owner cost and acceptability • political will Opportunities: • differential pricing, incentive to conserve water
Cost/Benefit:	• no regret • win-win

2. Water conservation education

Water conservation can also be achieved through education. Public education on water supply and water conservation should be conducted to ensure residents have a good understanding of Revelstoke's existing and future water supply, the costs of water treatment and distribution, how this may be affected by climate change, and ways in which residents can reduce water consumption.

Stakeholders:	• city – education and practice (NCES, youth, schools) • development community • CBT Watersmart
Timing:	• 1-5 years • short – start • medium – finish
Barriers and Opportunities:	Barriers: • political will • cost of education and incentives
Cost/Benefit:	• no regret • win-win • low regret

3. Develop watershed management plan

Uncertainty about future supply and demand justify protection of the designated community watersheds (Greeley, Bridge, Hamilton and Dohlan Creeks) through effective management planning.

Stakeholders:	• city (initiate) • CSRD – support • province/Parks Canada – land owners • RMR/ Downie Timber – tenure holders • CBT – funding and expertise
Timing:	• short: start developing plan • medium-long: complete plan
Barriers and Opportunities:	Barriers: • provincial government (collaboration required) • funding • tenure holders • expertise • political acceptability • environmental groups (potential barrier if fuel management is needed) Opportunities: • potential for bioenergy on crown forest
Cost/Benefit:	• no regrets • win-win

4. Conduct leak detection and repair

As outlined in the City's Annual Water Report 2010, Revelstoke has an active program to repair and replace pipes in poor condition or that have reached the end of their functional life. This is done in conjunction with road repairs. Revelstoke should continue to conduct leak detection and subsequently repair high-priority leakage areas.

Stakeholders:	• city engineer
Timing:	• ongoing • long term/ continuous process
Barriers and Opportunities:	Barriers: • city cost vs. treatment saving Opportunities: • couple with road and infrastructure improvements
Cost/Benefit:	• no regret • win-win • low regret - when done with other infrastructure upgrades

Note: at the public workshop, water supply was also identified as a potential risk from climate change. Community participants in the public workshop identified potential water impacts and actions to address each impact.

Summary of Public Workshop

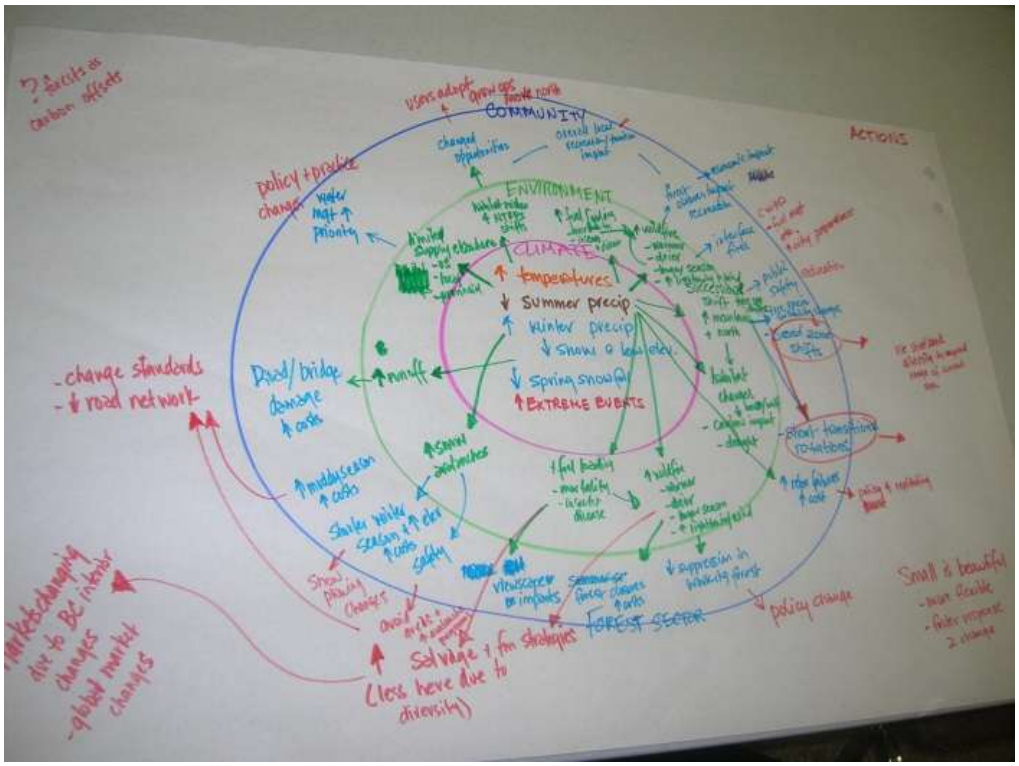
In companion to the local government workshop, a public workshop was held in Revelstoke on November 3, 2011 to engage interested community members in a discussion of the potential impacts and adaptive responses to climate change in Revelstoke. The public workshop was designed with three objectives in mind:

1. present historical climate information and climate change projections for the region;
2. visually chart some of the potential impacts of climate change on Revelstoke; and
3. discuss potential actions Revelstoke could take to address impacts.

