Kaslo / Area D Climate Change Adaptation Project

September 2010

Executive summary

The project timeline ran from October 2009 – July 2010, and extended to September 30th 2010 to enable further public engagement and data gathering. The $40,000 project was jointly funded by Columbia Basin Trust (CBT), Regional District of Central Kootenay (RDCK) and the Village of Kaslo. This enabled funding of a coordinator to work 20 hours per week. The project had access to the CBT Technical Support Team and expertise at Selkirk College.

A RDCK survey (2009) and a public meeting with Kaslo and Area D residents (February 2010) examined public opinions of priority areas important to the region's sustainability. Energy and climate change and water use came out as priority issues. The project identified two priority areas, water and agriculture. These were considered particularly vulnerable to climate change and were vital components to communities within the area. Forest fire hazards were also considered high priority but were previously covered through work by Kaslo and District Community Forest Society. Information gathering took place through a variety of methods including questionnaires that were distributed to the public, food growers and water user groups.

Several project studies and modelling were undertaken. To follow are their conclusions:

1. Kaslo / Area D climate scenario projections 2020, 2040, 2080
   The projections are for warmer winters, higher minimum winter temperatures, more lower elevation rain, less high elevation snow, higher maximum summer temperatures, less summer rain, more extreme weather events, longer growing degree days, increased frost free days.

2. Comparison of Kaslo Watersheds
   Four watersheds were studied, three within the study area. Only one watershed, Redfish, has extensive records available. This lies outside of the project area. In an inquiry to investigate whether Redfish Creek could be used as a surrogate, it was found that three watersheds within the project area (Bjerkness, Kemp and Fletcher) are significantly different to Redfish in aspect and elevation, requiring future monitoring of rainfall, stream flow and quality. Kemp creek has limited data supplied by Kaslo Village Council. There is very limited data available for these creeks.

3. Kaslo / Area D water supply and demand
   The peak stream flow (freshet) is expected to occur earlier in the season, with an increased stream flow between November to April. The low stream flow is anticipated to occur during May-September, particularly in July, a time when the water demand and environmental stress is usually the highest.
   There is only 3.5 years of data on domestic water use for Kaslo with the highest demand usually occurring in the July-August period. The average annual consumption (water provided by the treatment plant) per person is between 1,000-1,100 L / person / day (excluding water use for the golf course), reaching more than 2,300 L / person / day during hot summer days in July and August.

4. Kaslo / Area D agriculture and food provision

Without land clearing, there is insufficient agricultural land currently available within Kaslo / Area D to enable complete food self sufficiency. This is significant because of the potential for climate change and its corollary effects to disrupt the production and delivery of food from outside the region. Every effort should be made to protect existing agricultural designations. Access to and use of existing agricultural land is of considerable concern. There is limited commercial food production but active residential gardening occurs widely. Opportunities exist for new crops given projected climate change.

A temperature rise of more than 3 degrees C in BC is likely to have major negative consequences on crop production. The impact on freshwater and marine ecosystems gives rise for concern and livestock are sensitive to even limited increases in temperature. The increase in animal and crop diseases is considered to be one of the key climate change impacts on agriculture in BC, along with winter floods and summer droughts. Urbanisation has a massive impact on food production through the loss, degradation and contamination of arable land e.g. the Fraser Valley.

The damage to food distribution infrastructure, such as roads, bridges or ports in particular, could have impacts on food security. Given that most Canadian households no longer stock up on food for the winter and most North American grocery stores only have a three day supply of food in stock, transportation disruptions of longer than three days could have serious implications in some communities

5. Climate Change and Global Food Security

BC currently produces only about 48% of the food it consumes and remains heavily dependent on foreign sources to supplement its needs. While it is anticipated that countries and regions in higher altitude areas (i.e. Canada/BC) could expect increased production because of climate change (assuming no more than a 3 degree increase), lower altitude countries (sub/tropics) could experience a decrease due to increased drought, rising oceans and considerable flooding and land loss, and other extreme events.

