REDUCING VULNERABILITY TO CLIMATE CHANGE:
A TOOLKIT FOR COMMUNITIES

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Photo: Wayne Sawchuk

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GETTING STARTED

Many communities across the world are already experiencing the impacts of climate change. These include destabilization of soils, changes in wildlife distribution, increased forest fires, and other changes in the seasonal patterns of ecological systems. For those that live in close relation to the natural environment, including Indigenous and resource-based communities, these changes are particularly apparent and will lead to ecological, economic and social impacts.

This toolkit is designed to support communities in developing localized climate change adaptation plans. It is the result of review of several climate change adaptation plans and other guiding documents, as well as adaptation planning work done by Takla Lake First Nation in Northern BC, in conjunction with CPAWS-BC.

Climate Change: Causes & Consequences

Climate change is the result of the human activities including the burning of fossil fuels (coal, oil, natural gas, etc.), agricultural practices and deforestation. These processes release large amounts of heat-trapping gases into the atmosphere, causing changes in the global climate through the 'greenhouse effect'. It is very difficult to project the rate or intensity of changes, but it is certain that changes are occurring.

Localized impacts of climate change may include:

- Sea level rise causing shoreline erosion and flooding
- Loss of sea ice, snow cover and snowpack, lowering water supplies
- More frequent heavy rains, causing flooding, as well as less frequent light rains, leading to drought
- More frequent, more intense and longer heatwaves and cold snaps
- Hotter summers, increasing the threat of forest fires and worsening urban air quality
- Changes in the distribution and species of wildlife, as changes in other natural systems shift their ranges

Mitigation and Adaptation

Climate change will pose new challenges to communities, some of which will aggravate existing challenges and others which will create new challenges. Some challenges will be immediate, and others will evolve and develop over time. In order for communities to remain healthy and functional, they must both understand climate change, and learn to prepare for and adapt to its effects.

There are many things we can do to address climate change, and these can be roughly broken down into mitigation and adaptation. Mitigation activities address the root causes of climate change by reducing emissions of greenhouse gases (such as carbon dioxide). There are many ways in which communities can reduce their contribution to climate change. However, this is not the focus of this toolkit. Adaptation is a term used to describe any activities to reduce the impacts that climate change may have on a community, which will be the focus of this toolkit.

Adaptation planning looks at both the strengths and vulnerabilities of communities in light of the threats, and uses these to inform land use planning. Climate change adaptation planning is a proactive approach. This process allows communities to look at the possible effects of climate change, determine how to best prepare their communities for changing environmental conditions and also take advantage of any opportunities offered by a changing landscape.

Purpose of the Toolkit

This document is intended as a community resource, providing general guidelines and examples to support planning and decision-making processes. While it guides the process in order for communities to plan themselves, there will likely be the need for users to seek outside assistance for some stages. The toolkit is also intended to evolve over time, incorporating lessons learned through its application, and as additional resources become available.

Overview of the Process

This toolkit follows a process to develop a community-based climate change adaptation plan, including:

- Steps to gathering information and identifying local consequences of climate change
- Guidance on integrating findings into planning and policy
- Example worksheets, templates and checklists to use throughout the process
- Other resources to draw upon

The main phases of this toolkit are illustrated in Figure 1, below.

In Phase One: Identifying Climate Change Consequences, data is gathered by first taking stock of existing community-based and scientific information, then gathering new information from the community and climate science. This information is combined to understand what the consequences of climate change for the territory may be.

In Phase Two: Developing Adaptation Strategies, specific strategies are developed for adapting to the consequences identified in Phase One. These include actions and resources for implementation, matching strategies to existing policies and institutional roles, as well carrying out monitoring, adaptation and evaluation.

The Toolkit process draws on three key "dimensions" of communities:

- *Knowledge*: social and scientific, as well as new and existing information
- *Community attributes* that determine potential responses to climate change (infrastructure, resources)
- The *management* of knowledge and community attributes: how organizations work to adapt to change

The process is designed to engage with stakeholders throughout, in order to develop a thorough understanding of the challenges and impacts climate change poses to the community, as well as strengths and opportunities. Stakeholders and other impacted groups may include various levels of government and organizations, Indigenous groups and the general public. When identifying stakeholders, special consideration should be given to already-vulnerable groups and those who rely on close relationships with the natural environment.

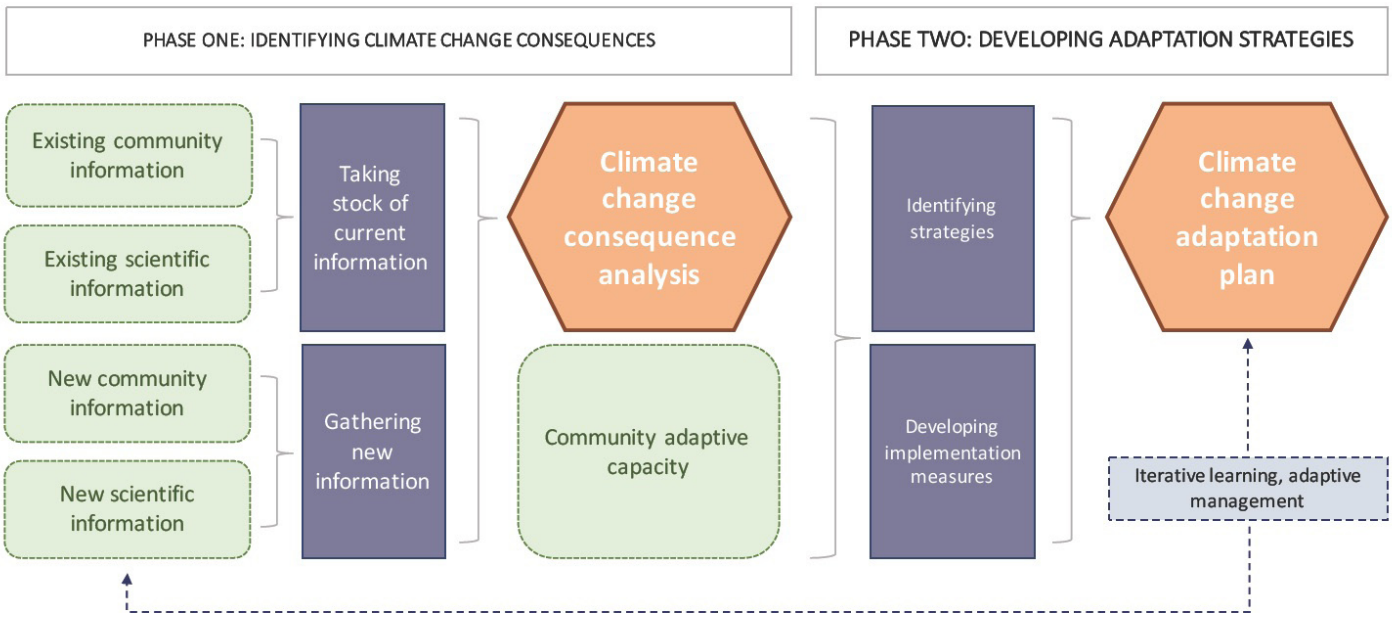


Figure 1. *Overview of Toolkit Process for Development of Adaptation Plan*

GLOSSARY

Adaptation: Actions that can be taken in order to live and survive in the new scenarios that are the result of global warming and extreme climatic events

Adaptive capacity: The ability of a system (like the built environment, natural or human systems) to adjust to climate change, including to minimize negative effects (vulnerabilities), to best take advantage of positive effects (opportunities), and to cope with inevitable consequences

Adaptation strategies: Ways in which communities change over long periods of time by modifying activities, institutions and rules to ensure that their interests are achieved

Climate: The average weather that occurs over a period of time

Climate Change Consequences: Both the vulnerabilities and opportunities presented by climate change

Climate Change Risk: A perceived or actual risk resulting from climate change that can affect natural and human systems

Ecological Upheaval: The combined effect of changes in precipitation, temperature, and the tolerance of different species

Exposure: The degree to which a system (such as a community) is subjected to stressors, such as changes in rainfall or average temperatures, or the frequency of extreme weather events

Indigenous Biocultural System: A complex system that integrates human and socio-cultural elements of indigenous people with physical and environmental elements of their territories. Its components include biological resources, ranging from micro scales (genetic) to macro scales (landscape), as well as the traditions and practices that have long existed, also known as “traditional knowledge”, including those related to adaptation to complex ecosystems and the sustainable use of biodiversity. Local economies and customary laws and institutions are also included.

