

# CLIMATE CHANGE AND FIRST NATIONS SOUTH of 60: IMPACTS, ADAPTATION, AND PRIORITIES

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## FULL REPORT



Submitted To:  
Indian and Northern Affairs Canada

Submitted By:



May 2008

CIER, the Centre for Indigenous Environmental Resources, is a national First Nation directed environmental non-profit organisation. We offer research, advisory, and education and training services to Indigenous communities, governments and private companies through our four program areas: Taking Action On Climate Change, Building Sustainable Communities, Protecting Lands and Waters, and Conserving Biodiversity.

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This document has been designed for double-sided printing and was originally printed on 100% post-consumer content process chlorine free (PCF) paper.



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## 1.0 INTRODUCTION

Climate change will affect First Nations across Canada in many different ways dependant on both location and level of resiliency. First Nations north of 60 degrees latitude have observed many changes such as melting permafrost, shortening and warming of the winter season, decline in the amount of sea ice, and changes to plants and wildlife including increased number and new species of insects and shifting vegetation zones. Although First Nations in the lower latitudes have observed some of these impacts as well, there is varying severity and level of perceived priority based on regional situations and capacities to adapt.

First Nations, along with other Aboriginal and northern communities, will likely be one of the most heavily impacted populations within Canada by climate change. This is due to several factors including First Nation's intimate, long-standing relationship with the land, the remote nature of reserve lands and community sites, limited and relatively non-diverse economies, poor energy security and transportation options, and the practise of subsistence activities in many communities. These characteristics of First Nations make them more vulnerable or sensitive to the impacts of climate change. Changes in the environment result in broad and far-reaching affects on all aspects of First Nations including social, cultural, and economic components.

First Nations south of 60 degrees latitude need to recognize and act on this need to prepare and implement adaptation projects in order to reduce this vulnerability, as do communities located further north. Climate change impacts now and over the long-term, present new challenges and some opportunities. In order to assess these and the resulting affects on the community, to identify options for dealing with these, and to take action using a continuous and proactive approach, First Nations require adequate and relevant internal capacity. This capacity could be required in many areas such as environmental governance, management, community planning, climate change, the sciences, and monitoring and evaluation. Throughout, there should also be an acknowledgment and balanced use and reliance on Traditional Knowledge. Communities also require appropriate, relevant, and current information, tools, resources, and case studies to incorporate proactive, long-term adaptation decisions and action. Funding opportunities to initiate work specifically on climate change adaptation, including those related to building internal capacity, is required to assist First Nations in their adaptation initiatives.

## 1.1 REPORT PURPOSE

In the fall of 2007, CIER received funding from the Climate Change program area of Indian and Northern Affairs Canada (INAC) to conduct research on First Nation climate change priorities, and climate change adaptation examples, tools and case studies that could assist First Nations to begin work on adaptation. In addition to our own research, this project involved an Advisory Committee with First Nation, Métis, and Inuit members.

This report shares the information that CIER learned through this project on climate change priorities and key adaptation areas. This is a relatively new area of work in Canada and adaptation tools are only just becoming available. CIER attempted to reach out to First Nations directly to learn what communities are doing to adapt to climate change (through a network of people doing climate change work and an online survey) but of course, we may have missed some very exciting work that is happening in First Nations.

As you are reading this report, if you recall any projects or strategies that your or another community has or is completing, please contact CIER. We are interested in hearing and sharing your stories so that other communities may learn from your experiences!



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## **2.0 CLIMATE CHANGE**

### **2.1 BACKGROUND**

The word “weather” describes the conditions of the day, for example hot, cold sunny, raining. Meanwhile, the word “climate” refers to long-term weather patterns (averaged over 30 years) that are typical of a region including rain or snowfalls, temperatures, humidity, dryness, storms, and winds. When changes occur in the climate that a region normally experiences it is called “climate change”.

Regions may get cooler or warmer over the course of a year or several years, but when these changes are averaged over a longer timeframe, the temperature of the earth's atmosphere is increasing. Furthermore, changes in the climate could also include changes to long-term average precipitation; for example, a region could get wetter or dryer. Climate variability – the change in weather patterns from year to year – occurs in each region. For example, one area may be wetter in some years but drier in other years (while the average amount will be somewhere between these ranges). A certain amount of regional climate variability is normal.

It is normal for the climate to change over 1,000's of years, but the concern is that over the last few decades the climate has been changing too quickly. This change includes an increase in climate variability. Warmer global temperatures will change many things including the way the ocean currents move, how much ice melts at the poles, and which species will survive in certain regions. Some people may ask; why is the average temperature of the Earth getting warmer?

The Earth's climate system is complex, but it is essentially an engine of air, land, water, ice, and biological life powered by the sun. Since the industrial revolution, humans have made notable changes to part of this engine, the planet's atmosphere. Primarily this has occurred from the increased release of greenhouse gases such as carbon dioxide and methane through human activities. Greenhouse gases are released through a number of ways such as; the burning of fossil fuels like coal and gasoline, through burning and clearing of forests, and decomposing vegetation in hydroelectric dam reservoirs for example.

The science behind global climate change is known as the greenhouse effect. As sunlight bathes the planet, the earth absorbs a portion, which then heats the planet. Meanwhile, some of the sunlight hits reflective surfaces such as the oceans, clouds, and ice caps. As a result, the

reflected sunlight travels back towards the atmosphere and can then escape to the greater universe. However, on the path back towards the universe, atmospheric gases can block some of the reflected sunlight, which then returns to the earth's surface and contributes to the warming of the planet. These gases are essential in keeping our planet at a warm enough temperature for life to exist.

If we imagine the gases in the atmosphere as a blanket, then if that blanket gets too thick the temperature will increase to uncomfortable levels. This is what is happening. The 'blanket' that is our atmosphere has doubled in thickness since the 19th century. Therefore, the average temperature of the oceans and the land has increased. Climate change refers to the regional changes in weather patterns that occur because of this.

Climate change should not be confused with the term global warming. The term global warming is not entirely correct because some regions may in fact see cooler temperatures. Many prefer the term climate change because it includes all changes, such as different precipitation amounts, cloud cover, and wind patterns, in addition to temperature.

## **2.2 INDICATORS OF GLOBAL CLIMATE CHANGE**

### **2.2.1 Rising Global Temperatures**

One of the main indicators that the world's climate is changing is the increase in global average temperatures. These changes may differ from region to region, but evidence points to an increase in global average surface temperature of 0.6°C, over sea and land, over the last 100 years (IPCC, 2001). By the year 2100, global temperatures are expected to increase by 1.4 to 5.8°C over 1990 levels. The affect of a global temperature increase will have regional impacts as this increase will not affect all regions in the same way or be equally distributed. For example, scientists predict that warming in the northern regions of North America will increase by more than 40% of the global mean average (Giorgi et al., 2001).

In Canada, we have already observed increases in the number of days with extremely high temperatures (Warren et al., 2004). Climate models predict that increases of 5.0 to 10.0°C by 2090 are possible for Canada, which is a much larger increase in temperatures than the projected global average temperature increase of 1.4 to 5.8°C (Environment Canada, 2003).

Within Canada, different regions will observe different increases in temperature. Some of these differences, as reported by Environment Canada include:

- 1 to 4°C increase in average temperature in British Columbia in the 21st century;
- 3 to 5°C increase in the Prairie regions;
- 2 to 6°C increase in the Yukon;
- 5 °C increase in the Northwest Territories and Nunavut;
- 2 to 5°C increase in Ontario;
- 4 to 6°C increase in Quebec; and,
- 3 to 4°C increase in the Atlantic Provinces.

### **2.2.2 Decreasing Sea Ice**

Due to increased average global temperatures, sea ice in the arctic is melting. Over the last 30 years, the extent of annual average sea ice in the north has decreased by 8%. Losses of late summer ice coverage ranges between 15 and 20%, which is much higher than the annual average. Some climate models project that summer sea ice will decline by greater than 50% by the end of this century (IPCC, 2001; ACIA, 2004). In addition, evidence indicates that the depth of sea ice has decreased by 40% during late summer and early autumn between the 1960s and late 1990s (ACIA, 2004).

The decline in depth and coverage of sea ice will undermine the survival of wildlife such as the polar bear, seal, and walrus. A decline in sea ice accelerates warming in the Arctic because as snow and ice melts, the land becomes exposed. Land is darker than the snow and ice, and as a result, it absorbs more of the sun's energy. As the land warms, it further accelerates the melting of ice and snow and the cycle of warming continues. This regional warming helps to accelerate warming at a global scale as well (ACIA, 2004).

### **2.2.3 Melting Glaciers**

Glacier melting is already occurring in British Columbia and the Canadian Arctic, as well as in other parts of the world (Brugman et al., 1997; ACIA, 2004). In British Columbia, the Rocky Mountains have approximately 1300 glaciers, which, by many estimates, have lost 25-75 per cent of their mass since 1850 (Environment Canada, 2000). Studies show that the reduction in these glacier areas is reducing the amount of water in the Saskatchewan-Nelson River Sub-Basins.



#### **2.2.4 Sea Level Rise**

In the last 100 years, global sea levels rose between 10 to 20 centimetres. It is projected that average global sea-levels will rise 10 to 90 centimetres between 1990 and 2100 due to the melting of ice caps and glaciers and thermal expansion. Thermal expansion describes the process whereby the volume of seawater expands as it warms (IPCC, 2001).

An increase in sea level will result in increased erosion and a loss of coastal ecosystems, including wetlands and spawning grounds for fish. Increased sea levels will also affect the infrastructure and safety of coastal communities because of increased risks from storm surges. Vulnerable areas in Canada include the Fraser River Delta, the Beaufort Sea Region, and much of the Atlantic region (Shaw et al., 1998; Environment Canada, 2006).

### **3.0 FIRST NATIONS SOUTH OF 60 DEGREES LATITUDE**

First Nations south of 60 degrees latitude are a diverse people with different realities based on their environments, social structure, and culture. It is important for First Nations to look at all aspects of resiliency when considering climate change impact priorities and adaptation options. In addition to the affects of climate change on the local economy and society, the culture, including language, may be at risk. For example, a climate change impact such as increased flooding may affect a community quite strongly culturally through loss of access to cultural grounds. Meanwhile another community close by may not face this challenge in the same way identifying infrastructure damage as the only affect. In this example, these communities would likely identify different priorities and strategies to meeting the challenges posed by increased flooding.

Given the variability across Canada, it is difficult to propose general strategies that could assist in maintaining the vital cultural component of First Nation communities. However, it was important to set the context for decision-making and priority setting by having a good understanding of the cultural, language, and demographic background information for First Nations south of 60 degrees latitude.

#### **3.1 CULTURAL AND LANGUAGE GROUPS**

Adaptability is, and has been, essential to First Nation survival in the demanding environments or ecological regions they have lived since time immemorial. As such, it is important to recognize that a community's sensitivity (high or low) to climate change will relate directly to their environment as well as indirectly to their culture due to the interconnectedness of the two. If climate change affects the environment, it will affect culture and language as well. For example through the loss of important species, climate change could affect culture and language by changing the way in which a First Nation interacts with its surrounding environment; such as hunting or ceremonial use of this animal and the language used to communicate this knowledge. This interconnectedness shows that it is also important to recognize culture as one of the areas to build resiliency and help create adaptation strategies that are a good fit with the community.

How groups of people survive and work with their environment often defines them as a people. Therefore, it is possible to group the many distinct First Nations across Canada into cultural

areas based on their ancestors' land use and occupancy. These cultural groups correspond to the physical and biological regions or ecological regions of Canada, but traditional territories of any one group may exist in multiple ecological regions. As such, each culture reflects a group's own set of traditions, values, behaviour, language dialects, and activities. Cultural identities can also reflect how groups of people survive together and adapt to local environments.

In addition to distinct cultural groups, Canada's First Nations are also diverse with respect to languages. Language forms the root of every culture. It has been determined that there are approximately 50 distinct First Nation languages spoken in Canada categorized into 10 First Nation linguistic families (The Canadian Encyclopaedia, 2008). The main language families are: Algonquian, Iroquoian, Athapaskan, Siouan, Wakashan, Tsimshian, Tlingit, Salishan, Kutenai, and Haida. Canada's Pacific Coast has the greatest number of languages and covers five language families. The two largest First Nation language families are Algonquian, which includes Cree and Ojibway, and Athapaskan (which itself includes Chipewyan and Dene). These two language families account for about 92% of First Nation language speakers living south of 60 degrees latitude (Statistics Canada, 1998) and are prevalent in most of the ecoregions outlined in section 3.3.

First Nations exist across Canada with varying cultures and languages and in different environments and climate change will affect each community differently. A community's ability to adapt to climate change will depend on a variety of factors including geographical location, economy, environment, culture, and social factors. For example, adaptation strategies that relate to the culture of a First Nation tied to one big game species, such as caribou, will be different for a First Nation whose culture is associated with several big game species. The First Nation who has cultural and historical ties to the caribou will find it harder to adapt to changes in behaviour or loss of their keystone species and the adaptation strategies they choose may not be as successful or applicable to the First Nation whose culture and history is tied to several big game species. Therefore, cultural as well as regional and geographic variability play an important role in prioritizing climate change impacts from community to community.

### **3.2 BACKGROUND INFORMATION**

In order to put the dispersal and distribution of First Nation communities South of 60 in context, CIER compared and contrasted the First Nation communities based on several variables. These included on-reserve versus off-reserve populations, number of First Nations regionally and/or

within political boundaries, number of remote versus non-remote communities, northern versus southern communities, and coastal versus inland communities. It is important to understand that these variables influence climate change impacts experienced by First Nations along with the needs and vulnerabilities of various communities across Canada. Understanding the dispersal and distribution of First Nation within these variables ultimately helped CIER make decisions on priority impacts and adaptation strategies discussed in this document.

### 3.2.1 Population on-reserve versus off-reserve

The 2006 Census shows the number of First Nation people in Canada to be 698,025 people with about 279,210 people (40%) living on-reserve and 418,815 people (60%) living off-reserve and/or in urban areas.

The total number of First Nations in Canada is 614. According to the First Nations Profiles on the INAC website, First Nations are located within the following regional and/or political boundaries:

1) The North (Yukon [16] and Northwest Territories [26])	42
2) British Columbia	198
3) The Prairies (Alberta [44], Saskatchewan [70], and Manitoba [62])	176
4) Ontario	126
5) Quebec and Labrador	39
6) Atlantic Provinces	33

(Indian and Northern Affairs Canada, 2003)

### 3.2.2 Remote versus non-remote

According to the 2005 INAC Band Classification Manual, the 117 Aboriginal communities classified as being remote have no year-round road access to a service centre and, as a result, experience a higher cost of transportation. Of these 117 remote Aboriginal communities, approximately 97 are First Nations south of 60 degrees latitude. Due to factors such as geographical remoteness, barriers to program and service delivery, and limited access to economic development opportunities, these remote communities face unique challenges that will be exacerbated by climate change; these communities will also experience additional challenges in planning for and implementing adaptation strategies than non-remote communities.

The reliance of some First Nations on seasonal and winter road access for transportation of goods and services to and from their communities, such as those in northern Manitoba and Ontario, face additional climate change challenges with respect to warmer winter weather. The changes in snow and ice due to warmer winter weather will have profound negative impacts on the construction of winter roads and thus the transport of goods and services. Any change in the transport of goods and services will put further stress on already challenged realities faced in these communities, especially since many of the communities that are winter road dependant are often but not always remote.

### **3.2.3 North versus South**

Disparity also occurs in First Nation communities in the northern parts of the provinces as opposed to those in regions that are more southern. As temperatures warm, First Nation communities situated on permafrost layers in northern regions will become more susceptible to the impacts of a changing landscape from melting permafrost. The melting of permafrost can threaten the structural stability of infrastructure in First Nations, such as houses, roads, schools, and water systems. Melting permafrost will also increase drainage of ground water, which can translate as a decrease in groundwater availability or lower water levels of inland rivers and lakes once held in by permafrost.

### **3.2.4 Coastal versus Inland**

Coastal First Nations will experience impacts from sea level rise more than inland First Nations. On the Pacific coast, there are approximately 100 First Nations while 35 First Nations are located on the Atlantic coast. These coastal communities may identify sea level rise as a high priority impact affecting community safety and infrastructure, and thus place more effort on developing strategies to adapt to this impact.

## **3.3 ECOREGIONS**

To help identify impact priorities for First Nations in Canada, CIER organized common climate change impacts within ecological regions or ecoregions, as opposed to political boundaries, to represent natural climatic regions. The vegetation distribution within these regions is due to many factors, but climate is the most influential on whether there will be conifers or grasses, for example. Therefore, it is safe to assume that changes to the climate in these regions will be, more or less, cross cutting.

First Nations within the same ecoregion are more likely to share similar challenges from impacts. Being located in the same province but varying ecoregions could mean different climate change impact situations. For example, a boreal forest community in Ontario will likely face similar climate change impacts to another community located in the boreal forest region of Saskatchewan rather than a community located within the Great lakes region of Ontario. Because the climate change impacts will be similar in the boreal, the strategies to adapt to the impacts could also be similar.

CIER organized the climate change impacts according to seven ecoregions based on forest regions. CIER added an additional category titled outside of forest regions, to account for First Nations not located in any one ecoregion, which perhaps fall on borders or on islands. The percentages of First Nations located within ecoregions are:

1) Boreal Forest	32%
2) Aspen Parkland/Grassland	14%
3) Taiga/Tundra	4%
4) Sub alpine/Montane/Columbian	9%
5) Coast	16%
6) Carolinian/great Lakes	13%
7) Acadian	4%
8) Outside of forest region	7%

This breakdown may assist First Nations and regional, provincial, or federal governments to identify climate change priorities, potential adaptation strategies, and partnership opportunities. The national ecoregion map (Figure 3.1) also indicates the location of main community sites of all First Nations within Canada. CIER developed the national ecoregion map as well as seven provincial ecoregion maps. The provincial ecoregion maps include tables that list all First Nations and their associated reserve lands. The maps include labels for all First Nations that identify the ecoregion in which they are located. Appendix 1 includes all eight maps.

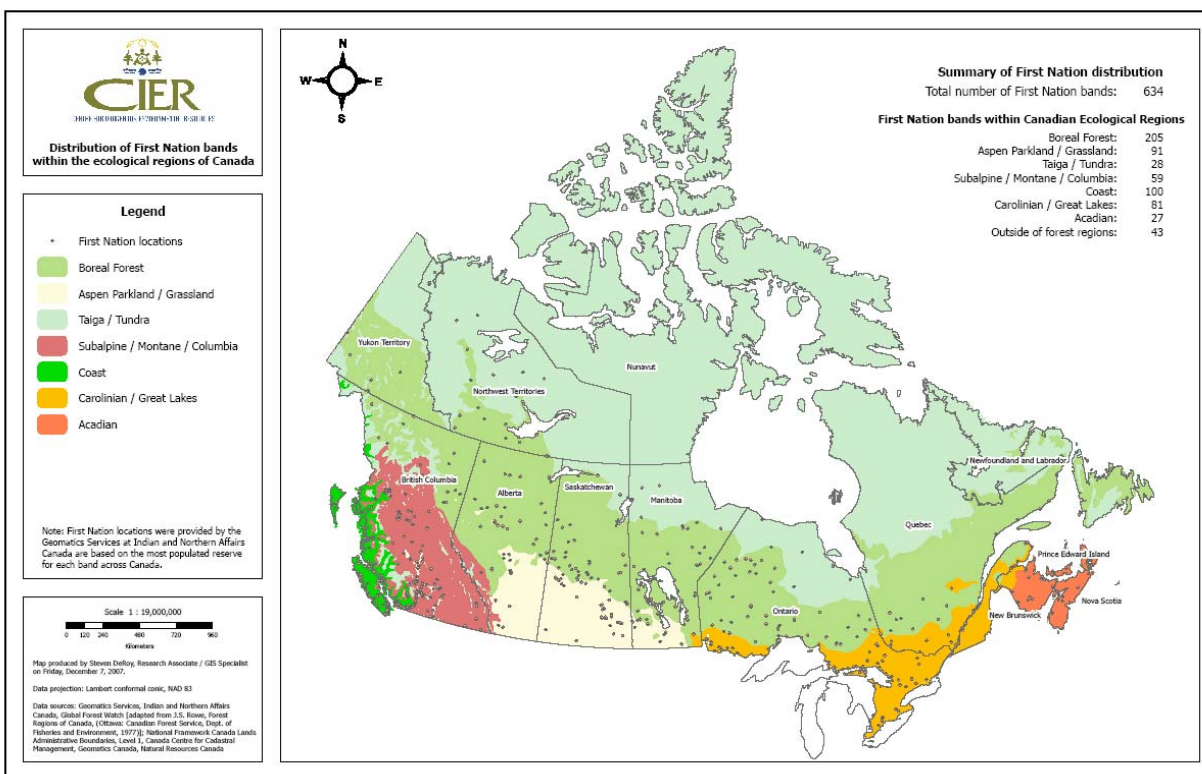


Figure 3.1: National Distribution of First Nations within the Ecological Regions of Canada.

Table 3.1 on the following page outlines some specific climate change impacts in each ecoregion. CIER identified five priority climate change impacts that will affect all ecoregions in some way (discussed in Section 4.1). CIER lists ecoregion-level impacts within three of the five impact areas identified. The other two impacts, increased forest fires and changes to snow and ice due to warmer weather, were not included in the table because the impacts are not variable within these areas. Increased forest fires will occur in all of the ecoregions. Changes to snow and ice are currently occurring and will have a great impact on Northern areas in the South of 60 region, such as the Northern boreal and taiga/tundra ecoregions.

Table 3.1 is not a comprehensive list of impacts, but rather it illustrates that each ecoregion will encounter different climate change impacts. The table can also serve as a starting point for climate change discussions at the ecoregion level.



Table 3.1: Examples of Three Priority Impacts by Ecoregion: Water, Extreme Weather, and Animal Behaviour

Ecoregion	Priority Impacts		
	Change in water quality and quantity	Increase in frequency and severity of extreme weather events	Change in animal behaviour and loss of keystone species
<b>Boreal Forest</b>	<ul style="list-style-type: none"> <li>• Soil moisture increasing in the winter and decreasing in the summer</li> <li>• Overall drier conditions</li> </ul>	<ul style="list-style-type: none"> <li>• Increased incidence of hurricanes, high winds, heavy snowfalls, hail, ice storms, and prolonged droughts</li> </ul>	<ul style="list-style-type: none"> <li>• Moose moving north into new regions</li> <li>• Change in caribou migration patterns and declining populations</li> </ul>
<b>Aspen Parkland/ Grassland</b>	<ul style="list-style-type: none"> <li>• Decreased quantity due to melting glaciers, increased temperatures, and less snow cover</li> <li>• Decreased quality due to lower quantity and increased concentration of contaminants and algae</li> </ul>	<ul style="list-style-type: none"> <li>• Increased occurrence of drought and more intense rainstorms</li> </ul>	<ul style="list-style-type: none"> <li>• Impacts on species dependent on seasonal wetlands</li> <li>• Loss of habitat for endangered fish</li> </ul>
<b>Taiga/Tundra</b>	<ul style="list-style-type: none"> <li>• Decreased quality due to melting permafrost</li> </ul>	<ul style="list-style-type: none"> <li>• Increased incidences of snowstorms</li> </ul>	<ul style="list-style-type: none"> <li>• Change in caribou migration patterns, and declining populations</li> </ul>
<b>Subalpine/ Montane/ Columbian</b>	<ul style="list-style-type: none"> <li>• Lower water quantity due to melting glaciers, less snow pack</li> </ul>	<ul style="list-style-type: none"> <li>• Intense precipitation events resulting in increased floods, slope erosion and avalanches</li> </ul>	<ul style="list-style-type: none"> <li>• Potential changes in mountain caribou</li> </ul>
<b>Coast</b>	<ul style="list-style-type: none"> <li>• Decreased quality due to storm surges, extreme weather, salination from sea level rise</li> </ul>	<ul style="list-style-type: none"> <li>• Increased incidence of snowfalls/ice storms/prolonged droughts/high winds</li> </ul>	<ul style="list-style-type: none"> <li>• Reproductive cycles of salmon impacted</li> </ul>
<b>Carolinian/ Great Lakes</b>	<ul style="list-style-type: none"> <li>• Decreased water quantity due to increased temperature, less snow cover, and increased transpiration</li> <li>• Decreased quality due to lower water levels combined with warmer temperatures and increased concentrations of contaminants and algae</li> </ul>	<ul style="list-style-type: none"> <li>• Increased incidence of severe rain storms and flash flooding</li> <li>• Increased incidence of drought</li> </ul>	<ul style="list-style-type: none"> <li>• Warm-water fish species will expand northward</li> <li>• Cold-water fish species will decline</li> <li>• Northern migratory birds to migrate further North</li> </ul>
<b>Acadian</b>	<ul style="list-style-type: none"> <li>• Decreased quality due to storm surges, extreme weather, salination from sea level rise</li> </ul>	<ul style="list-style-type: none"> <li>• Increased incidence of snowfalls/ice storms/prolonged droughts/high winds</li> </ul>	<ul style="list-style-type: none"> <li>• Piping Plover populations may be increasingly threatened</li> </ul>

## 4.0 CLIMATE CHANGE IMPACTS ON FIRST NATIONS SOUTH OF 60

Canadians are witnessing the impacts of climate change across the country. Severe weather, changes to precipitation patterns, milder winters, decreases in ice quantity and quality for winter road travel, and increases in pest problems are a sample of the existing climate change impacts. First Nations will likely be one of the most heavily impacted populations within Canada by climate change. Some aspects of First Nations, including an intimate long standing relationship with the land, remote locations of communities and limited economic and transportation options, make them more sensitive or vulnerable to climate change impacts.

People who are involved in climate change work refer to climate change impacts and climate change vulnerability. It is important to understand these terms and the differences between them. Impacts are the current and predicted environmental changes caused by global climate change, for example milder winters. Climate change vulnerabilities are the implications of these impacts. In other words, vulnerabilities reflect how climate change will affect First Nations communities directly, in economic, environmental, cultural, and social aspects of their lives. For example, melting permafrost is the climate change impact, while the damage to residential and non-residential buildings due to melting permafrost is the vulnerability.

Climate change vulnerability is also the sum of all the ways in which the community is sensitive or vulnerable. A community with a diverse economy, strong social systems, relatively undeveloped environment, and thriving culture will be less vulnerable to the same climate change impacts than a community that lacks these other strengths. For example, if a community has limited economic endeavours, which are tied to natural resources, then this community could be considered vulnerable to change in the use or value associated with this particular natural resource. If climate change negatively affects this resource, then this existing vulnerability is amplified by the potential loss or reduction of that resource.

Changes in the environment result in broad and far-reaching affects on all aspects of First Nations including social, cultural, and economic components. CIER considered all of these vulnerabilities to the impacts of climate change in our decisions on five priority impacts for First Nations.

#### 4.1 PRIORITY CLIMATE CHANGE IMPACTS

CIER used a variety of information sources to determine five priority climate change impacts for First Nations south of 60 degrees latitude. This included literary research gathered throughout the project, a project Advisory Committee, and a newly developed Adaptation Network. The feedback from these groups helped guide CIER's research on climate change impacts and also informed the selection of priority impacts.

The Advisory Committee was composed of Aboriginal people who were experienced with climate change impacts or adaptation in their respective region. CIER obtained feedback from this group through face-to-face meetings. CIER developed the adaptation network using two methods: a telephone survey and an on-line survey. The group contacted for a telephone survey were comprised of First Nations and non-First Nations people, some of whom are developing and actively implementing climate change work. The on-line survey was directed towards individuals from across Canada, the majority of whom were First Nations. For the full results of the adaptation network, and to hear what others said about climate change, please see Appendix 2.

The final five priority impacts were selected because they are applicable in multiple ecoregions in Canada, affect all four pillars of sustainability in First Nation communities, have a large magnitude, long duration, and will be difficult for First Nations to adjust to without adaptation measures. The four pillars of sustainability are social, environment, culture, and economy. CIER developed a large matrix containing existing or predicted climate change impacts in Canada as described in literature, including the likely magnitude and duration. CIER then determined how each impact could affect First Nations and this determined the five priority impacts. CIER provides modified versions of this matrix in three Impacts and Adaptations Tables contained in Appendix 3.

Appendix 3 includes instructions on how to use the tables when identifying specific or local climate change impacts, prioritizing these impacts, and brainstorming adaptation options. Table 1 lists potential climate change impacts and asks users to identify if these impacts are currently occurring or will occur in their area. Once these are identified, the user can then indicate which pillars of sustainability the impacts affect as a way to identify local priorities. Users can then move to table 2 to brainstorm adaptation options. Table 3 provides examples of adaptation options as suggested in literature.

First Nations can look at these tables to find out more information about potential climate change impacts in their area and community. However, the tables are not comprehensive lists of all climate change impacts in Canada and should be viewed as a starting point. There may be other impacts not included in the tables that will affect First Nations.

The five priority climate change impacts identified by CIER are:

- 1) Changes in water quality and quantity;
- 2) Increase in frequency and severity of extreme weather events;
- 3) Increase in frequency and severity of forest fires;
- 4) Changes in animal behaviour / loss of keystone species; and,
- 5) Changes in snow and ice due to warmer weather.

The following descriptions outline details about these impacts and their effects on First Nation communities.

#### **4.1.1 Changes in water quality and quantity**

Water quality is predicted to deteriorate across Canada due to a wide variety of climate changes, including:

- 1) Water contamination in Northern regions due to damage or destruction of water reservoirs resulting from thawing permafrost;
- 2) Contamination of freshwater sources in low lying coastal areas due to storm surges, extreme weather, and sea level rise (freshwater salination);
- 3) Increases of water-borne diseases due to a multitude of triggers such as; lower water levels combined with warmer temperatures for First Nations in the prairies and Great Lakes areas; and increasing flooding in coastal areas leading to contamination of water sources by wastewater; and,
- 4) Declining water quality due to declining lake and stream levels and resulting increases in concentrations of contaminants (such as PCB's, heavy metals, mercury, pharmaceuticals, and pesticides) and nutrient additions from agriculture and wastewater (Kundzewicz, et al., 2007).

Water quantity will be affected by declining water levels in lakes and streams due to factors such as increased temperature, decreased snow cover, and receding glaciers. Water quantity may increase in some areas due to increased precipitation and sea level rise.

*Likely Vulnerabilities/Sensitivities in First Nations*

The predicted decreases in water quality would result in increased costs to obtain quality drinking water through either enhanced water treatment infrastructure or outsourcing drinking water. This challenge would intensify for the many First Nations located in remote areas or those with limited economic resources required for maintaining, refurbishing, or replacing infrastructure.

There are already serious and considerable issues related to drinking water for First Nations; according to INAC's January, 2008 progress report on Drinking Water in First Nation Communities, 85 First Nation communities are classified as high risk. Any negative affects to water from climate change will only exacerbate existing water problems in First Nation communities. Decreased water quality would affect First Nation cultural uses of water such as subsistence harvesting of traditional foods and medicines or ceremonial practises.

Decreased water quantity would affect transportation on water bodies and leave less water available for agriculture (farming and ranching), hydroelectric power production, and fisheries for First Nations who engage in these activities.

#### **4.1.2 Increase in frequency and severity of extreme weather events**

Scientists predict that extreme weather events such as storms (wind, ice, thunder, and snow), floods, and droughts will occur more intensely and more often than has occurred in the past (Meehl et al., 2007).

*Likely Vulnerabilities/Sensitivities in First Nations*

Extreme weather events will affect First Nations and other people in Canada in similar ways, such as:

- Increased costs to respond to the weather events (snow removal and clean up of debris);
- Loss or damage of infrastructure and property (on-reserve buildings, boats, equipment);
- Costs incurred to replace or repair damaged goods;
- Heightened risk to human and animal life;

- Increased frequency of loss of services (hydro, gas, telephone) and closures (road, business, school); and,
- Stress on emergency services, such as hospitals.

These weather events will affect First Nations in additional, unique ways such as increased unpredictability or decreased safety on the land while carrying out traditional and subsistence activities. This may result in loss of opportunities to engage in traditional activities, damage to culturally important infrastructure such as cabins or other buildings along traplines, and a potential loss of important cultural sites. First Nations could also suffer a loss of economic opportunities in areas such as tourism, forestry, fishing, or agriculture.

#### **4.1.3 Increase in frequency and severity of forest fires**

Forest fires are predicted to increase in frequency and severity due to warmer winters, increases in extreme weather, increases in frequency and severity of drought, and increases in the presence of dead trees due to insect outbreaks (such as mountain pine beetle and spruce budworm), which is also predicted to increase due to climate change (Johnston, 2006).

##### *Likely Vulnerabilities/Sensitivities in First Nations*

The majority of First Nations live in forested areas. Thirty percent of First Nations reside within the heavily forested boreal ecoregion; many other First Nations live within the forested areas in the Acadian, Coastal, Carolinian, and Montane ecoregions. Increases in the frequency and severity of forest fires would result in an increased risk to human lives, cost of evacuation, and human stress in First Nations living in forested areas. This increased risk would exist for people during their time in the communities and out on the land.

Increases in frequency and severity of forest fires would also result in increased damage to infrastructure within the community or on traditional territories, which would result in higher costs to replace or repair this infrastructure. Additional affects include impeded travel; loss of a viable wood source; reduced air and water quality; and loss of important animal and plant species.

#### **4.1.4 Changes in animal behaviour / loss of keystone species**

The changes in precipitation and temperature will result in changing ecosystems, caused by changes in seasonal processes, structure of plant communities, productivity, nutrient cycling,

ecosystem boundaries, and disease, pests, and insect infestations. These ecosystem changes will result in changes to the distribution, abundance, and diversity of plants and animals.

Changing ecosystems could affect animal behaviour by altering the location and timing of life cycle events such as migration and reproduction (e.g. calving or spawning). As animal species respond to these environmental changes, this transition may result in decreased health (increases in diseases or physical abnormalities), safety (due to unsafe land) and survival (effects on birthing or survival of young, unavailable food source) of species. As animals and plants respond to the changing environmental conditions, this could lead to a loss of keystone species in ecoregions. Keystone species are organisms that have a much larger impact on their ecosystem than would be predicted based on their abundance, and which many other species depend upon for continued survival and support.

#### *Likely Vulnerabilities/Sensitivities in First Nations*

Changes in behaviour of animals could result in decreased health of the animals or the movement of animals from an area previously accessed by First Nations. Loss of keystone species could result in a loss of food security for First Nations who rely on wild plants and animals for food and medicine. Loss of wild foods would force these First Nations to substitute with market foods, which tend to be processed and are often more expensive and less nutritious. This change would result in health implications.

Changing animal behaviours could lead to issues for First Nations if animals move into different areas, for example if moose move out of areas that they have traditionally occupied. The affected First Nations' culture could be affected by the loss of these animals, as it would lead to a decrease in the ability to carry out traditional activities, a loss of knowledge about animals (and possibly plants), landscapes, and waterways, and the language associated with these practises. The loss of animals could result in a loss of economic opportunities such as ecotourism and guiding or outfitting.

