ROSSLAND
VISIONS TO ACTION
SUSTAINABILITY COMMISSION

City of Rossland: Communities Adapting to Climate Change Initiative

Final Report

September 30, 2010

Executive Summary

In October 2009, the City of Rossland and Rossland Sustainability Commission commenced a one-year project as part of the Communities Adapting to Climate Change Initiative funded by Columbia Basin Trust (CBT). Rossland was one of the phase two communities selected to participate in this CBT initiative. This report contains an outline of the process followed in that project, the key climate impacts and vulnerability and risk findings and the final recommendations of the project Steering Committee for consideration by Rossland City Council.

Project Milestones

Key project milestones included:

- the selection of a thirteen member **Steering Committee** and Local Resource Team comprised of residents, members of the Sustainability Commission, City Councillors, and City Staff (November 2009);
- completion of **Two Preliminary Reports** on Rossland's Historic and Future Climate and Rossland's Socioeconomic Base Case by the Adaptation to Climate Change Team (ACT) at Simon Fraser University (February 2010);
- completion of a **Local Observation Survey** of changes that long-term residents have noted in the climate (February 2010);
- a **public Impact Mapping and Priority Setting event** to prepare impact maps for six issue areas and to select **four priority issue areas** – water availability, infrastructure and built environment, energy prices and availability and food security – (March 2010);
- researching and assessing vulnerability and risk for the four priority issue areas to prepare a **Vulnerability and Risk Backgrounder** (May – June 2010); and
- preparation of an **Action Planning Data Base and Action Plans** for the four priority issue areas (August – September 2010).

Projected Climate Changes

There is substantial evidence that our climate is changing. The Intergovernmental Panel for Climate Change's (IPCC) 4th Assessment Report and downscaled climate models for the Columbia Basin suggest that key climate changes that Rossland is likely to experience by **2050** include:

- higher average summer and winter temperatures, in the potential range of 2°C;
- increased overall precipitation in the range of 10.5%, but decreases in precipitation in the summer in the range of 3%;
- decreases in snowfall and snowpack;

- earlier spring-run off by about 15 to 40 days;
- lower summer stream flows for longer periods; and
- increases in extreme events, such as heavy precipitation, droughts and windstorms.

These are likely conservative estimates, based on the best information available at the time of the IPCC 4th Assessment Report, which include optimistic assumptions regarding the success of international negotiations to limit global greenhouse gas emissions and peer-reviewed literature dating only to 2006. The views outlined in more recent scientific literature are more pessimistic.

Vulnerability and Risk

Rossland's vulnerability and risk for the four priority issue areas were assessed in detail. Highlights of those vulnerability and risks are as follows:

Infrastructure

Rossland's infrastructure is aging. Climate change could contribute to greater infrastructure deterioration and damage as a result of increased basement floods and sewer back ups in heavy rainfall events, increased freeze thaw stress on road surfaces, buildings and pipes, and more snow weight on roofs. Extreme events such as wildfires or windstorms could cause significant infrastructure damage. Rossland is preparing an Infrastructure Plan to outline a schedule for future upgrades and has an opportunity to consider climate change impacts in this plan at little additional cost. However, extensive City-wide infrastructure upgrades to address climate change impacts are unlikely given current funding levels. Thus adaptation measures may have to focus on maintenance and other practices, such as promoting increased on-site or subdivision water retention.

Water

Climate change could result in moderately reduced water capture in Rossland's reservoirs in most normal years due to decreased snowpack, earlier and faster spring run-off that no longer matches peak demand, and reduced summer precipitation. However variability in precipitation and temperatures and/or the increase in the incidence of extreme events could result in years where water capture is significantly lower than normal. Rossland's high relative demand compared to other jurisdictions provides for significant opportunities to address these potential challenges through adaptation measures.

Energy

Due to a multitude of non-climate change related factors, such as increased global energy demand and the rising cost of processing for many energy sources, global energy costs are expected to rise. Climate may exacerbate some energy pricing and availability challenges. Reductions in summer river flows could cause increases in hydroelectric prices and extreme events may cause temporary or extended power outages or price increases for fuels such

natural gas or oil. Adaptation measures to decrease Rossland's energy demand and identify alternate sources of energy make sense in the context of expected overall global price increases and mitigation requirements.

Food

The majority of Rossland's food is imported and thus the implications of climate change for food security must be considered at a global level. While the scientific literature suggests that overall global food production will not decline as long as global average temperature increases do not exceed 3°C, this must be taken with a considerable note of caution. Climate changes are expected to cause significant shifts in agricultural productivity, with temperate regions such as Canada becoming more productive, while productivity in tropical regions and the world's oceans may decline substantially. Thus the geopolitical implications of climate change on food production alone may have significant impacts on Rossland's access to food imports. Extreme events, pests and diseases may have significant further impacts on global food production. Non-climate change factors such as increase energy prices will also have an effect. In the context of the wide array of unknowns surrounding global food production, adaptation measures that promote increased local and regional food production would be prudent.