Maladaption: A change that leads to increased (rather than decreased) vulnerability

Mitigation: Actions that can be taken to reduce the onset and severity of change. In relation to climate change, mitigation often refers to reducing emissions of greenhouse gases in order to not aggravate the current trend.

Resilience: The ability of a system or community to absorb disturbances and maintain its functions in the face of internal and external change

Risk Assessment: An adaptation procedure, in which the type, likelihood and degree of potential vulnerabilities, threats or risks are identified in order to inform actions to manage or reduce risk

Scenario: A (usually simplified) description of how the future may develop, based on current knowledge and sets of assumptions about interaction of different forces

Vulnerability: The degree to which systems are sensitive to, and unable to cope with, external shocks or gradual trends, their interaction with other social, environmental or economic stressors and their adverse impacts

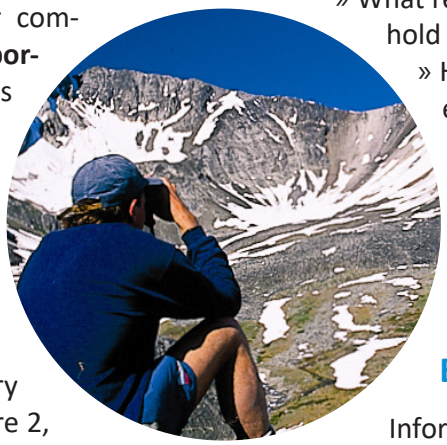
PHASE ONE: IDENTIFYING CLIMATE CHANGE CONSEQUENCES

Identifying potential climate change consequences allows planners to understand how a community may locally experience climate change, and what the priorities for adaptation are.

This process occurs in three steps:

1. Taking stock of existing information
2. Gathering new information
3. Combining community and scientific information

In identifying the consequences of climate change for communities, it is necessary to consider both vulnerabilities and opportunities associated with climate change. **Vulnerabilities** include hazards, risks, stressors and other challenges linked to or compounded by climate change. **Opportunities** are equally important, as changes in climate may open up new and different resources and potential. Including opportunities in adaptation planning recognizes the potential beneficial aspects of climate change. These should both be considered in a local context, as the impact and challenges will vary greatly between communities. Figure 2, below, lists some examples to think about throughout the identification of consequences.



Vulnerabilities

- Extreme weather events
- Landscape hazards (erosion, floods, wildfires etc)
- At-risk species (plants and animals)
- Infrastructure challenges (increased electrical demand, physical resilience of buildings, etc)
- Changes in the local food system

Opportunities

- Increased access to certain resources
- Different species available (plants and animals)
- Longer or warmer growing seasons

Figure 2. Potential Climate Change Vulnerabilities and Opportunities

INFORMATION GATHERING

A. Information needs

For this toolkit, we have divided the data into two main types: information from the local community and climate/scientific data. Together, this information will help planners understand the threats and values important to and for the community.

Before beginning to gather data, decisions should be made regarding the scope and scale of the plan. Some key questions to ask are:

» How big is the area being planned?
» What resources or tools are needed to gather, hold and work with information?
» How far back in time should data be gathered?
» How far into the future should the plan consider ?
» Who are the stakeholders?
» Who will be affected by changes within this area?

B. Gathering information

Information gathering can take many different forms, and the methods chosen should be those most appropriate, effective and convenient for the community. Information gathering should also be in line with social and cultural structures within in the community, such as family groups and community events. Collecting new information will be time consuming, and may take several weeks or even months. The approach used in Takla First Nation is detailed in the following pages of this toolkit as an example.

Putting together a team

A core team should be developed to conduct the process of gathering information and conducting the consequence analysis. Team members should be chosen based on their technical abilities (facilitation, information management, data entry, etc.), but also in terms of their relation to the community; it is useful for those involved in the process to be seen as neutral parties.

INFORMATION FROM COMMUNITY

A. Taking stock of existing information

Process:
This stage of information collection consists primarily of reviewing, summarizing and organizing existing information. This will include creating a database, digitizing paper copies of maps and documents, collecting, translating and identifying key pieces of information. Developing a timeline of significant events for the community is another important step, and will help to put the community's current situation into perspective. Pull important dates and events from reports, historical data, maps, and other information reviewed.

Resources:
- Team members to gather, review and organize information
- Access to or copies of maps, reports, studies and other historical documentation
- Electronic storage for information (a secure hard-drive and/or database)
- Computers and software for digitizing and organizing information (such as word processors, spreadsheet programs)
- Mapping tools (free and user-friendly versions include Google Earth Pro and QGis, both available online for download with user guides)

Data to gather:
- Information on demographics and statistics like population growth rates
- Historical information on environmental changes
- Records of extreme weather events
- Traditional or cultural use studies
- Information on outside factors that affect the community (such as regional policy or nearby development)
- Previous adaptation strategies and community planning initiatives

Outcomes:
- Community profile, detailing current and past social, cultural, environmental and economic aspects
- Maps showing existing land use information, including cultural uses, current planning initiatives, etc.
- Community timeline, including extreme weather occurrences and major community events or changes

Key aspects to remember:
- While information is gathered, mapping out areas identified in the information will be helpful
- It is also essential to keep the details of these features (such as who uses a particular hunting area, when a landslide happened, etc.)

Community Consultation with Takla Lake First Nation

Reviewing climate change vulnerabilities with members of the Takla Lake First Nation. Credit: Peter Wood

In the last 50 years, Takla Lake First Nation (TLFN), located in the northern interior of British Columbia, have experienced major environmental changes and stresses that have affected the health of their surrounding natural landscape. As a response, the community chose to undertake a vulnerability assessment, supported by CPAWS-BC. To gather information, the assessment team held discussions with the community's Keyah (a Sekani term used to indicate a territory or area that is associated with a particular family or clan within the Nation, used for subsistence as well as cultural and economic sustainability). Though meetings with Keyahs can pose a challenging task, as members are often widespread within the territory or may live in other communities, each Keyah has a spokesperson who assisted with scheduling, logistics, and identifying who should attend. Each Keyah meeting was comprised of family members who actively used the territory, and had significant knowledge of the land.

HANDLING SENSITIVE INFORMATION: Certain kinds of information that is gathered may be considered sensitive or restricted to certain people or uses (such as the locations and names of sacred sites and key natural resources). Before the process starts and during information collection, it is important to discuss how information will be managed, used and shared. Some key questions to consider are:

- Do the locations, names, or any other information and traditional knowledge about natural and cultural resources need to be kept confidential or only shared with certain people?
- Who should and should not know this information within the community? Outside of the community?
- If the community would like to include certain elements of sensitive information in their plan, how can they be presented in a way that keeps this information safe?
- What rules or tools should be used to ensure sensitive information is held or shared appropriately?