Furthermore, the indirect impacts and consequences of climate change are of considerable concern, such as greater poverty, migration, development pressures on arable land, civil unrest, and resource-based conflicts which have the potential to profoundly impact food security from global to regional levels.

While most current studies respecting the impact of climate change at a global level suggest optimism, it is to be noted that such studies are based on examining changes which are, in general, highly predictable, gradual and continuous. There are numerous scenarios in which food availability and accessibility become major issues.

Action recommendations[1]

The action recommendations in the project are separated for both water and agriculture, although it is acknowledged that many items overlap. Overall the recommendations for water fall into the general categories of emergencies, education / information, usage and supply monitoring, use reduction, and protection of water quantity and quality. For agriculture the general categories are activities relating to commercial and non commercial assistance, education / information, and emergency issues.

[1] Appendix C

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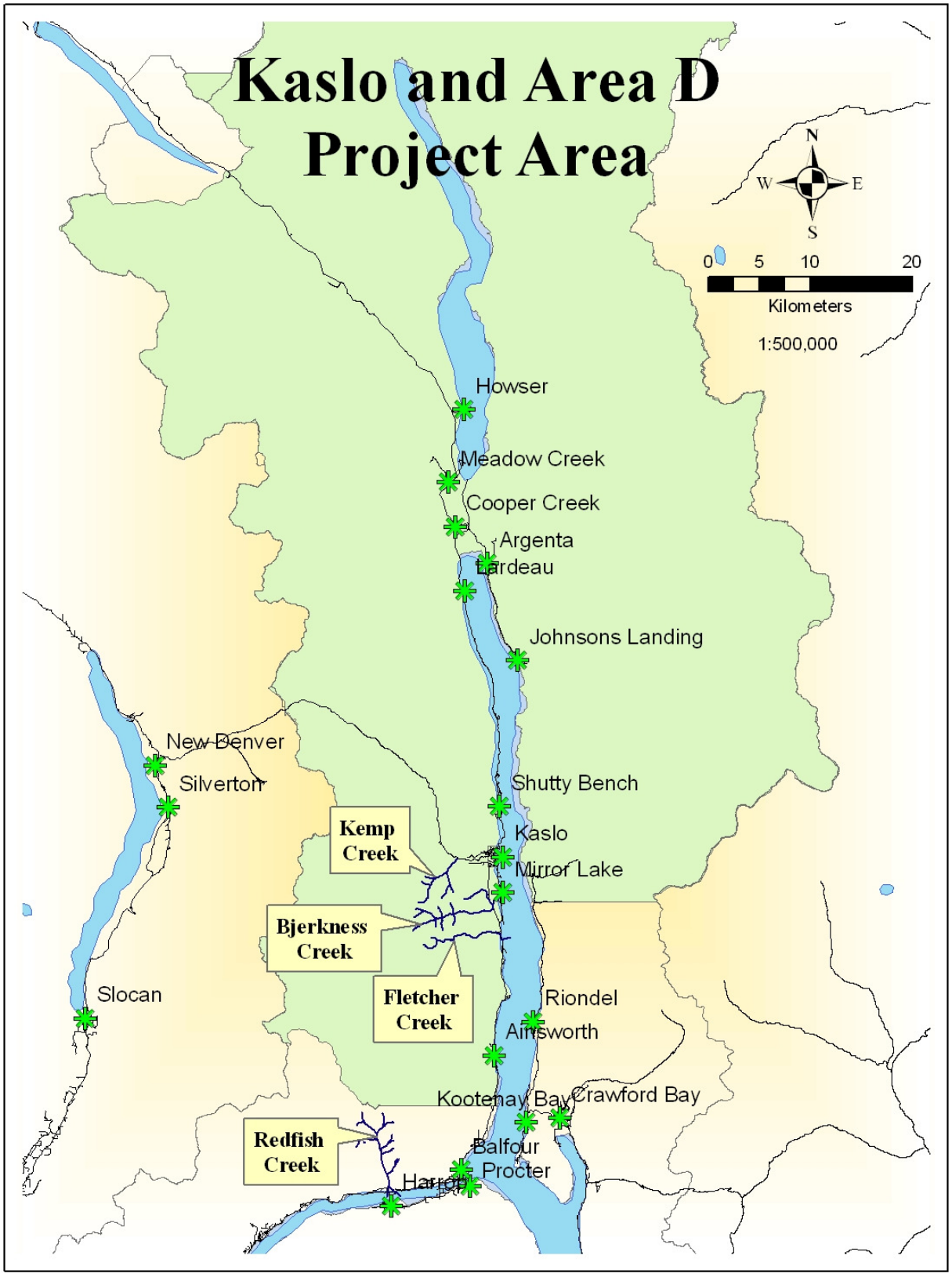
Appendices