#### **4.1.5 Changes in snow and ice due to warmer weather**

Warmer weather has resulted in a number of changes to snow and ice conditions throughout the year. Firstly, warmer weather has resulted in changes to the timing of freeze-up in the fall and thaw in the spring; often the freeze-up occurs much later and spring thaw occurs earlier than it has in the past. Warmer weather has also resulted in changes in the length of the freeze-



up period. For example in areas where the water was frozen for four straight months, may now experience intermittent thawing within this period. Coinciding with this change in the freeze up period is the change in the thickness of the ice throughout the winter, which is often a transition to thinner ice. The increased winter temperatures (plus other factors such as decreased precipitation) has led to decreased amounts of snow cover in some areas (Lemke et al., 2007).

#### *Likely Vulnerabilities/Sensitivities in First Nations*

Changes to snow and ice can have a significant impact on First Nations who rely on the snow and ice for transportation to carry out traditional activities or travel to other communities and areas. The changes in snow and ice can result in decreased safety on the land. There are increasing occurrences of First Nation individuals who have traveled in the area for many years, falling through the ice. This decrease safety on the land can lead to a decrease in cultural subsistence activities and loss of Indigenous Knowledge and the associate traditional language about these practises. It would also affect the health of First Nations who rely on wild foods, as they will be forced to purchase more market foods. For First Nations who rely on ice and snow to travel to other communities, the decreased ability to engage in this type of travel will result in negative social impacts.

These changes to snow and ice have also resulted in a shorter winter road season. Many Northern First Nations rely on winter roads for the transport of goods into the community, such as housing supplies and food. A shorter winter road season means that there is less time to transport food, fuel and materials into the community. Communities would then have to rely more on air or barge transport, which come at a much larger financial cost.

## **4.2 OTHER IMPACTS AND REGIONAL VARIABILITY**

CIER identified additional climate change impacts from literary research and input provided by the Advisory Committee and Adaptation Network. We recognize that these additional impacts will have severe impacts on some First Nations in Canada and the exclusion of these from the five priorities does not diminish their importance within specific ecoregions or communities. However, the research was national in scope and the additional impacts discussed here were not included in the top five priority impacts because they only affect certain ecoregions. CIER chose the five impacts because they will have wide ranging impacts on most First Nations across all ecoregions.

Some additional impacts include sea level rise, thawing permafrost, and soil erosion. Sea level rise will have severe implications for communities located in coastal areas. Rising sea levels could contaminate drinking water sources, damage homes and other buildings, and result in a loss of territory, which may include important cultural sites. Thawing permafrost would have a large impact on First Nations and Northern communities and also cause a wide range of impacts on water quality, housing, roads, lake and river trails, and traditional subsistence harvesting practises. Soil erosion in the prairies due to drier conditions will affect air and water quality and negatively affect communities that rely on agriculture.

All First Nations in Canada have unique social, economic and cultural characteristics. Given the diversity of ecosystems, vulnerabilities and characteristics of First Nations across Canada, it is important that each First Nation determine how they will be uniquely affected by climate change. If First Nations are not aware of how their community may be affected, then they can begin a dialogue using these five priority impacts.

## 5.0 ADAPTATION – PLANNING FOR CLIMATE CHANGE

There are three forms of adaptation communities and governments can use in the face of climate change: proactive, reactive, or 'do nothing'. Most communities in Canada, including First Nations, are currently reacting to climate change. Sometimes people refer to reactive adaptation as coping. Coping involves short-term or immediate reactive response to a stress and can be thought of as crisis management. Many First Nations are coping with current climate change impacts; however, they eventually may face a time when coping is no longer possible.

Proactive adaptation requires the anticipation of stresses before they occur so that the response to these stresses is planned and strategic. Proactive adaptation measures can therefore decrease the magnitude of future stresses. Proactive adaptation measures can be less cost intensive over the long-term when compared to reactive measures. Incorporating proactive adaptation measures can reduce the amount or intensity of stress felt by the community when there are systems available to meet the challenges presented by climate change. Therefore, there are many social as well as economic benefits of planning for climate change and implementing proactive adaptation measures. Incorporating proactive adaptation measures is also a good option because they can help prevent or lessen the impacts of climate change on First Nations by increasing resiliency and promoting sustainability.

CIER focused the adaptation strategies research on the five priority impacts identified in the previous section. This resulted in a list containing almost 100 adaptation strategy options (see Appendix 3, table 3). Additionally, CIER included Adaptation Network responses provided in both the online and the telephone survey, given in a section on preferred or existing adaptation options (see Appendix 2 for full report). CIER shared this list of adaptation strategies with the advisory committee members in order to identify adaptation option priorities and to understand the reasoning behind these decisions. These priorities are discussed in section 5.1.

CIER identified a number of potential initiatives for First Nations to adapt within each of the five priority impact areas. CIER developed these initiatives from literary research and feedback from the advisory network and adaptation committee and were based on adaptation strategies that individuals were already implementing or suggested ideas. We also present summaries of and detailed case studies (Appendix 4) that highlight existing adaptation projects in Canada.

## 5.1 PRIORITY CLIMATE CHANGE ADAPTATION AREAS

### 5.1.1 Deteriorating or changing water quality and quantity

The top four adaptation measures identified for changing water quality and quantity are:

- 1) Protecting and managing source water;
- 2) Improving water conservation to decrease total water consumption through conservation initiatives, public education programs, and water-costing mechanisms;
- 3) Initiating wetland conservation;
- 4) Incorporating climate change impacts when planning or designing sewage and water infrastructure and treatment facilities; using higher levels of wastewater treatment (from primary to secondary/tertiary levels); employ more stringent water treatment guidelines.

Other adaptations identified in our research include: relocating water intakes; digging deeper wells or getting surface water supply from further away; protecting and revegetating riparian zones; increasing the effort of water quality protection from agricultural, industrial and human wastes; and establishing and using water regulating structures to maintain flow rates of rivers.

CIER has identified the following potential initiatives for First Nations to adapt to water quality and quantity changes:

*Water conservation:* Water conservation initiatives would help raise awareness about climate change and decrease the current demand resulting from inefficient water use. When people have access to appropriate information and the opportunity to take ownership of the issue, they are more likely to make positive long-term changes for their community. This would involve information sharing and communications at the community level to teach people about water conservation and ways that they can take action. Developing these materials at the community level will help to ensure that they are culturally appropriate and engaging.

*Water infrastructure standards:* If a First Nation is in the process of planning or modifying their current water and wastewater facilities, it would be beneficial to consider climate change impacts upfront. In addition to factoring in climate change for the design of water infrastructure, it would also be beneficial to consider climate change impacts in the design process of residential and non-residential buildings as they relate to water (and energy).

### Case Study 1 - Drinking Water Safety and Source Water Protection

In 2006, there were 76 *Boil Water Advisories* and 3 *Do Not Consume Advisories* in native communities across Canada ([www.water.ca](http://www.water.ca)). Our research indicated that First Nations should expect climate change to exacerbate these water issues. Projects in Driftpile Cree Nation and Yellow Quill First Nation examine point source water protection and safe drinking water respectively.

Driftpile Cree Nation is located in the boreal ecoregion, approximately 300 kilometres northwest of Edmonton, Alberta. The community has had difficulties with water quality since May 2005, when a drinking water advisory was enacted due to unacceptable turbidity levels. The Nation worked diligently for a year and established a new water treatment system. Another one of their projects involves developing a First Nation's handbook on source water protection. The community collaborated with Technical Services Advisory Group (TSAG) to complete this initiative.

Yellowquill First Nation is also located in the boreal ecoregion, approximately eight kilometres east of Rose Valley, Saskatchewan. The community was under water advisories from 1995-2004. In order to ratify the problem, the community changed the source from a creek to an area of higher flow and ground water sources, as well as establishing a new water treatment system.



Driftpile Cree Nation



Yellowquill First Nation

*Water management using a watershed approach:* The definition of a watershed is an area of land that drains into a lake or river. There is growing interest in managing areas on a watershed basis, since anything done within the watershed affects the whole watershed system. A watershed approach to water management starts with a dialogue among all of the organizations/groups/bodies with interests in the watershed (e.g. First Nations, municipalities, private sector industries, provincial government departments, etc). In some places, watershed planning is underway. Where this is the case, First Nations need to be involved, if this is not already the case. In areas where it has yet to begin, First Nations could initiate and lead a watershed planning initiative. Although implementing this adaptation strategy may not be easy

and will require cooperation, negotiation and more, the best decisions are made when everyone affected by a watershed can come together to discuss the issues and plan for the future use of the watershed.

### **5.1.2 Changes in behaviour or loss of keystone species**

The top three adaptation measures identified for changes in animal behaviour or loss of keystone species are:

- 1) Habitat or species conservation; conserving or restoring migration corridors; minimizing landscape fragmentation;
- 2) Reviewing the regulations governing fishing; developing aquaculture facilities; changing laws for sport fishing to catch-and-release only; new regulations decreasing allowable catch for commercial freshwater and saltwater fisheries; reviewing expected subsistence levels for First Nation people; placing a moratorium on some fishing (e.g. lake trout); and,
- 3) Building on social networks; sharing wild foods with community members (Elders, disabled people); developing food / freezer co-op in community.

Additional adaptations for changes in behaviour and loss of keystone species include: establishing nest boxes and protecting cavity trees, adjusting harvest locations and seasons, and considering translocation of sensitive species farther north if habitat fragmentation is preventing the species distribution.

CIER has identified the following potential initiatives for First Nations to adapt to changes in animal behaviour or loss of keystone species:

*Maintenance of wildlife corridors:* Wildlife corridors are protected corridors between isolated patches of protected areas to allow animals to migrate between these areas. Wildlife corridors are needed because of the increasing fragmentation of natural spaces around the world; corridors have been shown to improve the chances of survival of some species. The identification of these corridors must acknowledge and maintain First Nation rights, be created with community support, and involve the community meaningfully in decision-making and all aspects of the process. First Nations could work with others in the region to develop a process for working together to identify and protect wildlife corridors. These initiatives should include long-term commitment from various stakeholders to ensure the longevity required for continuous maintenance of corridors.

*Social Networking:* Many First Nations have established or historical social networks to cope with environmental changes, based on current and/or traditional structures. It is important to recognize and strengthen these networks as a means of helping First Nations become more resilient to climate change. First Nations could do this by working together to develop, identify, or enhance their social or cultural responses to climate change issues related to traditional foods in a way that maintains or supports traditional sustenance activities. For example, communities could develop community freezers or initiatives to share traditional foods with those unable to participate in traditional activities.

*Healthy diet transitions:* Some First Nations may face the need to switch their reliance on wild foods, either completely or partially, to market foods due to climate change impacts and other factors (e.g. land use changes). It is important for First Nations to discuss this issue locally and determine sustainable and healthy adaptations. Potential adaptations could include eating other, different wild foods, sourcing healthy affordable market foods (potentially through subsidizing), and offering workshops to community members to introduce or promote these foods, or explore production of local foods (e.g. community garden or greenhouse). Potentially First Nations could develop a healthy food co-operative to ensure food security and the long-term economic sustainability of the initiative.

### **5.1.3 Increase in forest fires**

The top three adaptation measures identified for increases in forest fires are:

- 1) Developing an emergency preparedness plan / evacuation plan that may include public education and identifying and instilling measures to protect vulnerable infrastructure. Also, improving fire season readiness by building fire breaks around communities; forest fire training for local crews; fire monitoring to identify vulnerable areas; and sufficient / operable equipment and resources such as local water sources, pumps, trucks, and respirators;
- 2) Traditional forest management practises, such as controlled burns, to decrease the likelihood of larger more intense forest fires; and,
- 3) Selecting species and genetic varieties of trees that are more water efficient. Trees that are more water efficient will be more likely to survive a warmer and potentially drier climate than trees that are less water efficient. Trees that cannot survive in a warmer drier climate will die and the increased abundance of dead trees will increase the probability of forests fires.



Other adaptation strategies that were identified are: multiple thinning of forests, breeding programs to improve desirable traits of species for fire resistance, using natural disturbance-based fire management (controlled burns), and if possible, substituting existing 'high risk' recreational sites for different areas to reduce potential threats to human life.

*Hazards Research:* Hazards research provides an understanding of the hazards in a community and which of these hazards are of most concern. This research can often be the first step in developing an emergency response plan. First Nations could develop and prioritize a comprehensive list of environmental hazards due to climate change. Once the First Nation has completed the hazards research, the community can focus on the highest priority hazards and determine the next steps to deal with them.

*Development and practice of emergency plans:* This initiative would focus on community development of emergency response plans for hazards related to climate change. For example, a community could develop education materials on what to do in an emergency, including where to go, what to do, and even treatment information (e.g. herbal remedies, first aid and other emergency medical care). The project should include a component where the community implements and practices the emergency plan.

*Strengthening Informal/Social networks:* CIER has identified informal networks as an effective strategy for communities to adapt to increased uncertainty of fire conditions when carrying out subsistence activities. In many cases, First Nations likely already have these informal networks in place. It is important to recognize, and even formalize these networks to strengthen them and potentially expand them to include communities at a regional scale. This initiative could also involve the establishment of a community-initiated monitoring program.

#### **5.1.4 Increase in frequency and severity of extreme weather events**

The top three adaptation strategies related to an increase in the frequency and severity of extreme weather events are:

- 1) Incorporating the potential for extreme weather events in land management;
- 2) Redefining construction standards for zoning, planning and building codes as well as for infrastructure and/or using protective works; re-examination of plan policies, zoning controls, sub-division regulations, and building by-laws; and,
- 3) Planning for emergency preparedness.

**Case Study 2 - Seabird Island Indian Band - Emergency Preparedness**

Emergency preparedness can help First Nations meet the challenges posed by a number of climate change impacts, including the priority impacts identified through this project. This is especially true for increased frequency and severity of both extreme weather events and forest fires. Seabird Island First Nation utilized emergency preparedness to meet challenges posed by increased flooding.

Seabird Island First Nation is located in the Coastal ecoregion, approximately 20 kilometres northeast of Chilliwack, British Columbia. The First Nation created an emergency preparedness plan for their community, with flooding identified as the largest concern. Climate change has the potential to intensify spring floods as larger snow packs accumulate over winter, due to changes in precipitation. These snow packs also melt faster in the spring.

Part of the Seabird Island plan includes educating community members on what they need to do in the case of a flood. Six emergency response pamphlets are available for download on the Seabird Island website to assist in this process. The band has tasked the Seabird Fire Department with distributing this information to the membership.

There are also infrastructure procedures outlined in the plan that include shutting off the hydro and gas lines if flooding is imminent. In these cases, the membership will need access to alternative drinking water or means of preparing food, and the plan includes these alternatives. An evacuation plan is also included.



Seabird Island Band Office



Fraser River

Other adaptation strategies identified include: building a network of cabins to provide shelter for hunters and travellers that get caught in extreme weather; or moving buildings and infrastructure out of flood prone areas. Regarding tools and techniques, adaptation strategies also include: using larger, more powerful sea-worthy boats and snowmobiles for harvesting and transportation; installing storm retention ponds at critical points in the storm drainage network to deal with extreme rain; or using silt fences, tarping soil, and fill stockpiles to help minimize damage from storms.

The initiatives suggested for increases in forest fires (section 5.1.3) are also adaptation measures for increases in frequency and severity of extreme weather events: hazard research; development/practice of an emergency planning; and strengthening social/informal networks.

### **5.1.5 Changes in snow and ice due to warmer weather**

The four priority adaptation strategies related to changes in snow and ice due to warmer weather are:

- 1) Developing community communication networks (hazards mapping; mapping out / monitoring community trails and communicating to citizens which trails are safe, etc);
- 2) Developing land camps to strengthen Indigenous Knowledge, maintain traditional skills and values;
- 3) Building and maintaining more cost intensive winter roads that will extend their seasonal life, such as constructing permanent stream crossings; and,
- 4) Extending airstrips in remote communities to accommodate larger planes to address a shorter road access season.

Other adaptations identified include: using airships to transport goods; increasing reliance on barge transport in the summer; construction of all season roads; and using other innovations such as balloons to transport oil filled equipment over ice roads. Section 5.1.4 (increase in extreme weather events) suggested initiatives are also applicable adaptation measures for responses to changes in snow and ice due warmer weather.

### **5.1.6 General Adaptation**

CIER developed a 'general adaptation' category to include strategies that could be applied to multiple impacts. These general adaptations are:

- 1) Undertaking comprehensive community planning (that incorporates future climate change impacts in both the development of the plan and its implementation and decision making);
- 2) Increasing energy security and opting for renewable energy sources;
- 3) Increasing economic diversification;
- 4) Increasing or obtaining insurance; and,
- 5) Initiating climate change monitoring programs.

Changes in snow and ice will affect many First Nations south of 60. Implementing a monitoring program to record these changes may be a key adaptation step. There are often many observations of these changes, communicated and monitored by individuals involved in traditional activities. A monitoring program should bring together both traditional and western knowledge systems to distinguish the degree and how quickly these changes are occurring, as well as how changes are affecting people and animals.

The project aims to identify the specific conditions under which ice becomes safe for travel and predict the potential changes that might occur along the trail networks within Nunavik. To do this, snow and ice characteristics are measured at strategic locations along the trail networks. Also, interviews with ice experts are conducted to obtain more detailed descriptions of ice, snow and general weather conditions along the trail networks. Weekly ice trail information is displayed and updated regularly on their website.

## Nunavik Region

## 5.2 EXISTING STRATEGIES BY FIRST NATION COMMUNITIES

CIER did literary research and obtained feedback from the Adaptation Network about adaptation strategies in use in First Nations. There were limited examples of First Nation adaptation strategies available through the literary research. Reasons for the lack of representation in the literature may be that the focus on adaptation strategies is relatively recent or existing adaptation strategies are not documented in publicly available sources. It could also be that people are only just beginning to think about and implement climate change adaptation strategies. Ninety percent of the individuals who responded to CIER's online survey reported that their community had not developed any adaptation strategies for climate change impacts (although it is also possible that some survey participants were not aware of climate change activities taking place in their community). Monitoring programs (e.g. of ice conditions, of water quality) was the most common form of adaptation that was mentioned by participants

Some of the telephone survey participants (i.e. members of the Adaptation Network) were able to describe adaptation activities occurring in their communities; others stated that there were no adaptation activities taking place. Adaptation strategies identified by telephone survey participants included:

- Using informal networks of communication to deal with unpredictable snow and ice and weather conditions;
- Making changes to infrastructure planning (more energy efficient, using pilings more often);
- Purchasing bigger and stronger boats to deal with unpredictable weather; and,
- Making seasonal changes such as changing from a winter to a summer logging season, and increasing barge loads in the summer to compensate for shorter winter road seasons.

For those that said there were no activities taking place, they explained that climate change adaptation was not a top priority in their community - either because of more pressing issues that demand their attention, or because they are not witnessing very many climate change impacts and so there is no motivation to develop adaptations.

## 6.0 ADAPTATION TOOLS AND RESOURCES

All towns, municipalities, and cities require tools and resources to guide them as they adapt to a changing climate. Although some of these tools are applicable to First Nations, there are some aspects of First Nations, especially in relation to culture, governance, decision-making, and Aboriginal and Treaty rights, which require additional considerations. However, First Nation-specific tools are fewer in number or are not easily available in a public forum. Non-First Nation-specific tools and resources can be transferable as long as users make appropriate and needed adjustments to suit their specific needs, Traditional Knowledge, and existing processes. This section provides a sample of available tools that First Nations could use to address the climate change impacts and adaptation needs discussed in this report. Table 6.1 provides the names and websites for the various tools and guides summarized here. The complete annotated table of these tools is available in Appendix 4.

A scan of the relevant resources related to climate change water issues resulted in three guides and three tools. The three guides relate to conducting water audits, source water protection, and best practices reports on decision making and other procedures related to potable water, storm water, and wastewater. The tools CIER identified consist of a database with relevant, accessible, and national information and two comprehensive lists of sustainable water use tools and resources available from various levels of government, communities, and businesses.

For extreme weather, forest fires, and changes in snow and ice due to warmer weather CIER researched tools and resources related to both emergency planning and risk assessment. Collectively, these two areas provided the majority of tools, and guides identified through our research. For emergency planning, CIER identified three tools, and six guidebooks or manuals. The guidebooks/manuals provide outlines for the planning process for community and business, as well as those involved throughout the emergency response process. Tools include databases and maps of hazards, historical information, and vulnerabilities. Part of the emergency planning process is public awareness and there are a number of resources listed in Appendix 4.

The list of four risk assessment tools includes two web-based kits and four guides. The web-based kits provide information on risk assessment methods, case studies, and tools such as asset risk management, community based vulnerability, and cost/benefit assessment. The four guides to risk assessment include three government documents created by the Governments of

Ontario, Bangladesh, and Australia. Local Governments for Sustainability and the Centre for Science in the Earth System, a combination of governments and non-government organizations, created the final guide on our list, Preparing for Climate Change, for local, regional, and state governments.

There are very few tools and resources for First Nations to access that relate to traditional foods, food security, or changes to keystone species. The United States Department of Agriculture's Community Food Security Initiative created the Community Food Security Resource Kit. Although this tool provides information specific to the US federal government programming, it does offer information and examples related to health and nutrition as well as examples of different approaches to community food security such as cooperatives.

Table 6.1: Adaptation Tools and Resources

Area	Type	Title
Water	Guide	Manual for Conducting Water Audits and Developing Water Efficiency Programs at Federal Facilities <a href="http://www.ec.gc.ca/WATER/en/info/pubs/manual/e_contnt.htm">http://www.ec.gc.ca/WATER/en/info/pubs/manual/e_contnt.htm</a>
	Guide	Developing a Municipal Source Water Protection Plan <a href="http://www.gov.ns.ca/enla/water/sourcewater.asp">http://www.gov.ns.ca/enla/water/sourcewater.asp</a>
	Guide	Protection Plan: A Guide for Water Utilities and Municipalities InfraGuide Best Practices Reports <a href="http://sustainablecommunities.fcm.ca/infraguide/">http://sustainablecommunities.fcm.ca/infraguide/</a>
	Tool	An Analysis of Canadian and Other Water Conservation Practices and Initiatives <a href="http://www.ccme.ca/assets/pdf/kinkead_fnl_rpt_2005_04_2.1_web.pdf">http://www.ccme.ca/assets/pdf/kinkead_fnl_rpt_2005_04_2.1_web.pdf</a>
	Tool	WEED - water efficiency experiences database <a href="http://www.cwwa.ca/WEED/Search_e.asp">http://www.cwwa.ca/WEED/Search_e.asp</a>
	Tool	Drop by Drop: Urban Water Conservation Practices in Western Canada <a href="http://www.highriver.ca/LinkClick.aspx?link=DropbyDrop150.pdf&amp;tabid=443">http://www.highriver.ca/LinkClick.aspx?link=DropbyDrop150.pdf&amp;tabid=443</a>
Emergency Planning	Guide	Steps in Developing an Emergency Plan <a href="http://www.mpa.gov.nl.ca/mpa/fes/emo/munplanning/pdf/emerg-plan-steps.pdf">http://www.mpa.gov.nl.ca/mpa/fes/emo/munplanning/pdf/emerg-plan-steps.pdf</a>
	Guide	Planning Guide for Community Officials <a href="http://www.maca.gov.nt.ca/emergency_management/resource/emergency_plan/PlanningGuide.pdf">http://www.maca.gov.nt.ca/emergency_management/resource/emergency_plan/PlanningGuide.pdf</a>
	Guide	The Nova Scotia Emergency Management Manual <a href="http://www.gov.ns.ca/emo/AbsPage.aspx?id=1175&amp;siteid=1&amp;lang=1">http://www.gov.ns.ca/emo/AbsPage.aspx?id=1175&amp;siteid=1&amp;lang=1</a>

	Guide	Basic Rescue Skills <a href="http://getprepared.ca/_fl/basic-rescue-skills_e.pdf">http://getprepared.ca/_fl/basic-rescue-skills_e.pdf</a>
	Guide	Emergency Management Guide for Business and Industry: A Step-by-Step Approach to Emergency Planning, Response and Recovery for Companies of All Sizes <a href="http://www.fema.gov/pdf/business/guide/bizindst.pdf">http://www.fema.gov/pdf/business/guide/bizindst.pdf</a>
	Guide	A guide to business continuity planning <a href="http://getprepared.ca/_fl/bcont_e.pdf">http://getprepared.ca/_fl/bcont_e.pdf</a>
	Tool	Canadian Disaster Database <a href="http://ww5.ps-sp.gc.ca/res/em/cdd/search-en.asp">http://ww5.ps-sp.gc.ca/res/em/cdd/search-en.asp</a>
	Tool	Natural Hazards of Canada. Blizzards; Earthquakes; Floods; Hail; Icebergs, sea ice, and fog; Landslides and snow avalanches; Tornadoes; and Tsunamis and storm surges. <a href="http://www.publicsafety.gc.ca/res/em/nh/index-en.aspx">http://www.publicsafety.gc.ca/res/em/nh/index-en.aspx</a>
	Tool	Community Emergency Planning, Response, and Recovery <a href="http://www.pep.bc.ca/Community/community.html">http://www.pep.bc.ca/Community/community.html</a>
Risk Assessment	Guide	Risk-based Adaptation to Climate Change: A Guide for Ontario Municipalities <a href="http://adaptation.nrcan.gc.ca/projdb/pdf/176a_e.pdf">http://adaptation.nrcan.gc.ca/projdb/pdf/176a_e.pdf</a>
	Guide	A Participatory Guidebook for Community Risk Assessment and Risk Reduction Action Plan <a href="http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN029421.pdf">http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN029421.pdf</a>
	Guide	Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments <a href="http://postcarboncities.net/preparing-climate-change-guidebook-local-regional-and-state-governments">http://postcarboncities.net/preparing-climate-change-guidebook-local-regional-and-state-governments</a>
	Guide	Hazard Analysis <a href="http://www.ema.gov.au/agd/ema/rwpattach.nsf/viewasattachmentPersonal/BCE29B04E48926E6CA256C8A000A60E8/\$file/HAZARD_ANALYSIS.PDF">http://www.ema.gov.au/agd/ema/rwpattach.nsf/viewasattachmentPersonal/BCE29B04E48926E6CA256C8A000A60E8/\$file/HAZARD_ANALYSIS.PDF</a>
	Tool	Community Risk Assessment Toolkit <a href="http://www.proventionconsortium.org/?pageid=39">http://www.proventionconsortium.org/?pageid=39</a>
	Tool	Risk Assessment <a href="http://www.communityplanning.net/methods/method112.htm">http://www.communityplanning.net/methods/method112.htm</a>
	Tool	Risk and Vulnerability Assessment Tool <a href="http://www.csc.noaa.gov/rvat/hazPrint.html">http://www.csc.noaa.gov/rvat/hazPrint.html</a>
Food Security	Tool	Community-based Vulnerability & Risk Management Toolkit <a href="http://www.climadapt.com/tools.html">http://www.climadapt.com/tools.html</a>
	Tool	Community Food Security Resource Kit <a href="http://permanent.access.gpo.gov/lps6620/resoukit.htm">http://permanent.access.gpo.gov/lps6620/resoukit.htm</a>



## 7.0 CLOSING

Climate change is happening now and it will exacerbate existing vulnerabilities and create specific climate change vulnerabilities in communities across Canada. First Nations, with a strong connection to the land, will experience these impacts in a very real way. For many First Nations their geographic location and remote location will increase the magnitude of climate change impacts at the community level.

Communities across Canada need to start planning and implementing adaptation strategies to address their vulnerabilities to climate change. First Nations south of 60 degrees latitude have the opportunity to incorporate climate change decision-making practices now and implement projects that will increase resiliency and sustainability and reduce the overall community risk and long term costs associated with climate change adaptation. A changing climate is already affecting First Nations, and there are impacts that may require immediate action; attention to both these immediate needs and to well-planned adaptation strategies incorporated over the long-term, will help to increase resiliency and sustainability.

Adaptation measures can also be no-regret options – good decisions for the community and sustainability, and good decisions for climate change adaptation. Identifying high-risk areas where development is forbidden or creating and practicing an emergency plan are examples of no-regret adaptation strategies. Communities that have completed these types of projects are better able to meet challenges and capitalize on opportunities presented by both climate change and other non-climate related changes. Access to appropriate information, tools, and resources are required to support First Nations as they adapt to climate change. First Nations require easily accessible and regionally specific information to determine what climate change impacts they will experience in five, ten, and twenty-year timeframes.

This report is a good starting point as First Nations begin to identify their own priority impacts, resulting vulnerabilities, and adaptation strategies. Braiding together the best of Traditional Knowledge and western science will be important as First Nations begin their adaptation planning process. The majority of the existing adaptation tools are western and technical. To complement these, First Nations and others need to create culturally appropriate tools and resources, and need to share the adaptation tools and experiences developed at the community

level. Good background knowledge on local climate change observations combined with climate change predictions, and appropriate adaptation tools will help First Nations take action.

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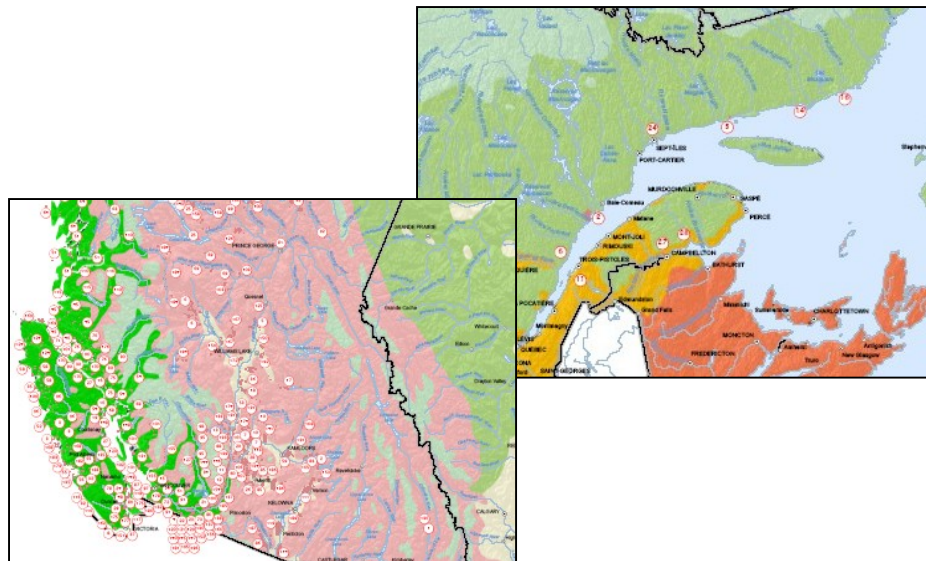
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# CLIMATE CHANGE AND FIRST NATIONS SOUTH OF 60: IMPACTS, ADAPTATION, AND PRIORITIES

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## APPENDIX 1: NATIONAL AND REGIONAL MAPS



Submitted To:  
Indian and Northern Affairs Canada

Submitted By:



May 2008



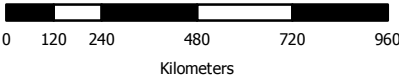
**Distribution of First Nation bands  
within the ecological regions of Canada**

**Legend**

- First Nation locations
- Boreal Forest
- Aspen Parkland / Grassland
- Taiga / Tundra
- Subalpine / Montane / Columbia
- Coast
- Carolinian / Great Lakes
- Acadian

Note: First Nation locations were provided by the Geomatics Services at Indian and Northern Affairs Canada are based on the most populated reserve for each band across Canada.

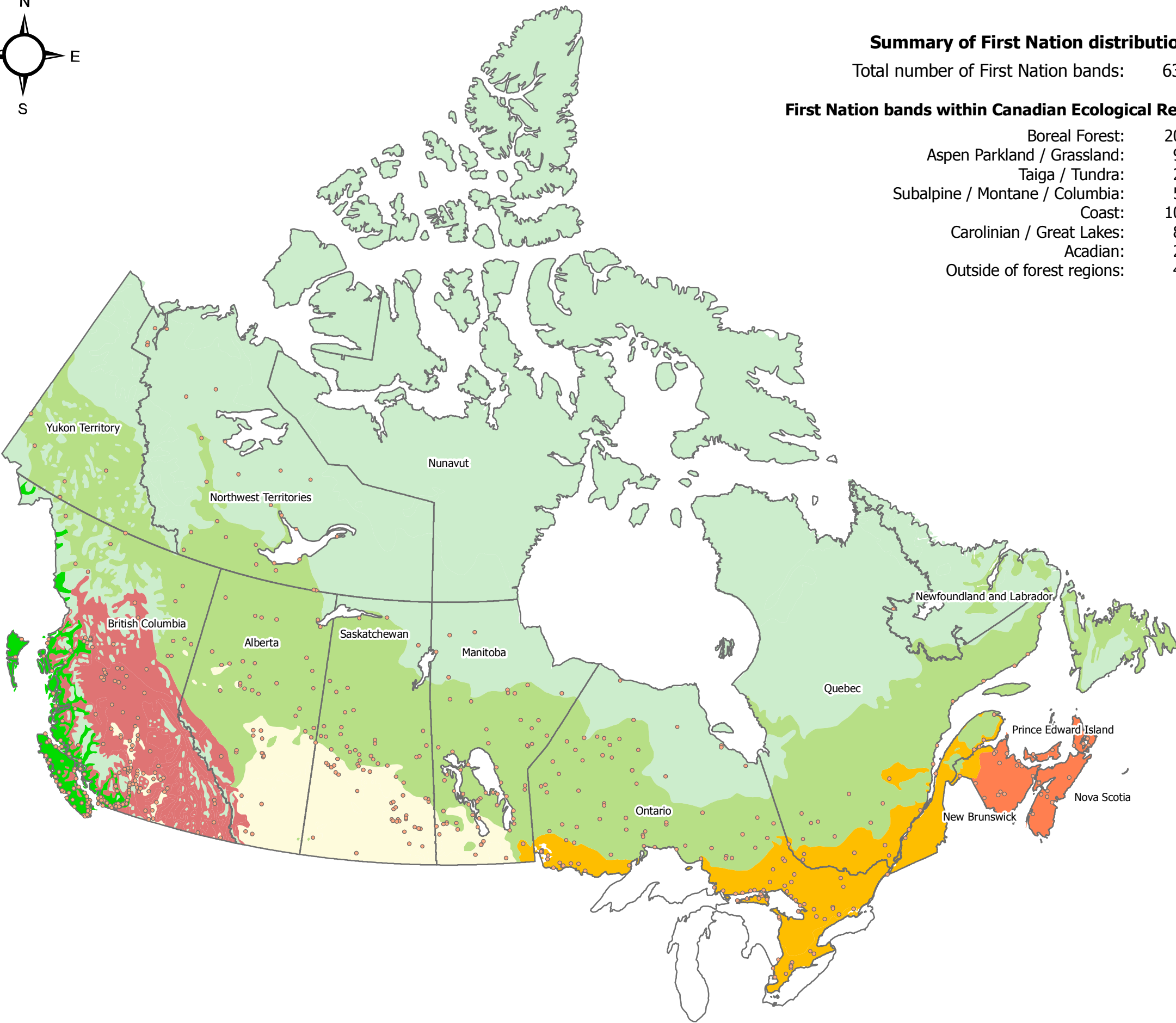
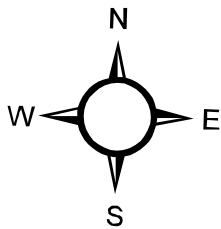
Scale 1 : 19,000,000



Map produced by Steven DeRoy, Research Associate / GIS Specialist on Friday, December 7, 2007.