B. Gathering new information

An important part of adaptation planning is to find out which activities and traditions of community members might be vulnerable to climate change impacts, as well as what changes are already being witnessed.

A wide variety of community members should be involved, so that information gathered represents a full spectrum of perspectives. Pay particular attention to the involvement of Elders, youth, women, and other often-marginalised groups in the community, as well as people who spend time on the land, traditional knowledge holders, those involved in social and cultural work, and those 'outliers' who may have very different perspectives from the majority.

A list of participants to consider includes:

- Land users (hunters and fishers, gatherers)
- Women
- Youth
- Elders
- Representatives of community organizations
- Local government
- Cultural and religious groups
- Business owners
- Parents
- Those employed outside the community
- Family groups

Data checking

After data has been collected and compiled, the data collection team should perform some form of 'checking' or validation exercise to give participants the opportunity to review the information, how it has been put together and understood by the team, to give feedback and make adjustments, and to provide additional information. This can be done through providing paper or electronic copies of interview transcripts, maps and summaries to individuals, or by making the results of community surveys publicly available in open-houses, or through posters, community websites, or mail-outs.

Methods:

The methods used to gain community input should reflect the context and needs of the community. Several methods are detailed in the following pages.

Some methods to consider for collecting information about land use and the changes being witnessed include:

- Individual or group interviews (pg. 7)
- Mapping of valued places and spaces (pg. 8)
- Surveys (mailed out or done in-person at community hubs) (pg. 9)
- Community gatherings specifically to collect information (pg. 10)
- Workshops and focus groups
- Open feedback forums such as noteboards or audio recording booths at community events

Keep in mind that several different methods of gathering data can be used. It may also be more appropriate or effective to gather information from some groups in one way, and others another way. For example, Elders may prefer in-person interviews to large workshops, parents or business owners may prefer surveys or phone interviews, and youth may be more comfortable drawing or talking about their ideas in a more casual setting.

Outcomes:

- Information about community uses of the land, as well as perceived vulnerabilities and opportunities
- Maps showing areas that community members value, use or are concerned about, and where changes have been observed or experienced
- Information added to the community's timeline

Photos: Takla Lake First Nation community interviews
Credit: Elyse Curley (top-right) & Michelle Sinclair (top-left, bottom)

I. Interviews

Purpose: Interviews are useful for gathering specific information from individuals or small groups of community members. During the interview, an interviewer asks questions and facilitates discussion on what kinds of changes participants have witnessed, how they use the land, what they value, and what they think about the future.

Resources:

- Trained interviewer
- Interview guide (questions or things to ask about)
- Audio-visual equipment (cameras, tape recorders) for documenting process
- Maps to help guide or spark conversation about land use

Process:

1. Develop an interview guide. Questions should be general, to allow community participants to talk about what is important to them, but should also include specific questions to understand local consequences. For an example of questions and an interview guide, see Appendix A.
2. Plan several weeks to complete interviews, to accommodate a variety of participants and avoid rushing.
3. Contact potential interview participants and share information about what you will be talking about with each person or group, so they have time before the interview to think about things.
4. Set up for interviews in a place that is comfortable for interview subjects, offers some privacy, and where you will not be interrupted.
5. Prepare equipment for recording information from the interviews. The interviewer should take quick notes during the discussion, but it is also very helpful to have the interview audio- or video-recorded.
6. Bring a map with you to each interview, to mark down locations interview participants talk about.
7. After completing the interviews, have any recordings transcribed and digitize all notes and maps.
8. Enter the information into a spreadsheet or database, and begin organizing participants' answers into themes; first arrange information by the question it responds to, then by any major ideas that come up. Continue to do this as more interviews are conducted, building different 'categories' around themes in the answers.
9. From the interview data, pull out community information around broader aspects of climate change consequences, such as where hazards, risks, or potential opportunities are mentioned.
10. Where possible, link information from the interviews to timelines or maps.

II. Mapping

Purpose:
Mapping provides a different way of talking about and recording information. Maps can include both physical features and resources, alongside social and cultural features, showing how the community uses and understands their space. Maps are also an effective way to communicate information to other community members, stakeholders and planners.

Resources:
- Audio or video equipment for recording mapping sessions
- List of questions to ask about
- GIS technician or team member familiar with mapping software
- Markers, pens or other means of marking maps
- Maps (paper or digital)
- Clear plastic sheets (optional) for overlaying map images
- Equipment and software for digitizing maps

Process:
The process here follows closely the steps proposed by Terry Tobias in Chief Kerry's Moose (see Appendix D), a very useful guide to participatory mapping. Having a GIS technician on the team or as outside assistance will also be very helpful for mapping, as map features can then be more easily digitized, manipulated, and used across databases.

Much like for interviewing, develop a list of things to ask about, to help guide the mapping session. This should focus on places and areas that participants use or value for various reasons, where they have seen changes or observed environmental events, and what they would like to see protected.

Process (cont'd):
1. Gather map images to use as base maps. Simple maps, with easily identifiable geographic features but minimal visual clutter (place names, icons, inset pictures, etc.) are useful as they allow participants space to mark their own features without pre-suggesting what is important. Print several large copies.
2. Contact potential mapping participants, and let them know what you will be talking about. Mapping exercises are generally best conducted with only one or two participants at a time, to be able to collect descriptive information about the features they map.
3. Set up for mapping in a place that is comfortable for interview subjects, where there is room to lay out maps and move around them easily, that offers some privacy, and where you will not be interrupted.
4. Using clear plastic overlays (Mylar, for example) over maps might be necessary if only one or two paper copies are available; these are taped over the maps and participants mark on the plastic sheets directly.
5. Prepare equipment for recording information from the interviews. Audio-recording the mapping sessions will help collect descriptive information about the features participants mark on the maps.
6. Ask the participant questions (see page 9), and encourage participants to talk about their answers as well as marking them on the map. Continue until the participant feels it is complete, or is running out of new things to add or talk about. Review any information that needs clarification.
7. Have the maps digitized and enter the descriptive data into a corresponding database, being sure to link the qualitative information to the features shown on the map in some way (codes, names, etc.).

Photo: Takla Lake, Michelle Sinclair

Example questions to ask while mapping

- What areas in and around the community do you value? Why?
- How do you use these areas? When do you use these areas? Who uses them with you?
- Have you seen any changes in the community or on the land? Where? When did these happen?
- Have you witnessed or observed any environmental events? Where and when did these occur?
- Where do you think future changes might happen?
- Have you observed any changes in the weather or the seasons? What are these? When do they occur?
- Are there any places or areas that are of concern to you?
- Have you noticed any changes in where you see animals or what kinds of animals you see?
- When you think about climate change, are there any places in particular that come to mind?
- Are there any areas you no longer use? Why? When did you stop using them?
- Are there any places, areas or resources that are culturally (socially/spiritually) important to you?
- What do you think the critical infrastructure (buildings, services, etc.) for the community is?
- What areas, if any, do you think should be monitored in the future?
- What areas might need to be protected in the future?
- Are there any places, areas or resources that are important to your livelihood or economic well-being?

For each feature, be sure to cover :

Where? (Specific spot or more general area?)
When? (What time of year? Before or after a big event? When did you start/stop using it?)
How is it important? (How do you get there? How is it used? How often is it used?)
Why is it important? (Does it have cultural, social, environmental, economic value?)
What? (Do you do here? What has changed?)
Who? (Who is it really important to? Who uses it? Who do you go with? Who knows about it?)