High Priority Actions

Nineteen high priority actions were identified in the context of key adaptation goals and objectives for each priority issue area. Many of the priority actions also include more detailed strategies that outline how the action can be achieved – the more detailed strategies are listed in the Action Planning Data Base in section four.

The actions were assessed with respect to their urgency, potential cost, lead implementer and links to the City Strategic Sustainability Plan and Official Community Plan. While some of these details are presented here, the rest are contained in section four of this report. Section four also outlines actions that were also identified as important second priorities in each issue area.

A key element of many of the high priority actions are that they are actions that the City and Sustainability Commission should be doing anyway. Many of them have already been identified in the Strategic Sustainability Plan (SSP) or Official Community Plan. Many of them are win-win solutions that will achieve a multitude of sustainability goals in addition to adaptation goals. Thus they can be viewed as no regrets actions that move our community towards our SSP Vision for 2030 even if the expected changes in climate did not occur. The fact that they are important from a climate change adaptation perspective just provides additional impetus to actions that we already intended to undertake.

The 19 priority actions selected at a public event in September 2010 are outlined below with their associated adaptation goals.

General

Key Adaptation Goals:

- Residents are knowledgeable and continue to learn about climate change adaptation
- Climate change adaptation is mainstreamed into City and community operations

ID	Action	Urg	Lead	Cost	Funding Source	Description
1.1.1	***Undertake a public outreach regarding specific climate change adaptation actions as they are implemented.***	H	City/ SC	L	City/SC	The outreach should be low-cost and simple i.e. mention of adaptation in conjunction with a City initiative in a City or Sustainability Commission newsletter, or as part of an event. The intent is to help residents to understand that adaptation is part of the rationale for certain actions, such as water conservation and fire smarting and to foster greater buy in for those actions.
1.5.1	***Ensure City committees, plans and processes consider climate impacts/adaptation in their decision making.***	H	City	L	City	The intent of this action is to ensure that climate change is considered in City decision-making. It is not intended to be onerous, but rather a lens that is applied to major decisions, much in the manner that the Strategic Sustainability Plan has been referenced as a standing line item in Staff memos to Council.

Urgency: High – Implement in 1-3 years; Medium – Implement in 3-5 years; Low – Implement in next 5-10 years
Cost: High – < $50,000**;** Medium – $10,00 to $50,000**;** Low – > $10,000
Lead: SC – Sustainability Commission; WSTF – Water Stewardship Task Force; ETF – Energy Task Force

Infrastructure

Key Adaptation Goals:

- Rossland's infrastructure is resilient to climate change
- Climate change is considered in infrastructure upgrades as well as new residential development and renovations
- Alternate management approaches (such as conservation, on-site or neighbourhood water retention etc.) are considered in place of infrastructure upgrades

ID	Action	Urg	Lead	Cost	Funding Source	Description
2.1.2 2.1.3 2.1.4	***Give consideration to climate change in the new City of Rossland infrastructure upgrade assessment and plan, and encourage Council to implement the plan.***	H	City	L	City	Given that the City is preparing an Infrastructure Plan, this is an opportunity to ensure that consideration is given to climate change impacts in that plan with limited additional cost. The potential for more frequent and intense extreme events and

						earlier spring run off will likely have some infrastructure implications and should be considered in the new plan.
2.1.5	***Encourage other agencies at the regional, provincial and federal level, such as CBT, to prepare best practices guides and provide funding for pilot programs to address climate change in mountain climates.***	H	SC	L	SC	Local governments have limited resources to develop best practices guides and pilot innovative climate change adaptation measures such as new drainage and road paving techniques. If other agencies were to provide funding for such projects, they could be potentially adopted on a larger scale. The Sustainability Commission (SC) could play an important advocacy role in encouraging these types of pilot programs.
2.6.3	***Prepare climate change design guidelines for new builds and renovations to reduce overheating, basement flooding, fire risk and extreme event damage.***	M	City/ SC	M	Grants	Voluntary guidelines for builders outlining how to build a climate change resilient home could increase the number of these types of homes in Rossland. The guidelines need not be extensive, but grant funding would probably be necessary to facilitate their development. The SC could play a role in developing grant applications.
2.10.1	***Revise the Subdivision and Development Servicing Bylaw to require on-site or subdivision water retention and minimized runoff design in new developments.***	H	City	M	City	The Subdivision and Development Servicing Bylaw was prepared in 1998 and variances are required for some innovative on-site or subdivision water retention techniques, such as swales. These water retention techniques are broadly supported in the OCP and can be less expensive than more conventional storm-water management approaches, such as curbs and gutters. Revising the Subdivision and Development Servicing Bylaw to remove barriers to their application might encourage their greater use. The Subdivision and Development Servicing Bylaw has recently been budgeted for revision.
2.10.2	***Promote on-site water retention, active storage capacity and permeable surfaces on existing residential properties through education and incentives.***	H	SC/ City	M	SC/ City	Minimizing runoff through water retention techniques is a major theme in the OCP and could be critical low-cost adaptation measure reducing the need for some infrastructure upgrades. The SC and City could play a partnership role in promoting these measures.