Abbreviations:
TST – Technical Support Team
CBT – Columbia Basin Trust
RDCK – Regional District of Central Kootenay
PCIC – Pacific Climate Impacts Consortium


Kaslo and Area D
Project Area
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0 5 10 20
Kilometers
1:500,000
Howser
Meadow Creek
Cooper Creek
Argenta
Lardeau
Johnsons Landing
New Denver
Silverton
Shutty Bench
Kaslo
Mirror Lake
Kemp Creek
Bjerkness Creek
Fletcher Creek
Slocan
Riondel
Ainsworth
Kootenay Bay
Crawford Bay
Redfish Creek
Balfour
Procter
Harrop

I. Mission Statement

The Climate Change Adaptation Steering Committee will prepare a climate change adaptation strategy for the benefit of all who live, work and play in RDCK Area D / Kaslo. The project objectives are to recommend a course of actions to adapt to the projected impacts and associated changes to
(1) local food production
(2) the availability and quality of year round accessible water.

This mission statement and supporting objectives guided the project throughout.

II. Introduction

The 'Climate Adaptation and You' project is one of three climate change adaptation projects within the Columbia Basin region, the other two being Rossland and Castlegar. It is a part of a community based initiative spearheaded by the Columbia Basin Trust. Its goal is to support communities in the Columbia Basin to increase their resiliency to climate change impacts at a community level. This includes helping to build the capacity of local governments and their community to effectively adapt to our changing climate.

The project ran from October 2009 to September 2010. During this time, the project was informed by five reports[2] commissioned specific to Area D / Kaslo, two public meetings, two issue specific meetings (water user groups and food growers) and questionnaires[3].

III. Climate change projection for 2050

With the backdrop of global land and ocean surface temperatures in the first half of 2010 being the warmest January-June on record[4], from data supplied by the Pacific Climate Impacts Consortium (PCIC), Kaslo / Area D is broadly looking at warmer, wetter winters, with less low elevation snow, and hotter, drier summers. There will be an increase in annual growing degree days and frost free days. This projected change in climate will provide communities with many challenges and some opportunities. For example, a longer growing season may well be offset by lesser water being available for irrigation.

A summary of projected climate change related impacts are detailed in Table 1, below. (1961-1990 baseline average in brackets)[5]

[2] Attached as Appendix I
[3] Attached as Appendix O
[4] National Climatic Data Centre
[5] Attached as Appendix H

	Summer	Spring	Fall	Winter	Annual
Temperature	+2.4 ℃ (17.1 ℃)	+1.4 ℃ (7 ℃)	+1.8 ℃ (7.2 ℃)	+1.7 ℃ (-2.0 ℃)	+1.9 ℃
Precipitation	-10% (55.9 mm)	+8% (53.5 mm)	+9% (65 mm)	+7% (101.4 mm)	+5%
Snowfall		-54% (4.2 cm)	-14% (8.3 cm)	-11% (62.5 cm)	-26%
Total Growing Degree Days					2290 (1700)
Frost Free Days					+25 days