III. Community Questionnaire

Purpose:

Questionnaires take less time and effort to carry out than other methods and are effective ways to gather a large amount of information from a wide range of community members. However, this information will not be as in-depth as with more time-intensive methods. As such, questionnaires should be used to get a broad sense of what the community thinks and values, to identify what is most important, or gauge support for particular actions. An example of the community survey used in Takla Lake First Nation is included in Appendix B.

Resources:

- Print or electronic surveys (several free programs exist for developing online surveys, such as Survey Monkey or Poll Daddy)
- Computer software for compiling survey results (such as a spreadsheet, or online programs)
- People to conduct surveys in-person or to tabulate and interpret results

Process:

1. Many of the survey questions may be the same as asked in other exercises. Survey questions can be either 'open-ended' (allowing participants to write in their own answers) or multiple-choice. Open-ended questions will get a wider variety of responses, which may be helpful but will need more time and effort to compile into useful results. However, restricting participants to only pre-determined choices may limit the depth of information gathered. A mix of open-ended and multiple choice questions is best. For example, including a choice of 'other', and allowing participants to add in an answer, or ending survey sections with the question "Is there anything else you would like to add?".
2. Develop questions in sections, covering information that needs to be gathered, such as 'changes in the environment', 'changes in the weather', 'important places on the land' and 'concerns for the future'.
3. Use wording that is clear and would be familiar and understandable to all members of the community.
4. Keep in mind the length of the survey: participants will not give questions near the end as much thought if they have been through a very long survey.

Community Questionnaire continued

5. Distribute surveys by mail, in person or online, explaining why the survey is being conducted and how results will be used. Conducting surveys at community events can be very effective.
6. Try to get a good sampling of the community by approaching different groups (by age, gender, socio-economic status, profession, etc.), and by gathering as many responses as possible.
7. Collect data in a database. Online programs can do this automatically, but spreadsheets also work.
8. Look for themes and categories in the information gathered. Add to the community timeline and maps.


David Nanuk

iv. Visioning

Purpose:
Developing a collective community vision will inform the climate change consequence analysis in terms of what is important to community, as well as the specific goals and actions in the related adaptation plan.

Resources:
- Facilitator
- Space to hold discussions that is comfortable and accessible for a variety of community members
- Chart paper, pens or markers, etc.
- Audio-visual equipment (cameras, tape recorders, etc. for documenting process)

Process:
1. Bring together a broad range of community members and facilitate an open discussion, encouraging participation from every attendee (especially those often left out or spoken-over). Be encouraging and non-judgemental.
2. Look to collect answers and build the discussion in a variety of ways, such as audio and video recording, drawings and other visual representation, chart paper or sticky notes, etc.
3. Review the responses and start to cluster or group different themes.
4. Discuss which themes or topics might be most important to the group as a whole
5. Discuss which format would be most appropriate or meaningful to represent the vision: this may differ between communities, and can be a sentence, a statement, or a logo, etc.
6. Once a vision has been agreed upon, record it and display it in an accessible way, so that participants can appreciate their contributions and know that it is remembered throughout the process.

Example questions to ask during community visioning:

- What is your most positive image of the community in 5, 10, 20, or 50 years?
- What would you be doing? What would your children be doing? What would their children be doing?
- What changes would you most like to see? What changes would you most like to have avoided?
- What role would you and others play in bringing about these changes?
- What would the community's surroundings look like?
- What would the community's built environment look like?
- What role will the existing local institutions have played?

CLIMATE MAPPING & GATHERING SCIENTIFIC DATA

Purpose:
Climate mapping is an effective way to bring together multiple sets of scientific data regarding climate change in a visual way that is more easily understood by community members and decision makers. It is a way of understanding ecological upheaval; the combined effect of changes in multiple natural systems.

Resources:
Climate mapping is a complex process to understand and carry out, and hiring a consultant may be the best approach. However, there are also resources available to help communities do this work themselves and the questions listed below will help guide the process either way. ClimateBC is used here as an example (see Appendix C), but there are several other tools available (listed in Appendix D).

Questions to ask of climate mapping:
- Where are the points of extreme change?
- Where do changes in the variables overlap?
- What are the consequences of climate change for different species within various bio-ecological classifications (BECs)? (e.g. the effect on cedar trees within the Interior Cedar-Hemlock zone)
- How will these changes affect growing days in the area?

Process: In this process, a map is created based on three climate attributes:

- **Mean annual temperature (MAT)** –the average temperature over a year
- **Mean annual precipitation (MAP)** – the average precipitation (rainfall, snow, etc.) over a year; and
- **Growing degree days (GDD)** – the number of days in which the temperature supported plant growth.

These three data sets are relatively easy to understand and interpret in terms of their potential impacts for communities. Depending on the geographic context of different communities, other attributes may be more appropriate. Additionally, climate mapping can include mapping of BECs, such as for tree species. This allows for a better understanding of how changes will play out in ecological systems in the area.

Outcomes:
- Map images and data pertaining to climactic changes in the area
- Information about effects on temperature, precipitation, and degree growing days
- Understanding of how various species and landscape features may be affected

A detailed explanation of the Climate BC online tool can be found in Appendix C.

Photo: David Nanuk

CONSEQUENCE ANALYSIS

A. Process

In this stage, all information gathered is compiled to create an understanding of what the consequences, both positive and negative, of climate change for the community may be.

This is done through overlaying maps representing community information and those developed through climate mapping, to identify areas of overlap. Descriptive information should also be integrated and used to identify areas of particular importance, concern, or upheaval. From this assessment, priorities for action can be determined based on the relative impact of each consequence. These three stages make up the consequence analysis.

B. Ecological Upheaval: Identifying Impacts and Areas of Consequence

To identify areas of consequence, first review the data gathered from community (previous and new information) and the themes that were identified, such as food security, emergency preparedness, hazards or risks, and opportunities. Remember that consequences may be both positive or negative.

Overlay the maps developed by community consultation with those developed through climate mapping and identify areas of overlap; where the predicted changes associated with climate change (such as drought) will impact areas important to the community (such as berry picking sites) or where changes have already been observed (such as die-off of berry shrubs). Some questions to think about to guide this process are as follows:

- Where are the extreme changes (for any one factor)?
- Where do changes overlap?
- How do these areas overlap with values and land uses identified by community?
- Where are the areas valued by community members?
- What areas do they use most or are of great concern to them?
- What areas are important for specific species?
- Where do these areas overlap?
- How do these areas overlap with areas of extreme change identified by climate mapping?

Consider what will happen in these areas of overlap. It is important to also keep in mind other external factors (such as community growth, other users of the area, outside pressures like development, existing plans) which may also interact with these consequences.

List these consequences, and themes or 'consequence areas', in Worksheet 1a. In identifying the consequences, describe scenarios (what it would actually look like on the ground if this were to happen). These will be used in the next stage, developing a table of vulnerabilities.

UNCERTAINTIES: "Knowing what we don't know", and acknowledging that there are some things that cannot be exactly predicted, is important to developing and implementing adaptation plans. Identifying uncertainties allows us to break down any assumptions that may underlie how consequences are understood, which then allows for the development of the best strategies to address the uncertainties. Uncertainties may be:

- **Social:** demographic and social trends, values, perceptions of climate change consequences
- **Scientific:** missing data or inability to know something through scientific investigation
- **Technological:** how different components, such as infrastructure will hold up under stress, what technology will become obsolete or what new technology will be developed in the future
- **Economic:** future economic conditions and trends
- **Political:** as policies are driven by politics, what sort of political will exists for adaptation actions
- **Climate change specific:** from incomplete understanding of climate systems, because weather is constantly changing, and because the extent and effectiveness of mitigation efforts are unknown

To address uncertainty, it should first be asked whether the uncertainty can be resolved (ie: by gathering missing data), and if it is necessary for the uncertainty to be addressed to carry out adaptation planning. Uncertainties should be considered when evaluating climate change consequences, as well as later on in developing specific strategies to address each consequence. Anticipating and incorporating uncertainty is key to the process of 'adaptive management', wherein assumptions are revisited in order to support strong decision making and action planning.