After learning about climate science, and some of the future projections for the area, participants engaged in an 'impact charting' exercise whereby the projected future climate conditions to 2050 were 'charted' to determine environmental impacts, community impacts, and potential responses or actions. Four priority impact areas were identified and charted by participants at the public workshop. The text below summarizes the discussion for each impact.

Forests and Ecosystems

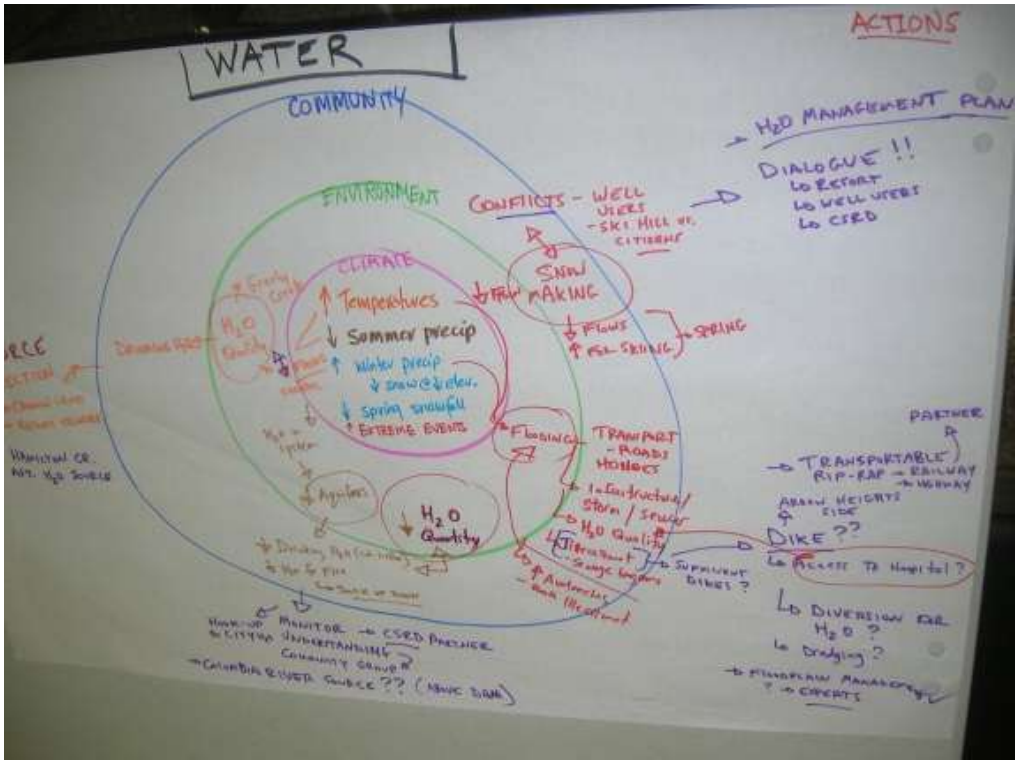
For forests and ecosystems, the environmental changes of increased temperature and decreased summer precipitation will have the most significant effects and could lead to environmental impacts such as increased forest mortality and disease, successional shifts, and wildlife habitat and behavioural changes. For the community, this could lead to public safety issues, increasing water management problems, and negative impacts on tourism and recreation. For the forestry sector, these impacts increase the uncertainty of future operations and may lead to increased operating costs. For example, operating costs could increase as a result of increased winter precipitation which increases road and bridge damage and prolongs the muddy season. To respond to these potential impacts, the forestry sector may need to re-think operational policies and re-planting practices, and update its road and bridge development standards. For the community, potential responses could include increasing City preparedness for wildfires, though public education and fuel management.



Water

The combination of increased temperatures and decreased summer precipitation are expected to affects water quality and water quantity, including groundwater resources. In companion with the reduced supply of water, is the potential for an increased demand for water, particularly for snow-making in the winter, and landscaping in the summer. There could also be less water available for drinking and fighting fires. Community responses may include source protection, exploring alternative water sources, or increasing dialogue and collaboration between CSRD, well-users and RMR.