Table 1: Projected change in climate 2050 (Baseline: 1961-1990 average)[6]

The consequences of such a change in climate are felt by communities as impacts. The projected impacts on the area's capacity to support life and the communities within are profound:

- Increase in annual mean temperatures.
- Warmer winters and less snow pack to act as a spring / early summer water supply will lead to a reduced water supply for people and commerce.
- Increased winter rainfall (less snow), land instability and flooding will provide challenges to local government and land owners.
- Increased extreme weather events, with power outages, tree wind throw and transport infrastructure disruption, will present additional challenges to distribution networks and essentials which require power e.g. water pumping.
- Higher maximum summer temperatures will present challenges for food growing.
- Drier summers will stress existing water availability, for drinking and irrigation. Forest fires will become more prevalent, and there will be a greater risk of crop disease.
- Increase in growing degree days and frost free days (positive impact).
- Greater seasonal variability and unpredictable weather.

Opportunities will present themselves and must be recognised, but be seen in the context of increased challenges such as water supply. There is a great need for communities to take steps to proactively adapt to these projected impacts from changes in our climate, and other associated events.

IV. Why climate change adaptation?

Adaptation refers to the initiatives to reduce the vulnerability of natural and human systems against actual or expected climate change effects. These are actions to minimise anticipated negative impacts, or enhance potential benefits, of climate change. Adaptation benefits are the avoided damage costs or the

[6] Pacific Climate Impacts Consortium, Plan2Adapt web site

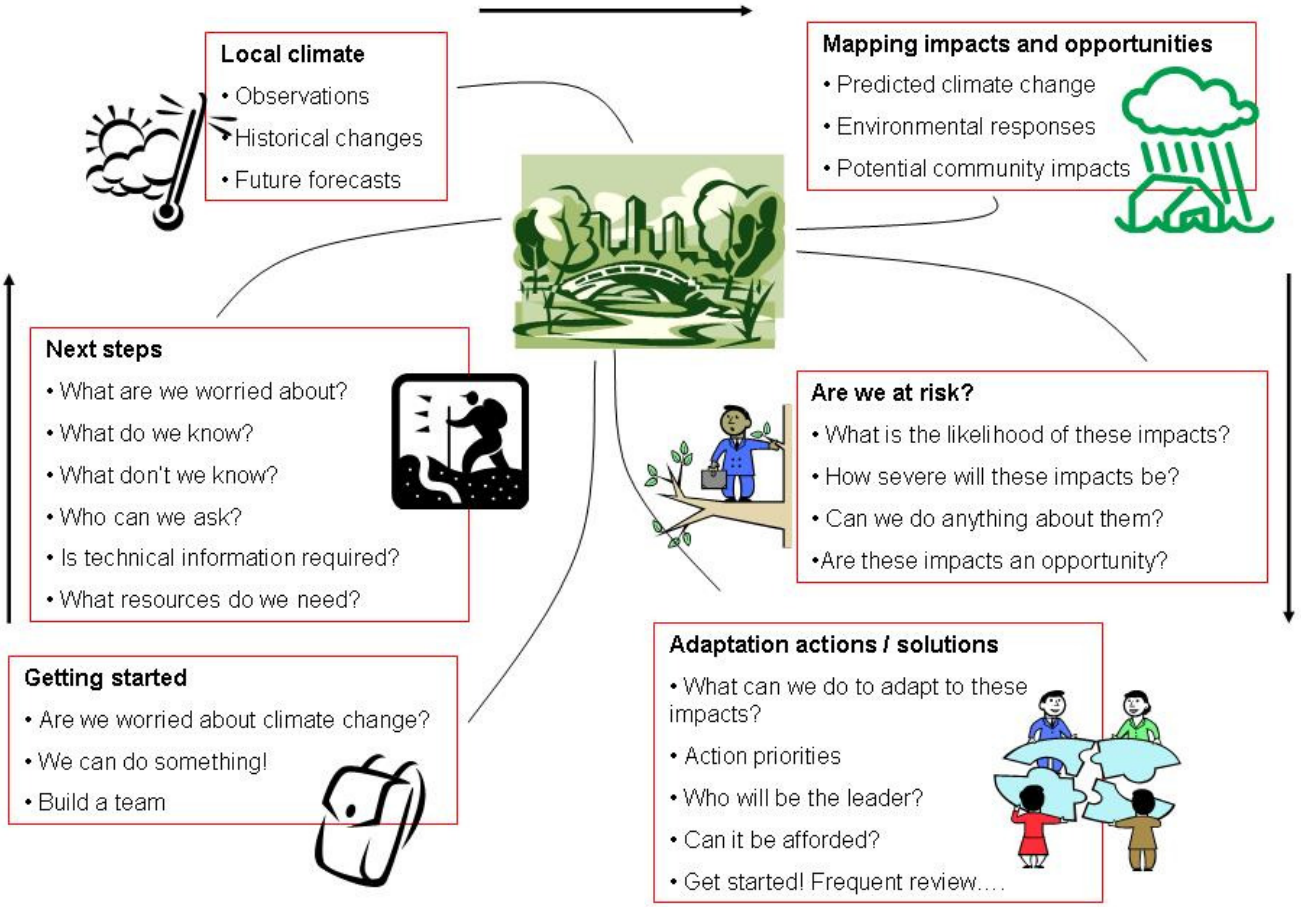
accrued benefits following the adoption and implementation of adaptation measures.