C. Evaluating Consequences

The consequences of climate change are also determined by characteristics of those changes: both the likelihood of the event and the level of impact associated with the consequence. When assessing these characteristics, the following should be considered (it may be helpful to write these out in a table):

Likelihood of the event

- How frequently could this event occur?
- Would this be a continuous event?
- How long might this event occur (what is its expected duration?)
- How do we know it is likely? Where are we getting this knowledge, and how certain can we be?

Level of impact

- What is the size of the consequence?
- How many people, areas, or systems would it affect?
- Could the impact be reversed?
- What are the impacts of this consequence on different groups in the community, culture, and the economy? (Think about existing inequalities, physical or psychological stress, different dependencies or supports needed)
- What would be the impacts of addressing the consequence?
- What would be the impacts of not addressing the consequence?

D. Prioritizing Consequences

Using the information from Worksheet 1a, (Climate Change Consequences by Area) begin filling out Worksheet 1b, (Consequences, Characteristics, and Priorities). Using actual data for the likelihood or level of impact may not be possible (and may be cumbersome), so using 'high', 'medium', and 'low' rankings is useful.

After the characteristics of consequences have been identified, review the information and begin ranking consequences by priority. Here community perspectives can also be taken into account, as to the value (social, cultural, economic, etc.) of certain areas, activities or services affected by a consequence. Once this ranking has been established, priority areas can be identified on maps, for communication to the community and to ensure integration into other land use planning processes.

Photo: Michelle Sinclair (left), Elyse Curley (right)

PHASE 2: DEVELOPING ADAPTATION STRATEGIES

IDENTIFYING SOLUTIONS

Using the prioritized areas of climate change consequences identified in Table 1b (Consequences, Characteristics, and Priorities), solutions can begin to be developed. This is done by first exploring the community's adaptive capacity to identify what resources and opportunities there are to draw on, then identifying what the desired outcomes (objectives) of the plan are. Examples of these are included on the right side of the page. In this stage, the vision identified by the community can also be helpful in determining what the adaptation plan will 'look like'. Finally, specific strategies are identified for each consequence area.

A. Understanding Adaptive Capacity

A community's adaptive capacity is its ability to adjust and respond to the changes it is being faced with. This includes: to minimize potential negative effects (vulnerabilities), to best take advantage of potential positive effects (opportunities), and to cope with the consequences. Evaluating what adaptive capacity a community has is a first step in developing realistic strategies for adapting to climate change.

Begin listing factors of community adaptive capacity, using the table in Worksheet 2a. Keep in mind that more resources may come up as the adaptation plan develops, and these should be recorded and included in strategy considerations.

Once a full evaluation of the community's adaptive capacity has been completed, begin to look at these factors in relation to specific climate change consequences, as identified in Worksheet 1a (Climate Change Consequence by Area). List these in Worksheet 2b (Consequences and Adaptive Capacity).

Identify an overall level (high, medium, low) of adaptive capacity for each consequence, considering also:

- How quickly would we be able to mobilize these resources?
- How long would it take to fully address the consequence?
- What would it cost to address it?
- Would the community need outside support or resources to address the consequence? What type?
- What uncertainties do we have? What information is missing?

RESOURCES: The people, tools and other aspects that can be drawn on in adaptation strategies

- Physical (equipment, infrastructure)
- Human (personnel, skills and education)
- Technology and communications infrastructure
- Funding and finances
- Partnerships and networks

STRESSORS: Existing issues and problems relevant to environmental change or the use of resources

- Overstressed systems (ie: existing water supply shortages, power deficits)
- Maintenance and upkeep of equipment and infrastructure
- Biological, environmental stressors (invasive species, disease, etc.)
- Population growth and other anticipated changes in the community
- Social, cultural and economic crises
- Debts and financial obligations

BARRIERS: Factors that might affect the community's ability to use its full resources.

- Legal and regulatory frameworks
- Existing policies
- Geographic barriers
- Other stakeholders' interests
- Uncertainties and missing information

CURRENT PROCESSES OR EFFORTS: Other initiatives already underway in or involving the community that could be integrated or might present challenges to adaptive strategies

- Processes to reduce stressors (refurbishing infrastructure, etc.)
- Regional or higher-level processes
- Existing policies at local, regional, national levels
- Environmental campaigns
- Other planning, research or community engagement processes

B. Developing Objectives

Objectives identify what the desired outcome for addressing a consequence would be (ie: "flooding is prevented"), and will help determine which actions need to be taken. Objectives should be realistic in the face of climate change and the ability of the community to adapt to changes, and specific to the issue.

Review the consequence tables and begin to develop goals for each area. Use Worksheet 2c to identify objectives, by first copying over consequence information from Worksheet 1a (Climate Change Consequences by Area). Then, think of an ideal, realistic outcome for each consequence, or for broader consequence areas.

C. Identifying Adaptation Strategies

Four categories of adaptation strategies:

1. Accepting the impacts and bearing losses: usually a decision not to act, because other processes are dealing with the consequence, or because the cost of acting to address the consequence is too high;
2. Loss prevention: actions taken prior to experiencing consequences which seek to reduce vulnerabilities;
3. Behaviour modification: actions taken prior to experiencing consequences in which behaviors and practices are changed or eliminated in order to reduce exposure;
4. Exploiting positive opportunities: taking advantage of positive aspects of climate change consequences.

Keeping the categories of adaptation strategies in mind, develop specific strategies to address the consequences, using Worksheet 2d. This process takes four steps:

STEP 1: Brainstorming adaptation strategies

Considering the objectives in the context of the adaptive capacity, begin to brainstorm potential strategies to address each consequence and achieve its objective. A wide range of potential strategies should be considered, even though not all will be possible.

These will be narrowed down in later stages. Consider the specifics of the vulnerability, as well as community adaptive capacity and uncertainties.

STEP 2: Explore adaptation strategies

This step adds detail to the strategies by identifying:

- Which actions are within the abilities of the community
- Which actions would 'lock in' outcomes (ie: the result of the action would reduce the community's future flexibility in addressing other changes, such as going massively into debt)
- What assumptions and uncertainties underpin different actions
- How the action will interact with other actions, stressors and forces
- What event or indicator would 'trigger' the action
- What are the maximum and minimum possible benefits of the action, and whether these are outweighed by the costs
- What barriers exist to implementing the action

STEP 3: Evaluate adaptation strategies

Following exploration of the strategies, sort potential strategies into four possible outcomes:

1. The strategy is implemented, as it is a 'no-regrets', 'low regrets', win-win or flexible option
2. The strategy requires further assessment, as some information is missing, or uncertainties are too large
3. The strategy is redesigned, if through the exploration of the strategy issues arise that need to be addressed
4. The strategy is deferred, as it is an effective and justifiable response to a consequence, but not appropriate to implement immediately

Prioritize adaptation strategies:

Once all of the strategies have been explored and evaluated, those which will not be deferred are ranked. These rankings should closely follow the priorities identified for each consequence in Worksheet 1b (Consequences, Resilience and Priority), and be categorized by immediate, short- and long-term implementation.

