



# Athabasca Region Background Document



*Athabasca land use planning* is a partnership between Saskatchewan's Athabasca communities, Prince Albert Grand Council, Saskatchewan Environment and others

Copyright © 2003 Athabasca Land Use Planning Interim Advisory Panel

ISBN 0-9681947-4-5

## **Acknowledgements**

We would like to thank the many people who provided information and assistance in putting this document together, and reviewing it. Special thanks to the Athabasca Interim Advisory Panel members, Athabasca communities, local business people, Saskatchewan Environment and other Saskatchewan Government employees, Prince Albert Grand Council employees, and others who contributed.

# Table of Contents

|            |   |           |
|------------|---|-----------|
| <b>1.0</b> | <b>INTRODUCTION .....</b>                                   | <b>1</b>  |
| 1.1.       | Purpose of the Background Document .....                    | 1         |
| 1.2.       | Purpose of the Athabasca Land Use Plan .....                | 1         |
| 1.3.       | How Did This Planning Come About? .....                     | 1         |
| 1.4.       | Planning Stages.....  | 2         |
| 1.5.       | Planning Process .....                                      | 3         |
| 1.6.       | Why Would People in the Region Want to Participate?..       | 4         |
| 1.7.       | How Can People Participate in the Plan? .....               | 4         |
| <b>2.0</b> | <b>THE PEOPLE OF THE ATHABASCA.....</b>                     | <b>6</b>  |
| 2.1.       | Black Lake .....  | 7         |
| 2.2.       | Hatchet Lake .....  | 7         |
| 2.3.       | Fond-du-Lac .....   | 8         |
| 2.4.       | Stony Rapids .....  | 8         |
| 2.5.       | Uranium City .....  | 8         |
| 2.6.       | Camsell Portage .....                                       | 9         |
| 2.7.       | Wollaston Lake.....   | 9         |
| <b>3.0</b> | <b>THE LAND AND RESOURCES .....</b>                         | <b>11</b> |
| 3.1.       | Ecoregions of Athabasca .....                               | 11        |
| 3.2.       | Mineral Resources .....                                     | 13        |
| 3.3.       | Water Resources .....                                       | 14        |
| 3.4.       | Fish Resources .....  | 16        |
| 3.5.       | Wildlife Resources.....                                     | 17        |
| 3.6.       | Fire.....   | 21        |
| <b>4.0</b> | <b>HOW PEOPLE USE THE LAND AND RESOURCES .....</b>          | <b>30</b> |
| 4.1.       | History .....   | 30        |
| 4.2.       | Provincial Crown Land Dispositions.....                     | 36        |
| 4.3.       | Fisheries .....   | 38        |
| 4.4.       | Outfitting.....   | 42        |
| 4.5.       | Wildlife .....  | 44        |
| 4.6.       | Recreation and Tourism.....                                 | 46        |
| 4.7.       | Water.....  | 47        |
| 4.8.       | Mineral Industry .....                                      | 51        |
| 4.9.       | Forest Uses.....  | 61        |
| <b>5.0</b> | <b>APPENDICES.....</b>                                      | <b>62</b> |
|            | Appendix 1. Some land use and resource issues .....         | 63        |
|            | Appendix 2. Other agencies and organizations .....          | 76        |
|            | Appendix 3. Species inventory of the Athabasca region ..... | 83        |
|            | Appendix 4. List of references.....                         | 90        |

## List of Figures

|   |    |
|---|----|
| Figure 1.1 Planning area .....                                  | 2  |
| Figure 1.2 Interim Advisory Panel structure .....               | 4  |
| Figure 1.3 People involved in preparing the land use plan.....  | 5  |
| Figure 2.1 Population by Community .....                        | 6  |
| Figure 2.2 Population by Age Group.....                         | 6  |
| Figure 3.1 Athabasca Ecoregions .....                           | 12 |
| Figure 3.2 Saskatchewan Geology .....                           | 13 |
| Figure 3.3 Athabasca precipitation .....                        | 14 |
| Figure 3.4 Drainage Basins and Watersheds .....                 | 15 |
| Figure 3.5 Beverly and Qamanijuaq Caribou Range.....            | 20 |
| Figure 3.6 Fire Cycle Map.....                                  | 22 |
| Figure 3.7 Fire History of the Athabasca Region .....           | 23 |
| Figure 3.8 BQCMB Fire Management Recommendations .....          | 25 |
| Figure 3.9 Heritage Sites .....                                 | 27 |
| Figure 3.10 Protected Areas .....                               | 29 |
| Figure 4.1 Some Travel Routes, Traplines and Cabins .....       | 32 |
| Figure 4.2 Treaty Areas and Traditional Dene Lands .....        | 35 |
| Figure 4.3 Crown Land Dispositions.....                         | 37 |
| Figure 4.4 Commercial Fishing Quotas.....                       | 40 |
| Figure 4.5 Commercial Fishing Licences .....                    | 41 |
| Figure 4.6 Outfitters in the Athabasca Region .....             | 43 |
| Figure 4.7 Fur Conservation Areas in the Athabasca Region ..... | 45 |
| Figure 4.8 Potential Hydro-Electric Development Areas.....      | 48 |
| Figure 4.9 Numbered Canoe Routes in the Athabasca Region .....  | 49 |
| Figure 4.10 Some Barren-Ground Caribou Ice Crossings.....       | 50 |
| Figure 4.11 Mineral Claims Process.....                         | 53 |
| Figure 4.12 Mineral Claims in the Athabasca Region.....         | 54 |
| Figure 4.13 Abandoned Mines, Uranium City Area.....             | 56 |
| Figure 4.14 Operating Mines in the Athabasca Region .....       | 60 |