Community action!
For example, through the Kaslo Lawns to Garden Program, 5 lawns were converted to vegetable gardens using drip lines, but no chemical fertilizers or pesticides. A considerable amount of water and greenhouse gas emissions have been saved.

Mitigation refers to actions that will reduce the sources or enhance the carbon sinks of greenhouse gas emissions.

For example, the RDCK Board has committed to reduce their CO_2 output (from 2007 levels) by 15% by 2020, and 20% by 2030, through reducing fleet vehicle use, procurement, reduced energy use etc.

The project mandate was to focus exclusively on climate change adaptation.



A community adaptation project journey

The flow diagram above illustrates a possible journey a community might take when embarking on a Climate Adaptation project. Each project is tailored to the specific needs and strengths of that community.

Community action!
Herb Thompson, Kaslo, installed a 1000 gallon water tank in his garden. He filled it up from rainwater collected from his roof in a couple of weeks. He now waters his garden produce with rain water, saving thousands of gallons of drinking water per year.

V. Study approach

The steering committee identified two priority areas which exist:

- food production
- water provision and quality.

The climate data obtained from PCIC provided a basis to examine the impacts of climate change on each of these issues. Large knowledge gaps existed in the project area and studies were carried out[7] to increase the knowledge base:
1) What were the properties of the area watersheds and what is known about any historical monitoring data?
2) How much water is supplied, where is it used and for what purposes?
3) How much agriculture land exists within the existing agricultural land reserve and how much of what is produced? Could Area D / Kaslo be food self-sufficient?
4) To what extent will climate change impact global food production?

This enabled the project to examine impacts and identify adaptive actions through the climate change lens. Anecdotal evidence informed and reinforced the project throughout.