Photo: Johnny Mikes

IMPLEMENTATION

A. Matching plan with policy

For effective, efficient implementation of adaptation strategies, each proposed strategy should be screened for interactions with existing policies, initiatives, and other aspects of the institutional context. Integrating climate change adaptation measures into other planning efforts such as land use, sustainability, infrastructure development and emergency preparedness ensures the most effective implementation possible by 'mainstreaming' and embedding these efforts.

This means looking at other planning activities, natural resource management, daily activities and function of the community, and any forthcoming processes. Many of these will already have been identified in the process of evaluating community adaptive capacity, but here they should be examined in more detail and specifically related to a strategy. Worksheet 3a (Strategies, Interactions, and Resources) can be used to make note of these interactions.

Throughout this process, natural partnerships, resources and sources of funding may arise. These should also be noted. Keep in mind that over time, these interactions and resources may change, and revisiting the adaptive strategies will be necessary.

Review the potential interactions, and identify who will have primary responsibility for carrying out each strategy, as well as a timeframe for the strategy to be implemented. Make notes as to any interactions with existing policy that can be taken advantage of to integrate the implementation of strategies more efficiently. Record this information in Worksheet 3b (Strategy Implementation).

These implementation plans should be written up as the final climate change adaptation plan, and form the basis for specific recommendations for policy and decision-makers, making clear the timeframes as well as explicit links to other community planning and governance initiatives.

B. Monitoring progress and change

Following up on adaptation strategies, monitoring the actual consequences created by climate change, and the interactions that develop, is crucial to the success of any adaptation plan. Monitoring of the real effects of climate changes, the consequences for communities, and the impact of adaptation strategies should occur at different stages throughout the process. This ensures room for revisiting assumptions, objectives and strategies, as well as changing perceptions, values and priorities of community members.

'Checking back' with community members' observations and experiences throughout the process, as well as updating available scientific information, is important to ensuring the best possible outcome for communities facing climate changes and its associated consequences. This can also be an important community opportunity for training and capacity building for gathering information, managing data and monitoring systems. See Appendix D for a guide to community-based monitoring programs.

C. Evaluation and adaptive management: incorporating experience into planning

The climate change adaptation plan, like climate change itself, should be a dynamic, 'living' document. This is done through continued monitoring, evaluation, revisiting of core elements of the plan, and incorporating new information and learning throughout the process.

The use of outside parties for monitoring and evaluating the plan and its implementation can be very helpful in that it gives 'fresh eyes' to the process. Another perspective may offer objectivity, be able to challenge assumptions in useful ways, and ask critical questions that may have been missed. A third- party evaluation is also important for identifying responsibilities and identifying areas where the plan or its implementation has fallen short of the objectives.

APPENDICES

Appendix A: Example Interview Guide

BEGINNING

- Welcoming, introductions to researchers, refreshments, etc.
- Signing and collection of documents such as consent forms, personal information
- Overview of study, timelines and outcomes
- Any initial questions from participants

Things to remember while interviewing:

- Not all questions will necessarily be asked and depending on how participants answer, some of these questions may be redundant
- Cross off questions/ topics as addressed to ensure you have covered them
- Make list of important things to talk about again
- Include breaks, time for coffee, food and smoking

OPENING QUESTIONS

Could you tell me about yourself? Such as your name, and what you do.

What things do you like about living in (community name)?

Follow-up questions:
- What aspects of (community name) do you appreciate?
- Why are these aspects important to you?
- Why do you feel that they are unique?

QUESTIONS ABOUT VALUED PLACES AND AREAS ON THE LAND

Are there special places or area in an around the community?

Follow-up questions:
- Based on our previous discussion, what special places in or around the community are particularly important to you or others in your community?
- What is the specific location?
- What is name of the place (in any other languages) and its meaning?

How is this place or area used? Who uses it? And for what? When is it typically used? Is it used often? How often?

Follow-up questions:
- What time of year do you use the area?
- Has it always been used this way?
- In the community, who uses this place?

Do you think the way this place is used will change in the future?

Follow-up questions:
- Why would it change?
- Would it have other uses?
- Is it being used more or less these days? Differently?
- How long have you (or others) used this space?

Why is this space/place important to you? Or to others in the community?

Follow-up questions:
- In what way does this area or place contribute to your sense of well-being and health? Your social or economic well-being?
- What are the specific benefits or important aspects of this space/place (physically, culturally, emotionally, spiritually) to you?
- How did you learn about this space/place?
- Who is this space important to in the community? Is it important to everyone? Only Elders, only some family members?
- What has happened here in the past?

QUESTIONS ABOUT CHANGE

Have you noticed any environmental changes on your land?

Some examples of changes people may have seen include fewer animals, different animals, presence of pine beetle, change in water levels, more hunters. Be sure to note specifics in the answers you collect – specific locations, wildlife, vegetation, rivers/creeks, lakes, and forests. Have a large map with you to mark down locations of the changes being observed.)

Follow-up questions:
- How recently have you noticed these changes?
- Do you think they're here to stay?
- Have these changes impacted how you and your family use this area? If so, please describe how you have adapted to these changes.

Have you noticed changes in the weather?

Some examples people may have noticed include changes in temperatures, extreme weather (more storms, wind), rainfall, and length of seasons.

Follow-up questions:
- How recent are the changes?
- Do you think they're here to stay?
- How have these changes impacted how you and your family use this area?

Have you noticed any changes in 'extreme weather' in the territory?

Some examples may include fire, flooding, extreme wind, intense storms, drought, etc.

Do you or your family members hunt, fish, trap or gather?

Follow-up questions:
- What time of year do you usually hunt? Fish? Trap? Gather?
- What do you harvest and where do you harvest it?
- Have you noticed any changes in the kinds of animals around or when they are around?

Over the past few years, have there been any long-term changes affecting when you harvest foods?

Follow-up questions:
- Has the time of year or season you hunt changed?
- Have there been long-term changes in the length of the seasons, like berry seasons?

Have there been any other long-term changes to where you harvest? Are there any areas that you used to harvest food but you don't anymore? If so, why?

Some examples might include a wetland drying up, or creek temperatures getting too warm to fish in.

Follow-up questions:
- Are there any times of the year when it is difficult or you are unable to access your hunting, fishing, or gathering grounds? If so, when? Why?

Have you changed how, when or where you harvest foods to respond to these changes? How?

Some examples might include harvesting at a different time, in a different place, or not harvesting at all anymore.

Are there times throughout the year that access to or out of the community is a problem? Are there times of year that access in the community is a problem, if any? Why?

Follow-up questions:
- Has this been changing over the years?
- Is it a one-time occurrence?

Have you noticed any changes to the built environment or infrastructure (buildings, services like waterlines, etc.) of your community?

Some examples might be pipes freezing more frequently in the winter, asphalt cracking or sinkholes developing.

FUTURE-FOCUSSED QUESTIONS

How do you envision your community in the future? What would you like to see?

Follow-up questions:
- What would you like the community to look like in the future?
- Is how the community is now how you would like it to be in the future? How so/how not?
- Ideally, what elements would you like to see protected?
- Are there elements that you would like to see developed?
- Are there changes that need to be made to ensure that this future vision is possible?

If things continue like they are, what do you see the future of the community looking like now?

Follow-up questions:
- When you think of the community 10 years down the line, what comes to mind?
- What are some future issues, anticipated changes and challenges?
- How has the community changed?
- How will the community change?
- What do you think is causing these changes?
- Are there different opinions about this in the community?

ENDING

What other things do you feel are important to well-being in the community, now and in the future?

Follow-up questions:
- Is there anything we've talked about today, or that hasn't yet been mentioned, that is very important to the community? A priority?
- Are these being talked about in community planning?
- If not, how should these be included or reflected in planning?