Data projection: Lambert conformal conic, NAD 83

Data sources: Geomatics Services, Indian and Northern Affairs Canada, Global Forest Watch [adapted from J.S. Rowe, Forest Regions of Canada, (Ottawa: Canadian Forest Service, Dept. of Fisheries and Environment, 1977)]; National Framework Canada Lands Administrative Boundaries, Level 1, Canada Centre for Cadastral Management, Geomatics Canada, Natural Resources Canada



**Summary of First Nation distribution**

Total number of First Nation bands: 634

**First Nation bands within Canadian Ecological Regions**

Boreal Forest:	205
Aspen Parkland / Grassland:	91
Taiga / Tundra:	28
Subalpine / Montane / Columbia:	59
Coast:	100
Carolinian / Great Lakes:	81
Acadian:	27
Outside of forest regions:	43

# Distribution of First Nations within the ecological regions of British Columbia

## Aspen Parkland / Grassland

Band Label	Band Name	Associated Reserves
5	Alexandria	Alexandria 1, Alexandria 12, Alexandria 1a, Hay Ranch 2
6	Alexis Creek	Alexis Creek 6, Chezacut Cemetery 5
7	Ashcroft	Ashcroft 4, Cheetsum's Farm 1, One Hundred Five Mile Post 2
10	Bonaparte	Bonaparte 3, Mauvais Rocher 5
13	Bridge River	Bridge River 1, Bridge River 2, Lillooet 1a
17	Canim Lake	Canim Lake 4
18	Canoe Creek	Canoe Creek 1, Canoe Creek 2, Canoe Creek 3, Dog Creek 1, Dog Creek 2, Dog Creek 4
20	Cayoose Creek	Cayoosh Creek 1, Pashilqua 2
28	Cook's Ferry	Antko 21, Basque 18, Chuchhriaschin 5, Chuchhriaschin 5a, Entlqwekkinh 19, Kumcheen 1, Lish-Leesh-Tum 17, Lower Shawniken 4a, Nicoelton 6, Pemynoos 9, Pokheitsk 10, Schikaelton 16, Shawniken 3, Shawniken 4b, Shpapzchinh 20, , Skoonkoon 2, Spatsum 11, Spatsum 11a, Spences Bridge 4, Spences Bridge 4c, Tsinkahtl 8, Twoyqhalsht 16, Upper Tsinkahtl 8a
36	Esketemc (Formerly Alkali Lake_	Alixton 5, Alkali Lake 1, Alkali Lake 4a, Isadore Harry 12, Johny Sticks 2, Little Springs 18, Little Springs 8, Old Clemenés 16, Pete Suckers 13, Roper's Meadow 14, Sandy Harry 4, Swan Lake 3, Windy Mouth 7, Wycott's Flat 6
53	High Bar	High Bar 1, High Bar 1a, High Bar 2
59	Kamloops	Kamloops 1, Kamloops 2, Kamloops 3, Kamloops 5, Hamilton Creek 7
85	Lower Nicola	Hamilton Creek 7, Joeyaska 2, Logan's 6, Nicola Mameet 1, Zoht 4
86	Lower Similkameen	Alexis 9, Ashnola 10, Blind Creek 6, Blind Creek 6a, Chopaka 7 & 8, Lower Similkameen 2, Narcisse's Farm 4, Range 13
88	Lytton	Cameron Bar 13, Fish Lake 7, Lytton 13a, Lytton 32, Lytton 33, Lytton 4a, Lytton 4b, Lytton 4c, Lytton 4d, Lytton 4e, Lytton 4f, Lytton 5a, Nesikep 6, Nesikep 6a, Nickel Palm 4seah 5, Tsaukan 12
105	Neskonlith (Was Neskainlith)	Neskonlith 1 And 2
111	Okanagan	Duck Lake 7, Harris 3, Okanagan 1, Otter Lake 2, Priest's Valley 6, Swan Lake 4
113	Oregon Jack Creek	Oregon Jack Creek 5, Paska Island 3, South Nepa 7, Upper Nepa 6
114	Osoyoos	Osoyoos 1 And 3
119	Penticton	Penticton 1, 2, And 3a
141	Skeetchestn (Deadman's Creek)	Skeetchestn
150	Soda Creek	Deep Creek 2, Soda Creek 1
153	Spallumcheen	Enderby 2
159	Stone	Stone 1
161	T'it'kit (Formerly Lillooet)	Kilchult 3, Mccartney's Flat 4, Riley Creek 1b, Towinock 2
167	Tl?Etinqox-T?ln Government(Formerly Anaham)	Anahims Flat 1, Anahim's Meadow 2, Anahim's Meadow 2a
171	Tobacco Plains	Tobacco Plains 2
172	Toosey	Toosey 1, 1a, And 3
174	Ts'kw'aylaxw First Nation (Formerly Pavilion)	Leon Creek 2, Leon Creek 2a, Pavilion 1, Pavilion 1a, Ts'kw'aylaxw 5
186	Upper Nicola	Douglas Lake 3, Hamilton Creek 2, Nicola Lake 1, Spahomin Creek 8
189	Westbank First Nation	Medicine Creek 12, Mission Creek 8, Tsinstikeptum 10, Tsinstikeptum 9
191	Whispering Pines / Clinton	Kelly Creek 3
192	Williams Lake	Asahal Lake 2, Carpenter Mountain 15, Chimney Creek 5, Five Mile 3, James Louie 3a, San Jose 6, Tillion 4, Williams Lake 1
193	Xaxli'p First Nation (Formerly Fountain)	Chilhil 6, Dry Salmon 7, Fountain 1, Fountain 10, Fountain 11, Fountain 12, Fountain 1a, Fountain 1b, Fountain 1c, Fountain 1d, Fountain 2, Fountain 3, Fountain 3a, Fountain 4, Fountain 9, Fountain Creek 8, Quatlenemo 5

## Boreal Forest

Band Label	Band Name	Associated Reserves
9	Blueberry River	Beaton River 204, South Parcel, Blueberry River No. 205
31	Dease River	Dease River 1, Dease River 2 (Dease), Dease River 3 (Dease), Dease River 4
33	Doig River	Beaton River No. 204, North Parcel, Doig River 206
38	Fort Nelson	Fontas 1, Fort Nelson 2, Kahntah 3, Snake 5
49	Halfway River	Halfway River 168
57	Iskut	Stikine River 7
82	Liard River	Blue River 1, Dease River 2 (Liard), Dease River 3 (Liard), Good Hope Lake, Horse Ranch Pass 4, Liard River 3, Lower Post Settlement, Mcdames Creek 2, Muddy River 1, One Mile Point 1
122	Prophet River First Nation	Prophet River 4
128	Saulteau First Nations	East Moberly Lake 169
163	Tahltan	Classy Creek 8, Dease Lake 9, Guhthe Tah 12, Hiusta's Meadow 2, Tahltan 1, Tahltan 10, Telegraph Creek 6, Telegraph Creek 6a
165	Taku River Tlingit	Alkhili 2, Atlin-Teslin Indian Cemetery 4, Five Mile Point 3, Jennings River 8, Mcdonald Lake 1, Taku 6, Teslin Lake 7, Teslin Lake 9, Unnamed No. 10
188	West Moberly Lake	West Moberly Lake 168a

Coast

Band Label	Band Name	Associated Reserves
3	Ahousaht	Hisnit Fishery 34, Kishnacous 29, Marktosis 15, Moyehai 23, Oinimitis 14, Openit 27, Peneetle 22, Quortsowe 13, Seektukis 24, Swan 35, Tequa 21, Tootoowiltena 28, Wahous 19, Wahous 20, Wappook 26, Watta 25
4	Aitchelitz	Aitchelitch 9, Skumalasph 16
8	Beecher Bay	Becher Bay 1, Becher Bay 2, Fraser Island 6, Lamb Island 5, Long Neck Island 9, Twin Island 10, Village Islands 7, Whale Island 8
11	Boothroyd	Boothroyd 5b, Boothroyd 5c, Chaumox 11, Kahmoose 4, Sam Adams 12, Sho-Ook 5, Speyum 3, Tsawawmuck 1, Tsintahkti 2
12	Boston Bar First Nation	Austin's Flat 3, Boston Bar 10, Boston Bar 11, Boston Bar 1a, Boston Bar 8, Boston Bar 9, Bucktum 4, Kopchitchin 2, Paul's 6, Scaucy 5, Shrypttahooks 7, Tuckkwiowhum 1
15	Burrard	Burrard Inlet 3
16	Campbell River	Loughborough 3, Matlaten 4
19	Cape Mudge	Cape Mudge 10, Open Bay 8, Quinsam 12, Village Bay 7
21	Chawathil	Chawathil 4, Greenwood Island 3, Hope 1, Schkam 2, Tunnel 6
22	Cheam	Cheam 1, Tseatah 2
23	Chehalis	Chehalis 5 And 6
24	Chemainus First Nation	Chemainus 13, Oyster Bay 12
27	Comox	Comox 1, Goose Spit 3, Pentledge 2, Salmon River 1 (Comox)
29	Cowichan	Cowichan 1, Cowichan 9, Est-Patrolas 4, Kakalatza 6, Kil-Pah-Las 3, Skutz 7, Skutz 8, Theik 2, Tzart-Lam 5
30	Da'naxda'xw First Nation (Formerly Tanakteuk)	Ahnuhati 6, Dead Point 5, Freda Point 4, Keogh 2, Kwatse 3, Sim Creek 5, Tsawwati 1
32	Dididaht	Ahuk 1, Carmanah 6, Cheewat 4a, Chuchummisapo 15, Claoose 4, Doobah 10, Homitan 8, Iktuksasuk 7, Ilclo 12, Malachan 11, Opatseeah 13, Oyees 9, Saouk 16, Sarque 5, Tsuquanah 2, Wokitsas 14, Wyah 3
34	Douglas	Douglas 8, Lelachen 6, Tipella 7
35	Ehattesaht	Chenahkint 12, Ehatis 11, Hecate 17, Hesquis 10a, Hoke Point 10b, Klitsis 16, Oke 10
37	Esquimalt	Esquimalt
41	Gitanyow (Formerly Kitwancool)	Gitanyow 2
42	Gitsegukla	Andimaul 1, Gitsegukla 1, Gitsegukla Logging 3, New Gitsegukla 2
43	Gitwangak	Chig-In-Kaht 8, Gitwangak 1, Gitwangak 2, Kits-Ka-Haws 6, Koonwats 7, Kwa-Tsa-Lix 4, Tum-Bah 5
45	Gwa'sala-Nakwaxda'xw	Dedagaus 8, Halowis 5, Kai-Too-Kwis 15, Kequesta 1, Khazisela 7, Ko-Kwi-Iss 14, Kuthlo 18, Kwetahkis 9, Na-Kwockto 2, Nekite 2, Owh-Wis-Too-A-Wan 10, Pahas 3, Pel-Looth'I-Kai 17, Peneece 11, Saagoombahlah 6, Toksee 4, Tsai-Kwi-Ee 13, Tseetsum-Sawlasilah 6, Tsulquate 4, Waump 16, Wawwat'I 12, Wyclese 1
46	Gwawaenuk Tribe (Formerly Kwa-Wa-Aineuk)	Dove Island 12, Gleyka 6, Hopetown 10a, Kadis 11, Keogh 3, Kunstamis 2, Kunstamis 2a, Lawanth 5, Quay 4
48	Halalt	Halalt 2
50	Hartley Bay	Gill Island 2, Gribble Island 10, Kitkahta 1, Kulkayu 4, Kulkayu 4a, Lackzuswadda 9, Maple Point 11, Quaal 3, Quaal 3a
51	Heiltsuk	Bella Bella 1, Clatse 5, Elcho 6, Hoonees 2, Howeet 8, Kajustus 10, Kisameet 7, Kunsoot 9, Neekas 4, Quartcha 3, Tankeah 5, Tcimotf 1a, Yeo Island 13
52	Hesquiaht	Hesquiat 1, Maahpe 4, Refuge Cove 6, Teahmit 3
54	Homalco	Bear Bay 8, Homalco 1, Homalco 2, Homalco 2a, Homalco 9, Mushkin 5, Mushkin 5a, Orford Bay 4, Potato Point 3
55	Hupacasath First Nation (Formerly Opetchesaht)	Ahahswinis 1, Chuchakacook 4, Cous 3, Klehkoot 2
56	Huu-Ay-Aht First Nation (Formerly Ohiaht)	Anacla 12, Clutus 11, Dochsupple 3, Masit 13, Nuchaquis 2, Numukamis 1, Sachsa 4
58	Ka:'Yu:'K't'h/Che:k:tlas7et'h' First Nations	Amai 15, Artlish 12, Chamiss 7, Granite Island 4, Hisnit 4, Houpsitas 6, Kaoowinch 10, Kaouk 13, Kashittle 9, Kayouk 8, Machta 16, Mahope 3, Malksope 7, Markale 14, Ououkinsh 5, Tahsish 11, Upsowis 6, Yakats 5
61	Katzie	Barnston Island 3, Graveyard 5, Katzie 1, Katzie 2, Pitt Lake 4
63	Kitamaat	Bees 6, Crab River 18, Giltoyees 13, Henderson's Ranch 11, Ja We Yah's 99, Jugwees 5, Kemano 17, Kitamaat 1, Kitamaat 2, Kitasa 7, Kitlope 16, Kuaste 8, Misgatlee 14, Tahla 4, Walth 3
64	Kitasoo	Canoona 2, Dil-Ma-Sow 5, Goo-Ewe 8, Kdad-Eesh 4, Kinmakanksk 6, Kitasoo 1, Lattkaloup 9, Oatswish 13, Quckwa 7, Skilak 14, St. Joe 10, Ulthakoush 11, Weeteeam 3
65	Kitkatla	Citeyats 9, Clowel 13, Grassy Islet 2, Keecha 11, Keswar 16, Kitsemenlagan 19, Kitsemenlagan 19a, Kooryet 12, Kumowadah 3, Sand Island 4, Sheganny 14, Toowartz 8, Tsimlairen 15, Tsimtack 7
66	Kitselas	Chimdimash 2, Chimdimash 2a, Ikshenigwolk 3, Ketoned 7, Kitselas 1, Kshish 4, Kshish 4b, Kulspai 6, Port Essington, Zaimoetz 5
67	Kitsumkalum	Dalk-Ka-Gila-Quoeux 2, Kitsumkaylum 1, Zimagord 3
68	Klahoose First Nation	Ahpokum 9, Deep Valley 5, Klahoose 1, Quaniwsom 2, Quequa 6, Squirrel Cove 8, Tatpo-Oose 10, Tork 7
71	Kwakiutl	Fort Rupert 1, Keogh 6, Kippase 2, Klickseewy 7, Shell Island 3, Thomas Point 5, Thomas Point 5a, Walden 9, Wazulis 14
72	Kwantlen First Nations (Formerly Langley)	Langley 2, Langley 3, Langley 4, Langley 5, Mcmillan Island 6, Whonnock 1
73	Kwaw-Kwaw-A-Pilt	Kwawkwawapilt 6
74	Kwayhqutlum First Nation (Formerly Coquitlam)	Coquitlam 1 And 2
75	Kwiakah	Matsayno 5
76	Kwicksutaineuk-Ah-Kwaw-Ah-Mish	Ahta 3, Alalco 8, Dakiulis 7, Dug-Da-Myse 12, Gwayasdums 1, Kye-Yaa-La 1, Kyidagwis 2, Meetup 2
78	Lake Cowichan First Nation	Cowichan Lake
79	Lax Kw'alaams	Alder Creek 70, Bill Lake 37, Channel Islands 33, Dashken 22, Dundas Island 32b, Dzagayap 73, Dzagayap 74, Ensheshese 13, Ensheshese 53, Gitandoiks 75, Gitandoiks 76, Iakgwas 69, Imkusiyen 65, Kasika 36, Kasika 71, Kasika 72, Ketai 28, Klakelse 86, Knamadeek 52, Knames 45, Knames 46, Ksadagamks 43, Ksadsks 44, Ksagwisgwas 62, Ksagwisgwas 63, Ksames 85, Kshaoom 23, Kstus 83, Kstus 84, Ktamgaodzen 51, Kyex 64, Lachmach 16, Lax Kw'alaams 1, Maganktoon 56, Maklaksadagmaks 41, Meyanlow 58, Ndakdolk 54, Nishanocknawnak 35, Pitt Island 27, Psacelay 77, Red Bluff 88, Salvus 26, Scuttsap 11a, Spakels 17, Spanaknok 57, Spayaks 60, Spokwan 48, Toon 15, Union Bay 31, Wilskaskammel 14, Wudzimagon 61
80	Leq'a: Mel First Nation (Formerly Lakahahmen)	Aylechootlook 5, Holachten 8, Lackaway 2, Lakahahmen 11, Lakway Cemetery 3, Papekwatchin 4, Skweahm 10, Sumas Cemetery 12, Yaalstrick 1, Zaitscullachan 9
87	Lyackson	Lyackson 3, Shingle Point 4
89	Malahat First Nation	Malahat 11
90	Mamalilikulla-Qwe'qwa'sot'em	Apsagayu 1a, Compton Island 6, Mahmalilikullah 1



Coast - continued...

Band Label	Band Name	Associated Reserves
91	Matsqui	Matsqui 4, Matsqui Main 2, Sahhacum 1, Three Islands 3
93	Metlakatla	Khtahda 10, Khyex 8, Meanlaw 24, Scuttsap 11, Shoowahtlans 4, Tsimpsean 2 South Part, Tuck Inlet 89, Wilnaskancaud 3
95	Mount Currie	Lokla 4, Mount Currie 1, Mount Currie 10, Mount Currie 2, Mount Currie 6, Mount Currie 7, Mount Currie 8, Nesuch 3
96	Mowachaht/Muchalaht	Ahaminaquus 12, Cheesish 15, Coopte 9, Hisnit 7, Hleepte 14, Hoiss 8, Matchlee 13, Mooyah 16, Moutcha 5, Nesuk 4, Ous 17, Sucwoa 6, Tahsis 11, Tsa Xana 18, Tsarksis 2, Tsowwin 10
97	Musqueam	Musqueam 2, Musqueam 4, Sea Island 3
101	Namigis First Nation (Formerly Nimpkish)	Ar-Ce-Wy-Ee 4, Ches-La-Kee 3, O-Tsaw-Las 5
102	Nanoose	Nanoose
109	Nuchatlaht	Ahpukto 3, Nuchatl 1, Nuchatl 2, Occosh 8, Oclucje 7, Opemit 4, Owossitsa 6, Savey 15, Shoomart 5, Sophe 14
110	Nuxalk Nation	Bella Coola 1, Chatscah 2, Kemsquit 1, Kwatlana 4, Nooseseck 2, Skowquiltz River 3, Taleomy 3
112	Old Masset Village Council	Ain 6, Cohoe Point 20, Dangingay 12, Egeria Bay 19, Guoyskun 22, Hiellen 2, Jalun 14, Kioosta 15, Kose 9, Kung 11, Lanas 4, Mammin River 25, Masset 1, Naden 10, Naden 23, Owun 24, Saouchten 18, Satunquin 5, Susk 17, Tatense 16, Tiahn 27, Tlaa Gaa Aawtlaas 28, Yan 7
115	Oweekeno	Katit 1, Kiltala 2
116	Pacheedaht First Nation	Gordon River 2, Pacheena 1, Quesidaquah 4
117	Pauquachin	Cole Bay 3
120	Peters	Peters 1, 1a, And 2
121	Popkum	Popkum 1 And 2
123	Qualicum First Nation	Qualicum
124	Quatsino	Ah-We-Cha-Ol-To 16, Cayilth 5, Cayuse 6, Clatux 9, Clienna 14, Grass Point 13, Klaskish 3, Kultah 4, Mah-Te-Nicht 8, Maquazneecht Island 17, O-Ya-Kum-La 11, Pa-Cat'l-Lin-Ne 3, Pulcah 15, Quatleyo 12, Quatsino Subdivision 18, Quattishe 1, Teeta 7, Telaise 1, Toh-Quo-Eugh 2, Tsowenachs 2
127	Samahquam	Baptiste Smith 1a, Sachteen 2, Sachteen 2a, Samahquam 1
129	Scowlitz	Pekw'xe:yles (Peckquaylis) Indian Reserve, Scowlitz 1, Squawkum Creek 3, Williams 2
130	Seabird Island	Seabird Island
131	Sechelt	Sechelt Lands No. 1, Sechelt Lands No. 10, Sechelt Lands No. 12, Sechelt Lands No. 12a, Sechelt Lands No. 13, Sechelt Lands No. 14, Sechelt Lands No. 15, Sechelt Lands No. 17, Sechelt Lands No. 18, Sechelt Lands No. 19, Sechelt Lands No. 19a, Sechelt Lands No. 2, Sechelt Lands No. 23, Sechelt Lands No. 24, Sechelt Lands No. 25, Sechelt Lands No. 26, Sechelt Lands No. 27, Sechelt Lands No. 28, Sechelt Lands No. 3, Sechelt Lands No. 4, Sechelt Lands No. 5
132	Semiahmoo	Semiahmoo
135	Sheshaht	Ahmitsa 5, Alberni 2, Equis 8, Tsahaheh 1, Tseoowa 4
137	Shxw'ow'hamel First Nation (Formerly Ohamil)	Kuthlalth 3, Ohamil 1, Wahleach Island 2
138	Shxwh?:Y Village (Formerly Skway)	Skway 5
140	Skawahlook First Nation	Ruby Creek 2, Skawahlook 1
142	Skidegate	Black Slate 11, Cumshewas 7, Deena 3, Kaste 6, Lagins 5, Skaigha 2, Skedance 8, Skidegate 1, Tasu Site
144	Skookum Chuck	Franks 10, Morteen 9, Perrets 11, Sklahhesten 5, Sklahhesten 5a, Sklahhesten 5b, Skookumchuck 4, Skookumchuck 4a, Sweeteen 3
145	Skowkale	Grass 15, Skowkale 10, Skowkale 11
147	Skwah	Schelowat 1, Skwah 4, Skwahla 2, Skwali 3
148	Slammon	Kahkaykay 6, Paukeanum 3, Slammon 1, Tokenatch 5, Toquana 4
149	Snuneymuxw First Nation (Formerly Nanaimo)	Nanaimo River 2, 3, And 4, Nanaimo Town 1
151	Songhees	(Deadman's Island) Halkett Island No. 2, New Songhees 1a
152	Soowahlie	Soowahlie 14
154	Spuzzum	Chapman's Bar 10, Long Tunnel 5, Long Tunnel 5a, Papsilqua 2, Papsilqua 2a, Papsilqua 2b, Saddle Rock 9, Skuet 6, Spuzzum 1, Spuzzum 1a, Spuzzum 7, Stout 8, Teequaloose 3, Teequaloose 3a, Yelakin 4, Yelankin 4a
155	Squamish	Aikwucks 15, Capilano 5, Cheakamus 11, Chekwelp 26, Chekwelp 26a, Defence Island 28, Kaikalahun 25, Kitsilano 6, Kowtain 17, Kwum Kwum 28a, Mission 1, Poquiosin & Skamain 13, Seaichem 16, Seymour Creek 2, Stawamus 24, Waiwakum 14, Yekwaupsum 18, Yekwaupsum 19
156	Squiaala First Nation	Squiaala 7 And 8
160	Sumas First Nation	Upper Sumas 6
162	T'sou-Ke First Nation (Formerly Sooke)	T'sou-Ke 1 And 2
168	Tlaoquiaht /Formerly Clayoquot	Clayoqua 6, Eelseuklis 10, Ilthpaya 8, Indian Island 30, Kootowis 4, Okeamin 5, Onadsilth 9, Winche 7
169	Tlatlasikwala	Hope Island 1
170	Tlowitsis Tribe (Formerly Tlowitsis-Mumtagila)	Etsekin 1, Hanatsa 6, Haylahte 3, Keecekiltum 2, Pawala 5, Port Neville 4
173	Toquaht	Chenatha 4, Chequis 3, Deekyakus 2, Macoah 1
175	Tsartlip	Goldstream 13, Senanus Island 10, South Saanich 1
176	Tsawataineuk	Bat-L-Ki 3, Charles Creek 2, Kawages 4, Kukwapa 5, Quae 7
177	Tsawout First Nation	East Saanich 2, Fulford Harbour 5
178	Tsawwassen	Tsawwassen
180	Tseycum	Pender Island 8, Saturna Island 7
181	Tzeachten	Tzeachten 13
182	Uchucklesaht	Cowishil 1, Elhlateese 2
183	Ucluelet First Nation	Clakamucus 2, Ittatsoo 1, Kleykleyhous 5, Outs 3, Quinaquiltz 4, Ucluth 6, Wya 7
185	Union Bar	Aywawwis 15, Kawkawa Lake 16, Klaklacum 12, Puckatholetchin 11, Skawahlum 10, Swahliseah 14, Trafalgar Flat 13
195	Yakweakwioose	Yakweakwioose 12
196	Yale	Albert Flat 5, Kaykaip 7, Lukseetsissum 9, Qualark 4, Squeah 6, Stullawheets 8, Yale 18, Yale 19, Yale 20, Yale 21, Yale 22

Subalpine / Montane / Columbia

Band Label	Band Name	Associated Reserves
1	?Akisq'nuk First Nation (Formerly Columbia Lake)	Columbia Lake 3
2	Adams Lake	Hustalen 1, Sahhaltkum 4, Squaam 2, Stequmwhulpa 5, Switsemalph 6, Switsemalph 7, Toops 3
5	Alexandria	Alexandria 1, Alexandria 10, Alexandria 11, Alexandria 3, Alexandria 3a, Big Joe's Meadow 7, Freddie's Meadow 8, Lorin Meadow 9, Mckay Meadow 4, Necausley Creek 6, Webster Creek 5
6	Alexis Creek	Agats Meadow 8, Alexis Creek 12, Alexis Creek 13, Alexis Creek 14, Alexis Creek 14, Alexis Creek 15, Alexis Creek 16, Alexis Creek 17, Alexis Creek 18, Alexis Creek 20, Alexis Creek 21, Alexis Creek 22, Alexis Creek 23, Alexis Creek 24, Alexis Creek 25, Alexis Creek 26, Alexis Creek 27, Alexis Creek 28, Alexis Creek 29, Alexis Creek 29, Alexis Creek 30, Alexis Creek 30, Alexis Creek 31, Alexis Creek 32, Alexis Creek 33, Alexis Creek 34, Alexis Creek 35, Alexis Creek 6, Charley Boy's Meadow 3, Freddie Charley Boy 7, Michel Gardens 36, Puntzi Lake 2, Redstone Cemetery 1b, Redstone Flat 1, Redstone Flat 1a, Seymour Meadows 19, Toby Helenes Meadow 10, Toby Helenes Meadow 11, Toby Helenes Meadow 9, Toby's Meadow 4
7	Ashcroft	Mclean's Lake 3
10	Bonaparte	Bonaparte 3, Grasslands 7, Hihium Lake 6, Loon Lake 4, Lower Hat Creek 2, Upper Hat Creek 1
11	Boothroyd	Boothroyd 13, Boothroyd 5a, Boothroyd 5b, Boothroyd 5c, Boothroyd 6a, Boothroyd 6b, Boothroyd 8a, Chukcheetso 7, Dufferin 10, Inkahtsaph 6, Sho-Ook 5, Staiyahanny 8, Stlakament 9
13	Bridge River	Bridge River 1, Lillooet 1a
14	Burns Lake	Burns Lake 18, Poison Creek 17, Poison Creek 17a, Sheraton Creek 19
15	Burrard	Inlailawatash 4 And 4a
16	Campbell River	Homayno 2
17	Canim Lake	Canim Lake 1, Canim Lake 2, Canim Lake 3, Canim Lake 5, Canim Lake 6
18	Canoe Creek	Canoe Creek 2, Copper Johnny Meadow 8, Dog Creek 3, Fish Lake 5, Spilmouse 4, Tinmusket 5a, Toby Lake 6
20	Cayoose Creek	Cayoosh Creek 1, Pashilqua 2, Pashilqua 2a
21	Chawathil	Chawathil 4
25	Cheslatta Carrier Nation	Alexis Thomas 1a, Baptiste Louis 8, Cheslatta 1 (Incls. 11 Pcls), Holy Cross Lake 3, Knapp Lake 6, Leon 14, Murray Lake 4, Targe Creek 15
26	Coldwater	Coldwater 1, Gwen Lake 3, Paul's Basin 2
28	Cook's Ferry	Kloklowuck 7, Nicoelton 6
36	Esketemc (Formerly Alkali Lake_	Cludolicum 9, Cludolicum 9a, Isadore Harry 12, Little Springs 18, Loon Lake 10, Pete Suckers 13, Sampson's Meadow 11, Sampson's Meadow 11a
40	Gitanmaax	Anlaw 4, Gitanmaax 1, Kisgegas, Ksoo-Gun-Ya 2a, Tsitsk 3
41	Gitanyow (Formerly Kitwancool)	Gitanyow 1 And 3a
42	Gitsegukla	Gitsegukla 1, Gitsegukla Logging 3, New Gitsegukla 2
44	Glen Vowell	Sik-E-Dakh 2
47	Hagwilget Village	Bulkley 1, Hagwilget 1
51	Heiltsuk	Noota 4
59	Kamloops	Kamloops 4 And 5
60	Kanaka Bar	Kanaka Bar 1a, Kanaka Bar 2, Nekliptum 1, Pegleg 3, Pegleg 3a, Whyeek 4
62	Kispiox	Agwedin 3, Andak 9, Gul-Mak 8, Gun-A-Chal 5, Kis-An-Usko 7, Kispiox 1, Kuldoe 1, Quan-Skum-Ksin-Mich-Mich 4, Sidina 6, Waulp 10
63	Kitamaat	Kitlope 16, Wekellals 15
69	Kluskus	Bishop Bluffs 10, Bishop Bluffs 5, Bishop Bluffs 6, Chief Morris 13, Cluchuta Lake 10a, Cluchuta Lake 10b, Kloyadingli 2, Kluskus 1, Kluskus 14, Kushya Creek 12, Kushya Creek 7, Sundayman's Meadow 3, Tatelkus Lake 28, Tsachla Lake 8, Tzetzi Lake 11, Upper Kluskus Lake 9, Yaladelassla 4
70	Kwadacha (Formerly Fort Ware)	Fort Ware 1, Sucker Lake 2, Weissener Lake 3
76	Kwicksutaineuk-Ah-Kwaw-Ah-Mish	Kakweken 4
77	Lake Babine Nation	Alphonse Tommy 7, Augier Lake 22, Babine 16, Babine 25, Babine 26, Babine 6, Babine Lake 20, Babine Lake 21b, Babine River 21, Babine River 21a, Casdeded 8, Chanoodandidalch 14, Chapel Park 28, Clotalairquot 4, Michell Pierre 12, Nedoats 11, Nedoats 13, Ne-Tsaw-Greece 10, No-Cut 5, Pinkut Lake 23, Tadinlay 15, Tahlo Lake 24, Tsak 9, Woyenne 27
79	Lax Kw'alaams	Alastair 80, Alastair 81, Alastair 82, Carm Creek 38, Iakvas 68, Iakwulgyiyaps 78, Kasiks River 29, Kateen River 39, Khutzemateen 49, Knokmolks 67, Kstus 84, Lakelse 25, Lakgeas 87, Tsemknawalquam 79
81	Lheidli T'enneh Nation (Formerly Lheit Lit'en)	Clesbaoneecheck 3, Fort George 2, Fort George Cemetery 1a, Salaquo 4
83	Little Shuswap Lake	Chum Creek 2, Meadow Creek 3, North Bay 5, Quaaout 1, Scotch Creek 4
84	Lower Kootenay	Creston 1, Lower Kootenay 1a, Lower Kootenay 1b, Lower Kootenay 1c, Lower Kootenay 2, Lower Kootenay 3, Lower Kootenay 4, Lower Kootenay 5, St. Mary's 1a
85	Lower Nicola	Nicola Mameet 1, Pipeul 3, Speous 8, Zoht 14, Zoht 4, Zoht 5
86	Lower Similkameen	Ashnola 10, Keremeos Forks 12 & 12a, Range 13
88	Lytton	Bootahnie 15, Halhalaeden 14, Halhalaeden 14a, Inkluckcheen 21, Inkluckcheen 21b, Kitzowit 20, Klahkamich 17, Kleetlekut 22, Kleetlekut 22a, Klickkumcheen 18, Lytton 21a, Lytton 27b, Lytton 31, Lytton 33, Lytton 3a, Lytton 9a, Lytton 9b, Maka 8, Nananahout 1, Ngwyu'yemc 36, Nickeyeah 25, Nkaih 10, Nocten 19, Nohomeen 23, Nuuaudin 2, Nuuaudin 2a, Nuuaudin 2b, Papyum 27, Papyum 27a, Papyum Graveyard 27c, Skwayaynope 26, Spintlum Flat 3, Stryen 9, Tsaukan 12, Tuckozap 24, Two Mile Creek 16, Two Mile CreEk 16a, Yawaucht 11
92	Mcleod Lake	Arctic Lake 10, Blue Lake 24, Carp Lake 3, Davie Lake 28, Hominka 11, Kerry Lake East 9, Kerry Lake West 8, McIntyre Lake 23, Mcleod Lake 1, Mcleod Lake 5, Pack River 2, Quaw Island 25, Tacheeda Lake 14, Tom Cook 26, War Lake 4, Weedon Carp 6, Weedon Lake 27
94	Moricetown	Babine 17, Babine 18, Bulkley River 19, Coryatsaqua 2, Jean Baptiste 28, Moricetown 1, Oschawwinna 3
95	Mount Currie	Challetkohum 5 And 9
98	N'quatqua (Formerly Anderson Lake)	Anderson Lake 5, Nequatque 1, Nequatque 2, Nequatque 3, Nequatque 3a, Nequatque 4
99	Nadleh Whuten (Formerly Fraser Lake)	Canyon Lake 7, Fondeur 9, Fraser Lake 2, Nautley 1, Ormonde Creek 8, Seaspunkut 4, Yensischuck 3
100	Nak'azdli	Beaver Islands 8, Carrier Lake 15, Great Bear Lake 16, Inzana Lake 12, Nak'azdli 1, Nehounlee Lake 13, Six Mile Meadow 6, Sowchea 3, Sowchea 3a, Stuart Lake 10, Stuart Lake 9, Tatsadah Lake 14, Tatselawas 2, Uzta 4, Uzta 7a, Williams Prairie Meadow 1a
103	Nazk0	Baezaeko River 25, Baezaeko River 26, Baezaeko River 27, Coglistiko River 29, Deep Creek 5, Euchinico Creek 17, Euchinico Creek 18, Euchinico Creek 19, Fishpot Lake 24, Lower Fishpot Lake 24a, Michelle Creek 22, Michelle Creek 23, Nahlquonate 2, Nazco 20, Nazco 21, Nazco Cemetery 20a, Redwater Creek 30, Trout Lake Alec 16, Trout Lake Jonny 15
104	Nee-Tahi-Buhn	Eastern Island 13, Francois Lake 7, Isaac 8, Omineca 1, Skins Lake 16b
105	Neskonlith (Was Neskainlith)	Neskonlith 1, Neskonlith 2, Switsemalph 3

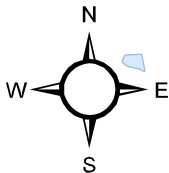
Subalpine / Montane / Columbia continued...