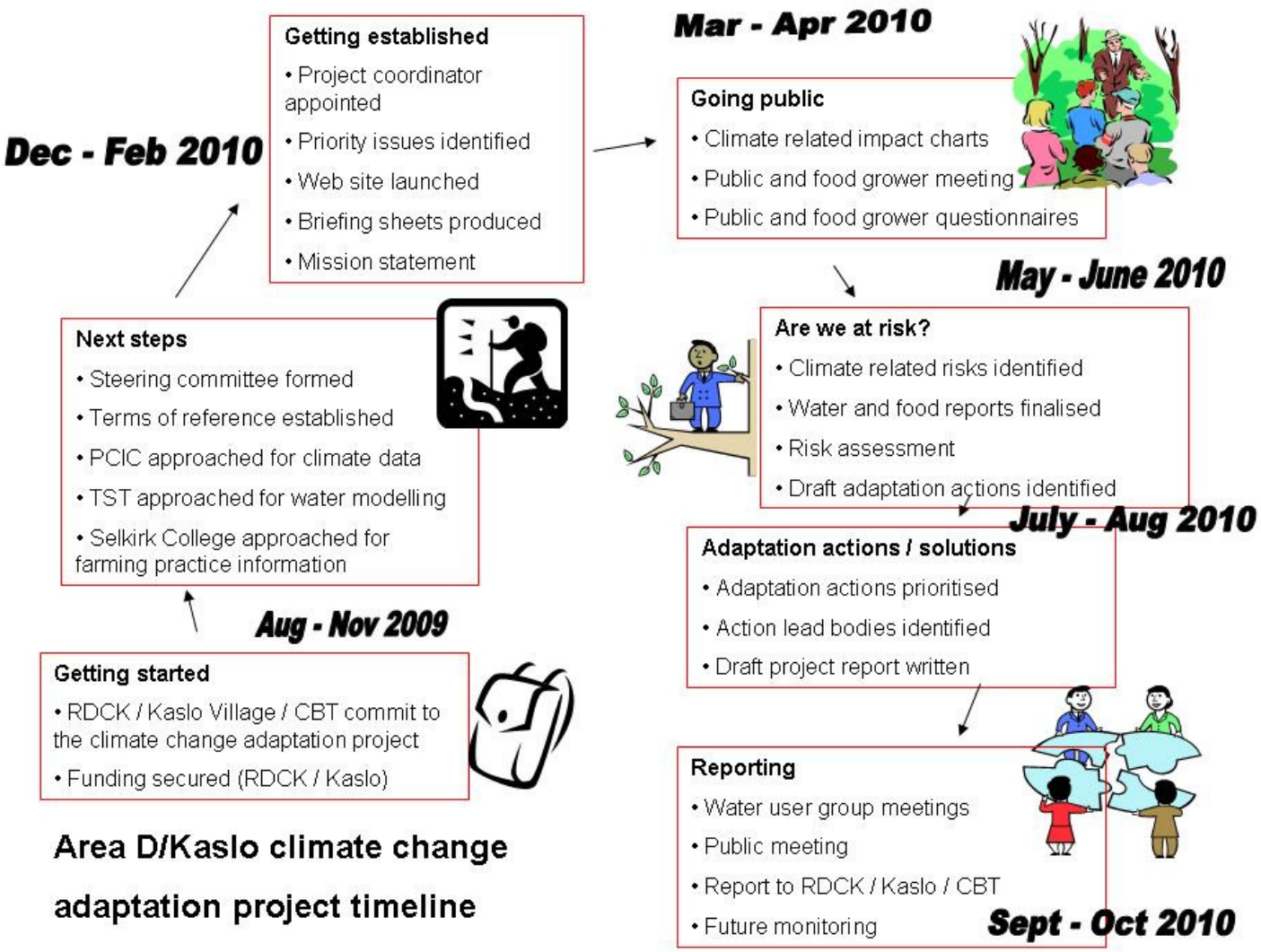
Once these impacts were recognised, the impact consequence and the probability of it occurring were assessed. Adaptation actions emerged from this process and subsequently prioritised.

Change in climate ⟶ ecosystem response ⟶ community impact ⟶ associated risks ⟶ adaptation action.
For example:
reduced spring snowfall ⟶ earlier low summer creek flows ⟶ potential water shortages ⟶ demand exceeding supply ⟶ an action to reduce treated water consumption by using rainwater to water garden vegetables.

Finally, lead bodies were assigned to each action. Monitoring will take place on an ongoing basis.