Are there any places or spaces you can think of that we haven't yet talked about that we should?

Follow-up questions:
- Are there spots or areas that are important to you that aren't on the map?
- Are there any other uses for the spaces we have mapped so far?
- Are there any changes or clarifications people would like to make?

If we are trying to understand the important or valued places in and around the community, do you think we missed anything?

Follow-up questions:
- (Give a short summary) How well does that capture our discussion?
- Would anyone like to add anything?
- Is there anything else, related to this study that we should have talked about? Anything we missed?
- Do you have any final comments that you would like to add about what we've talked about?

Appendix B: Takla Lake Community Survey

Climate Change Vulnerability Questionnaire

Name:_____ Date: _____

Email and/ or phone number: _____

CHANGES ON THE LAND

A. Have you noticed any environmental changes on your land (such as wildlife, vegetation, rivers/creeks/lakes, forests]?

B. How recently have you noticed the changes?

C. Do you think they're here to stay?

D. Have these changes impacted how you and your family use this area? If so, please describe how you have adapted to these changes.

CHANGES IN THE WEATHER

A. Have you noticed changes in the weather (such as temperature, extreme weather like more storms, wind, rainfall, length of seasons)?

B. How recent are the changes?

C. Do you think they're here to stay?

D. How have these changes impacted how you and your family use this area? How are you adapting?

E. Have you noticed any changes in 'extreme weather' in the territory (such as fire, flooding, extreme wind, etc.)? How are you adapting?)

GATHERING FOOD

A. Do you: Hunt? Yes/ No Fish? Yes/ No Trap? Yes/ No Gather? Yes/ No

B. What time of the year do you usually Hunt? Fish? Trap? Gather?

C. What do you harvest and where?

D. Over the past few years have there been any long-term changes affecting when you harvest traditional foods? (For example, has the time of year or season you hunt changed? Have there been long term changes in the length of the seasons, like berry seasons?)

E. Have there been any other long-term changes to where you harvest traditional foods? Are there any areas that you used to harvest food but you don't anymore? If so, why?

F. Have you changed how/when/where you harvest foods to respond to these changes?

HOW YOU USE THE LAND

G. Are there any times of the year when it is difficult or you are unable to access areas you use on the land? If so, when? Why?

H. Are there times throughout the year that access to or out of the community a problem? Why? How are you adapting?

I. Are there times of the year that access in the community is a problem, if any? Why? Has this been changing over the years? Is it a one-time occurrence? How are you adapting?

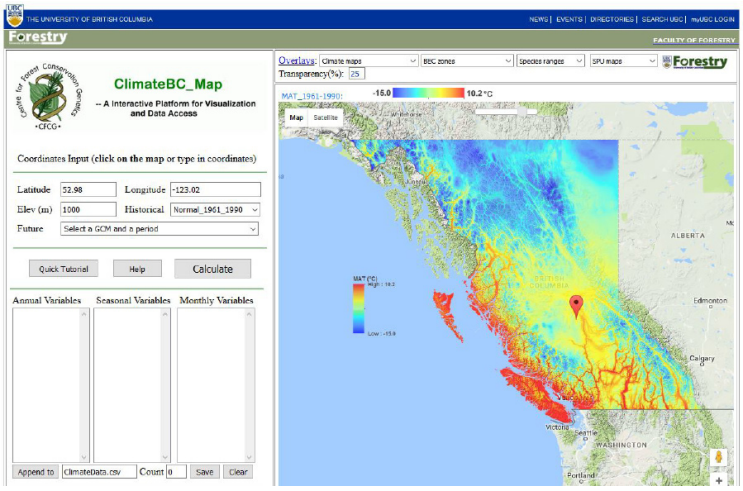
J. Are there other things you would like to add about changes you have noticed, adaptations you have had to make, or the way you use the land? Please add them here.

K. Are there any questions you have about these changes, or about this study? Please add them here.

Appendix C: Climate BC

ClimateBC is a free tool, and can be used online or downloaded to a computer. The ClimateBC tool can be used to model a number of different time periods in the future, and includes data on 23 annual climate variables, 56 seasonal climate variables, and 168 monthly climate variables.

Screenshot of ClimateBC online tool:



To create a climate map with ClimateBC:

1) Access the online tool at http://www.climatewna.com/climateBC_Map.aspx or download it from http://climate-models.forestry.ubc.ca/climatebc/downloads/download.html

2) Begin by entering the coordinates of the plan area (a centre point), or by clicking on the map.
**Note: the transparency of the climate overlay can be adjusted by using the slider at the top of the map.*

3) Choose a historical period from the drop- down menu ('Historical'). This can be any year between 1901 and 2014, in order to compare past and current climate visualizations with future projections.

OR

Choose a future period ('Future'); these projections are listed by General Circulation Model ('GCM') and period. GCMs are mathematic models of the physical processes in the atmosphere, ocean, and land surface. These models are used to simulate the effects of climate change in different geographic areas.

ClimateBC offers 3 sets of GCMs:

- CanESM2: the "Earth System Model", from the Canadian Centre for Climate Modelling and Analysis
- CNRM-CM5: developed by Meteo France
- HadGEM2: the "Hadley Centre Global Environment Model 2", developed by the Government of the UK

Within each set, there are different time periods (ex: "_2085"). Each GCM is also available for different Representative Concentration Pathways or 'RCPs'. RCPs are based on the projected atmospheric concentration of 4 greenhouse gases, with rcp2.6 being the least concentrated (and thus having the least impact).

Creating climate maps using different RCP values will give a range of possible outcomes, and can help planners visualize 'best case' and 'worst case' scenarios.

4) Click 'Calculate' to generate the data and visualization. The data will be shown in 3 columns: annual variables, seasonal variables, and monthly variables. The annual variables are most important for overall climate change adaptation planning, and it is here that MAP, MAT and GDD values can be found.

**Note: GDD values are shown in 4 variables: DD<0 (degree-days below 0' C), DD>5 (degree-days above 5'C, or 'growing' days), DD<18 (degree-days below 18'C), and DD>18 (degree-days above 18'C). These values are also shown seasonally, by winter (_wt), spring (_sp), summer (_sm) and autumn (_at).*

A complete list of what each data variable means can be found at: http://www.climatewna.com/help/ClimateBC/Help.htm#_Toc410137602

5) The data variables can be saved in a .csv file (which can be opened to a spreadsheet in Excel) using the "Append to" windows below the three columns.

6) Select overlays (above the map) to show climate attributes (MAT, MAP, DD>5) for either historical (1961- 990) periods, the changes in MAT and MAP between 2001-2009, or as projected for 2020, 2050 and 2080 using a selected GCM (CGCM3a2r4).

7) The map overlays can be saved in a .tif file (which can be opened by GIS programs) using the "Download Overlay raster files" button below the map.

Appendix D: Other Examples, References and Resources

Mapping:

Tobias, T. N. 2000. Chief Kerry's Moose: a guidebook to land use and occupancy mapping, research design and data collection. The Union of BC Indian Chiefs and Ecotrust. Vancouver, BC, Canada.
Available from: http://www.reviewboard.ca/upload/ref_library/Tobias_whole_1226505817.pdf

University of British Columbia, Department of Forestry and Centre for Forest Conservation Genetics. ClimateBC: An Interactive Platform for Visualization and Data Access.
Available at: http://www.climatewna.com/climateBC_Map.aspx

Community- Based Monitoring:

Parlee, B. and Lutsel K'e Dene First Nation. 1998. A Guide to Community- Based Monitoring for Northern Communities. Canadian Arctic Resources Committee, Northern Minerals Program Working Paper No. 5.
Available from: http://www.carc.org/pdfs/NMPWorkingPaper5Parlee.pdf

Understanding Community Adaptive Capacity and Resiliency:

Matthews, R., & Sydneysmith, R. (2010) Adaptive capacity as a dynamic institutional process: Conceptual perspectives and their application. In D. Armitage & R. Plummer (Eds.), Adaptive capacity and environmental governance (pp. 223–242). Heidelberg: Springer.