Water

Key Adaptation Goals:

- Rossland has accurate information regarding annual stream flows, snow pack and water use
- Rossland manages its existing water supply without the need for additional reservoir capacity
- The impact of potentially decreased water supply in late summer/early fall as a result of climate change is minimized without creating additional costs to tax payers
- Rossland is prepared to respond to droughts
- Ecosystem needs are considered in Rossland's strategic water management

ID	Action	Urg	Lead	Cost	Funding Source	Description
3.1.1 3.1.2	***Improve our data regarding water supply and demand.***	H	City	L	City	The City is already taking significant action on this front with the installation of water meters to measure usage and the planned increase in manual monitoring on our creeks. Prioritization of this action is intended as a show of support for those actions to ensure that they continue and to provide impetus for the analysis and publication of the data once it is available.
3.2.1	***Reduce per capita water use through a combination of regulation, education, incentives and targets.***	H	City/ SC/ WSTF	L-M	SC/City/ CBT Water Smart	Rossland's per capita water use is very high compared to many other jurisdictions in North America and the world. Measures to reduce it just make sense from many perspectives – climate change adaptation, sustainability, reduced future infrastructure costs, reduced sewer treatment costs and the potential to maintain downstream flows. These measures do not have to be high cost, particularly with the range of billing options made possible with water meters, and potentially grants available through CBT Water Smart for education.
3.4.1	***Create a watershed and/or a water management plan.***	M	City/ WSTF	M	City	This has been recommended in both the SSP and OCP and could be accomplished at limited cost by updating the existing draft plan. A plan could encompass many of the water actions outlined in this report including a drought plan (3.3.1) with trigger points for water restrictions in extreme climate change event years.
3.5.1	***Encourage residents to utilize alternative water sources for non-potable water use needs.***	M	SC/ WSTF	L	SC	Communities around the world use rainwater and greywater for non-potable water use needs such as lawn or garden watering. Although provincial legislation currently restricts the range of uses of greywater, this could change in the future. Although

						rainwater barrels (as opposed to cisterns) do not provide a significant reduction in potable water demand, they promote an ethic of conservation and could be promoted at low cost through the education strategies adopted for action 3.2.1. They also assist in on-site water retention. Wide use of cisterns could have a notable impact on Rossland's water demand.

Energy

Key Adaptation Goals:

- Rossland's vulnerability to the impacts of rising energy prices is minimized
- Rossland's vulnerability to temporary and long-term energy supply interruptions is minimized
- Rossland has a diversified energy supply through local renewable energy generation

ID		Urg	Lead	Cost	Funding Source	Description
4.1.2	***Develop a Community and Corporate Energy Plan.***	M	City/ ETF	M	City/ SC/ Grants	A Community Energy Plan with targets and measures for community and corporate energy management has been suggested in the SSP, OCP and by the Energy Task Force (ETF). It would assist the City in achieving both climate change adaptation goals and carbon neutral commitments, while potentially on a Corporate level reducing City costs if energy savings are achieved. It is also a symbolic issue, establishing the City's willingness to lead by example. Templates exist and this could likely be done at low cost with the help of the ETF.
4.1.5	***Control sprawl and promote infill development.***	H	City	L	City	The City is already taking significant action on this front and the intent of prioritizing this action is to provide support to those initiatives and ensure that they continue and are reflected in Council decisions.
4.1.8	***Identify and implement energy conservation measures on a Corporate City level.***	H	City/ ETF	M	City/ Grants	In the absence of a Community and Corporate Energy Plan, the City can start taking actions to implement energy conservation measures, such as the use of lower wattage bulbs in streetlights, or a green fleet program. These actions will both help to reduce City costs and contribute to the achievement of carbon neutral commitments. Although the City's contribution to community energy use is relatively small, it was repeatedly noted that the City must lead by example if they want

						residents to take action on energy conservation.
4.3.1	***Provide incentives for the development of renewable energy facilities.***	M	City	H	City/ Grants	Renewable energy is a significant contributor to community energy needs in many European countries at reasonable rates of return. Although renewables have yet to achieve grid parity in BC, there is significant interest in them, and small pilot projects could be fostered through the use of incentives. Renewable energy is supported in the OCP. Ultimately this kind of initiative could produce economic development spin-off benefits, but at the outset might require grant funding.