The project prides itself in the uniqueness of the studies and the robustness of the decision making process. The CBT's Technical Team's public presentations were very well received. The following illustration shows the timeline for major milestones in the project.

[7] Columbia Basin Trust technical support team (UBC, UVic, PCIC) and Selkirk College

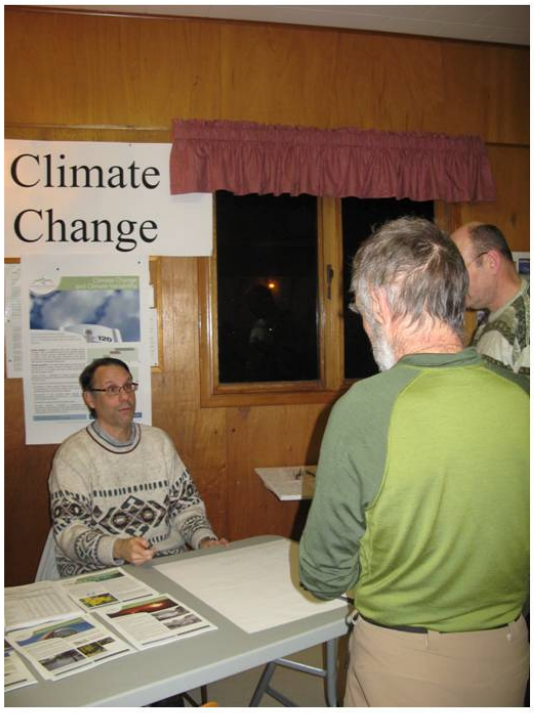


VI. Conclusion

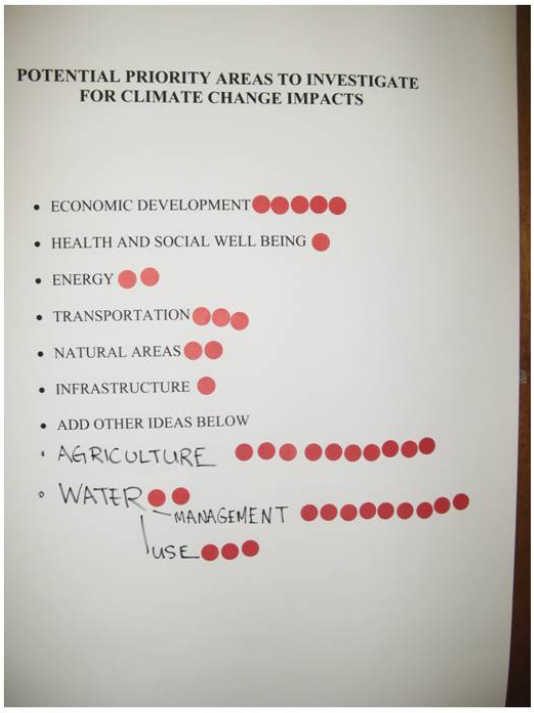
Climate change presents a very real and present day threat to the sustainability of local communities. The Area D / Kaslo climate change adaptation project has looked in depth at future climate projections and the two priority issues of the provision of water and food. The committee has considered carefully the findings of anecdotal and expert reports and the recommendations are for the wellbeing and viability of the people who live, work and play within the project area. The actions are without prejudice, benefit no one individual and must be acted upon with the utmost urgency by politicians, local government, business and households alike.

The appendices may contain information and web links which have originated from the author. The steering committee are not responsible for any errors which may arise in either content or wording.

The Director of Area D has requested that the Area D Advisory Planning Commission monitor the implementation of action recommendations. The report will be available on the Kaslo Village and RDCK web sites.



Public meeting, Kaslo, February 2010



Priority issues, Kaslo, February 2010

Technical support team and local politicians, Kaslo, February '10

Climate impacts session, March 2010

Climate impact mapping, March 2010

Risk assessment session, June 2010