The increase in winter precipitation and extreme events, could lead to increased flooding risk. Increased flooding could negatively affect local infrastructure, including transportation, storm and sewer systems, and sewage treatment (lagoons). Potential responses include determining the sufficiency of, and potentially enhancing the dike system and rip-rap protection, completing a flood plain management plan, and diverting water by river dredging.



Food Security

Increased temperatures could extend the growing season in Revelstoke, increasing the capacity of residents to grow food. The City, along with local food advocates, could enhance this potential benefit by encouraging people to grow more food on their private properties; the City could lead by example by growing food on select City properties. Revelstoke could also have adverse agricultural effects related to increased temperature and decreased summer precipitation. For example, more pests and weeds could invade and damage gardens. Residents could address potential impacts by growing organic food and the City could support local gardening by providing tax incentives and modifying policies (building code) to allow grey water use for gardening.

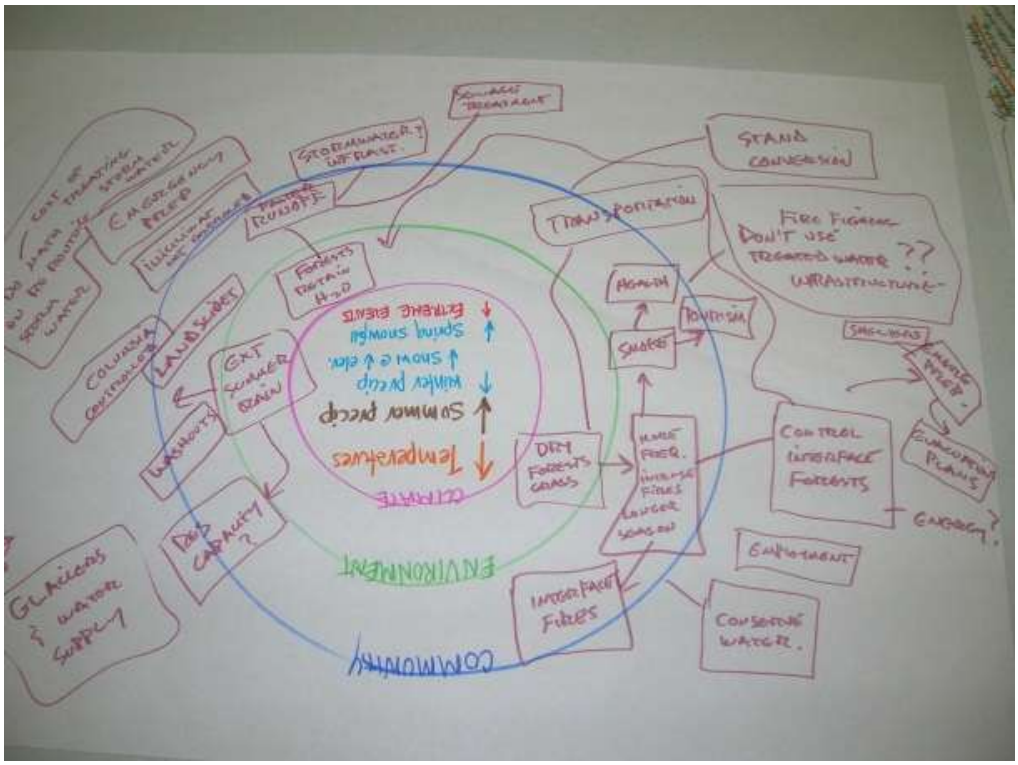
An increase in extreme events, including avalanches, heavy rain and flooding, could increase road closures and threaten Revelstoke's local food supply. From a broader perspective, extreme events nationally and globally could also cut-off food supplies of imported products. Actions to reduce these risks include increasing local food storage, preservation capacity (cellars), and education and awareness on desirable landscape plants and garden varieties to promote and encourage local food production.

Extreme Events

A projected increase in extreme weather events, including wildfires, landslides and flooding could lead to a variety of community impacts:

- wildfires: increased smoke and related health problems, impacts to tourism, and impacts to transportation;
- landslides: washouts of roads and other infrastructure; and
- flooding: impacts to stormwater and sewage infrastructure.

Potential actions to reduce the risk of wildfires include conserving water for firefighting capacity, controlling interface fires through forest management, and enhancing emergency preparedness and evacuation plans. Emergency plans will also assist in reducing landslide and flooding risks.