The Climate Impacts Group. 2007. Preparing for Climate Change: A Guidebook for Local, Regional and State Governments. Washington: University of Washington.
Available from: http://cses.washington.edu/db/pdf/snoveretalgb574.pdf

Berkes, F., and Jolly, D. 2002. Adapting to climate change: socio-ecological resilience in a Canadian western Arctic community. Conservation Ecology, v. 5, no. 2, p. 18 –33.

Furgal, C.M. and Seguin, J. 2006. Climate change, health and community adaptive capacity: lessons from the Canadian North. Environmental Health Perspectives, v. 114, no. 12, p. 1964–1970.

Example Climate Change Plans and Vulnerability Studies:

Hennessey, R., Jones, S., Swales, S. and Duerden, F. (2011) Dawson Climate Change Adaptation Plan, Revised Edition. Northern Climate ExChange, Yukon Research Centre, Yukon College. Whitehorse, YT.

Hennessey, R. and Streicker, J. (2010) Future Histories of Whitehorse: Scenarios of Change. Northern Climate ExChange, Yukon Research Centre, Yukon College. Whitehorse, YT. 39 p.

Hennessey, R., Stuart, S. and Duerden, F. (2012) Mayo Region Climate Change Adaptation Plan. Northern Climate ExChange, Yukon Research Centre, Yukon College. Whitehorse, YT. 103 p.

Hennessey, R. and Streicker, J. (2011) Whitehorse Climate Change Adaptation Plan. Northern Climate ExChange, Yukon Research Centre, Yukon College. Whitehorse, YT. 84 p.

WORKSHEETS

Worksheet 1a: Climate Change Consequences by Area

Area of Consequence	Negative Consequence (Vulnerability)
1 *Ex: Hazards*	A *Ex: Vulnerability to forest fire increases due to drought, dry trees, lightning, wind.*
	B
	C
	D
2 *Ex: Infrastructure*	A *Ex: Increased incidence of damage to power lines from wind-thrown trees, etc.*
	B
	C
	D
3	A
	B
	C
	D
4	A
	B
	C
	D
5	A
	B
	C

Worksheet 1a: Climate Change Consequences by Area

Area of Consequence	Positive Consequence (Opportunity)
1 *Ex: Food security*	A *Ex: Longer growing season, likely an opportunity for local agriculture.*
	B *Ex: Different species available because of shifting ranges (caribou moving south)*
	C
	D
2	A
	B
	C
	D
3	A
	B
	C
	D
4	A
	B
	C
	D
5	A
	B
	C

Worksheet 1b: Consequences, Resilience and Priority

Consequence Area	Consequence (vulnerability or opportunity)	Characteristics		Priority (high, medium, low)
		Level of Impact (high, medium, low)	**Likelihood** (high, medium, low)	
1	A			
	B			
	C			
	D			
2	A			
	B			
	C			
	D			
3	A			
	B			
	C			
	D			
4	A			
	B			
	C			
	D			
5	A			
	B			
	C			
	D			

Worksheet 2a: Dimensions of Community Adaptive Capacity

Resources	Interactions	Barriers and current stressors	Current processes and efforts

Worksheet 2b: Consequences and Adaptive Capacity

Consequence Area	**Consequence** (vulnerability or opportunity)	**Adaptive Capacity**				**Level of Adaptive Capacity** (high, medium, low)
		Resources	**Interactions**	**Barriers and Current Stressors**	**Current processes and efforts**	
1	A					
	B					
	C					
	D					
2	A					
	B					
	C					
	D					
3	A					
	B					
	C					
	D					
4	A					
	B					
	C					
	D					
5	A					
	B					
	C					
	D					

Worksheet 2c: Objectives for Consequences

Consequence Area	**Consequence** (vulnerability or opportunity)	**Objective**
1	A	
	B	
	C	
	D	
2	A	
	B	
	C	
	D	
3	A	
	B	
	C	
	D	
4	A	
	B	
	C	
	D	
5	A	
	B	
	C	
	D	

Worksheet 2d: Potential Adaptation Strategies to address consequences

Consequence Area 1: _____

Consequence (vulnerability or opportunity)		**Objective**	**Adaptation Strategy**	**Priority** (immediate. short- term, long- term)
A				
B				
C				
D				

Consequence Area 2: _____

Consequence (vulnerability or opportunity)		**Objective**	**Adaptation Strategy**	**Priority** (high, medium, low)
A				
B				
C				
D				

Worksheet 2d: Potential Adaptation Strategies to address consequences continued

Consequence Area 1: _____

	Consequence (vulnerability or opportunity)	**Objective**	**Adaptation Strategy**	**Priority** (immediate. short- term, long- term)
A				
B				
C				
D				

Consequence Area 4: _____

	Consequence (vulnerability or opportunity)	**Objective**	**Adaptation Strategy**	**Priority** (high, medium, low)
A				
B				
C				
D				

Consequence Area 5: _____

	Consequence (vulnerability or opportunity)	**Objective**	**Adaptation Strategy**	**Priority** (high, medium, low)
A				
B				
C				
D				

Worksheet 3a: Strategies, Interactions, and Resources

Consequence	**Adaptation Strategy**	**Interactions** (existing policy, etc.)	**Resources** (partnerships, funding, etc.)
1A			
1B			
1C			
1D			
Consequence	**Adaptation Strategy**	**Interactions** (existing policy, etc.)	**Resources** (partnerships, funding, etc.)
2A			
2B			
2C			
2D			
Consequence	**Adaptation Strategy**	**Interactions** (existing policy, etc.)	**Resources** (partnerships, funding, etc.)
3A			
3B			
3C			
3D			

Worksheet 3a: Strategies, Interactions, and Resources continued

Consequence	**Adaptation Strategy**	**Interactions** (existing policy, etc.)	**Resources** (partnerships, funding, etc.)
4A			
4B			
4C			
4D			
Consequence	**Adaptation Strategy**	**Interactions** (existing policy, etc.)	**Resources** (partnerships, funding, etc.)
5A			
5B			
5C			
5D			

Worksheet 3b: Strategy Implementation

Consequence Area 1: _____

Consequence	Priority (high, medium, low)	Implementation			
		Adaptation Strategy	**Lead Partner**	**Timeframe**	**Interaction notes**
A					
B					
C					
D					

Consequence Area 2: _____

Consequence	Priority (high, medium, low)	Implementation			
		Adaptation Strategy	**Lead Partner**	**Timeframe**	**Interaction notes**
A					
B					
C					
D					

Consequence Area 3: _____

Consequence	Priority (high, medium, low)	Implementation			
		Adaptation Strategy	**Lead Partner**	**Timeframe**	**Interaction notes**
A					
B					
C					
D					

Worksheet 3b: Strategy Implementation continued

Consequence Area 4: _____

Consequence	**Priority** (high, medium, low)	**Implementation**			
		Adaptation Strategy	**Lead Partner**	**Timeframe**	**Interaction notes**
A					
B					
C					
D					

Consequence Area 5: _____

Consequence	**Priority** (high, medium, low)	**Implementation**			
		Adaptation Strategy	**Lead Partner**	**Timeframe**	**Interaction notes**
A					
B					
C					
D					