Band Label	Band Name	Associated Reserves
106	Nicomen	Enhalt 11, Gulada 3a, Klahkowitz 5, Kykinalko 2, Naykikoulth 13, Nicomen 1, Putkwa 14, Sackum 3, Shoskhost 7, Shuouchten 15, Skaynaneichst 12, Skeikut 9, Skhpowtz 4, Sleetsis 6, Squianny 10, Unpukpulquatum 8
107	Nooaitch	Nooaitch 10, Nooaitch Grass 9
108	North Thompson	Barriere River 3a, Boulder Creek 5, Louis Creek 4, Nekalliston 2, North Thompson 1
111	Okanagan	Okanagan 1, Swan Lake 4
113	Oregon Jack Creek	Hay Meadow 1, Oregon Jack Creek 2
114	Osoyoos	Osoyoos 1
125	Red Bluff	Dragon Lake 3, Quesnel 1, Rich Bar 4, Sinnce-Tah-Lah 2
126	Saik'uz First Nation (Formerly Stony Creek)	Clustalach 5, Corkscrew Creek 10, Corkscrew Creek 9, Laketown 3, Noonla 6, Old Country Meadow 4, Sackanitecla 2, Sinkut Lake 8, Stony Creek 1, Tatuk Lake 7
127	Samahquam	Baptiste Smith 1b, Samahquam 1
131	Sechelt	Sechelt Lands No. 11, Sechelt Lands No. 16, Sechelt Lands No. 6, Sechelt Lands No. 6a, Sechelt Lands No. 7, Sechelt Lands No. 8, Sechelt Lands No. 9
133	Seton Lake	Mission 5, Necait 6, Seton Lake 5a, Silicon 2, Slosch 1, Slosch 1a, Whitecap 1
134	Shackan	Papsilqua 13, Shackan 11, Soldatquo 12
136	Shuswap	Shuswap
139	Siska	Humhampt 6, Humhampt 6a, Kupchynalth 1, Kupchynalth 2, Moosh 4, Nahamanak 7, Siska Flat 3, Siska Flat 5a, Siska Flat 5b, Siska Flat 8, Zacht 5
140	Skawahlook First Nation	Skawahlook 1
141	Skeetchestn (Deadman's Creek)	Hihium Lake 6a, Hihium Lake 6b, Marshy Lake 1, Skeetchestn
143	Skin Tyee	Skin Lake 15, Skins Lake 16a, Tatla't East 2, Uncha Lake 13a, Western Island 14
144	Skookum Chuck	Glazier Creek 12
146	Skuppah	Inklyuhkinatko 2, Pooeyelth 3, Skuppah 1, Skuppah 2a, Skuppah 2b, Skuppah 3a, Skuppah 4, Skuppah 4a
153	Spallumcheen	Enderby 2, Salmon River 1 (Spallumcheen), Sicamous 3
154	Spuzzum	Long Tunnel 5a, Spuzzum 1, Spuzzum 1a
155	Squamish	Cheakamus 11, Chuckchuck 8, Kwum Kwum 28a, Poquiosin & Skamain 13, Poyam 9, Skowishin 7, Skowishin Graveyard 10, Yookwitz 12
157	St. Mary's	Bummers Flat 6, Cassimayooks 5, Isidore's Ranch 4, Kootenay 1, Kootenay 1
158	Stellat'en First Nation	Binta Lake 2, Stellaquo 1
159	Stone	Brigham Creek 3, Saddle Horse 2, Stone 1, Stone 1a, Stone 4
161	T'it'kit (Formerly Lillooet)	Lillooet 1, Seton Lake 5
164	Takla Lake	Bear Lake 1a, Bear Lake 4, Bear River 3, Cheztainya Lake 11, Driftwood River 1, Klewaduska 6, Kotsine 2, North Tacla Lake 10, North Tacla Lake 11a, North Tacla Lake 12, North Tacla Lake 7, North Tacla Lake 7a, North Tacla Lake 8, Tacla Lake 9, Tsupmeet 5
166	Tl'azt'en Nations(Form Stuart Lake)	Bihl' K' A 18, Bihl' K'a Chah 20, Bihlk'a 6, Binche 10, Binche 12, Binche 2, Binche Bun 7, Camsell Lake 30, Carsoosat 17, Chundoo Lh'tan La 45, Chuz Teeslee 41, Chuz-Ghun 8, Dlah Koh 31, Dzin Tl'at 46, Dzitline-Lee 9, Ihch'az Uz Ta Tsoh 44, Jus K'ay Tl'oh 32, K'ay Noo 47, Kuz-Che 5, La Tse Cho Diz I 33, Lhoh Cho 29, Nak'a Lat 39, Natazutlooh 25, Noo Kat 42, North Road 19, O K'ay Wha Cho 26, Shas Dzuhl Koh 35, Sisul Tl'o K'ut 14, Sisul Tl'o K'ut 21, Skooby Island 48, Ta DuHl 36, Tache 1, Tanizul 43, Teeslee 15, Teh Noo'n Che 49, Tes-Gha-La 7a, Tl'o Ba 22, Tsay-Cho 4, Tsaz Chech 27, Tsaz Chech 28, Tsaz Cheh Koh 24, Tse Bay Ha Tine 34, Tsun Tin Ah 37, Wha T'a Noo 40
167	Tl'Etinqox-T?In Government(Formerly Anaham)	Anahim 10, Anahim 11, Anahim 12, Anahim 13, Anahim 14, Anahim 15, Anahim 16, Anahim 17, Anahim 18, Anahim 3, Anahim 4, Anahim 5, Anahim 6, Anahim 7, Anahim 8, Anahim 9
171	Tobacco Plains	Tobacco Plains 2
172	Toosey	Baptiste Meadow 2
174	Ts'kw'aylaxw First Nation (Formerly Pavilion)	Marble Canyon 3, Pavilion 3a, Pavilion 4
179	Tsay Keh Dene (Formerly Ingenika)	Parsnips 5, Police Meadow 2, Tutu Creek 4
184	Ulkatcho	Abuntlet Lake 4, Andy Cahoose Meadow 16, Betty Creek 18, Blackwater Meadow 11, Cahoose 10, Cahoose 12, Cahoose 8, Casimiel Meadows 15a, Fishtrap 19, Louis Squinas Ranch 14, Salmon River Meadow 7, Squinas 2, Thomas Squinas Ranch 2a, Tilgatko 17, Towdystan Lake 3, Ulkatcho 1, Ulkatcho 13, Ulkatcho 14a, Ulkatcho 5, Ulkatcho 6, Ulkatcho 6, Willow Meadow 9
185	Union Bar	Puckatholetchin 11
186	Upper Nicola	Chapperon Creek 6, Chapperon Lake 5, Douglas Lake 3, Salmon Lake 7, Spahomin Creek 4, Spahomin Creek 8
187	Upper Similkameen	Chuchuwayha 2, Chuchuwayha 2c, Lulu 5, Nine Mile Creek 4, One Mile 6, Vermilion Forks 1, Wolf Creek 3
189	Westbank First Nation	Medicine Hill 11
190	Wet'suwet'en First Nation	Duncan Lake 2, Felix George 7, Foxy Creek 6, Gaichbin 8, Klagookchew 9, Maxan Creek 5, Maxan Lake 3, Maxan Lake 4, Palling 1, Tatla West 11, Tsichgass 10
191	Whispering Pines / Clinton	Clinton 1, Whispering Pines 4
194	Xeni Gwet'in First Nations(Formerly Nemaiah Valley)	Chilco Lake 1, Chilco Lake 1a, Garden 2, Garden 2a, Lezbye 6, Lohbiee 3, Tanakut 4, Tsunnia Lake 5
196	Yale	Albert Flat 5, Four And One Half Mile 2, Stullawheets 8, Yale 23, Yale 24, Yale 25, Yale Town 1
197	Yekooche	Nan-Tl' At 13, Ucausley 16, Ye-Koo-Che 3, Ye-Koos-Lee 11

Taiga / Tundra

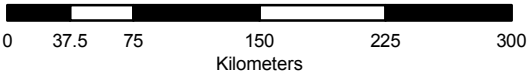
Band Label	Band Name	Associated Reserves
38	Fort Nelson	Fort Nelson 2
41	Gitanyow (Formerly Kitwancool)	Gitanyow 3a
57	Iskut	Iskut 6, Kluachon Lake 1
68	Klahoose First Nation	Klahoose 1, Salmon Bay 3
82	Liard River	Mosquito Creek 5
88	Lytton	Lytton 26a, Lytton 31, Nickeyeah 25, Skwayaynope 26
98	N'quatqua (Formerly Anderson Lake)	Anderson Lake 5
139	Siska	Humhampt 6a
146	Skuppah	Skuppah 3a
163	Tahltan	Salmon Creek 3, Tahltan Forks 5, Tatcho Creek 11, Upper Tahltan 4
164	Takla Lake	Bear Lake 1b, Tsaytut Island 1c
165	Taku River Tlingit	Silver Salmon Lake 5
166	Tl'azt'en Nations(Form Stuart Lake)	Metso A Choot 23





# First Nation bands within the major ecological regions of British Columbia

Scale: 1 : 4,500,000

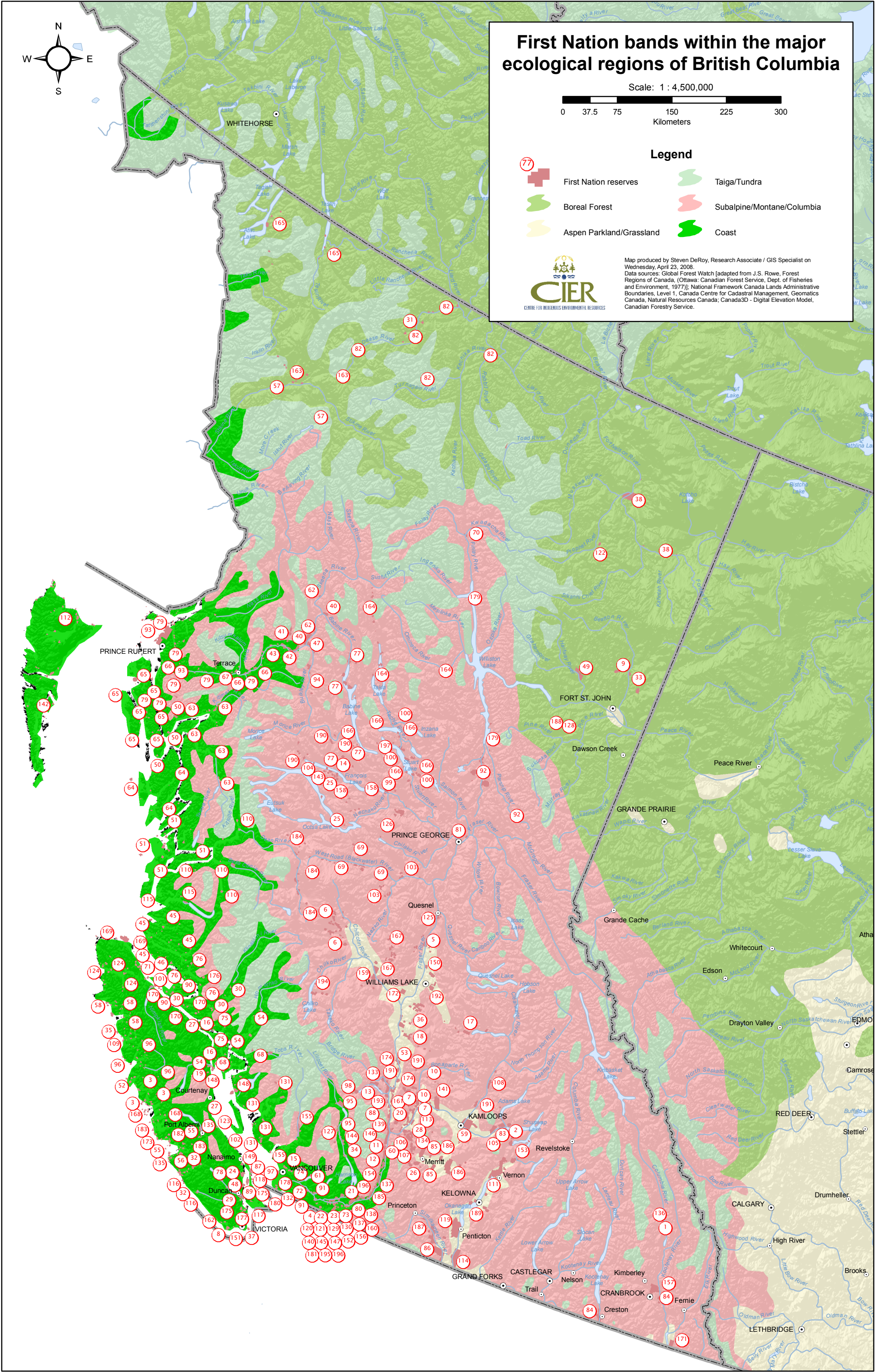


## Legend

- |    |                          |                            |
|----|--------------------------|----------------------------|
| 77 | First Nation reserves    | Taiga/Tundra               |
|    | Boreal Forest            | Subalpine/Montane/Columbia |
|    | Aspen Parkland/Grassland | Coast                      |



Map produced by Steven DeRoy, Research Associate / GIS Specialist on Wednesday, April 23, 2008.  
Data sources: Global Forest Watch [adapted from J.S. Rowe, Forest Regions of Canada, (Ottawa: Canadian Forest Service, Dept. of Fisheries and Environment, 1977)]; National Framework Canada Lands Administrative Boundaries, Level 1; Canada Centre for Cadastral Management, Geomatics Canada, Natural Resources Canada; Canada3D - Digital Elevation Model, Canadian Forestry Service.





First Nations within the major forest regions of Alberta

Aspen Parkland - Grassland

Map Label	Band Name	Associated Reserves
1	Alexander Band	Alexander 134
2	Alexis Band	Alexis 133
4	Beaver Lake Band	Blue Quills First Nation Indian Reserve
6	Blood Band	Blood 148
7	Chiniki Band	Eden Valley 216, Stoney 142B
13	Enoch Band	Stony Plain 135 and 135A
14	Ermineskin Band	Ermineskin 138
18	Frog Lake Band	Puskiakiwenin 122, Unipouheos 121
19	Grouard Band	Kapawe'no First Nation 150B (Formerly Freeman 150B), 150C (Formerly Halcro 150C), 150D (Formerly Pakashan 150D), and 230 (Formerly Grouard 230)
23	Kapawe'no First Nation	Kapawe'no First Nation No. 229 (Formerly Grouard 229)
27	Louis Bull Band	Louis Bull 138B
28	Montana Band	Montana 139, Pigeon Lake 138A
30	Onion Lake	Makaoos I.R. 120
31	Paul Band	Wabamun 133A and 133B
32	Piikani Nation (Peigan Band)	Peigan Timber Limit 147B, Piikani Reserve No. 147
33	Saddle Lake Band (Saddle Lake)	Saddle Lake 125
34	Samson Band	Samson 137 and 137A
36	Siksika Nation	Siksika 146
39	Sturgeon Lake Band	Sturgeon Lake 154 and 154A
40	Sucker Creek Band	Sucker Creek 150A
44	Tsuu T'ina Band	Tsuu T'ina Nation 145
45	Wesley Band	Stoney 142, 143, 144

Boreal Forest

Map Label	Band Name	Associated Reserves
1	Alexander Band	Alexander 134A (Fox Creek) And 134B
2	Alexis Band	Alexis Elk River 233, Alexis Whitecourt 232
3	Beaver First Nation Band	Boyer River 164, Child Lake 164A
4	Beaver Lake Band	Beaver Lake 131
5	Bigstone Cree Band	Jean Baptiste Gambler 183, Wabasca 166, 166A, 166B, 166C, 166D
7	Chiniki Band	Stoney 142B
8	Cold Lake First Nations Band	Cold Lake 149, 149A And 149B
9	Cree Band	Allison Bay 219, Devil'S Gate 220, Dog Head 218, Old Fort 217 And Peace Point No.222
10	Dene Tha' Band	Amber River 211, Bistcho Lake 213, Bushe River 207, Hay Lake 209, Jackfish Point 214, Upper Hay River 212, Zama Lake 210
11	Driftpile Band	Drift Pile River 150
12	Duncan's Band	Duncans 151A, William Mckenzie 151K
15	Fort Chipewyan Band	Chipewyan 201, 201A, 201B, 201C, 201D, 201E, 201F, 201G
16	Fort McKay Band	Fort Mckay 174, Namur Lake 174B, Namur River 174A
17	Fort McMurray Band	Clearwater 175, Gregoire Lake 176, 176A, And 176B
18	Frog Lake Band	Puskiakiwenin 122, Unipouheos 121
19	Grouard Band	Kapawe'No First Nation No. 150D (Formerly Pakashan 150D)
20	Heart Lake Band	Heart Lake 167 And 167A
21	Horse Lake Band	Clear Hills 152C, Horse Lakes 152B
22	Janvier Band	Cowper Lake 194A, Janvier 194, Winefred Lake 194B
23	Kapawe'no First Nation	Kapawe'No First Nation No. 231 (Formerly Grouard 231)
24	Kehiwin Band	Kehiwin 123
25	Little Red River Band	Fox Lake 162, John D'Or Prairie 215
26	Loon River Cree	Loon Lake 235, Loon Prairie 237, Swampy Lake 236
28	Montana Band	Pigeon Lake 138A
29	O'Chiese Band	O'Chiese 203, O'Chiese Cemetery 203A
31	Paul Band	Buck Lake 133C, Wabamun 133A
33	Saddle Lake Band (Saddle Lake)	Saddle Lake 125, White Fish Lake 128
35	Sawridge Band	Sawridge 150G And 150H
37	Smiths Landing First Nation	Hokedhe Tue 196E (Myers Lake Site), K'I Tue 196D (Birch Lake Site), Li Deze 196C (Dog River Site), Thabacha Nare 196A (Fort Smith Site), Thebathi 196 (Fitzgerald / Corridor Site & Fitzgerald Site), Tsu K'Adhe Tue 196F (Leland Lake Site), Tthe Jere Ghaili 196B (Pine Lake Road Site)
39	Sturgeon Lake Band	Sturgeon Lake 154 And 154B
41	Sunchild Cree Band	Sunchild 202
42	Swan River Band	Assineau River 150F, Swan River 150E
43	Tallcree Band	Beaver Ranch 163, 163A, 163B; Fort Vermillion 173B; Tall Cree 173, 173A; Wadlin Lake 173C
45	Wesley Band	Stoney 142, 143, 144
46	Whitefish Lake Band	Utikoomak Lake 155, 155A, And 155B
47	Woodland Cree Band	Woodland Cree 226, 227, And 228

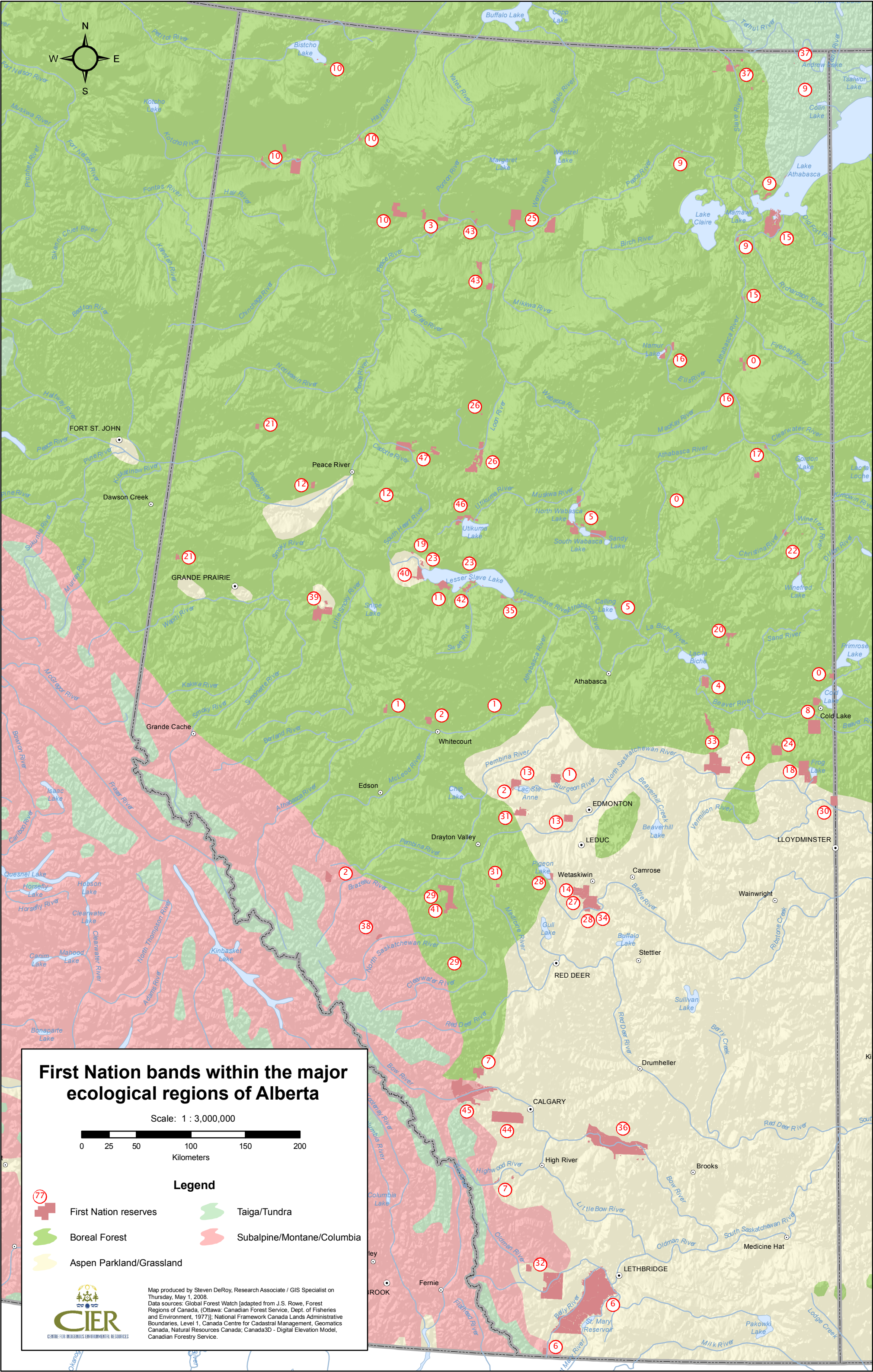
Subalpine - Montane - Columbia

Map Label	Band Name	Associated Reserves
2	Alexis Band	Alexis Cardinal 234
6	Blood Band	Blood Timber Limit 148A
7	Chiniki Band	Eden Valley 216
38	Stoney Band	Big Horn 144A
45	Wesley Band	Stoney 142, 143, 144

Taiga - Tundra

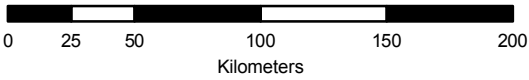
Map Label	Band Name	Associated Reserves
9	Cree Band	Charles Lake 225, Collin Lake 223, Cornwall Lake 224, Sandy Point 221
37	Smiths Landing First Nation	Tsu Tue 196G (Charles Lake Site)
45	Wesley Band	Stoney 142, 143, 144





# First Nation bands within the major ecological regions of Alberta

Scale: 1 : 3,000,000



## Legend

- First Nation reserves
- Boreal Forest
- Subalpine/Montane/Columbia
- Taiga/Tundra
- Aspen Parkland/Grassland



Map produced by Steven DeRoy, Research Associate / GIS Specialist on Thursday, May 1, 2008.  
Data sources: Global Forest Watch [adapted from J.S. Rowe, Forest Regions of Canada, (Ottawa: Canadian Forest Service, Dept. of Fisheries and Environment, 1977)]; National Framework Canada Lands Administrative Boundaries, Level 1, Canada Centre for Cadastral Management, Geomatics Canada, Natural Resources Canada; Canada3D - Digital Elevation Model, Canadian Forestry Service.



# First Nations within the major forest regions of Saskatchewan

## Aspen Parkland / Grassland

Band Label	Band Name	Associated Reserves
2	Beardy's & Okemasis	Beardy's 97; Okemasis 96, 97A, 97-B; Willow Cree
8	Carry The Kettle	Assiniboine 76, Carry The Kettle Nakoda First Nation 76-1, 76-11, 76-12, 76-14, 76-15, 76-2, 76-4, 76-6, 76-7, 76-8
10	Cote First Nation 366	Cote 64
11	Cowessess	Cowessess 73 And 73A
13	Day Star	Day Star 87
15	Fishing Lake First Nation	Fishing Lake 89 And 89A
18	Gordon	Gordon 86
21	James Smith	Cumberland 100A
23	Kahkewistahaw	Kahkewistahaw 72 And 72 A-1
24	Kawacatoose	Poorman 88
25	Keeseekoose	Keeseekoose 66, 66-Ca-01, 66-Ca-02, 66-Ca-03, 66-Ca-04, 66-Ca-05, 66-Ca-06, 66-Ch-01, 66-Ch-03, 66-Ch-04, 66-Ke-01, 66-Ke-02, 66-Ke-03, 66-Ke-04, 66-Ke-05, 66-Sa-01, 66-Sa-02
26	Key	The Key 65
27	Kinistin Was Kinistino	Kinistin 91 And 91A, Treaty Four Reserve Grounds 77
29	Little Black Bear	Little Black Bear 84
30	Little Pine	Little Pine 116, Min-A-He-Quo-Sis 116C
35	Moosomin	Moosomin 112A, 112B, 112H
36	Mosquito-Grizzly Bear's Head	Gold Eagle, Grizzly Bear's Head & Lean Man 110 & 111, Mosquito Grizzly Bear's Head Lean Man Tle 1, Mosquito 109
37	Muscowpetung	Last Mountain Lake 80A, Muscowpetung 80
38	Muskeg Lake	Asimakaniseekan Askiy 102A; Muskeg Lake 102H, 102J, And 102L
40	Muskowekwan Band	Muskowekwan Muskowekwan 85, 85-1, 85-10, 85-11, 85-12, 85-13, 85-14, 85-15, 85-16, 85-17, 85-22, 85-23, 85-24, 85-25, 85-26, 85-27, 85-28, 85-29, 85-2A, 85-3, 85-30, 85-31, 85-32, 85-33, 85-34, 85-35, 85-36, 85-37, 85-38, 85-39, 85-4, 85-40, 85-41, 85-42, 85-43, 85-44, 85-45, 85-47, 85-48, 85-49, 85-5, 85-6, 85-7, 85-8, 85-9, And 85A
41	Nekaneet	Nekaneet Cree Nation
42	Ocean Man	Ocean Man 69, 69A, 69B, 69C, 69D, 69E, 69F, 69G, 69H, 69I
43	Ochapowace	"Ochapowace 71, 71-1, 71-10, 71-101, 71-102, 71-103, 71-104, 71-105, 71-106, 71-107, 71-108, 71-09, 71-11, 71-110, 71-110, 71-112, 71-115, 71-116, 71-117, 71-118, 71-12, 71-13, 71-14, 71-15, 71-16, 71-16, 71-17, 71-18, 71-19, 71-2, 71-20, 71-21, 71-22, 71-23, 71-24, 71-25, 71-26, 71-27, 71-29, 71-3, 71-34, 71-35, 71-36, 71-37, 71-38, 71-39, 71-4, 71-40, 71-41, 71-42, 71-43, 71-44, 71-45, 71-46, 71-47, 71-48, 71-49, 71-5, 71-50, 71-51, 71-52, 71-53, 71-54, 71-55, 71-56, 71-57, 71-59, 71-6, 71-60, 71-61, 71-62, 71-63, 71-64, 71-65, 71-66, 71-67, 71-68, 71-69, 71-7, 71-70, 71-70, 71-71, 71-72, 71-73, 71-74, 71-75, 71-76, 71-77, 71-78, 71-79, 71-8, 71-80, 71-82, 71-83, 71-86, 71-87, 71-88, 71-89, 71-9, 71-91, 71-92, 71-93, 71-95, 71-96, 71-97, 71-98, 71-99 "
44	Okanese	Okanese 82, 82A, 82B, 82Bb, 82C, 82Cc, 82D, 82E, 82Ee, 82F, 82G, 82H, 82I, 82K, 82M, 82N, 82O, 82P, 82Q, 82R, 82T, 82U, 82V, 82W, 82X, 82Y, 82Z
45	One Arrow	One Arrow 95, 95-1A, 95-1B, 95-1C, 95-1D, 95-1E, 95-1E, 95-1F, 95-1G, 95-1H, 95-1I; Tipamahto Aski 95A
46	Onion Lake	Onion Lake 119-2, Seekaskootch 119
48	Pasqua First Nation 79	Pasqua 79
49	Peepeekisis	Peepeekisis 81
52	Pheasant Rump Nakota Band	Pheasant Rump Nakota Band 68, 68B, 68C, 68D, 68E, 68F
53	Piapot	Piapot Cree First Nation 75, 75E, 75F, 75G, 75H, 75I, 75J, 75K, 75T
54	Poundmaker	Poundmaker 114, 114-10A, 114-11A, 114-12, 114-13, 114-15, 114-15C, 114-16, 114-17A, 114-18A, 114-19, 114-1A, 114-21, 114-22, 114-2A, 114-2B, 114-2C, 114-3A, 114-3B, 114-4A, 114-6A2, 114-6A3, 114-6B2, 114-6C2, 114-7A, 114-8A, 114-9, 114-9A
56	Red Pheasant	Red Pheasant 108
57	Sakimay First Nations	Little Bone 74B; Minoahchak 74C; Sakimay 74, 74-1, 74-2, 74-3, 74-4, 74-6, 74-7, 74-9; Shesheep 74A
58	Saulteaux	Saulteaux First Nation 159, 159B, 159D, 159E, 159F, 159H, 159I, 159M, 159O, 159P, 159Q, 159R, 159U, 159W, 159Z
60	Standing Buffalo	Standing Buffalo 78
61	Starblanket	Star Blanket 83, 83B, 83C, 83D, 83F, 83G, 83H, 83J; Wa-Pii-Moos-Toosis 83A
63	Sweet Grass	Sweet Grass 113, 113A, 113B, 113-C19, 113-C7, 113-E22, 113-F16, 113-G7, 113-H1, 113-I4, 113-J3, 113-K32, 113-L6, 113-M16, 113-N27, 113-O28, 113-P2, 113-S6
64	Thunderchild First Nation	Thunderchild First Nation 115B, 115F, 115G, 115H, 115W
67	White Bear	White Bear 70
68	Whitecap Dakota/Sioux First Nation	Whitecap 94
70	Wood Mountain	Wood Mountain 160

## Boreal Forest

Band Label	Band Name	Associated Reserves
1	Ahtahkakoop	Ahtahkakoop 104
3	Big River	Big River 118 and 118A
4	Birch Narrows First Nation	Churchill Lake 193A; Turnor Lake 193B and 194
5	Black Lake	Chicken 224 and 225
6	Buffalo River Dene Nation	Buffalo River Dene Nation 193
7	Canoe Lake	Canoe Lake 165, 165A and 165B; Eagles Lake 165C; Onikahp Sahgnikansis 165E; Wepuskow Sahgaiechan 165D
8	Carry The Kettle	Carry The Kettle Nakoda First Nation 76-7
9	Clearwater River Dene	Clearwater River Dene Band 221, 222 and 223
10	Cote First Nation 366	Cote 64
12	Cumberland House Cree Nation	Budd's Point 20D; Cumberland House Cree Nation 20; Muskeg River 20C; Pine Bluff 20A and 20B
14	English River First Nation	Cree Lake 192G; Dipper Rapids 192C; Elak Dase 192A; English River 192H; Ile A La Crosse 192E; Knee Lake 192B; La Plonge 192; Primeau Lake 192F; Wapachewunak 192D
16	Flying Dust First Nation	Flying Dust First Nation 105, 105D, 105E and 105F; Gladue Lake 105B; Meadow Lake 105A and 105C
17	Fond Du Lac	Fond Du Lac 227, 228, 229, 231, 232, 233
20	Island Lake First Nation	Ministikwan 161 and 161A
21	James Smith	Cumberland 100A; James Smith 100
22	Joseph Bighead	Big Island Lake Cree Territory
25	Keeseekoose	Keeseekoose 66, 66A, 66-Co-01, 66-Co-02, 66-St-01, 66-St-02, 66-St-03, Kk66-St-04
26	Key	The Key 65
27	Kinistin Was Kinistino	Kinistin 91
28	Lac La Ronge	Bittern Lake 218; Four Portages 157C; Fox Point 157D and 157E; Grandmother's Bay 219; Kitsakie 156B; Lac La Ronge 156; Little Hills 158, 158A and 158B; Little Red River 106C and 106D; Morin Lake 217; Old Fort 157B; Potato River 156A; Stanley 157 and 157A; Sucker River 156C
30	Little Pine	Little Pine 116
31	Lucky Man	Lucky Man I.R.
32	Makwa Sahgaiehcan First Nation	Makwa Lake 129, 129A, 129B and 129C
33	Mistawasis	Mistawasis 103
34	Montreal Lake	Montreal Lake 106 and 106B
35	Moosomin	Moosomin 112E, 112F, 112G, 112H, 112J, 112L, 112M, 112P
36	Mosquito-Grizzly Bear's Head	Mosquito Grizzly Bear's Head Lean Man Tle 1`
38	Muskeg Lake	Lake Pitihkwakew 102B; Muskeg Lake Cree Nation 102, 102B, 102D, 102E, 102F and 102G
39	Muskoday First Nation	Muskoday First Nation 99
44	Okanese	Okanese 82J and 82S
46	Onion Lake	Onion Lake 119-1 and 119-2; Seekaskootch 119
47	Opaskwayak Cree Nation Band	Opaskwayak C.N. 27A (Carrot River)
50	Pelican Lake	Chitek Lake 191; Pelican Lake 191-A, 191-B, 191-C and 191-D
51	Peter Ballantyne Cree Nation	Amisk Lake 184; Birch Portage 184A; Kimosom Pwatinahk 203; Kipahigan Sakahikan 222; Kiskaciwan 208; Manawanstawayak 230; Maskikopawiscikosik 229; Mirond Lake 184E; Mistahi Wasahk 209; Mistik; Muskwaminiwatim 225; Nakiskatowaneek 227; Nemekus Sakahikan 221; Northern Lights 220; Opawakoscikan 201; Pelican Narrows 184B and 206; Pisiwiminiwatim 207; Sandy Narrows 184C; Sokatisewin Sakahikan 224; Southend 200 and 200A; Sturgeon We184F and We205; Wapaskokimaw 202; Waskwaynikapik 228; Waskwiatik Sakahikan 223; Woody Lake 184D
54	Poundmaker	Poundmaker 114-5A and 114-5B
55	Red Earth	Carrot River 29A; Red Earth 29
56	Red Pheasant	Red Pheasant 108
58	Saulteaux	Saulteaux First Nation 159A, 159Bb, 159C, 159Cc, 159D, 159G, 159J, 159K, 159L, 159N, 159P, 159Q, 159S, 159T, 159U, 159V, 159W
59	Shoal Lake Cree Nation	Shoal Lake 28A
62	Sturgeon Lake First Nation	Sturgeon Lake 101 and 101A
64	Thunderchild First Nation	Thunderchild First Nation 115B, 115C, 115D, 115E, 115I, 115J, 115K, 115M, 115N, 115Q, 115S
65	Wahpeton Dakota Nation	Wahpaton 94A and 94B
66	Waterhen Lake	Waterhen 130
69	Witchekan Lake	Witchekan Lake 117 and 117-D
71	Yellowquill Was Nut Lake	Yellow Quill 90 and 90-8