Next Steps

This document summarizes the results of Revelstoke's climate adaptation scanning and workshop. Now that priority risks and actions have been identified, some potential next steps for the City of Revelstoke, in no particular order, are outlined below.

Deepen Adaptation Planning:
The one-day workshop provided a quick snapshot of some of the potential climate impacts facing the City of Revelstoke. Climate change and human responses to climate change are complex and Revelstoke may wish to pursue further planning efforts and engage community members more broadly, to further understand community risks and opportunities, and local responses. CACCI can work with Revelstoke to undertake a more comprehensive climate adaptation planning process.

Develop a Joint Project:
Seven other communities in the Columbia Basin are engaged in adaptation planning processes. Many communities have similar needs when it comes to planning, bylaws and regulations and there is an opportunity for Basin communities to pool their resources to develop a joint project. CACCI can assist with the coordination of developing a joint project with other Basin communities.

Engage the Public:
Undertake outreach regarding climate change impacts and adaptation actions. Use public events and forums as an avenue to promote the City's work in this field. The CACCI team can assist in developing a specific climate adaptation public engagement event and/or integrating such an event into other planned engagement processes.

Implement:
Implement some of the actions identified during the workshop. CACCI can work with the City of Revelstoke to provide climate adaptation technical support (e.g. scientists, engineers, planners, academics, hydrologists, etc.) and matching funding.

Mainstream:
Ensure that future development, land use planning, and bylaws consider that the future climate is changing and uncertain, and will not be the same as the past. CACCI can share learning and examples from other communities and provide technical support to facilitate mainstreaming.

Appendix A: Workshop Participants at Local Government Workshop

Community Participants

Name	Position/ Title
Steve Bender	City Councillor
Sarah Boyle	Manager of Resource Conservation - Parks Canada
Mike Copperthwaite	Manager, Revelstoke Community Forest Corporation
Laurie Donato	Manager of City of Revelstoke Planning Development Permits
Rob Girard	Fire Chief
John Guenther	Director of Planning
Darren Komonoski	Operations Manager
Brian Mallett	Director of Engineering
Alan Mason	Director of Revelstoke and Area Community Economic Development
Penny Page-Brittin	Environmental Sustainability Coordinator
David Raven	Mayor of Revelstoke
Chris Selvig	City of Revelstoke Planning Department
Phil Welock	City Councillor

Facilitators

Name	Position/ Title
Katherine Mahoney	Coordinator, Communities Adapting to Climate Change Initiative
Cindy Pearce	Technical Support Team Member. Consultant - Mountain Labyrinths Inc.
Mel Reasoner	Technical Support Team Member. Climate Scientist.
Jeff Zukiwsky	Community Liaison, Communities Adapting to Climate Change Initiative

Appendix B: Workshop Process

The workshop methodology for the local government workshop represents the learning from the first years of CACCI and condenses a year-long planning process into one-day. The workshop is designed as a rapid assessment and is not intended to result in the development of a concrete climate adaptation plan. Instead, the workshop moves participants quickly through a series of round-table conversations to start the dialogue around what climate change means for the community.

The first part of the day focused on answering three questions about climate and weather in Revelstoke. This was done using round-table discussions (conversation café style).

- **Round 1: exploring local observations:** what changes have you observed through your work and personal life that might be related to climate change?
- **Round 2: current climate/weather effects:** how has your community been affected by weather events and climate? 1950 to 2011. Consider risks and opportunities related the economy, lifestyle, environment, infrastructure, etc.

Following Round 2, participants were given an overview of climate change science and climate change in the Columbia Basin, including historical weather records and future climate projections.

- **Round 3: future climate / weather effects:** with climate change in mind, how will your community be affected by weather events and climate in the future? 2011 to 2050.

Following the round-table discussions, participants identified priority risks. Priority risks were taken forward to the action planning stage and local actions were identified to increase Revelstoke's resiliency to these potential climate impacts. Participants then identified priority actions, either enhancements to existing actions or new actions, and assessed each action using the following criteria:

- **Key stakeholders:** who is affected by the risk, and who should lead the implementation of the action?
- **Timing:** should the action be implemented in the short (within 2 years), medium (2-10 years), or long (10+ years) term?
- **Barriers and opportunities:** are there barriers and/or windows of opportunity where actions can be implemented?
- **Cost/benefit value:** is the action a good investment of time and resources? Actions can be:
    - Win-win: actions that minimize the climate threat, but also have other social, environmental or economic benefits;
    - No regret: actions that are justified under existing climate conditions; and/or
    - Low regret: actions for which the costs are relatively low, and benefits relatively large if projected changes occur.