Food

Key Adaptation Goals:

- Rossland is a food secure community and its vulnerability to potential declines in global food production are minimized
- Local farmers and residential growers are supported
- Agricultural lands are identified and protected

ID		Urg	Lead	Cost	Funding Source	Description
5.1.2	***Promote increased local food production and processing.***	H	REAL Food/ SC	M	SC/City/ Grants	This could include measures such as encouraging backyard gardening, mentoring programs and workshops. Rossland REAL Food is already playing a significant role in this area and with a continuation of their funding may be able to continue to do so at a relatively low cost.
5.3.1	***Ensure local growers have sufficient land access.***	M	City	L	City	For limited expenditure, the City could further designate unused public lands suitable for growing as additional community gardens and incorporate garden designations into development density bonuses. While moving towards food self-sufficiency may require a regional level solution, the City could provide assistance promoting additional backyard gardening or small-scale agriculture through in greenhouse development or the purchase of private land for demonstration farms. This would require a higher level of funding and the potential water consumption implications might have

						to be assessed.
5.4.1	***Establish a community composting system.***	M	City	M	City/ RDKB	A community composting system for yard and/or food waste system would not only provide benefits for food production, but also for reducing Rossland's contribution to the waste stream. Yard waste could be composted in dispersed neighbourhood sites.
5.5.1	***Protect agricultural land and topsoil through incentives, education, planning and regulation.***	M	City/ REAL Food	L	City	Protecting potential agricultural land from development and ensuring that development, renovations and landscaping are done in a manner that protects topsoil are critical components of maintaining the potential for future agriculture. With some funding, Rossland REAL Food could play a role in the education component of this action, but the City has a key land-use planning role to play.

Conclusions and Next Steps

Climate change is a critical challenge facing the City of Rossland. Its impacts will likely start to become more evident as we move towards 2050. Climate change can also be viewed as a potential opportunity to undertake some key adaptation actions that the City has already identified in the SSP and OCP as being desirable for Rossland to promote sustainability, reduce City costs and encourage economic development. The fact that these actions are also important from a climate change adaptation perspective provides further impetus for their implementation.

"Win-win" climate change adaptations are "actions that provide adaptation benefits while meeting other social, environmental or economic objectives, including climate change mitigation." ~ Pew Center on Global Climate Change

The nineteen priority adaptation actions identified in this report are presented to the City and to the Sustainability Commission for their consideration and implementation. Each priority action has been flagged with regard to whether the City or Sustainability Commission might best play a lead role in its implementation.

The City is already undertaking a few of the priority actions. Including those actions in the recommendations here is intended to provide further support to the actions that the City is already taking. Other priority actions are additional to the work that the City is already doing and will require some budget planning by both the City and the Sustainability Commission. When selecting priority actions, consideration was given to their affordability. In most cases, the priority actions can be accomplished if they are incorporated into regular budget planning and implemented as part of the sustainability initiatives that the City would likely consider as part of

"Even with mitigation efforts, climate change will continue to unfold for decades due to the long atmospheric lifetime of past greenhouse-gas emissions and the gradual release of excess heat that has built up in the oceans. Climate change adaptation is thus a necessity for our nation and the world." ~ Scientific American, US Needs a Strategy for Adaptation to Climate Change, September 30, 2010

the SSP implementation. Other actions may require grant funding if they are to be implemented. The Sustainability Commission may have an important role to play in assisting in the preparation of appropriate grant applications.

Ultimately a plan is only as good as its implementation, and it is the hope of the Steering Committee that the priority actions identified in this report form the basis for the City's ongoing response to climate change.

Climate change is already occurring. The precise manner in which it will manifest in Rossland is not completely known. This report provides some best guesses based on the science available. Even if mitigation strategies prove successful, some level of climate change is inevitable. Local governments will be forced to be at the forefront of climate change adaptation and the choices they make today might affect their capacity to adapt in the future. Incorporating climate change adaptation considerations into regular planning cycles is a critical step for local governments to start taking today. Communities that anticipate and prepare for climate change now will position themselves to be the resilient sustainable communities of the future.

"Many decisions that will affect how communities fare in a changing climate will be made locally." ~ Rosina Bierbaum, Dean of University of Michigan's School of Natural Resources and Environment.