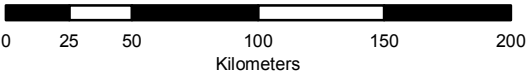
## Taiga / Tundra

Band Label	Band Name	Associated Reserves
5	Black Lake	Chicken 224, 225 and 226
17	Fond Du Lac	Fond Du Lac 229
19	Hatchet Lake	Lac La Hache 220



# First Nation bands within the major ecological regions of Saskatchewan

Scale: 1 : 3,000,000

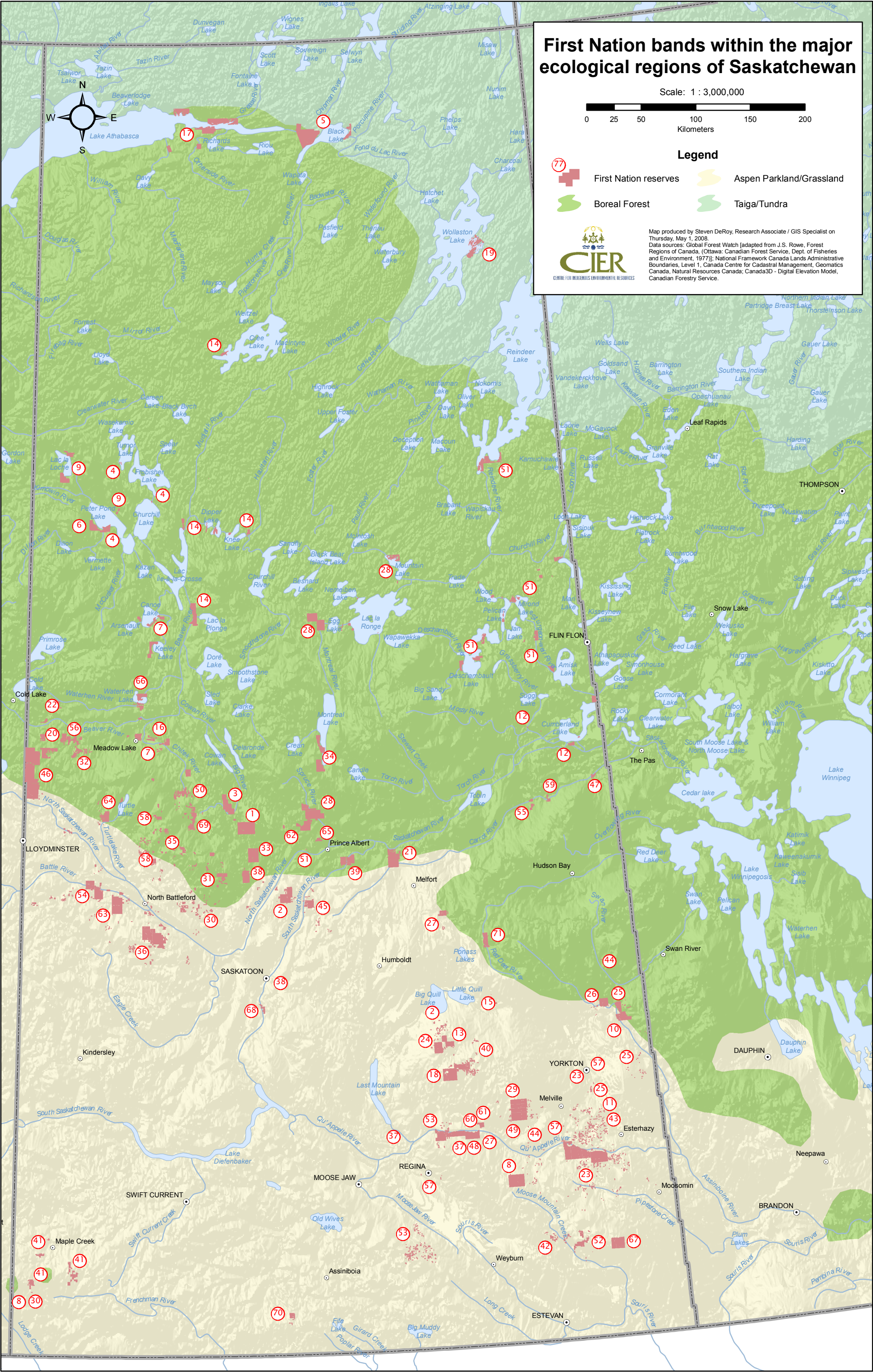


## Legend

- First Nation reserves
- Aspen Parkland/Grassland
- Boreal Forest
- Taiga/Tundra



Map produced by Steven DeRoy, Research Associate / GIS Specialist on Thursday, May 1, 2008.  
Data sources: Global Forest Watch [adapted from J.S. Rowe, Forest Regions of Canada, (Ottawa: Canadian Forest Service, Dept. of Fisheries and Environment, 1977)]; National Framework Canada Lands Administrative Boundaries, Level 1; Canada Centre for Cadastral Management, Geomatics Canada, Natural Resources Canada; Canada3D - Digital Elevation Model, Canadian Forestry Service.





# First Nations within the major forest regions of Manitoba

## Aspen Parkland / Grassland

Band Label	Band Name	Associated Reserves
4	Birdtail Sioux First Nation Band	Birdtail Creek 57 and Birdtail Haylands 57A
11	Dakota Plains First Nation Band	Dakota Plains 6A
12	Dakota Tipi Band	Dakota Tipi 1
14	Ebb and Flow Band	Ebb and Flow 52
18	Gamblers Band	Gambler 63
19	Garden Hill First Nation Band	Carry The Kettle Nakoda 76-28; Kawacatoose First Nation 88; Moosomin 112K; Muskowekwan 85-54 and 85-55; Ochapowace 71-28, 71-30, 71-31, 71-32, 71-33, 71-94, 71-129; Okanese 82L; Sakimay 74-5 and 74-16; Saulteaux First Nations 159 Ff; Sweetgrass 113-D33
24	Keeseekoowenin Band	Keeseekoowenin 61
26	Lake Manitoba Band	Dog Creek 46
31	Long Plain First Nation Band	Long Plain 6
42	Oak Lake First Nation Band	Canupawakpa Dakota and Oak Lake 59A
45	Peguis Band	Peguis 1D, 1E, 1F and 1G; St. Peters Fishing Station 1A
49	Rolling River Band	Rolling River 67
50	Roseau River Anishinabe First Nation Government	Roseau Rapids 2A and Roseau River 2 and 2B
52	Sandy Bay First Nation Band	Sandy Bay 5
57	Sioux Valley First Nation Band	Sioux Valley Dakota Nation
61	Swan Lake First Nation Band	Indian Gardens 8; Swan Lake 7 and 8A
65	Waywayseecappo First Nation Treaty Four 1874 Band	Waywayseecappo First Nation

## Carolinian / Great Lakes

Band Label	Band Name	Associated Reserves
3	Big Island First Nation	Shoal Lake 31J
7	Buffalo Point First Nation Band	Buffalo Point 1, 2, 3 and 36; Reed River 36A
23	Iskutewisakaygun #39 Independent First Nation	Shoal Lake 39A
38	Northwest Angle #37 First Nation	Northwest Angle 34C, 37B and 37C; Shoal Lake 34B1 and 37A
56	Shoal Lake #40 First Nation	Shoal Lake 40

## Taiga / Tundra

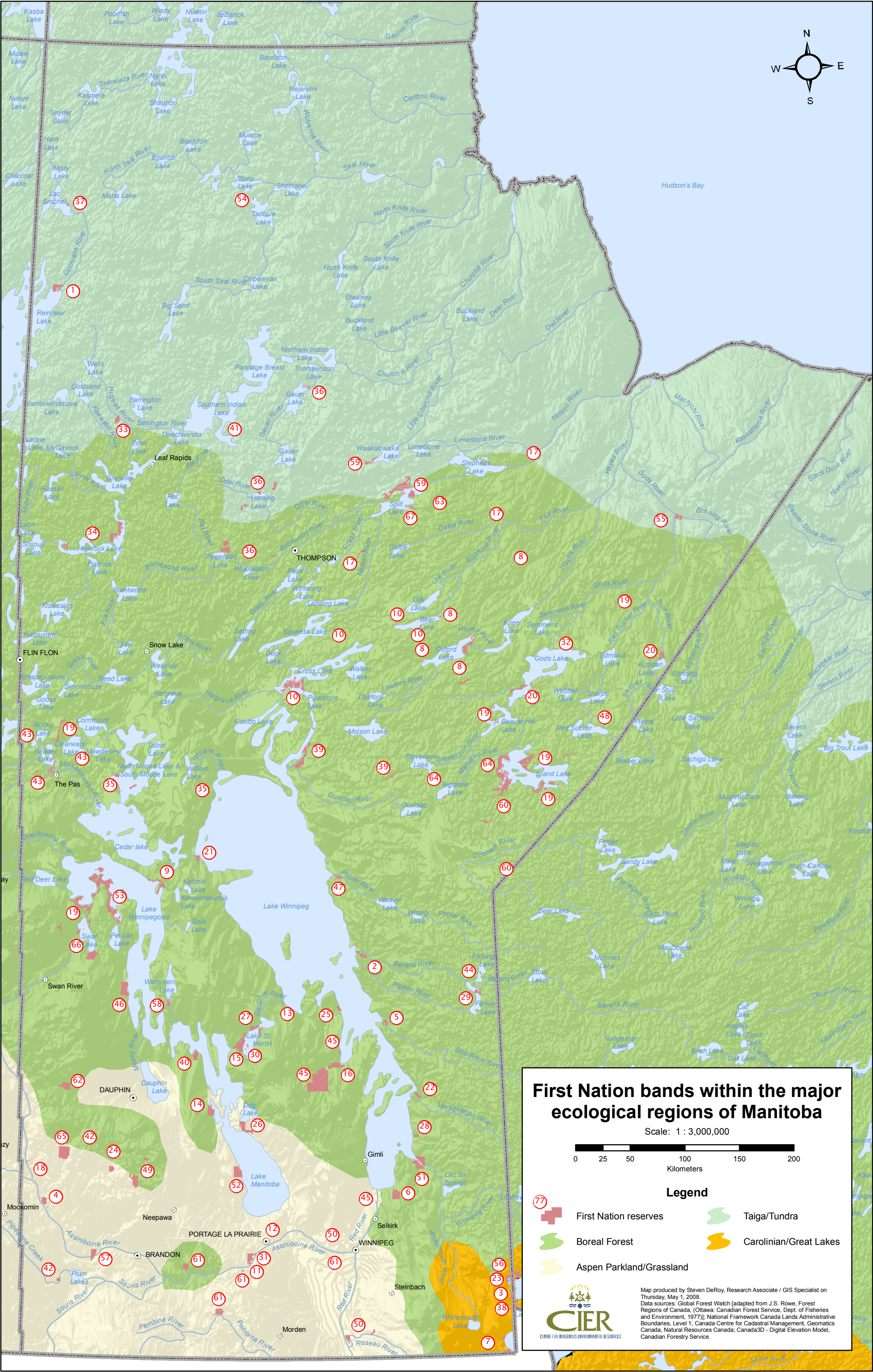
Band Label	Band Name	Associated Reserves
1	Barren Lands Band	Brochet 197
17	Fox Lake Band	Fox Lake East 2
33	Marcel Colomb First Nation Band	Black Sturgeon
36	Nisichawayasihk Cree Nation Band	Kapawasihk; Opekunosakakanihk; Wapasihk; and Wuskwi Sipi
37	Northlands Band	Lac Brochet 197A
41	O-Pipon-Na-Piwin Cree Nation Band	O-Pipon-Na-Piwin Cree Nation 1
54	Sayisi Dene First Nation Band	Churchill 1
55	Shamattawa First Nation Band	Shamattawa 1
59	Split Lake Cree First Nation Band	Split Lake 171



# Boreal Forest

Band Label	Band Name	Associated Reserves
2	Berens River Band	Berens River 13 and Pigeon River 13A
5	Bloodvein Band	Bloodvein 12
6	Brokenhead Ojibway Nation Band	Brokenhead 4
8	Bunibonibee Cree Nation Band	Oxford House 24, 24A, 24B, 24C and 24D
9	Chemawawin Cree Nation Band	Chemawawin 1, 2 and 3
10	Cross Lake Band	Cross Lake 19, 19A, 19B, 19C, 19D, 19E, 19X01, 19X02, 19X03, 19X05 and 19X06; Whiskey Jack
13	Dauphin River Band	Dauphin River 48A
14	Ebb and Flow Band	Ebb and Flow 52
15	Faford Band	Faford 50
16	Fisher River Band	Fisher River 44 and 44A
17	Fox Lake Band	Fox Lake 1 and Fox Lake West 3
19	Garden Hill First Nation Band	Amik Wachink Sakahikan; English River First Nation Barkwell Bay 192I; English River First Nation Flatstone Lake 192L; English River First Nation Haultain Lake 192K; Garden Hill First Nation; Kistapinan 211; Kistapinânihk 231; Mckay 209; Pelican Rapids Access Road Phase 1 ; Pe-Ta-Waygamak; Red Cross Lake North ; Roadside 165F; Root Lake Beach Ridge Site ; Saulteaux 159Ee; Saulteaux 159Ii; Seeseep Sakahikan; Wesha Kijay Wasagamach; and Yellow Quill 90-18
20	God's Lake Narrows Band	Andrew Bay; Chataway Lake/Knife Lake; God'S Lake 23; North Prominent Ridge and Vermilyea Lake
21	Grand Rapids First Nation Band	Grand Rapids 33
22	Hollow Water First Nation Band	Hollow Water 10
24	Keeseekoowenin Band	Bottle Lake 61B and Clear Lake 61A
25	Kinonjeoshtegon Band	Jackhead 43 and 43A
27	Lake St. Martin Band	The Narrows 49 and 49A
28	Little Black River Band	Black River 9
29	Little Grand Rapids Band	Little Grand Rapids 14
30	Little Saskatchewan Band	Little Saskatchewan 48 and 48B
32	Manto Sipi Cree Nation Band	God'S River 86A
34	Mathias Colomb Band	Highrock 199 and Pukatawagan 198
35	Mosakahiken Cree Nation Band	Moose Lake 31A, 31C, 31D, 31G and 31J
36	Nisichawayasihk Cree Nation Band	Monahawuhkan; Nelson House 170, 170A, 170B and 170C
39	Norway House Band	Norway House 17, 17A and 17B; Ponask Lake
40	O-Chi-Chak-Ko-Sipi First Nation Band	Crane River 51
42	Oak Lake First Nation Band	Fishing Station 62A
43	Opaskwayak Cree Nation Band	Opaskwayak Cree Nation 21 (Stony Point), 21A, 21B, 21C, 21D, 21E, 21F, 21G, 21I, 21J, 21K, 21L, 21N and 21P; Root Lake 231; Salt Channel 21D
44	Pauingassi First Nation	Pauingassi
45	Peguis Band	Peguis 1B, 1C, 1G, 1H and 1I
46	Pine Creek Band	Pine Creek 66A
47	Poplar River First Nation Band	Poplar River 16
48	Red Sucker Lake Band	Red Sucker Lake 1976
49	Rolling River Band	Rolling River 67, 67A and 67B
51	Sagkeeng/Fort Alexander First Nation Band	Fort Alexander 3
53	Sapotaweyak Cree Nation Band	Sapotaweyak Cree Nation - Spruce Island and Sapotaweyak Cree Nation; Shoal River 65A, 65B and 65F
58	Skownan First Nation Band	Waterhen 45
59	Split Lake Cree First Nation Band	Split Lake 171, 171A and 171B
60	St. Theresa Point Band	Cantin Lake; Mukwa Narrows; and St. Theresa Point
61	Swan Lake First Nation Band	Swan Lake 7A
62	Tootinaowaziibeeng Treaty Reserve Band	Valley River 63A
63	War Lake Band	Mooseocoot
64	Wasagamack Band	Feather Rapids; Naytawunkank; and Wasagamack
66	Wuskwi Sipi hk Band	Swan Lake 65C; Wuskwi Sipi hk 1, 2, 3A, 3B, 3C, 3D, 3E, 3F, 4, 5, 6 and 7
67	York Factory First Nation Band	York Landing





# First Nation bands within the major ecological regions of Manitoba

Scale: 1 : 3,000,000



## Legend

- 77 First Nation reserves
- Boreal Forest
- Aspen Parkland/Grassland
- Taiga/Tundra
- Carolinian/Great Lakes



Map produced by Steven DeRoy, Research Associate / GIS Specialist on Thursday, May 1, 2008.  
Data sources: Global Forest Watch [adapted from J.S. Rowe, Forest Regions of Canada, (Ottawa: Canadian Forest Service, Dept. of Fisheries and Environment, 1977)]; National Framework Canada Lands Administrative Boundaries, Level 1, Canada Centre for Cadastral Management, Geomatics Canada, Natural Resources Canada; Canada3D - Digital Elevation Model, Canadian Forestry Service.



Boreal Forest

Distribution of First Nations within the ecological regions of Ontario

Band Label	Band Name	Associated Reserves
6	Bearskin Lake First Nation	Bearskin Lake Indian Reserve
10	Brunswick House First Nation	Duck Lake Indian Reserve No. 76b, Mountbatten Indian Reserve No. 76a
11	Cat Lake First Nation	Cat Lake Indian Reserve No. 63c
12	Chapleau Cree First Nation	Chapleau Cree Fox Lake Indian Reserve, Chapleau Indian Reserve No. 75
13	Chapleau Ojibway First Nation	Chapleau Indian Reserve No. 61, Chapleau Indian Reserve No. 61a, Chapleau Indian Reserve No. 74, Chapleau Indian Reserve No. 74a,
20	Conseil De La Premiere Nation Abitibiwinni	Abitibi Indian Reserve No. 70
21	Constance Lake First Nation	Constance Lake Indian Reserve No. 92
24	Deer Lake First Nation	Deer Lake Indian Reserve
26	Eabametoong First Nation	Fort Hope Indian Reserve No. 64
27	Eagle Lake First Nation	Eagle Lake Indian Reserve No. 27
28	Flying Post First Nation	Flying Post Indian Reserve No. 73
33	Ginoogaming First Nation	Ginoogaming First Nation
34	Grassy Narrows First Nation	English River Indian Reserve No. 21
35	Gull Bay First Nation	Gull River Indian Reserve No. 55
39	Kasabonika Lake First Nation	Kasabonika Lake Indian Reserve
41	Kee-Way-Win First Nation	Kee-Way-Win
42	Kingfisher Lake First Nation	Kingfisher Indian Reserve No. 2a, Kingfisher Indian Reserve No. 3a, Kingfisher Lake Indian Reserve No. 1
43	Kitchenuhmaykoosib Inninuwig	Kitchenuhmaykoosib Aaki No. 84
44	Lac Des Mille Lacs First Nation	Lac Des Mille Lacs Indian Reserve No. 22a1, Seine River Indian Reserve No. 22a2
46	Lac Seul First Nation	Lac Seul Indian Reserve No. 28
47	Long Lake #58 First Nation	Long Lake Indian Reserve No. 58
51	Matachewan First Nation	Matachewan Indian Reserve No. 72
52	Mattagami First Nation	Mattagami Indian Reserve No. 71
53	Michipicoten First Nation	Missanabie Indian Reserve No. 62
54	Mishkeegogamang First Nation	Osnaburgh Indian Reserve No. 63a And 63b
65	Muskrat Dam Lake First Nation	Muskrat Dam Lake Indian Reserve
67	Neskantaga First Nation	Neskantaga Indian Reserve
70	North Caribou Lake First Nation	Weagamow Lake Indian Reserve No. 87
71	North Spirit Lake First Nation	North Spirit Lake Indian Reserve
75	Ojibway Nation Of Saugeen First Nation	Ojibway Nation Of Saugeen Indian Reserve
78	Ojibways Of The Pic River First Nation	Pic River Indian Reserve No. 50
80	Pays Plat First Nation	Pays Plat Indian Reserve No. 51
81	Pic Moberg First Nation	Pic Moberg Reserve North, Pic Moberg Reserve South
82	Pikangikum First Nation	Pikangikum Indian Reserve No. 14
83	Poplar Hill First Nation	Poplar Hill Indian Reserve
85	Red Rock First Nation	Lake Helen Indian Reserve No. 53a, Red Rock Indian Reserve No. 53
86	Rocky Bay First Nation	Rocky Bay Indian Reserve No. 1
87	Sachigo Lake First Nation	Sachigo Lake Indian Reserve No. 1, Sachigo Lake Indian Reserve No. 2, Sachigo Lake Indian Reserve No. 3
89	Sandy Lake First Nation	Sandy Lake Indian Reserve No. 88
99	Taykwa Tagamou Nation (At New Post)	New Post Indian Reserve No. 69 And 69a
102	Wabaseemoong First Nation	One Man Lake Indian Reserve No. 29, Swan Lake Indian Reserve No. 29, Wabaseemoong Indian Reserve
103	Wabauskang First Nation	Wabauskang Indian Reserve No. 21
104	Wabigoon Lake Ojibway Nation First Nation	Wabigoon Lake Indian Reserve No. 27
108	Wapekeka First Nation	Wapekeka Reserve No. 1 And 2
111	Wawakapewin First Nation	Wawakapewin Indian Reserve
112	Webequie First Nation	Webequie Indian Reserve
113	Weenusk First Nation	Winisk Indian Reserve No. 90
117	Whitesand First Nation	Whitesand Indian Reserve
119	Wunnumin First Nation	Wunnumin Indian Reserve No. 1 And 2

Carolinian / Great Lakes

Band Label	Band Name	Associated Reserves
1	Alderville First Nation	Alderville First Nation Reserve, Sugar Island Indian Reserve No. 37a
2	Algonquins Of Pikwakanagan First Nation	Pikwakanagan
3	Anishinabe Of Wauzhushk Onigum First Nation	Kenora Indian Reserve No. 38b
5	Batchewana First Nation	Rankin Location Indian Reserve No. 15d, Whitefish Island Indian Reserve
8	Big Grassy First Nation	Assabaska Indian Reserve, Big Grassy River Indian Reserve No. 35g, Naongashing Indian Reserve No. 35a, Obabikong Indian Reserve No. 35b,
9	Big Island First Nation	Big Island Indian Reserve No. 31d, Big Island Indian Reserve No. 31e, Big Island Indian Reserve No. 31f, Big Island Mainland Indian Reserve No. 93, Lake Of The Woods Indian Reserve No. 31b, Lake Of The Woods Indian Reserve No. 31g, Lake Of The Woods Indian Reserve No. 31h, Naongashing Indian Reserve No. 31a, Saug-A-Gaw-Sing Indian Reserve No. 1, Shoal Lake Indian Reserve No. 31j
14	Chippewas Of Kettle & Stony Point First Nation	Kettle Point Indian Reserve No. 44
15	Chippewas Of Mnjikaning First Nation	Indian River Reserve, Mnjikaning First Nation Indian Reserve No. 32
16	Chippewas Of Nawash First Nation	Cape Croker Hunting Ground Indian Reserve No. 60b, Neyaashiinigmiing Reserve
17	Chippewas Of Sarnia First Nation	Sarnia Indian Reserve No. 45
18	Chippewas Of The Thames First Nation	Chippewa Of The Thames First Nation Indian Reserve No. 42
19	Cockburn Island First Nation	Zhiibaahaasing Indian Reserve No. 19, Zhiibaahaasing Indian Reserve No.19a
22	Couchiching First Nation	Couchiching Indian Reserve No. 16a
23	Curve Lake First Nation	Curve Lake First Nation Indian Reserve No. 35, Curve Lake Indian Reserve No. 35a, Islands In The Trent Waters Indian Reserve No. 36a
25	Dokis First Nation	Dokis Indian Reserve No. 9
27	Eagle Lake First Nation	Eagle Lake Indian Reserve No. 27
30	Fort William First Nation	Fort William Indian Reserve No. 52
31	Garden River First Nation	Garden River Indian Reserve No. 14
32	Georgina Island First Nation	Chippewas Of Georgina Island First Nation, Chippewas Of Georgina Island First Nation Indian Reserve No. 33a
36	Henvey Inlet First Nation	French River Indian Reserve No. 13, Henvey Inlet Indian Reserve No. 2
37	Hiawatha First Nation	Hiawatha First Nation
38	Iskutewisakaygun #39 Independent First Nation	Shoal Lake Indian Reserve No. 39a
45	Lac La Croix First Nation	Neguaguon Lake Indian Reserve No. 25d
48	M'chigeeng First Nation	M'chigeeng Indian Reserve No. 22
49	Magnetewan First Nation	Magnetawan Indian Reserve No. 1
53	Michipicoten First Nation	Gros Cap Indian Reserve No. 49, Gros Cap Indian Village Reserve No. 49a
55	Mississauga First Nation	Mississagi River Indian Reserve No. 8
56	Mississaugas Of New Credit First Nation	New Credit Indian Reserve No. 40a
57	Mississaugas Of Scugog Island First Nation	Mississaugas Of Scugog Island
58	Mohawks Of Akwesasne First Nation	Akwesasne Reserve No. 59
59	Mohawks Of The Bay Of Quinte First Nation	Tyendinaga Mohawk Territory
61	Moose Deer Point First Nation	Moose Point Indian Reserve No. 79
62	Moravian Of The Thames First Nation	Moravian Indian Reserve No. 47
63	Anishinabe Of Wauzhushk Onigum, Anishnaabeg Of Naongashiing, Big Grassy, Buffalo Point First Nation, Iskatewizaagegan #39 Independent First Nation, Nootkamegwanning, Northwest Angle No.33, Northwest Angle No.37, Obashkaandagaang, Ochiichagwe'babigo'ining First Nation, Ojibways Of Onigaming First Nation, Shoal Lake No.40, Wabaseemoong Independent Nations	Agency Indian Reserve No. 30
64	Munsee-Deleware Nation First Nation	Munsee Delaware Nation No. 1
66	Naicatchewenin First Nation	Agency Indian Reserve No. 1, Rainy Lake Indian Reserve No. 17a, Rainy Lake Indian Reserve No. 17b
68	Nickicousemenecaning First Nation	Rainy Lake Indian Reserve No. 26a, Rainy Lake Indian Reserve No. 26b, Rainy Lake Indian Reserve No. 26c
69	Nipissing First Nation	Nipissing Indian Reserve No. 10
72	Northwest Angle #33 First Nation	Northwest Angle Indian Reserve No. 33b, Whitefish Bay Indian Reserve No. 33a, Lake Of The Woods Indian Reserve No. 34, Northwest Angle Indian Reserve No. 34c And 37b, Shoal Lake Indian Reserve No. 34b1, Shoal Lake Indian Reserve No. 37a, Whitefish Bay Indian Reserve No. 34a
74	Ochiichagwe'babigo'ining First Nation Band	The Dalles Indian Reserve No. 38c
76	Ojibways Of Onigaming First Nation	Sabaskong Bay Indian Reserve No. 35c, Sabaskong Bay Indian Reserve No. 35d, Sabaskong Bay Indian Reserve No. 35f, Sabaskong Bay Indian Reserve No. 35h,
77	Ojibways Of Sucker Creek First Nation	Sucker Creek Indian Reserve No. 23
79	Onyota'a:ka First Nation	Oneida Indian Reserve No. 41
84	Rainy River First Nation	Long Sault Indian Reserve No. 12, Manitou Rapids Indian Reserve No. 11
88	Sagamok Anishnawbek First Nation	Sagamok Indian Reserve
90	Saugeen First Nation	Chief's Point Indian Reserve No. 28, Saugeen And Cape Croker Fishing Islands Indian Reserve No. 1, Saugeen Hunting Grounds Indian Reserve No. 60a, Saugeen Indian Reserve No. 29,
91	Seine River First Nation	Seine River Indian Reserve No. 23a, Seine River Indian Reserve No. 23b, Sturgeon Falls Indian Reserve No. 23
92	Serpent River First Nation	Serpent River Indian Reserve No. 7
93	Shawanaga First Nation	Naiscoutaing Indian Reserve No. 17a, Shawanaga Indian Reserve No. 17, Shawanaga Indian Reserve No. 17b

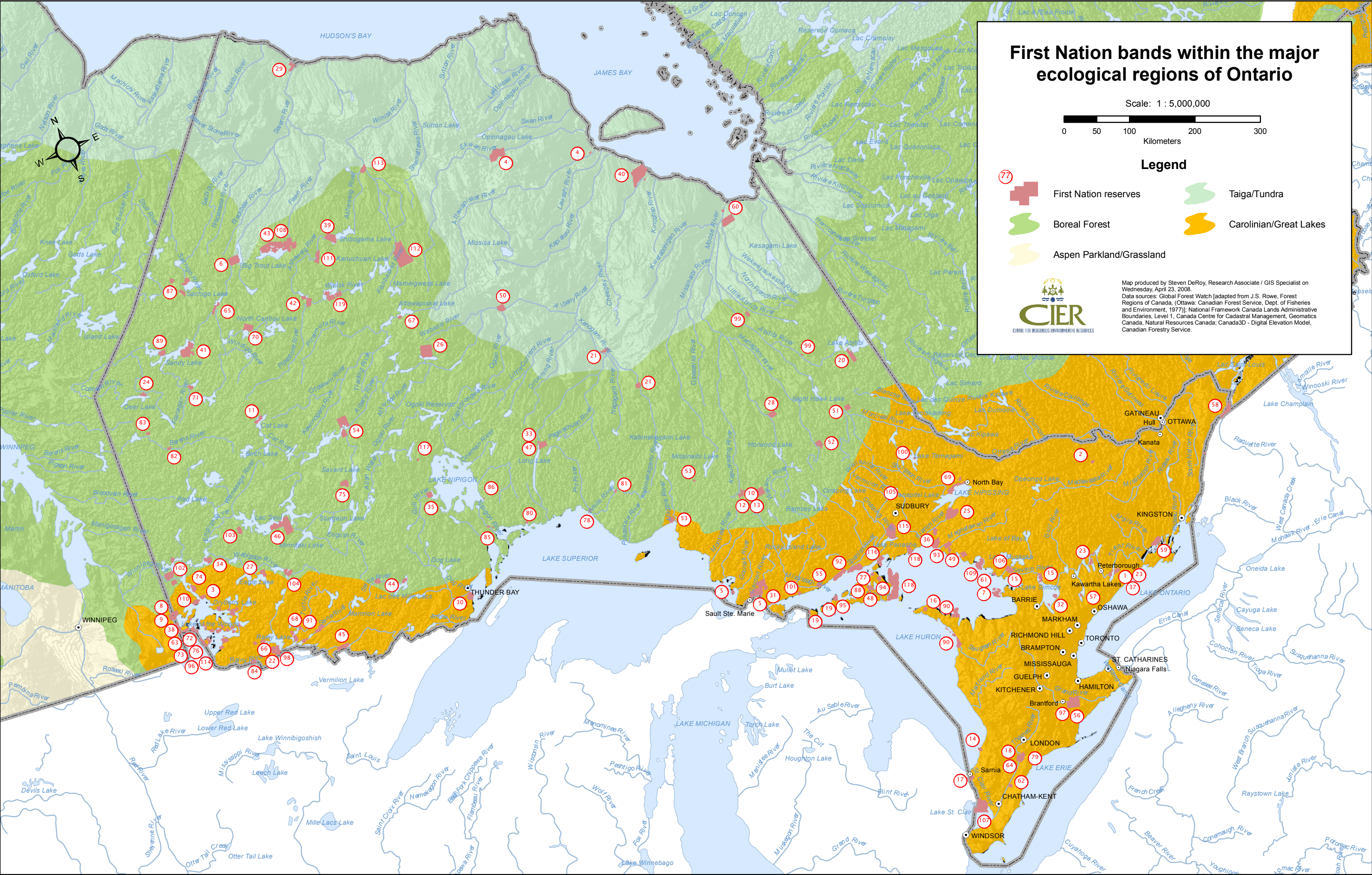
Carolinian / Great Lakes continued...

Band Label	Band Name	Associated Reserves
94	Sheguiandah First Nation	Sheguiandah Indian Reserve No. 24
95	Sheshegwaning First Nation	Sheshegwaning Indian Reserve No. 20
96	Shoal Lake #40 First Nation	Shoal Lake Indian Reserve No. 40
97	Six Nations Of Grand River First Nation	Glebe Farm Indian Reserve No. 40b, Six Nations Indian Reserve No. 40
98	Stanjikoming First Nation	Rainy Lake Indian Reserve No. 18c
100	Temagami First Nation	Bear Island Indian Reserve No. 1
101	Thessalon First Nation	Thessalon Indian Reserve No. 12
105	Wahnapiatae First Nation	Wahnapiatae Indian Reserve No. 11
106	Wahta Mohawk First Nation	Wahta Mohawk Territory
107	Walpole Island First Nation	Walpole Island Indian Reserve No. 46
109	Wasauksing-Parry Island First Nation	Parry Island First Nation
110	Washagamis Bay First Nation	Rat Portage Indian Reserve No. 38a
114	Whitefish Bay First Nation	Sabaskong Bay Indian Reserve No. 32c, Whitefish Bay Indian Reserve No. 32a, Yellow Girl Bay Indian Reserve No. 32b
115	Whitefish Lake First Nation	Whitefish Lake Indian Reserve No. 6
116	Whitefish River First Nation	Whitefish River Indian Reserve No. 4
118	Wikwemikong First Nation	Point Grondine Indian Reserve No. 3, Wikwemikong Unceded Indian Reserve No. 26

Taiga / Tundra

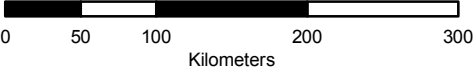
Band Label	Band Name	Associated Reserves
4	Attawapiskat First Nation	Attawapiskat Indian Reserve No. 91 And 91a
6	Bearskin Lake First Nation	Bearskin Lake Indian Reserve
21	Constance Lake First Nation	English River Indian Reserve No. 66
29	Fort Severn First Nation	Fort Severn Indian Reserve No. 89
40	Kashechewan First Nation	Fort Albany Indian Reserve No. 67
50	Martin Falls First Nation	Marten Falls Indian Reserve No. 65
60	Moose Cree First Nation	Factory Island Indian Reserve No. 1, Moose Factory Indian Reserve No. 68
113	Weenusk First Nation	Winisk Indian Reserve No. 90





# First Nation bands within the major ecological regions of Ontario

Scale: 1 : 5,000,000



## Legend

- First Nation reserves
- Taiga/Tundra
- Boreal Forest
- Aspen Parkland/Grassland
- Carolinian/Great Lakes



Map produced by Steven DeRoy, Research Associate / GIS Specialist on Wednesday, April 23, 2008.  
Data sources: Global Forest Watch [adapted from J.S. Rowe, Forest Regions of Canada, (Ottawa: Canadian Forest Service, Dept. of Fisheries and Environment, 1977)]; National Framework Canada Lands Administrative Boundaries, Level 1, Canada Centre for Cadastral Management, Geomatics Canada, Natural Resources Canada; Canada3D - Digital Elevation Model, Canadian Forestry Service.



# Distribution of First Nations within the ecological regions of Quebec

## Boreal Forest

Band Label	Band Name	Associated Reserves
1	Algonquins Of Barriere Lake	Rapid Lake
2	Conseil De Bande De Betsiamites	Betsiamites
4	Conseil De Bande Des Atikamewk D'opitciwan	Obedjiwan Indian Reserve No. 28
5	Conseil De Bande Des Innus De Ekuanitshit	Mingan
6	Conseil De Bande Des Montagnais Essipit	Innue Essipit
8	Conseil De Bande La Nation Anishnabe Du Lac Simon	Lac Simon
10	Conseil De La Premi?Re Nation Abitibiwinni	Pikogan
12	Conseil De Wemotaci	Coucoucache Indian Reserve No. 24a, Communaut Atikamekw De Manawan
13	Conseil Des Atikamekw De Manawan	Communaut Atikamekw De Manawan
14	Conseil Des Montagnais De Natashquan	Natashquan Indian Reserve No. 1
16	Conseil Des Montagnais Unamen Shipu	Romaine Indian Reserve No. 2
18	Cree Nation Of Chisasibi	Chisasibi
19	Cree Nation Of Mistissini	Mistissini
20	Cree Nation Of Nemaska	Nemiscau
21	Cree Nation Of Wemindji	Wemindji
23	Eastmain	Eastmain
24	Innu Takuaikan Uashat Mak Mani-Utenam	Maliotenam Indian Reserve No. 27a, Uashat Indian Reserve No. 27
36	Waswanipi	Waswanipi

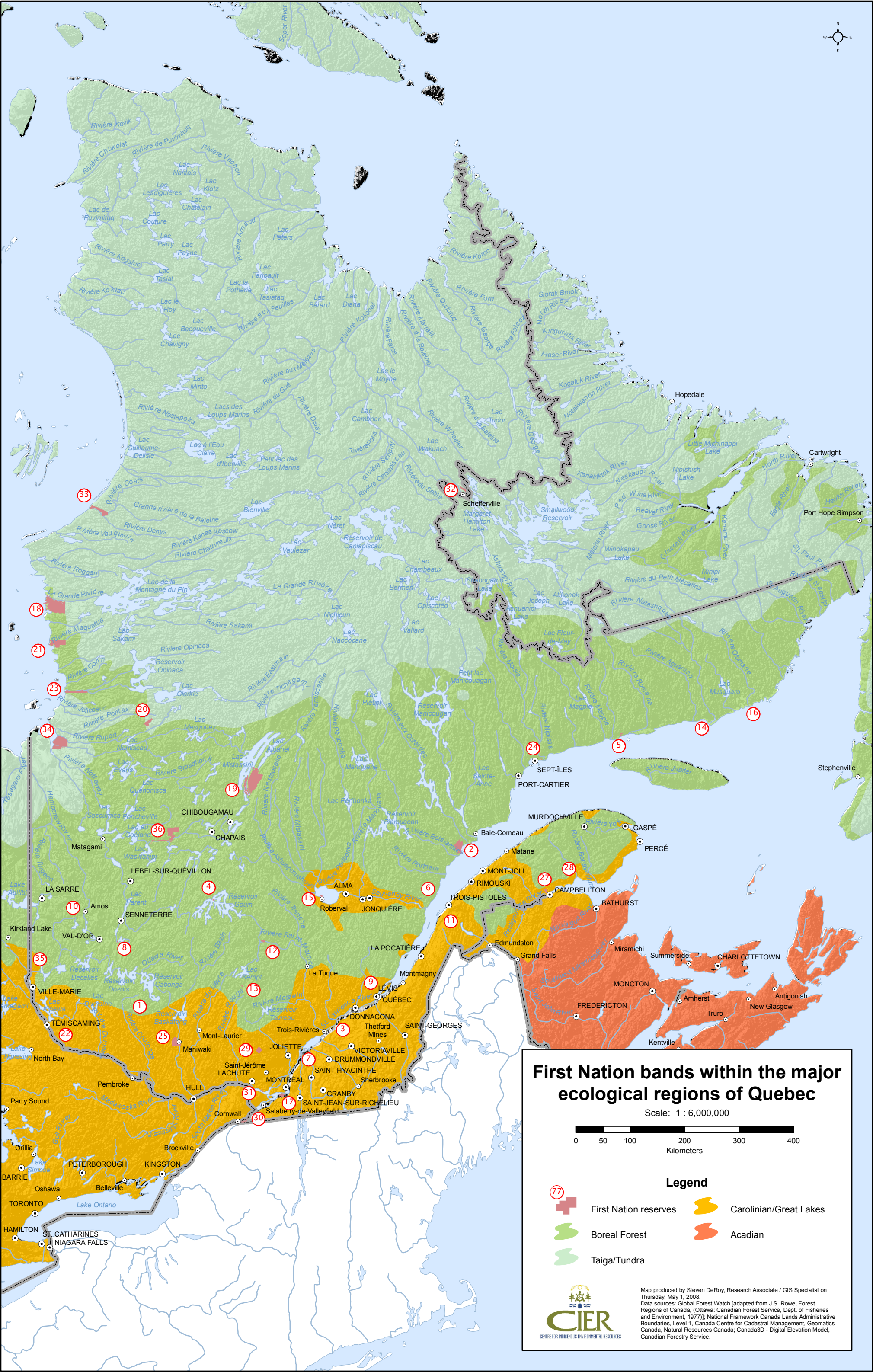
## Carolinian / Great Lakes

Band Label	Band Name	Associated Reserves
7	Conseil De Bande D'odanak	Odanak Indian Reserve No. 12
9	Conseil De La Nation Huronne-Wendat	Village Des Hurons Wendake Indian Reserve No. 7 And No. 7a
11	Conseil De La Premi?Re Nation Malécite De Viger	Whitworth Indian Reserve No. 21
15	Conseil Des Montagnais Du Lac St-Jean	Mashteuiatsh
17	Council Of Kahnawake	Kahnawake Indian Reserve No. 14
22	Eagle Village First Nation-Kipawa	Eagle Village First Nation - Kipawa
25	Kitigan Zibi Anishinabeg (Maniwaki)	Kitigan Zibi
27	Listuguj Mi'gmaq First Nation Council	Listuguj
28	Micmacs Of Gescapegiag Band Council	Gesgapegiag
29	Mohawk Of Kanesatake	Doncaster Indian Reserve No. 17
31	Mohawks Of Kanesatake	Kanesatake Lands
35	Timiskaming First Nation	Timiskaming

## Taiga / Tundra

Band Label	Band Name	Associated Reserves
18	Cree Nation Of Chisasibi	Chisasibi
20	Cree Nation Of Nemaska	Nemiscau
26	La Nation Innu Matimekush-Lac John	Lac John, Matimekosh
32	Naskapi Nation Of Kawawachikamach	Kawawachikamach
33	Premipre Nation De Whapmagoostui	Whapmagoostui
34	The Crees Of The Waskaganish First Nation	Waskaganish







# Distribution of First Nations within the ecological regions of the Maritimes

## Acadian

Band Label	Band Name	Associated Reserves
1	Abegweit Band	Morell Indian Reserve No. 2, Scotchfort Indian Reserve No. 4
2	Acadia Band	Gold River Indian Reserve No. 21, Medway River Indian Reserve No. 11, Ponhook Lake Indian Reserve No. 10, Wildcat Indian Reserve No. 12, Yarmouth Indian Reserve No. 33
3	Afton Band	Franklin Manor Indian Reserve No. 22 (Part), Pomquet And Afton Indian Reserve No. 23, Summerside Indian Reserve No. 38
4	Annapolis Valley Band	Cambridge Indian Reserve No. 32, St. Croix Indian Reserve No. 34
5	Bear River Band	Bear River Indian Reserve No. 6, Bear River Indian Reserve No. 6a, Bear River Indian Reserve No. 6b
6	Big Cove Band	Richibucto Indian Reserve No. 15
7	Buctouche Band	Buctouche Indian Reserve No. 16
8	Burnt Church Band	Burnt Church Indian Reserve No. 14, Pokemouche Indian Reserve No. 13, Tabusintac Indian Reserve No. 9
9	Chapel Island Band	Chapel Island Indian Reserve No. 5
10	Eel Ground Band	Big Hole Tract Indian Reserve No. 8 (South Half), Eel Ground Indian Reserve No. 2, Renous Indian Reserve No. 12
11	Eel River Band	Moose Meadows Indian Reserve No. 4
12	Eskasoni Band	Eskasoni Indian Reserve No. 3, Eskasoni Indian Reserve No. 3a, Malagawatch Indian Reserve No. 4
13	Fort Folly Band	Fort Folly Indian Reserve No. 1
14	Horton Band	Glooscap Indian Reserve No. 35
15	Indian Island Band	Indian Island Indian Reserve No. 28
16	Kingsclear Band	Kingsclear Indian Reserve No. 6
17	Lennox Island Band	Lennox Island Indian Reserve No. 1
19	Membertou Band	Caribou Marsh Indian Reserve No. 29, Membertou Indian Reserve No. 28b, Sydney Indian Reserve No. 28a
21	Millbrook Band	Beaver Lake Indian Reserve No. 17, Cole Harbour Indian Reserve No. 30, Millbrook Indian Reserve No. 27, Sheet Harbour Indian Reserve No. 36, Truro Indian Reserve No. 27a, Truro Indian Reserve No. 27b, Truro Indian Reserve No. 27c
23	Oromocto Band	Oromocto Indian Reserve No. 26
24	Pabineau Band	Pabineau Indian Reserve No. 11
25	Pictou Landing Band	Boat Harbour West Indian Reserve No. 37, Fisher's Grant Indian Reserve No. 24, Fisher's Grant Reserve Indian Reserve No. 24g, Merigomish Harbour Indian Reserve No. 31
26	Red Bank Band	Big Hole Tract Indian Reserve No. 8 (North Half), Indian Point Indian Reserve No. 1, Red Bank Indian Reserve No. 4, Red Bank Indian Reserve No. 7
27	Saint Mary's Band	Devon Indian Reserve No. 30, St. Mary's Indian Reserve No. 24
29	Shubenacadie Band	Indian Brook Indian Reserve No. 14, New Ross Indian Reserve No. 20, Pennal Indian Reserve No. 19, Shubenacadie Indian Reserve No. 13
30	Tobique Band	The Brothers Indian Reserve No. 18, Tobique Indian Reserve No. 20
31	Wagmatcook Band	Margaree Indian Reserve No. 25, Wagmatcook Indian Reserve No. 1
32	Whycocomagh Band	Whycocomagh Indian Reserve No. 2
33	Woodstock Band	Woodstock Indian Reserve No. 23

## Boreal Forest

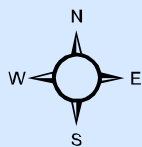
Band Label	Band Name	Associated Reserves
20	Miawpukek Band	Samiajij Miawpukek
28	Sheshatshiu Innu First Nation	Sheshatshiu Indian Reserve No.3

## Carolinian / Great Lakes

Band Label	Band Name	Associated Reserves
11	Eel River Band	Eel River Indian Reserve No. 3, Indian Ranch Indian Reserve
18	Madawaska Maliseet First Nation	St. Basile Indian Reserve No. 10

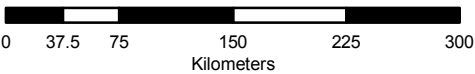
## Taiga / Tundra

Band Label	Band Name	Associated Reserves
20	Miawpukek Band	Samiajij Miawpukek
22	Mushuau Innu First Nation	Natuashish Indian Reserve No. 2



# First Nation bands within the major ecological regions of the Maritimes

Scale: 1 : 5,000,000



## Legend

77



First Nation reserves



Boreal Forest



Taiga/Tundra



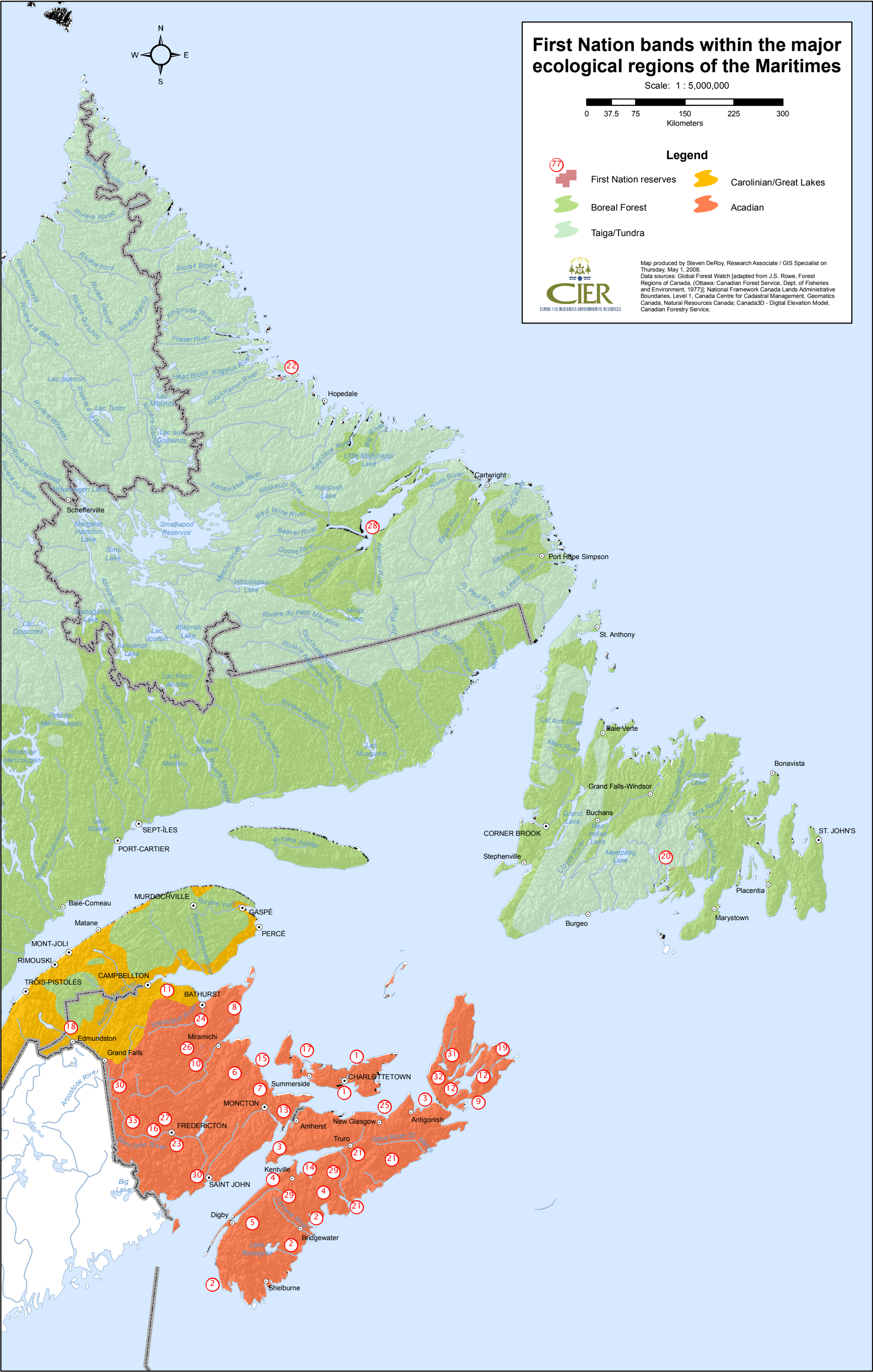
Carolinian/Great Lakes



Acadian



Map produced by Steven DeRoy, Research Associate / GIS Specialist on Thursday, May 1, 2008.  
Data sources: Global Forest Watch [adapted from J.S. Rowe, Forest Regions of Canada, (Ottawa: Canadian Forest Service, Dept. of Fisheries and Environment, 1977)]; National Framework Canada Lands Administrative Boundaries, Level 1, Canada Centre for Cadastral Management, Geomatics Canada, Natural Resources Canada; Canada3D - Digital Elevation Model, Canadian Forestry Service.



# CLIMATE CHANGE AND FIRST NATIONS SOUTH OF 60: IMPACTS, ADAPTATION, AND PRIORITIES

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## APPENDIX 2: ADAPTATION NETWORK SURVEY AND RESULTS



Submitted To:  
Indian and Northern Affairs Canada

Submitted By:



May 2008



# **CIER On-line Survey Climate Change Survey Results**

## **Table of Contents**

<b>1.1</b>	<b>Introduction .....</b>	<b>1</b>
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## 1.1 INTRODUCTION

CIER developed an online survey regarding current climate change impacts in First Nations and current adaptation strategies, which was directed towards individuals predominantly living in and / or working with First Nation communities. Individuals were invited directly via an email to First Nations general email addresses and indirectly through advertisement of the survey on the CIER website. CIER used these results as a source of information to guide our research and decisions to identify priority climate change impacts and adaptation strategies for First Nations south of 60 degrees latitude. The survey solicited information on:

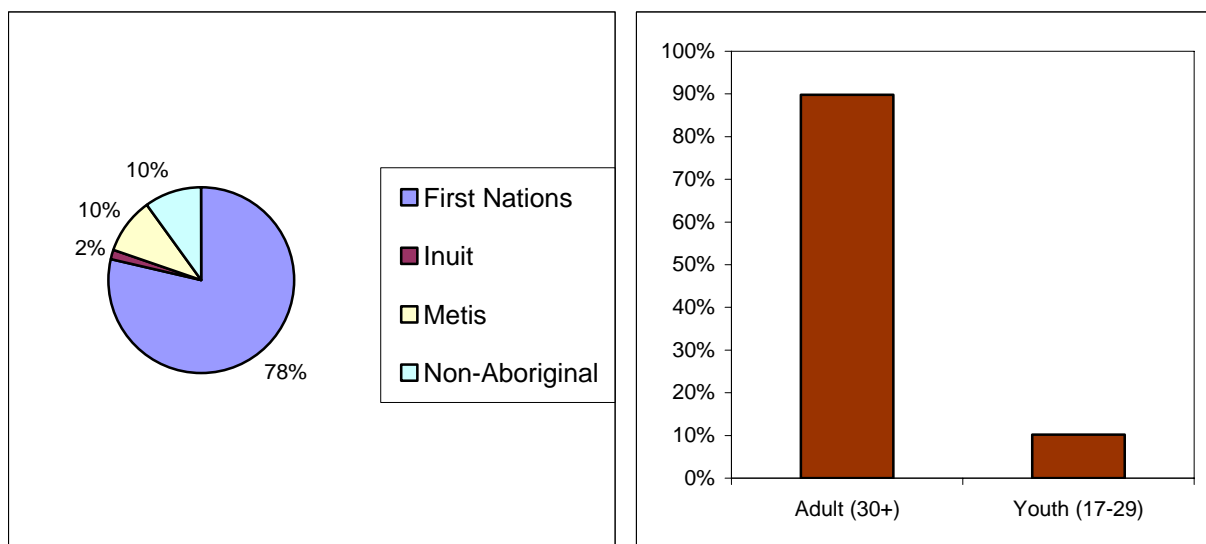
- Current climate change impacts community members are experiencing;
- Vulnerabilities of First Nations communities to climate change;
- Current adaptation strategies being employed;
- Barriers preventing adaptation strategies from being employed; and,
- Any information or other needs with respect to climate change for communities.

The online survey provided some open-ended questions and questions with set responses. CIER also provided opportunities for participants to include additional comments. The survey solicited the majority of information from First Nation members or those familiar with First Nations communities. However, some Inuit and Metis participants included their input. In order to include these comments, CIER has titled the majority of results as 'Aboriginal', with the understanding that the majority of information pertains to First Nations.

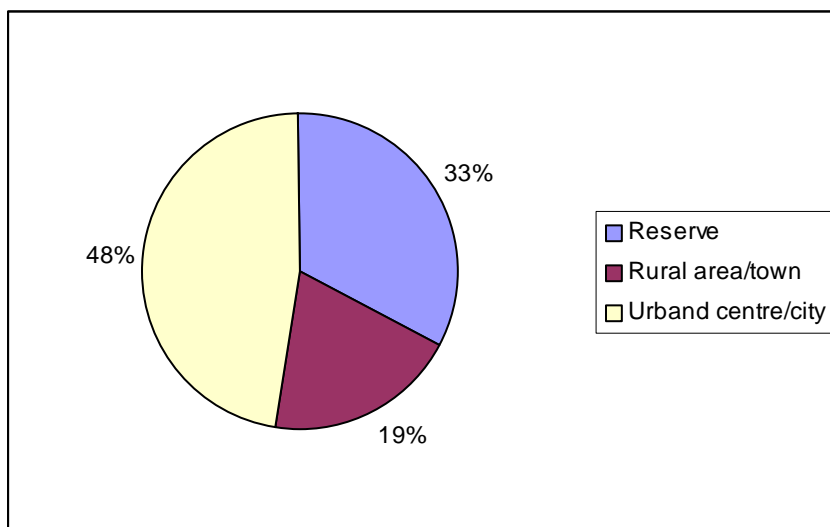
## 1.2 BACKGROUND INFORMATION ON RESPONDENTS

CIER received responses from 115 people to the online survey on climate change impacts and adaptations. While CIER directed the survey towards First Nations, there was small input from Inuit (1%) and Metis (10%) individuals. The majority of respondents were: First Nations, over 30 years of age, either in manager or supervisor roles, professionals or students, and worked for Aboriginal communities or governments. The graphs on the following two pages outline the demographics of the individuals who responded.

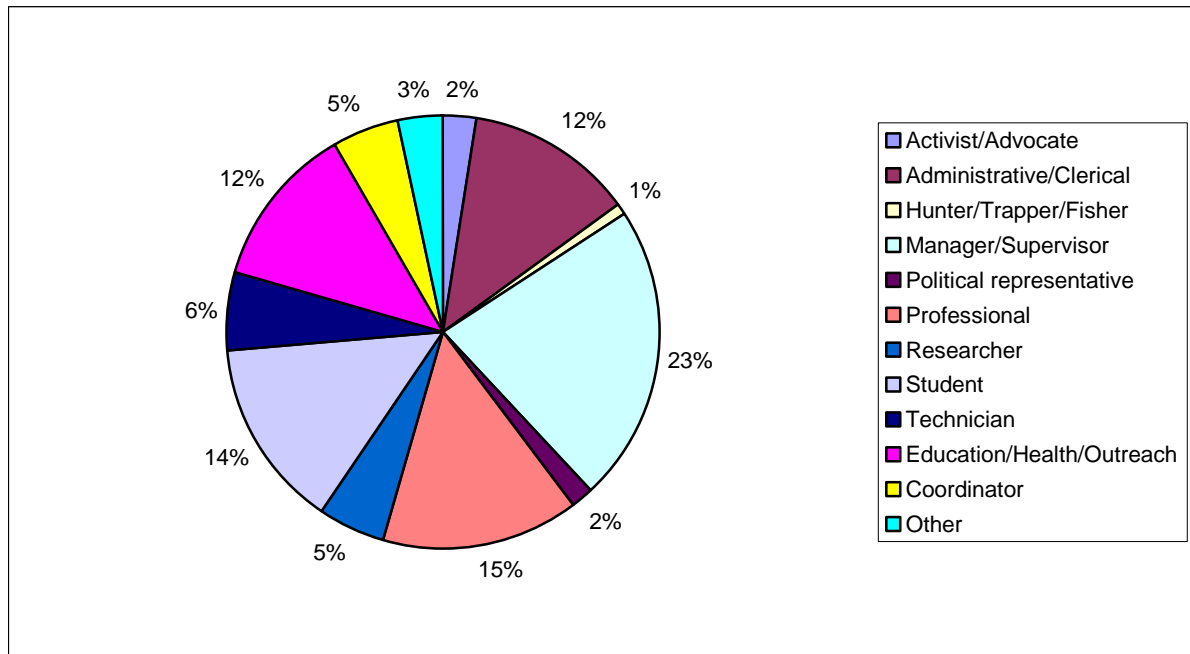
### 1) Age and ethnic background:



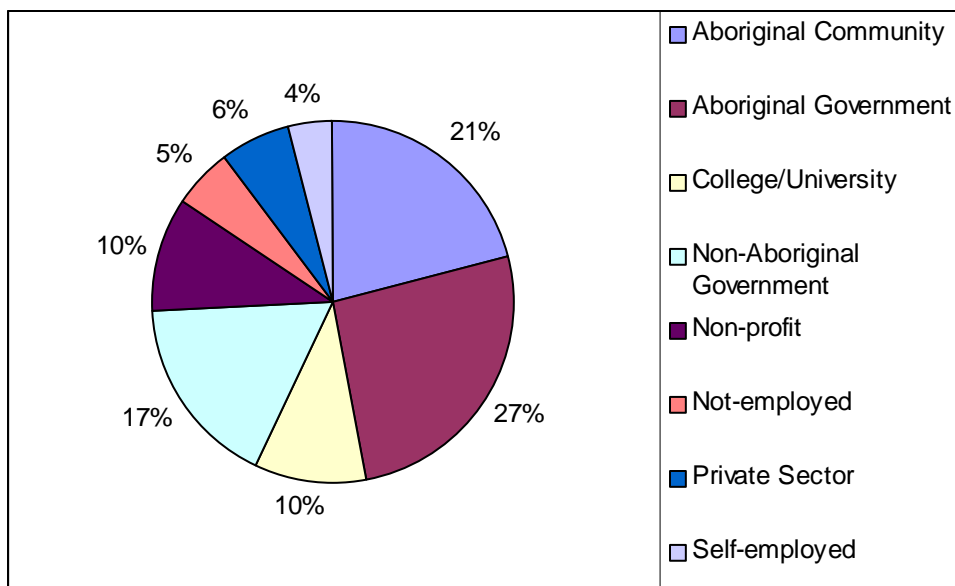
### 2) Primary place of residence:



## 3) Type of work:



## 4) Organization currently working for:

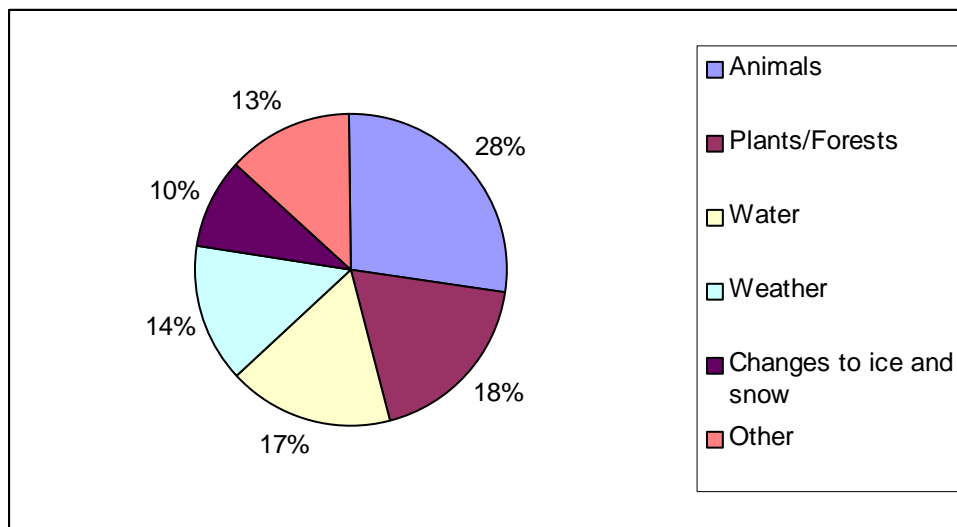




### 1.3 SURVEY RESPONSES

The following questions and graphs represent the summaries of responses to the online survey.

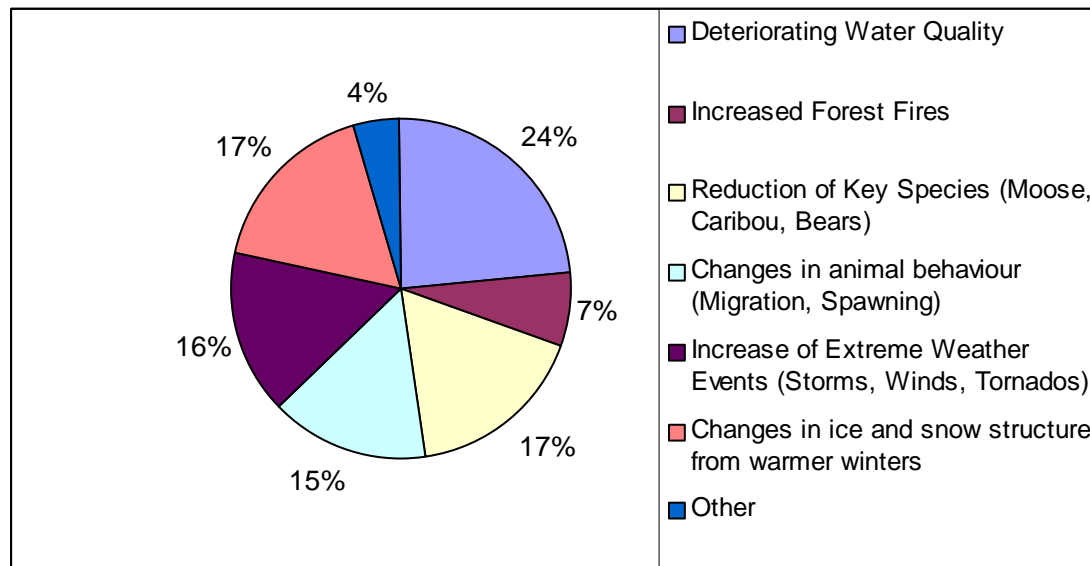
#### 1) How do you feel First Nations are currently experiencing climate change?



For changes to animals, respondents described decreasing numbers and sometimes disappearance of animals, changes to yearly cycles such as having young sooner, and decreases in health resulting in reduced safety of consuming wild animals. The comments about plants included decreasing abundance or complete disappearance of some plants, threats to the forest such as pine beetle, changes to habitats and ecosystems, and changes in yearly cycles such as early blossoming times.

Respondents often described climate change impacts related to water in terms of decreasing availability of water or contamination of water sources while a few respondents commented about flooding. Respondents discussing weather usually described the change in weather patterns and increased variability. Respondents also described changes to snow and ice such as decreased snow pack in the winter, changes to freeze thaw cycles, and generally thinner ice. Other issues brought up less frequently were changes to seasons, warmer temperatures, deteriorating air quality, shorter winters, and melting permafrost.

- 2) Identify which of the following climate change impacts you are most concerned about  
(Please select a maximum of three).

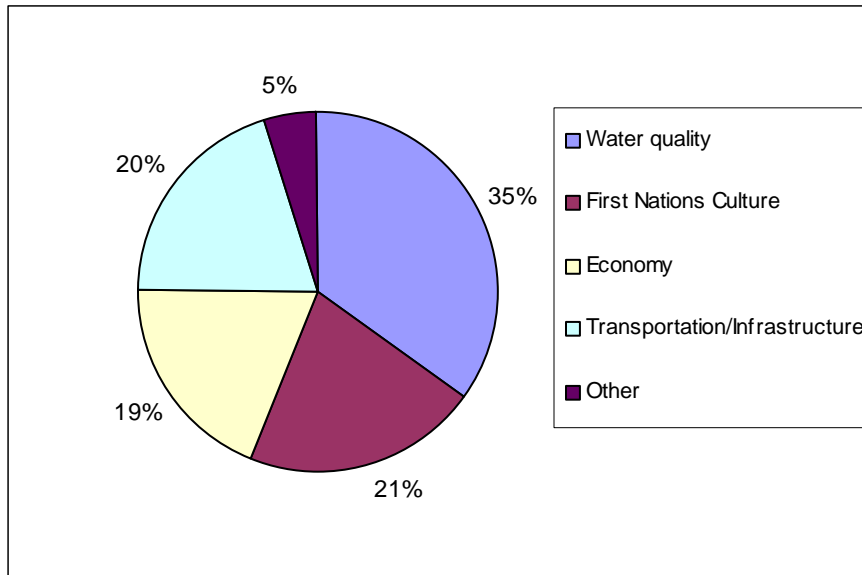


Other climate change impacts of concern described were: changing weather patterns, deteriorating of forests from pine beetle, new invasive species in areas, deteriorating air quality, changing plant distribution, and changing snow structure.

- 3) In which ways do you think First Nations are most vulnerable to climate change impacts?

The options available for people to select were:

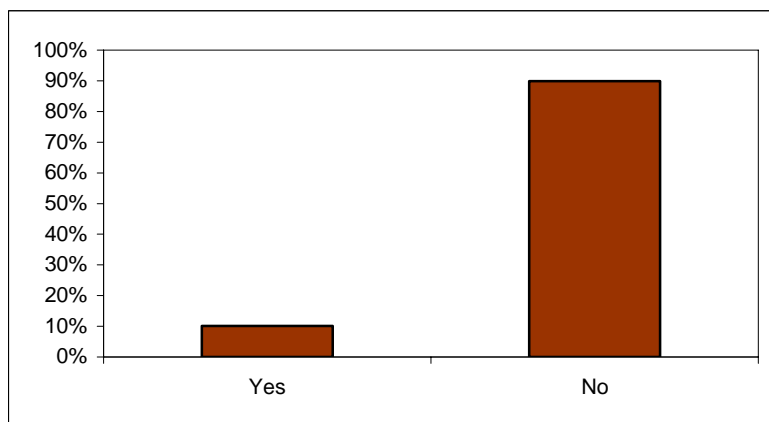
- Water quality (drinking water, surface water (lakes, rivers), marine, and ground water)
- First Nations Culture (language, Indigenous knowledge, traditional pursuits)
- Economy (economic development, tourism, traditional economies)
- Transportation (winter roads, bridges, barges, ferries) Infrastructure (commercial and residential buildings)



Respondents listed other vulnerabilities which all concerned the affect of climate change on First Nations health, for example, in overall physical health, issues related to loss of traditional foods and increased reliance on store bought foods, and illness and disease from factors such as contaminants, new viral strains, new pests, and similar.

4) Has your community developed ways of coping or adapting to existing climate change impacts?

Ninety percent of those surveyed reported that their communities did not have any ways of coping or adapting to climate change.

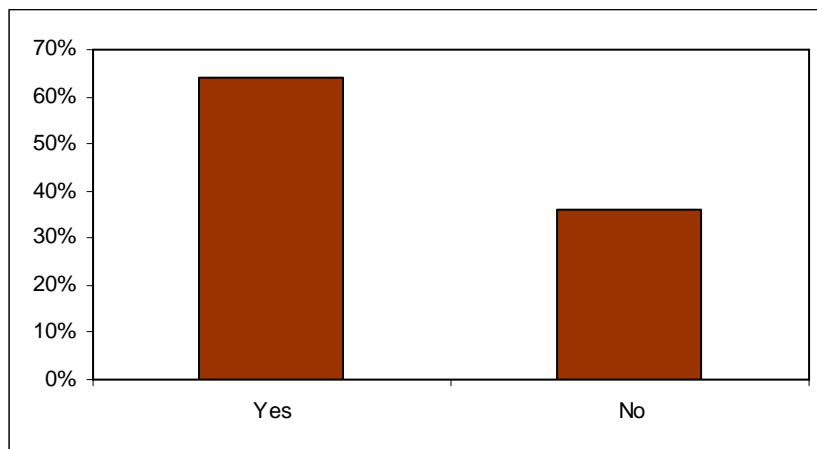


5) If your community has developed ways of coping or adapting, please describe them.

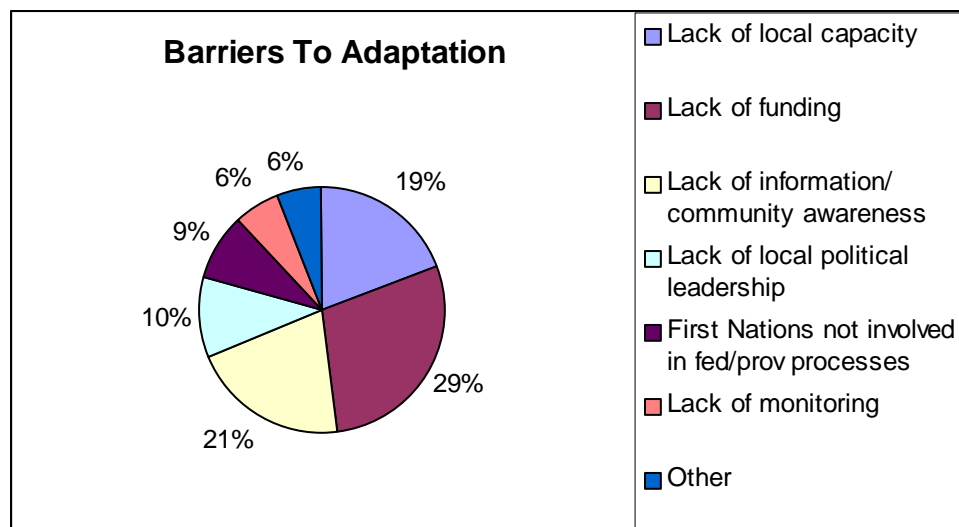
The majority of respondents who said that their community had developed ways of coping or adapting to climate change referred to monitoring that was occurring in their community, predominately water quality monitoring but also fish, habitats and air quality monitoring. Other adaptation strategies mentioned were the use of an emergency response team, putting up signs to limit fish consumption, changing the harvest times of wild plants and animals, and clearing rotten logs to ease water flow into a river. A few respondents also talked about mitigation measures such as recycling.

6) Are there any ways that your community would like to adapt but have barriers preventing you from doing this?

Sixty-four percent of respondents said they did have barriers preventing them from implementing adaptation strategies.



7) If your community does have barriers to climate change adaptation, please describe them.



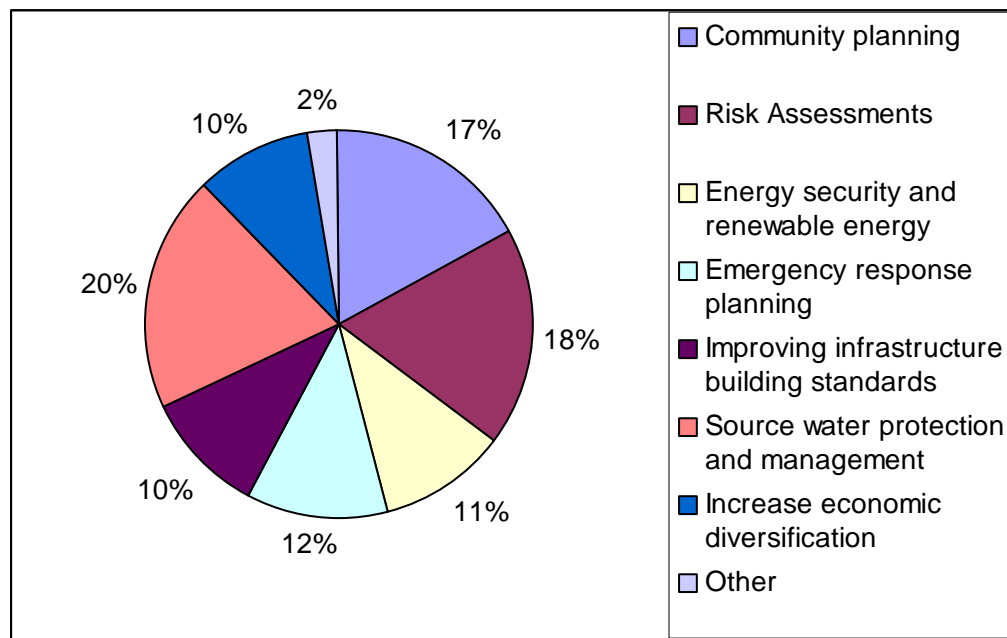
Respondents identified a lack of capacity, funding, and community awareness as the largest barriers to climate change adaptation in their communities. Respondents stated that communities lack the trained and qualified people required to implement adaptation work as well as inadequate funds to provide training to members or to carry out adaptation initiatives. Many respondents also said there was a lack of awareness and information at the community level of the impacts of climate change in their community. They said members require information on climate change impacts, the priority areas they should focus on, as well as practical solutions for adaptations.

Some respondents also described a lack of leadership at the community level, explaining that their leadership was not concerned about climate change or did not see it as a priority. Respondents also identified provincial and federal governments do not include First Nations in the decision making process, resulting in denied abilities to carry out their initiatives, as another political barrier to adaptation. Some respondents discussed the need for monitoring before developing adaptation strategies. Other comments included an inability to give up traditional lifestyles, that climate change issues are not a priority given the day-to-day crises on some reserves, lack of communication with off-reserve members, and oil companies.

8) What does your community need to better adapt to climate change? (please check a maximum of three)

The options available included:

- Comprehensive community planning;
- Risk Assessments to identify community vulnerabilities;
- Increasing energy security and opting for renewable energy sources;
- Emergency response planning;
- Improving building standards for infrastructure to include climate change considerations;
- Source water protection and management; and,
- Increase economic diversification.

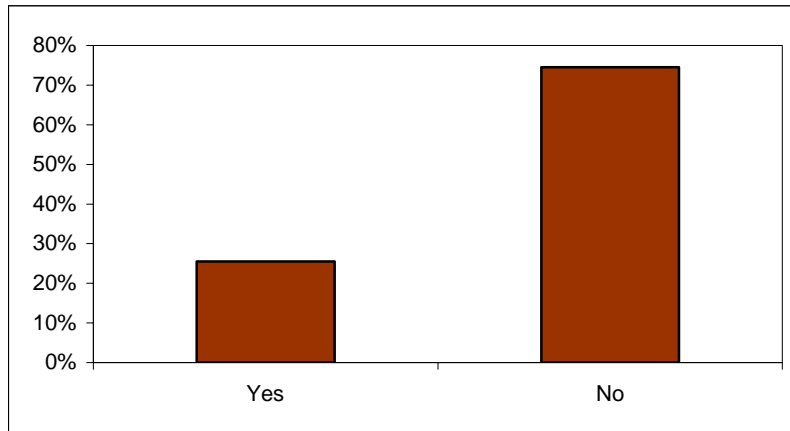


Other needs listed by respondents include:

- A needs study;
- More information about processes and products available now and information from government, industrial sectors, and urban centres;
- Funding; and,
- Training and capacity building for community members to do complete monitoring or inventories, and identify or enhance community solutions.

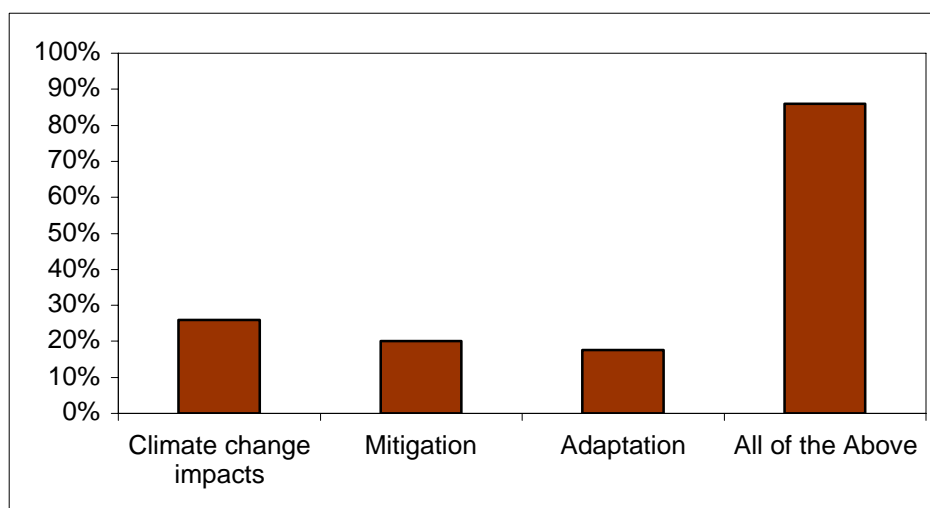
- 9) Do you think your community has a good understanding of what climate change impacts are happening (or could potentially happen) in your community?

Seventy-five percent of respondents felt that their communities did not have a good understanding of the climate change impacts in their communities.



- 10) In what areas do you or First Nations require more information?

Eighty-six percent of respondents communicated that First Nations required information on all three suggested areas: climate change impacts, mitigation and adaptation measures.



## 1.4 SUMMARY

The Online surveys identified the main ways in which First Nations are experiencing climate change as:

- 1) Changing water quality and quantity
- 2) Decreasing abundance and health in animals and plants
- 3) Increasing variability in the weather and increases in extreme weather events
- 4) Changing ice and snow conditions

The online survey results included the following as the major affects that climate change will have on First Nations communities:

- 1) Water Quality;
- 2) Transportation;
- 3) Culture;
- 4) Economy; and,
- 5) Health (including affects of loss of traditional foods).

The results of the adaptation network illustrate that few First Nations communities are employing adaptation strategies. For those that are carrying out adaptation, it is often in the form of strengthening information networks of communication and monitoring environmental parameters, such as water quality. The on-line respondents selected source water protection and management, improvement of infrastructure building standards, and community planning as priority areas for First Nations adaptation.

Some barriers that prevent First Nations from employing adaptation strategies are a lack of available funding and a lack of understanding at the community level about climate change impacts in their communities and potential adaptation strategies. In addition to increased funding and information or awareness at the community level, First Nations also require initiatives that engage the community as well as communicate to the leadership the importance of climate change adaptation measures.



# CLIMATE CHANGE AND FIRST NATIONS SOUTH OF 60: IMPACTS, ADAPTATION, AND PRIORITIES

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## APPENDIX 3: IMPACTS AND ADAPTATION TABLES



Submitted To:  
Indian and Northern Affairs Canada

Submitted By:



May 2008



## **Appendix 3**

### **Impacts and Adaptations Tables**

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## 1.0 INSTRUCTIONS FOR TABLES

CIER utilized a large matrix to determine national climate change priorities and potential adaptation options. We modified this matrix into three tables that list a large number of potential impacts and corresponding adaptation strategies to facilitate community brainstorming of their priorities.

Use the following tables to start your adaptation planning process and determine your five most important climate change impacts and potential adaptations.

A map of the ecoregions is located in section 1.2 on the following page. Alternatively, access your provincial map located in Appendix 1 of the document titled: *Climate Change & First Nations South of 60: Impacts, Adaptations, and Priorities*. Make a note of the ecoregion within which your nation falls at the top of tables one and two.

- 1) Refer to table one, entitled “Impacts Brainstorming”. Check off all of the impacts that apply to your nation.
- 2) For each ‘check’, indicate the pillars of sustainability affected by the impact. The four pillars of sustainability are cultural, economic, environmental, and social. When deciding if the impact affects each pillar of sustainability ask yourself the following:
  - Cultural: Will the Climate Change impact language, ceremonies, or traditional practices?
  - Economic: Will the Climate Change impact affect economic opportunity (positive or negatively), cost to the band administration, cost to the traditional economy or subsistence economy, or the cost of living?
  - Environmental: Will the Climate Change impact affect negatively or positively the physical environment (air, water, and land) or plants, animals, and insects?
  - Social: Will the Climate Change impact health, safety, recreation, or government?
- 3) Refer to table two entitled “Priority Impacts and Adaptations Brainstorming”. Please circle your top five impacts from the list and give any examples of adaptations that you can think of.
- 4) Once you are finished brainstorming, or if you are having difficulties, refer to table 3 entitled “Adaptation Strategies by Priority Impact”. This table lists adaptation strategies described in literature or identified through our research.



### 3.0 IMPACTS AND ADAPTATIONS TABLES

#### 3.1 TABLE 1 - PRIORITY IMPACTS IDENTIFICATION & PILLARS OF SUSTAINABILITY

Priority Impacts Identification and Pillars of Sustainability		
<b>Ecoregions:</b> Boreal (B), Aspen Parkland (AP), Taiga (T), Subalpine (S), Coast (C), Great Lakes (GL), Acadian (A)	1. What is your ecoregion? _____	
<b>Impacts:</b> Climate change impacts are the environmental changes that are currently happening or predicted to occur due to global climate change.	2. Check "Yes" for each impact relevant to your community.	
<b>Pillars of Sustainability:</b> Economic ( <b>E</b> ) (cost of living, administration, economic opportunities, traditional economies), Environmental ( <b>EN</b> ) (negative, physical: plants, animals, air, water, land), Social (health, safety, recreation, governance), Cultural ( <b>C</b> ) (language, ceremonies).	3. For each "Yes", indicate which pillar of sustainability it affects. Use abbreviations.	
Impacts	Yes	Pillars of Sustainability
<b>Water</b>		
<b>Water - Glaciers</b>		
Receding/increased melt rate		
Spring Flooding		
Advancing (some regions - West Side of Mountain Ranges)		
Surface and ground water reduction east of Mountain Ranges (Drought)		
Aesthetics		
<b>Water - Surface</b>		
Deteriorating quality		
Lower quantities		
Higher quantities		
Overland flooding		
Decreased oxygen levels		
Increased sedimentation		
Concentration of existing pollutants		
Increased evaporation		
Disappearing lakes		
Changing waterways - rivers		
Flash flooding		
Changing water velocities		
Increased temperature		
Water expansion due to heating		
Long off ice season/open water season		

Impacts	Yes	Pillars of Sustainability
Changing lake turnover		
Changing lake stratification		
Increase algae blooms		
Changes to waves		
Changes to currents		
Drying wetlands bogs, fens		
Increased bog fires		
Storm surge		
Increased precipitation		
Extreme weather events		
Changes to artesian wells		
Increased waterborne diseases		
Increased standing water		
Groundwater		
Changes in recharge - glaciers, surface water, increased run off		
Decreasing quantity/decreasing availability		
Changing groundwater flow		
Decrease in quality from overland flooding, melting permafrost		
Land		
Melting permafrost		
Increased forest fires		
Increased forest damage (wind)		
Loss of drought-intolerant tree species		
Changing forest structure		
Increased evapotranspiration		
Moving treeline/timberline		
Shrinking region (tundra/taiga)		
Changing boundaries (latitude/altitude)		
Longer thawed surface for tundra and taiga		
Increased erosion (wind, water)		
Drying soils		
Increased landslides		
Increased avalanches		
Changes in snow depth/quantity		
Aesthetics		

Impacts	Yes	Pillars of Sustainability
Changes in annual patterns of precipitation		
Changes in seasonal patterns of precipitation		
Drought		
Drying watershed		
Flooding		
Storm surges		
Salinization of soils		
Desertification		
Increased shoreline (receding water)		
Loss of land - sea level rise		
Loss of land - erosion		
Loss of land - surface water flooding		
Loss of beaches (floods/receding water/erosion)		
Increased wind/wind storms		
Ice storms		
Hurricanes		
Ice storms		
Changing harbours		
Storm surges/flooding/sea level rise damaging deltas/Estuaries/salt flats		
Tides changing		
Changes in productivity		
Increased annual temperatures		
<b>Animals</b>		
<b>All</b>		
Loss of native species from invasive species (all animals)		
<b>Inverts</b>		
Forest Infestations from Pests		
Pine Beetles		
Spruce Beetle		
Forest Tent Caterpillar		
Spruce Budworm		
Asian Longhorn Beetle		
Expanding ranges into the Arctic		
Increasing population of disease vectors		
More black flies		



Impacts	Yes	Pillars of Sustainability
More parasites (What parasites? Human, mammals, or aquatic)		
Crop pests increasing		
<b>Birds</b>		
Changes to migration routes		
Changes to critical habitats		
Changing populations of wetland species		
Changing dickie bird ranges / seasons		
<b>Vertebrates</b>		
Changes in behaviour (hibernations, migration, ranges)		
Increased stress from pests		
Habitat changes		
Heat stress		
Increased competition		
Increased exposure to disease		
Change ecological niches		
Reduced Fur Quality		
Decreased Health		
Extinction		
Mass death due to changes in ice safety		
<b>Aquatic</b>		
Loss of species (invasive, temp changes, increased pollutant conc.)		
Increased in deformities		
Increased feminization (temperature dependent sex determination)		
Spawning changes		
Water changes affecting sex ratios		
Keystone species reduction (Marine, Aquatic, Animals)		
Changes in aquatic mammals species		
<b>Marine</b>		
Changes in seafood		
Changes in shell fish		
Changes to coral		
Changes in ranges of small and large marine animals		
Changes in food chain		
Changes in ooligan		
Changes in marine fish species		

Impacts	Yes	Pillars of Sustainability
<b>Plants</b>		
Changes in distribution		
Changes in forest ranges		
Drying of berries		
Drying moss		
Changes in phenology		
Invasive plant species / increased competition		
Increase size of plants		
Extended growing seasons		
Changes in productivity - increase/decreases		
Increased stress resulting from pests		
Loss of drought-sensitive plant species		
Loss of shoreline species		
Shoreline erosion		
Sensitive habitat loss - costal erosion, wetlands		
Increased disease		
Fires		
Increasing bog fires		
Pollination/Seed transport loss due to changing vector timing		
Effects on fruit trees		
Changes in amount of medicine in plants		
Increased evapotranspiration		
Change in community structure		
Increased wind throw/blow down		
Aesthetics		
Increased pollen		
<b>Weather</b>		
<b>Extreme Weather Events</b>		
Increase in frequencies of extreme weather		
Increase frequencies/severity of storms; including thunder, and wind		
Increase frequencies/severity of hurricane		
Increased frequencies/severity of tornados		
Increased frequencies/severity of snow storms		
Increased frequencies/severity of hailstorms		
Increased frequencies/severity of ice storms		

Impacts	Yes	Pillars of Sustainability
<b>General Weather</b>		
Changing precipitation seasonal/annual		
Increased frequencies/severity of heat waves		
Shorter, milder winters		
Longer, hotter summers		
Increased global temperature		
Regional cooling possible		
Changing wind speeds - seasonal/annual		
Changes in cloud cover - seasonal/annual		
Increased lightning and thunderstorms		
Fewer extreme cold events		
Increased variability		
Straight line winds		
Increased humidity		
Increased freeze thaw cycle		
Rapid thaw leading to flooding		
Changes in snow structure		
<b>Air</b>		
Increasing temperature/ increased humidity		
Exacerbates compounds - smog		
Increased particulates - drier conditions combined with wind		
Changing air patterns/jet streams		

### 3.2 TABLE 2 - PRIORITY IMPACTS & ADAPTATIONS BRAINSTORMING

Priority Impacts and Adaptation Brainstorming	
1. Identify your ecoregion: _____	<b>Ecoregions:</b> Boreal (B), Aspen Parkland (AP), Taiga (T), Subalpine (S), Coast (C), Great Lakes (GL), Acadian (A)
2. Circle your top five impacts from the following list.	
3. Identify adaptation strategies for each of the five impacts selected.	
Impacts	Adaptation Strategies
<b>Water - Surface</b>	
Receding/increased melt rate of glaciers	
Deteriorating quality	
Overland flooding	
Increased sedimentation	
Increased temperature	
Storm surge	
Increased waterborne diseases	
<b>Land</b>	
Increased forest fires	
Changing boundaries (latitude/altitude)	
Changes in snow depth/quantity/quality	
Drying watershed	
<b>Animals - Inverts</b>	
Forest Infestations from Pests	
Increasing population of disease vectors	
More parasites	
<b>Animals - Birds</b>	
Changes to migration routes	
Changes to critical habitats	
<b>Animals - Vertebrates</b>	
Changes in behaviour (hibernations, migration, ranges)	
Increased stress from pests	
Increased exposure to disease	
<b>Animals - Aquatic</b>	
Spawning changes	
Keystone species reduction (Marine, Aquatic, Animals)	

Impacts	Adaptation Strategies
<b>Animals - Marine</b>	
Changes in seafood and shell fish	
Changes in ranges of small and large marine animals	
Changes in marine fish species	
<b>Plants</b>	
Changes in forest ranges	
Increased disease	
<b>Weather - Extreme weather events</b>	
Increase in frequencies of extreme weather	
Increased frequencies / severity of snow storms	
<b>Weather - General Weather</b>	
Shorter, milder winters	
Longer, hotter summers	
Fewer extreme cold events	
Rapid thaw leading to flooding	
<b>Air</b>	
Exacerbates compounds - smog	

### 3.3 TABLE 3 - ADAPTATION STRATEGIES BY PRIORITY IMPACT

Potential Adaptation Strategies (as suggested in literature or existing adaptation projects) by Priority Impact
Deteriorating/Changing Water Quality and Quantity
Establishing and using water regulating structures to maintain flow rates of rivers
Change in the parameters of water treatment or the introduction of different or improved technologies
Improving demand management to decrease total water consumption through water conservation initiatives and water-costing mechanisms; water conservation measures and public education programs; water conservation through consumer education (restricted lawn watering, xeriscaping, low flush toilets/showerheads), industrial and commercial re-use of water, upgrading plumbing infrastructure, implementing charges for water
Pay farmers and landowners to maintain/enhance wetlands, ecologically sensitive lands, riparian areas, and natural areas
Relocating water intakes
Digging deeper wells or getting a surface water supply from further away
Boil water advisories
National (federal-provincial) monitoring efforts
Increased effort at water quality protection from agricultural, industrial and human wastes
Water management options such as reservoir development habitat protection
Protecting and re-vegetating riparian zones (reduce damages and losses from flooding), increase water retention in wetlands, restore or maintain connects between wetlands and lakes or rivers [ <i>and groundwater</i> ]
Wetland conservation - establish policies which protect wetlands since wetlands are beneficial for their ability to provide water purification
Improved planning and preparedness for droughts and severe floods
Networking with other communities
Taking bottled water out on the land / Use snow instead of lake water for drinking when on the land
Small dams to help control flow rates for community based hydro; increase industrial reclamation standards (longer-term WQM and potable water standards. Communication; Education and training, retrofit First Nation sewage systems to handle warmer climates/warmer source water; distribute and plan to meet water quality guidelines, where possible use watershed approach to source water protection. Protect cold groundwater input to deal with warmer water impacts on salmonid fish; create river drainage systems to handle increase in river flow; rain water capture.

<b>Increase in Frequency and Severity of Extreme Weather</b>
Land management - avoid building on land prone to flooding, erosion and violent winds; future land use decisions enforced through policies and bylaws; re-examination of plan policies, zoning controls, sub-division regulations, and building by-laws
Redefining construction standards for zoning, planning and building codes; for infrastructure and/or using protective works i.e. Red River floodway; structural adaptations enforced through building and engineering codes
Construction of protective engineering works such as ripraps, breakwaters, levees, bulkheads, (but are expensive and often shield erosion zones to the detriment of bordering zones)
Improving weather forecasting to allow earlier weather alerts and greater accessibility to regional-specific weather forecasts; community communication networks; reopening recently closed weather monitoring stations (provide up-to-date weather reports)
Creating or updating emergency response plans/ preparedness plans, or warning systems; land use planning
Building a network of cabins to provide shelter and safety for those hunters and travellers who get caught in extreme weather events (position cabins along travel or hunting routes)
Buying bigger and faster boats with GPS
Moving buildings and infrastructure out of flood prone areas
Droughts - soil moisture conservation strategies, promoting the recharge of aquifers, construction of farm ponds and dugouts, designing new criteria for adjustable water storage structures
Installation of a tertiary waste-water treatment; addition of a second larger water pipeline from nearby lake; xeriscaping; when dry use wells
Increase insurance and/or public relief
Cloud Seeding (prevent hail, increase precipitation)
Install storm water retention ponds at critical points in the storm drainage network to deal with extreme rain
Changing the National Building Code of Canada to prevent or decrease damage to buildings
Install storm-water detention tanks for more ponds at critical ponds in the system for untreated waste water runoff from high rainfall events, treat this excess water; use silt fences, tarping soil and fill stockpiles to help minimize damage from storms.
Consider the entire potential range of rainfall events when planning water treatment systems, to allow for maximum infiltration during the low intensity rainfall events, coupled with maximum storage for the high intensity events

Dyke and diversion system support from sandbagging and extending dykes; research and education (flood hotline, Red River Basin Task Force); establish floodplain construction requirements in the National Building Code
Silt fences, tarping soil and fill stockpiles to help minimize damage from storms.
Building treatments such as increased use of "hurricane brackets" to hold roof in place; Building treatments such as increased strength of windows (low-e argon windows, for example which are cited as having additional strength to withstand wind)
Emergency preparedness planning
Installation of an Emergency Public Warning System and creation of an Emergency Response Communication Centre
Diversification of natural resources used in local economy
Adopt larger and more powerful sea-worthy boats and snowmobiles for harvesting and transportation purposes (more expensive too)
Secure energy source, and back-up services (e.g. diesel, sat. phones); shared emergency response/clean-up equipment (e.g. TC)
Community based hazards mapping; INAC to pay for damage to infrastructure from storms within impacts to Band Capital Programs; Melting permafrost in North - study soil in North in newly thawed permafrost to determine increased capacity to support agricultural practises
<b>Changes in the Behaviour of Species / Loss of Keystone Species</b>
Establishing and using water regulating structures to protect the spawning grounds of fish species
Habitat or species preservation; migration corridors; minimize landscape fragmentation, preserve or restore migration corridors; increased connectivity between habitats
Establishment of reserves or refuges for animals
Address climate change in species-at-risk recovery plans
Account for climate change in (forest management) habitat management plans
Encourage active habitat management, such as the establishments of nest boxes and the protection of cavity trees, to facilitate the colonization of sites by bird species expanding their ranges.
Consider translocation of sensitive species farther north if inadequate habitat connectivity is blocking the species distribution
In severe cases, establish captive populations of rare species to conserve genetic diversity
Adjust harvest allocations and seasons of (hunted and trapped) wildlife species to reflect changing carrying capacities and shifting breeding and migration patterns



Review of the regulations governing fishing; developing aquaculture facilities; changing laws for sport fishing to catch-and-release only; change fishing quotas to total allowable harvest; new regulations decreasing allowable catch for commercial Freshwater and Saltwater fisheries; review of expected subsistence levels for First Nation people; Changes to current commercial fisheries management systems (e.g. laws on sport fishing changed to catch and release only); Moratorium on some fishing (e.g. lake trout)
Animal monitoring programs
Modifying the timing of harvest activity (get winter wood in spring instead of fall), modifying the location of harvest activity, modifying the method of harvesting activity (go on ATV instead of skidoos), adjusting the species harvested, minimizing risk and uncertainty (don't go if too dangerous)
Share wild foods with community members (Elders, disabled people)
Use of 'fire smart' landscapes; implement fire smart programs
Improve soil management, spacing, tree rotation length to enhance success of forests under new or variable climate patterns
Improved density control in both natural and artificial regeneration
Create biologically diverse rather than single-species tree plantations to enhance and hasten species dispersal to more suitable new ranges
Develop relationships with nearby FNs if need to move into their territory; economic diversification (community level; individual business); adapt to new hunting/trapping/fishing species.; have a communal freezer/food co-op; get involved in bioregional planning;
Develop community health plan to address shift from traditional foods (decreased keystone species) to market/commercial foods to ensure 'healthful' market foods are affordable and accessible; halt major projects in the north; don't punish north because of loss in south, any habitat reserves should be in south; animal strategies subject to Aboriginal and treaty rights
<b>Increase in Forest Fires</b>
Programmes of multiple thinning before final harvest
Breeding programmes that attempt to improve the desirable traits of species to be regenerated
Preserve diversity within gene pool of trees
Develop systems of protection from fire, insects and disease
Silvicultural measures such as artificial regeneration, thinning, or fertilization; pest management
Inventory and forecasting tools for planning and scheduling of forest interventions
Transition from fire prevention to fire management; Natural Disturbance Based fire management (controlled burns)

Traditional management, agro forestry, small woodlot management and windrow (shelterbelts)
Substituting existing recreational sites for different areas
Shifting species and genetic varieties of trees to increase water use efficiency in trees
Invest more in prevention, management and containment of large forest fires
Develop emergency preparedness plan/evacuation plan; public education; change in fires season readiness; identifying vulnerable infrastructure and measures to protect; Ensure there is dual entry/access to community; Build fire breaks around community; Have a forest fire training/local crew; sufficient/operable/local water source/pumps/trucks/respirators; Fire monitoring to identify vulnerable areas; Increase (or get) insurance
Restoration projects funded by voluntary 'carbon offsets' markets; research and monitoring programs; economic programs (create mills and sell lumber, burn stands, replant), create new economic opportunities using infested wood; fire smart; work with shifting forests and plant broad leaf trees in southern regions, plant shrubs and other plants to prevent erosion;
<b>Changes to Snow / Ice Due to Warmer Weather</b>
Construction of all season roads; moving winter roads onto land instead of over rivers and lakes; changing coastal routes of winter roads
Increased reliance on barge transport in the summer
More expensive construction and maintenance of ice-roads that would extend their seasonal life e.g. construction of permanent stream crossings
Use airships to transport goods; fly in supplies
Other innovations (e.g. using balloons to transport oilfield equipment over ice roads)
Development of land camps to strengthen TK, maintain skills and values
Develop community communication networks (hazards mapping; mapping out/monitoring community trails and communicating to citizens which trails are safe, etc)
Adjustments in hunting timing, methods and management regimes
Rely on more low-impact transportation systems
Be flexible, take more time when planning, wait
Take extra supplies, becoming more risk averse (avoiding dangerous areas, avoiding going out if the weather is going to be bad, avoiding travel at dangerous times of the year), technological adjustments (use of GPS, vhf radios, satellite images of ice) and use of better equipment (powerful boats), changing the timing and location of harvesting, community networking (where to go, when); resource collection close to home

General
Environmental monitoring
Education and awareness about Climate Change
Implement sustainable living practises
Informal networks - informal organizations, local band councils, scientists and ecologists, municipal governments working together to develop resource management techniques and long-term strategic planning
Pilot programs, aimed at building adaptive capacity in the 'worst case scenario' and amongst the most vulnerable/poorest communities (can then be used by higher capacity First Nations
Build adaptive capacity by developing incentives to promote adaptive behaviour (and disincentives to maladaptive behaviour (coordinating with federal/provincial governments)
Use Risk Management Approach in community decision making; ecological economics (full cost accounting for not adapting)

# CLIMATE CHANGE AND FIRST NATIONS SOUTH OF 60: IMPACTS, ADAPTATION, AND PRIORITIES

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## APPENDIX 4: CASE STUDIES AND TOOLS



Submitted To:  
Indian and Northern Affairs Canada

Submitted By:



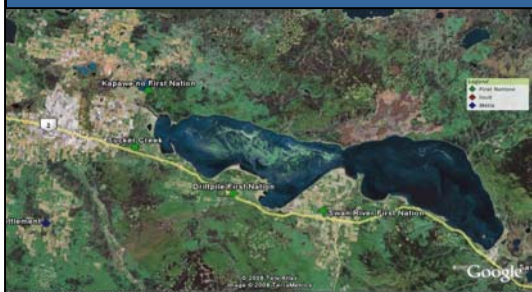
May 2008

## QUICK FACTS

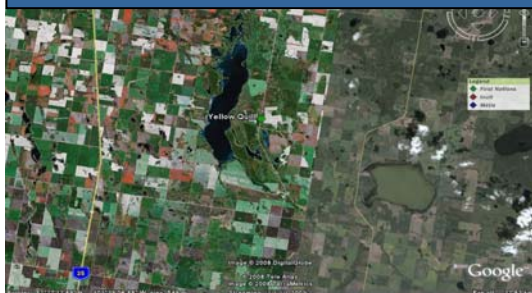
**Location:** Driftpile Cree Nation, 300 km NW of Edmonton, AB  
**Population:** 2291  
**Language:** English, Cree

**Location:** Yellow Quill First Nation, SK, 200 Km WNW of Saskatoon, SK  
**Population:** 2537  
**Language:** English, Saulteaux

## DRIFTPILE CREE NATION



## YELLOW QUILL FIRST NATION



## FN WATER FACTS

The following conditions may result in a Boil Water Advisory recommended by Health Canada:

- Unacceptable levels of disease-causing bacteria, viruses or parasites in the water system anywhere from the source to the tap
- Unacceptable levels of turbidity (cloudiness caused by suspended solids).

### First Nations with high-risk water systems in Canada:

New Brunswick: 2;  
 Quebec: 1; Ontario: 8;  
 Alberta: 3; BC: 7  
 (www.ainc-inac.gc.ca)

## Case Study 1 Drinking Water Safety and Source Water Protection in Driftpile Cree Nation and Yellow Quill First Nation



Tipis  
 (www.driftpilecreenation.com)

## BACKGROUND

As of March 21st, 2008, there were 94 Boil Water Advisories and 3 Do Not Consume Advisories in First Nations across Canada (www.water.ca). Climate change is expected to exacerbate water issues in First Nations. The predicted decreases in water quality would increase the costs of quality drinking water through either enhanced water treatment infrastructure or outsourcing drinking water. First Nations in remote areas or with limited economic resources (e.g. for upgrading or replacing infrastructure) will experience this as an even greater challenge.

The following projects are examples of drinking water and point source protection occurring in two First Nations: Driftpile Cree Nation and Yellow Quill First Nation. Also highlighted are the efforts of the Keepers of the Water.



RO unit  
 (www.eps-sdw.gc.ca)



Raw water  
 (www.eps-sdw.gc.ca)

## DRINKING WATER

Yellow Quill First Nation was under boil water advisory from 1995 to 2004. Due to the poor quality of their water source, the First Nation was not able to provide clean and safe drinking water to their community membership.

In March of 2004 a new treatment system was installed. The system includes bio-filtration and reverse osmosis.

In addition, the source of water was changed from a polluted, stagnant creek to one combined from an area of higher flow and groundwater sources. In June of 2004, the boil advisory was lifted and the community could drink directly from the tap after nine years of problem water. For more information visit the Canadian Water Network website at [www.cwn-rce.ca](http://www.cwn-rce.ca).

## SOURCE WATER PROTECTION

Driftpile First Nation, situated about 300 kilometres northwest of Edmonton, has had water problems since May 2005. At this time a drinking water advisory was put in place because of unacceptable turbidity levels in the water distribution system.

In 2006, the risk level for this community was reduced from high to medium due to the work that had been done over the course of the year. A new water treatment plant was opened October 11, 2006 and the drinking water advisory was immediately lifted. Currently, Drift pile First Nation is looking to partner with two other First Nations to recruit an oversight operator until it has a fully certified operator.

Driftpile First Nation has also been working with the Technical Services Advisory Group (TSAG) to develop a handbook on source water protection.

Please visit the Driftpile First Nation website at [www.driftpilecreation.com](http://www.driftpilecreation.com).

## ADAPTATION

Water quality and quantity issues are an expected impact of climate change. Some priority adaptations are:

- Source water protection and management
- Water demand management to decrease total water consumption via water conservation initiatives, public education programs and water –costing mechanisms
- Wetland conservation initiatives
- Use of climate change data when planning/designing sewage and water treatment facilities; higher levels of water treatment
- Networks with other communities; share information, projects, initiatives, TK.

## KEEPERS OF THE WATER

In the fall of 2006, a group of concerned citizens met in Liidlii Kui Denendeh (Fort Simpson), Northwest Territories to discuss their growing fears about the fate of the Arctic Ocean Drainage Basin. The drainage basin covers one-fifth of Canada's landmass, and encompasses British Columbia, Alberta, Saskatchewan, Northwest Territories, and the Yukon.

Once a wild and pristine watershed, this Basin is becoming increasingly toxic, depleted fresh water resource.

This gathering produced a water declaration that placed the needs of all that rely upon the Basin waters before the ambitions and activities of government and industry. For more information visit the official website at: [www.keepersofthewater.ca](http://www.keepersofthewater.ca).

## CONTACTS

### Driftpile Cree Nation:

Karolyn Badger  
(780) 355-3868

### Yellow Quill First Nation:

Roberta Neapetung  
(306) 322-2281

### Technical Services Advisory Group:

Denise Hammel  
(780) 483-8601

### The Keepers of the Water:

Norine Wark  
(250) 843-7310



Keepers of the Water Logo  
([www.keepersofthewater.ca](http://www.keepersofthewater.ca))



## QUICK FACTS

**Location:** Seabird Island Indian Band, 20 km NE of Chilliwack, British Columbia  
**Population:** 535  
**Language:** English, Halq'emeylem

## SEABIRD ISLAND BAND



## SEABIRD ISLAND BAND OFFICE



## SEABIRD ISLAND BAND INFORMATION

### Website Downloads

- Emergency Response Plan;
- Emergency Kit Info Pamphlet;
- Your Emergency Preparedness Guide;
- Preparedness Program Brochure;
- Seabird Island Information Kit; and,
- Emergency Social Services.

## Case Study 2 Emergency Preparedness in Seabird Island Indian Band



Sandbagging  
([www.seabirdisland.ca](http://www.seabirdisland.ca))

## BACKGROUND

Seabird Island Indian Band created an emergency preparedness plan for their community. Flooding was identified as the largest concern for the community. The community seeks to be prepared for events such as the 1948 flood.

Climate change has the potential to exacerbate spring floods as larger snow packs accumulated over winter due to changes in precipitation and these snow packs melt faster in the spring. The greatest risk is in the middle of May through to the first week of June.

Part of the plan includes educating the community members on what they need to do in the case of a flood. The Seabird Island Fire Department had gone door to door in the community with a checklist of what people should have on hand that would allow them to manage on their own for the first 72 hours.

For more information please visit the Seabird Island Indian Band website at [www.seabirdisland.ca](http://www.seabirdisland.ca) and the First Nations' Emergency Services website at [www.fnesc.bc.ca](http://www.fnesc.bc.ca).



Fraser River  
([www.seabirdisland.ca](http://www.seabirdisland.ca))



FNES logo  
([www.seabirdisland.ca](http://www.seabirdisland.ca))



## DRINKING WATER

### Boiling Water

Boiling is the safest method of treating water. Bring water to a rolling boil for 10 minutes, keeping in mind that some water will evaporate. Let the water cool before drinking.

Boiled water will taste better if you put oxygen back into it by pouring the water back and forth between two clean containers. This will also improve the taste of stored water.

For more information, please visit the Public Safety Canada Get Prepared website at [www.getprepared.ca](http://www.getprepared.ca).

## EVACUATION PLAN

If the need to evacuate should arise, the Seabird Fire Department will evacuate community members with elders and people with special needs as their first priority.

If flooding becomes imminent, hydro and gas lines will be shut off. Alternate sources of drinking water and means to cook food must be anticipated.

There are many steps that need to be taken and the Seabird Fire Department is responsible for distributing information.

Other emergency preparedness websites such as:  
[www.safeguard.ca](http://www.safeguard.ca)  
[www.safecanada.ca](http://www.safecanada.ca)  
[www.publicsafety.gc.ca](http://www.publicsafety.gc.ca)

## ADAPTATION

An expected impact of climate change is an increase in frequency and severity of extreme weather events. Some priority adaptations are:

- Incorporate the potential for extreme weather events in land management; re-examination of plan policies, zoning controls, sub-division regulations, and building by-laws;
- Redefine construction standards for zoning, planning and building codes; for infrastructure and/or using protective works; and,
- Create and practice an emergency preparedness plan.

Flooded Homes  
([www.getprepared.ca](http://www.getprepared.ca))



Seabird Island Band School  
([www.seabirdisland.ca](http://www.seabirdisland.ca))

## CONTACTS

### Chief Clem Seymour

Portfolios: Executive Committee, Economic Development, Ex Officio Member on All Portfolios

### Councillor Stacy McNeil

Portfolios: Health and Social Services (Alt) Education Committee Co-Chair, Safety and Emergency Services

### Councillor Margaret Pettis

Portfolios: Education Committee, Chair, and Education Executive, Health and Social Development, Safety and Emergency Services

### Councillor Carol Hope

Portfolios: Health and Social Development, and Education (Alt)

### Councillor Robert Armstrong

Portfolios: Economic Development, and Safety, and Emergency Services

## QUICK FACTS

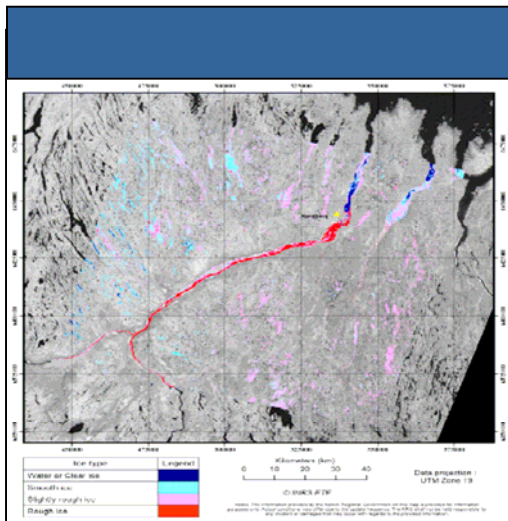
**Location:** Nunavik, Northern Quebec Region is located in the northern third of the province of Quebec.

**Area:** 443,684.71 square kilometers

**Population: 2742**

**Languages:** French, English, Inuktitut, and Cree

## NUNAVIK REGION



## PROJECT FACTS

The main project team consists of:

- 6 communities
- Five local researchers
- Kativik regional government
- Laval University
- Trent University
- Ouranos Consortium
- Natural Resources Canada

### Case Study 3

#### Silaup Aistjipallianinga Project in Northern Quebec



Measuring Ice Thickness  
(<http://climatechange.krg.ca>)

## BACKGROUND

The Kativik Regional Government (KRG) and the Inuit communities of Kangiqsualujjuaq, Kangiqsujuaq, Umiujaq, and Kawawachikamach have developed an ice-monitoring program based on weekly fieldwork and interviews.

Snow and ice characteristics are measured at strategic locations along the trail networks. Interviews with ice experts are conducted to obtain more detailed descriptions of ice, snow, and general weather conditions along the trail networks. Weekly ice trail information is displayed and updated regularly on the KRG project website. KRG has extended the project to include the communities of Ivujivik and Akulivik.

This ice-monitoring program is part of the larger research project called "*Climate Change in Northern Québec: Access to Land and Resources*". Information gathered during the ice-monitoring program will be used in conjunction with predictions from regional climatic scenarios developed by the Ouranos Consortium (a group of climate change researchers).

The project goal is to identify the specific conditions under which ice becomes safe for travel and predict the potential changes along Nunavik trail networks as well as the implications of these changes on the existence of “safe” ice as viewed from a human health and safety perspective.

For more information visit the KRG website at:  
<http://climatechange.krg.ca>.

## COMMUNITIES INVOLVED

Akulivik, Quebec  
 Ivujivik, Quebec  
 Kangiqsualujuaq, Quebec  
 Kangiqsujaq, Quebec  
 Kawawachikamach, Quebec  
 Umiujuaq, Quebec



Kangiqsujaq  
 (<http://climatechange.krg.ca>)

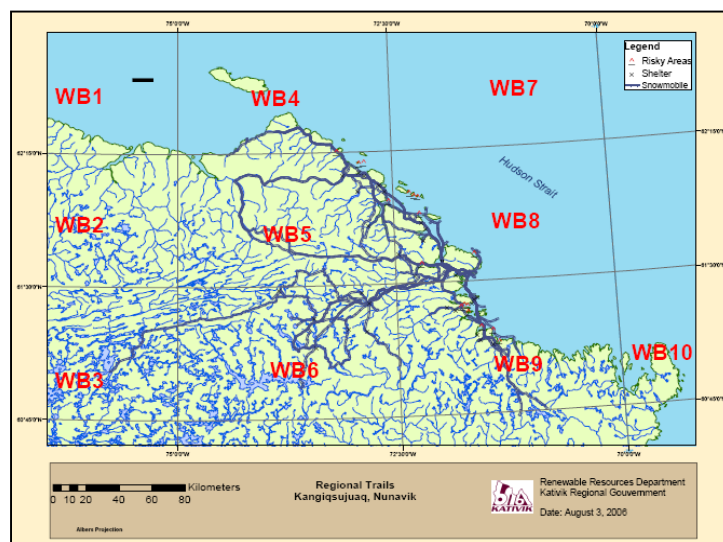
## OTHER PARTNERS

- ArcticNet (University Laval)
- Centre d'études nordiques (Laval University)
- Consortium on Regional Climatology and Adaptation to Climate Change
- Community of Akulivik
- Community of Ivujivik
- Community of Kangiqsualujuaq
- Community of Kangiqsujaq
- Community of Umiujuaq
- Climate Change Impacts and Adaptation Directorate (NRCan)
- Kativik Environmental Advisory Committee
- Makivik Corporation
- Ministère des Transports du Québec
- Nasivvik Center - Centre for Inuit Health and Changing Environments (Laval University)
- Naskapi Nation of Kawawachikamach
- Northern Ecosystem Initiative (Environment Canada)
- Public Health Unit, CHUL-CHUQ

## ADAPTATIONS

A major impact of climate change will be changes to snow and ice due to warmer winters. Some priority adaptations are:

- Develop community communication networks;
- Hazards mapping;
- Mapping out/monitoring community trails;
- Communicating to citizens which trails are safe;
- Develop land camps to strengthen TK;
- Maintain skills and values; and,
- Construct and maintain ice-roads to extend their seasonal life (for example, construction of permanent stream crossings).



Trail Map (<http://climatechange.krg.ca>)

Akulivik,  
 Quebec  
 (<http://climatechange.krg.ca>)



## CONTACTS

**Researcher and Project Leader:**  
 Martin Tremblay  
 Renewable Resources Department  
 Kativik Regional Government  
 Kuujuaq, Quebec  
 Tel.: (819) 964-2961, ext. 2322  
 Email: [mtremblay@krg.ca](mailto:mtremblay@krg.ca)

**Local Researcher in Akulivik and Ivujivik:**  
 Eli Angiyou  
 Email: [eangiyou@tamaani.ca](mailto:eangiyou@tamaani.ca)



Winter Road  
 ([www.thedieselgypsy.com](http://www.thedieselgypsy.com))

An Annotated List of Existing Climate Change Adaptation or Related Tools						
Topic	Type	Title	Authors/Org	Year	Access	Notes
<b>Tools</b>						
Water	Toolkit	An Analysis of Canadian and Other Water Conservation Practices and Initiatives	Canadian Council of Minister of the Environment (CCME)	2006	<a href="http://www.ccme.ca/assets/pdf/kinkead_fnl_rpt_2005_04_2.1_web.pdf">http://www.ccme.ca/assets/pdf/kinkead_fnl_rpt_2005_04_2.1_web.pdf</a>	PDF document of relevant strategies and actions that Canadian governments, communities, businesses and households can pursue to ensure that water is used in an efficient, productive and sustainable manner. The document provides links and resources, is user-friendly and easy to find.
Water	Resource	WEED - water efficiency experiences database	CWWA - Canadian Water and Wastewater Association	2004	<a href="http://www.cwwa.ca/WEED/Search_e.asp">http://www.cwwa.ca/WEED/Search_e.asp</a>	Online database to promote information exchange in the field of water-use efficiency. It is accessible, easy to find, user-friendly and does not use technical language. It is Canada wide with no specific focus.
Water	Resource	Drop by Drop: Urban Water Conservation Practices in Western Canada	Canada West Foundation	2004	<a href="http://www.highriver.ca/LinkClick.aspx?link=DropbyDrop150.pdf&amp;tabid=443">http://www.highriver.ca/LinkClick.aspx?link=DropbyDrop150.pdf&amp;tabid=443</a>	PDF document that lists the various municipal water conservation tools used in large urban centres in Western Canada
Water	Manual	Manual for Conducting Water Audits and Developing Water Efficiency Programs at Federal Facilities	Environment Canada - Interdepartmental Advisory Group on Water Conservation at Federal Facilities	N/A	<a href="http://www.ec.gc.ca/WATER/en/info/pubs/manual/e_cointnt.htm">http://www.ec.gc.ca/WATER/en/info/pubs/manual/e_cointnt.htm</a>	Lists the steps necessary to conduct a water audit and how to optimize water usage and water savings for the facility. Also lists case studies which include two First Nation Schools (INAC) - Walpole Island FN and Curve Lake FN
Water	Guide	Developing a Municipal Source Water Protection Plan: A Guide for Water Utilities and Municipalities	Nova Scotia Department of Environment and Labour	2002	<a href="http://www.gov.ns.ca/enla/water/sourcewater.asp">http://www.gov.ns.ca/enla/water/sourcewater.asp</a>	A 5-part guide to implementing source protection for water supplies. It is accessible online and outlines the process in each booklet. There is a certain capacity level required for each step, but is user-friendly and not in technical language.

Water	Guide	InfraGuide Best Practices Reports	Federation of Canadian Municipalities (FCM) and National Research Council	2008	<a href="http://sustainablecommunities.fcm.ca/infraguide/">http://sustainablecommunities.fcm.ca/infraguide/</a>	Best practices reports on topics such as decision-making and investment planning, potable water, storm and wastewater, environmental protocols, etc. How to procedures that are easy to use and accessible. For Municipal settings but information can be related to communities but would require technical knowledge of water-based infrastructure. Has a section on e-learning tools.
<b>Tools</b>						
Risk Assessment	Web based toolkit	Community Risk Assessment Toolkit	Prevention Consortium	N/A	<a href="http://www.proventionconsortium.org/?pageid=39">http://www.proventionconsortium.org/?pageid=39</a>	Contains a collection of methods and case studies, a search tool, a glossary of items, additional links
Hazards Analysis	Assessment Tool	Risk and Vulnerability Assessment Tool	Coastal Services Center, National Oceanic and Atmospheric Administration	2007	<a href="http://www.csc.noaa.gov/rvat/hazPrint.html">http://www.csc.noaa.gov/rvat/hazPrint.html</a>	Document about hazard analysis that provides information on its purpose, objectives, primary steps, and describes how to do each step. Provides examples and details of how to prioritize and score the hazards. Relates to hazards associated with hurricane storm surge, floods, coastal erosion, and wind. It is applicable to coastal communities.
Risk Assessment	Web page	Risk Assessment	The Community Planning Website	N/A	<a href="http://www.communityplanning.net/methods/method112.htm">http://www.communityplanning.net/methods/method112.htm</a>	Website that provides information on 3 elements of risk assessment: hazard analysis, vulnerability assessment, and capacity assessment. It also provides information on a variety of methods that can make it easy for communities to do risk assessments. Information is very limited.



Risk Management	Toolkit	Community-based Vulnerability & Risk Management Toolkit	ClimAdapt	N/A	<a href="http://www.climadapt.com/tools.html">http://www.climadapt.com/tools.html</a>	<p>Available upon request from Halifax Regional Municipality (HRM)</p> <p>1. Risk Management Tool: An asset / activity risk assessment tool to help assess the vulnerability of HRM physical and environmental assets/activities to climate impacts, under potential climate change scenarios.</p> <p>2. Community-Based Vulnerability Assessment and Risk Management Tool: Techniques to identify, quantify, and evaluate anticipated climate vulnerability for the HRM Municipality itself, and the broader HRM community.</p> <p>3. Cost/Benefit Assessment Tool: A cost/benefit analysis guide to assist municipal decision-makers to identify and quantify the economic costs and benefits of proposed climate adaptation planning and management measures within HRM's existing budget, compared with the costs/benefits of a "business as usual" approach.</p> <p>4. Environmental Impact Assessment (EIA) Tool: A practical climate adaptation tool and methodology for HRM practitioners to assess the impacts of the environment (i.e., climate change) on the project, in addition to the traditional EIA Guide that assesses the impact of the project on the environment.</p> <p>5. Communications &amp; Outreach Tool: A customized toolkit, comprised of several communications and outreach approaches, which targets vulnerable residents and businesses informing and mobilizing them to support HRM-led risk reduction (adaptation) activities and programs.</p>
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Guides, Manuals, and Handbooks						
Risk Assessment	Guide	Risk-based Adaptation to Climate Change: A Guide for Ontario Municipalities	Government of Ontario, Ministry of Municipal Affairs and Housing; Natural Resources Canada; Institute for Catastrophic Loss Reduction	2006	<a href="http://adaptation.nrcan.gc.ca/projdb/pdf/176a_e.pdf">http://adaptation.nrcan.gc.ca/projdb/pdf/176a_e.pdf</a>	A PDF document that talks about risk management, adaptation, and vulnerability reduction and provides detailed information on how to do a risk assessment in relation to climate change. It provides regionally specific information for Ontario on climate change projections and Canada. It is climate change focused and works well at the community level. Would need some modification for use by/with First Nation communities.
Risk Assessment	Guidebook	A Participatory Guidebook for Community Risk Assessment and Risk Reduction Action Plan	Directorate of Relief and Rehabilitation, Ministry of Food and Disaster Management, Government of the Peoples Republic of Bangladesh	2006	<a href="http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN029421.pdf">http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN029421.pdf</a>	PDF document that outlines steps and activities for planning a community risk assessment. The information is focused on and ensures top-down policy reform, awareness raising interventions and community driven risk assessment and planning activities. It also provides background on ways to scope the community such as focus groups, transect walks and interviews. The document is made for facilitators.
Risk Assessment	Guidebook	Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments	ICLEI: Local Governments for Sustainability & Centre for Science in the Earth System	2007	<a href="http://postcarboncities.net/preparing-climate-change-guidebook-local-regional-and-state-governments">http://postcarboncities.net/preparing-climate-change-guidebook-local-regional-and-state-governments</a>	Chapter nine is applicable. Good general planning tool for local governments to plan for climate change
Hazards Analysis	Guide	Hazard Analysis	Emergency Management, Government of Australia	N/A	<a href="http://www.ema.gov.au/agd/ema/rwpattach.nsf/viewasattachmentPersonal/BCE29B04E48926E6CA256C8A000A60E8/\$file/HAZARD_ANALYSIS.PDF">http://www.ema.gov.au/agd/ema/rwpattach.nsf/viewasattachmentPersonal/BCE29B04E48926E6CA256C8A000A60E8/\$file/HAZARD_ANALYSIS.PDF</a>	PDF document of Chapter 4 that describes a simple process for identifying and analysing hazards and their effects upon a community. It is easy to follow and step-by-step. It would be applicable to all types of communities.



First Nations Resource Organisations and Training						
Vulnerability Assessment	Tutorial	Vulnerability Assessment Tutorial: Step by step guidelines for assessing community vulnerability	Coastal Services Center, National Oceanic and Atmospheric Administration	?	<a href="http://www.csc.noaa.gov/products/nchaz/htm/step2.htm">http://www.csc.noaa.gov/products/nchaz/htm/step2.htm</a>	Available as a CD-ROM; provides tutorial lessons on vulnerability assessment and case study
Tools						
Emergency Preparedness	Database	Canadian Disaster Database	Government of Canada - Public Safety Canada	N/A	<a href="http://www5.ps-sp.gc.ca/res/em/cdd/search-en.asp">http://www5.ps-sp.gc.ca/res/em/cdd/search-en.asp</a>	Electronic-web-based database of historical disasters in Canada. It contains detailed disaster information for over 700 natural, technological, and conflict events (excluding war). Users can select searches, types of disasters, regions, etc. to find out information on where and when a disaster occurred, who was affected, and a rough estimate of the costs.
Emergency Preparedness	Map Series	Natural Hazards of Canada. Blizzards; Earthquakes; Floods; Hail; Icebergs, sea ice, and fog; Landslides and snow avalanches; Tornadoes; and Tsunamis and storm surges.	Government of Canada - Public Safety Canada (Natural Resources Canada, Geological Survey of Canada, The Atlas of Canada, Environment Canada, and Statistics Canada)	N/A	<a href="http://www.publicsafety.gc.ca/res/em/nh/index-en.aspx">http://www.publicsafety.gc.ca/res/em/nh/index-en.aspx</a>	Series of PDF documents available on the website. One is a Canada map with accompanying small-scale maps that provide more regional specific information regarding range / specific hazards information such as dates, impacts, etc Good tool to identify past hazards / current vulnerabilities. Includes: earthquakes, floods, tornadoes, tsunamis, landslides and snow avalanches, volcanic eruptions.

Emergency Planning	Kits	Community Emergency Planning, Response, and Recovery	Government of British Columbia - Provincial Emergency Program	2004	<a href="http://www.pep.bc.ca/Community/community.html">http://www.pep.bc.ca/Community/community.html</a>	Web-based kit using both web pages and PDF documents. Provides links to a Planning Tool Kit; Response Tool Kit; Recovery Tool Kit; and Funding and Support Tool Kit, all of which provide guides, references, templates, and forms for communities, which may be useful in preparing for, responding to and recovering from emergencies. BC focused but would be transferable to other areas.
<b>Guides, Manuals, and Handbooks</b>						
Emergency Planning	Guide	Steps in Developing an Emergency Plan	Newfoundland and Labrador Emergency Measures Program	N/A	<a href="http://www.mpa.gov.nl.ca/mpa/fes/emo/munplanning/pdf/emerg-plan-steps.pdf">http://www.mpa.gov.nl.ca/mpa/fes/emo/munplanning/pdf/emerg-plan-steps.pdf</a>	A short PDF document outlining steps in developing an emergency plan. It provides regionally specific comments to provincial ministers.
Emergency Planning	Guide	Planning Guide for Community Officials	Government of the Northwest Territories - Environmental Measures Organization	2002	<a href="http://www.maca.gov.nt.ca/emergency_management/source/emergency_plan/PlanningGuide.pdf">http://www.maca.gov.nt.ca/emergency_management/source/emergency_plan/PlanningGuide.pdf</a>	PDF document outlining an Emergency Planning Tool for community officials. It provides a step-by-step emergency planning guide and a model community plan as an example. The document can assist other authorities to create an effective emergency plan for their community. Can be applied to Band Councils.
Emergency Planning	Manual	The Nova Scotia Emergency Management Manual	Nova Scotia Government - Emergency Measures Organization	2002	<a href="http://www.gov.ns.ca/emo/AbsPage.aspx?id=1175&amp;siteid=1&amp;lang=1">http://www.gov.ns.ca/emo/AbsPage.aspx?id=1175&amp;siteid=1&amp;lang=1</a>	PDF document of the Nova Scotia Municipal Planning Manual - Part II and III applicable. Part II has information on Municipal planning, hazard analysis, and Municipal operations centres. Part III has information on various support documents needed by emergency managers in Nova Scotia. Made for emergency management practitioners.

Emergency Preparedness	Guide	Basic Rescue Skills	Government of Canada - Office of Critical Infrastructure Protection and Emergency Preparedness	2002	<a href="http://getprepared.ca/fl/basic-rescue-skills_e.pdf">http://getprepared.ca/fl/basic-rescue-skills_e.pdf</a>	PDF booklet of basic rescue skills for individuals interested in basic information about rescue work in damaged structures. For individuals interested in pursuing training as First Responders. Basic information only.
Emergency Planning	Guide	Emergency Management Guide for Business and Industry: A Step-by-Step Approach to Emergency Planning, Response and Recovery for Companies of All Sizes	Federal Emergency Management Agency (FEMA)	1993	<a href="http://www.fema.gov/pdf/business/guide/bizindst.pdf">http://www.fema.gov/pdf/business/guide/bizindst.pdf</a>	PDF document for business and industry that provides step-by-step advice on how to create and maintain a comprehensive emergency management program. Specific to business and industry, but of any size. Do not need in-depth knowledge of emergency management.
Emergency Preparedness	Guide	A guide to business continuity planning	Government of Canada - Public Safety and Emergency Preparedness Canada	N/A	<a href="http://getprepared.ca/fl/bcont_e.pdf">http://getprepared.ca/fl/bcont_e.pdf</a>	PDF document providing a guide for businesses to follow to ensure that critical services or products are delivered during a disruption. A proactive attitude to plan for risks from potential disasters. Focus on businesses, organizations.
<b>First Nations Resource Organisations and Training Programs</b>						
Emergency Preparedness	Training	First Nations Emergency Plan Workshop	Government of Ontario - Emergency Management Ontario	N/A	<a href="http://www.mcscs.jus.gov.on.ca/english/pub_security/emo/courses/course_first_nations.html">http://www.mcscs.jus.gov.on.ca/english/pub_security/emo/courses/course_first_nations.html</a>	Webpage providing information on a one-day training workshop for Ontario First Nations on emergency planning. Workshop directed at First Nations Emergency Management Coordinators and selected Senior Officials. Provides information on other training courses and how to enrol.

Emergency Planning	Resource	First Nations' Emergency Services	First Nations' Emergency Services	N/A	<a href="http://www.fness.bc.ca/">http://www.fness.bc.ca/</a>	Website of a non-profit organization dedicated to building capacity within First Nations by increasing the safety, security, and well-being of First Nation people in the Province of British Columbia. Provides support programs, information, and guidelines. Programs primarily funded by INAC.
<b>General Communication Tools for Public Awareness</b>						
Emergency Preparedness	General Resource Guide	Your Emergency Preparedness GUIDE	Government of Canada - Public Safety Canada	N/A	<a href="http://getprepared.ca/fl/guide/national_e.pdf">http://getprepared.ca/fl/guide/national_e.pdf</a>	PDF document providing information to individuals and families on how to prepare to stay safe for 72 hours when a disaster strikes. It is available in other formats, braile, audio, video, etc. Checklist of what to do and what to include in a toolkit.
Emergency Preparedness	General Resource Guide	Your Emergency Preparedness GUIDE - In Inuktitut	Government of Canada - Public Safety Canada	N/A	<a href="http://getprepared.ca/fl/guide/06-123_72hrs_l.pdf">http://getprepared.ca/fl/guide/06-123_72hrs_l.pdf</a>	Same as above but in Inuktitut
Emergency Preparedness	General Resource Guide	Self-Help Advice. Floods: What to do before and after	Government of Canada - Public Safety and Emergency Preparedness Canada	2005	<a href="http://getprepared.ca/fl/floods_e.pdf">http://getprepared.ca/fl/floods_e.pdf</a>	PDF document on self-help advice for floods: before, after, clean-up, water damage, what to keep or discard, before moving back. Information for individuals to raise-awareness and educate about flooding.
Emergency Preparedness	General Resource Guide	Self-Help Advice. Preparing for the Unexpected	Government of Canada - Public Safety and Emergency Preparedness Canada	2005	<a href="http://getprepared.ca/fl/unexpected_e.pdf">http://getprepared.ca/fl/unexpected_e.pdf</a>	PDF document on self-help advice for preparing for the unexpected: preparing, developing a personal emergency plan, during an emergency, after an emergency. Information for individuals to raise-awareness and educate about unexpected events.

Emergency Preparedness	General Resource Guide	Self-Help Advice: Severe Storms	Government of Canada - Public Safety and Emergency Preparedness Canada	2005	<a href="http://getprepared.ca/fl/storm_e.pdf">http://getprepared.ca/fl/storm_e.pdf</a>	PDF document on self-help advice for preparing for severe storms: preparing, during a storm, after a storm. Information for individuals to raise-awareness and educate about storms such as tornados, severe thunderstorms, hurricanes, winter storms.
Emergency Preparedness	General Resource Guide	Self-Help Advice. Storm Surges	Government of Canada - Public Safety and Emergency Preparedness Canada	2005	<a href="http://getprepared.ca/fl/stormsurge_e.pdf">http://getprepared.ca/fl/stormsurge_e.pdf</a>	PDF document on self-help advice for preparing for storm surges: preparing, listening for warnings, what is your community doing. Information for individuals to raise-awareness and educate about storm surges.
Emergency Preparedness	General Resource Guide	Self-Help Advice. Winter Power Failures	Government of Canada - Public Safety and Emergency Preparedness Canada	2005	<a href="http://getprepared.ca/fl/power_e.pdf">http://getprepared.ca/fl/power_e.pdf</a>	PDF document on self-help advice for preparing for winter power failures: what to do if there is a power failure, what to do if have to evacuate. Information for individuals to raise-awareness and educate about winter power failures.
Emergency Preparedness	General Resource Guide	Emergency Preparedness Guide for People with Disabilities / Special Needs	Government of Ontario - Emergency Management Ontario	2007	<a href="http://www.mcscs.jus.gov.on.ca/english/publications/comm_safety/6350_EMO_V2.pdf">http://www.mcscs.jus.gov.on.ca/english/publications/comm_safety/6350_EMO_V2.pdf</a>	PDF document for persons with disabilities / special needs to prepare for emergencies: developing and practicing an emergency response plan and the preparation of an emergency survival kit. Information on how to best prepare for an emergency based on one's special needs.
Emergency Preparedness	General Resource Guide	Guide de préparation aux situations d'urgence: à l'intention des personnes ayant un handicap ou des besoins particuliers	Government of Ontario - Emergency Management Ontario	2007	<a href="http://www.mcscs.jus.gov.on.ca/french/publications/comm_safety/6350_EMO_FR.pdf">http://www.mcscs.jus.gov.on.ca/french/publications/comm_safety/6350_EMO_FR.pdf</a>	Same as above but in French.

Emergency Preparedness	General Resource Guide	Personal Emergency Preparedness Guidebook	Regional District of Nanaimo - Safety/Emergency Program	N/A	<a href="http://www.rdn.bc.ca/cms/wpattachments/wpID141atlD47.pdf">http://www.rdn.bc.ca/cms/wpattachments/wpID141atlD47.pdf</a>	PDF document providing information to individuals and families about how to prepare for fires, forest fires, floods, earthquakes, and power outages. Focus on the BC Region, but transferable to other regions with same disaster possibilities.
Emergency Preparedness	General Resource Guide	FireSmart Manual - BC Edition	BC Government - The BC Forest Service - Protection Program	2003	<a href="http://www.pssg.gov.bc.ca/firecom/pdf/homeowner-firesmart.pdf">http://www.pssg.gov.bc.ca/firecom/pdf/homeowner-firesmart.pdf</a>	PDF document providing information to individuals about protecting homes from wildfires and how to reduce the hazards by following the steps that are outlined. Relates to forest fires; residential building construction; land maintained; planning.
Hazards Planning	General Resource Guide	Individual & Neighbourhood ALL-HAZARD Emergency Preparedness Workbook	British Columbia - Ministry of Public Safety and Solicitor General	2002	<a href="http://www.pep.bc.ca/hazard_preparedness/AllHazardsWEB.pdf">http://www.pep.bc.ca/hazard_preparedness/AllHazardsWEB.pdf</a>	PDF document for the BC region as an all inclusive guide to family emergency planning. It covers hazards such as floods, earthquakes, tsunamis, landslide, and severe storms, power outages. Individual and community based focus.
<b>Tools</b>						
Food Security	Resource Kit	Community Food Security Resource Kit	United States Department of Agriculture (USDA) Community Food Security Initiative	2000	<a href="http://permanent.access.gpo.gov/lps6620/resoukit.htm">http://permanent.access.gpo.gov/lps6620/resoukit.htm</a>	Website providing a "one-stop-shop" for assistance for community centred food security activities. Has information on seven action areas related to infrastructure, economic security, nutrition assistance, food recovery and donations, local food production/marketing, education and awareness, and research, monitoring and evaluation. Federal government focus. It does not seem to have a 'downloadable' version.