## List of Tables

|  |    |
|--|----|
| Table 3.1 Wildlife Species in the Region .....                     | 17 |
| Table 4.1 Highlights of Currently Operating Mines.....             | 59 |
| Table 5.1 List of abandoned underground exploration/mining sites . | 67 |
| Table 5.2 Mammal species list .....                                | 83 |
| Table 5.3 Fish species list.....                                   | 83 |
| Table 5.4 Reptile species list .....                               | 84 |
| Table 5.5 Amphibian species list.....                              | 84 |
| Table 5.6 Vascular plant species list.....                         | 84 |
| Table 5.7 Provincial and global rank definitions.....              | 88 |
| Table 5.8 COSEWIC status definitions .....                         | 89 |

# 1.0 Introduction

This **background document** presents information about the land, plants, animals, and water resources in Athabasca.

It also shows how some people in the region use these resources.

## 1.1 Purpose of the Background Document

This document compiles existing resource information to help understand land and resource characteristics and issues in the region. It gives an overview of the ecology and resource base, community profiles, cultural environment, types of resource use and land use, resource-based history, and potential land activities.

Sources of resource information include government technical reports and maps; industry impact statements and monitoring reports; information from other management initiatives within the area such as caribou co-management and commercial fishing cooperatives; cultural, social and economic profiles and perspectives; and information provided by local community members and other interested stakeholders.

## 1.2 Purpose of the Athabasca Land Use Plan

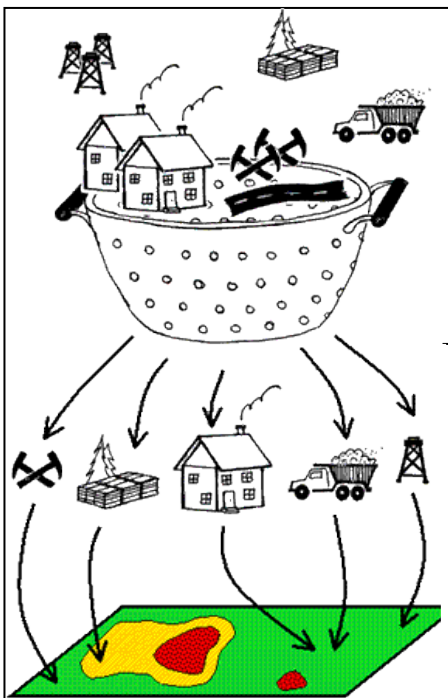
The Athabasca land use plan will create policies to guide future development and protection of the land and resources. It will reflect the social, cultural and economic priorities of the Athabasca Interim Advisory Panel, residents of the Athabasca region, and the people of Saskatchewan.

## 1.3 How Did This Planning Come About?

In 1995, the coast guard stopped dredging services in Athabasca, which affected barging. In response, Athabasca people and agencies worked together to build a new service road to the region. Athabasca leadership developed an Agreement with the Saskatchewan government to prepare a land use plan, starting with the road corridor. Under this Agreement, the Interim Advisory Panel will recommend a local management structure with delegated authority to carry out the plan.

To better understand this land use plan, the Agreement Respecting the Land and Renewable Resource Use Planning and Management in Northern Saskatchewan-Lake Athabasca Region (“The Agreement”) is recommended reading.

This graphic explains **land use planning**



### LAND USE & PROTECTION AREAS

(Where development is appropriate)

- yes (Subject to permit and / or license restrictions)
- maybe (There are special considerations for development activities; e.g. caribou migration or frozen ground access.)
- no (Development would conflict with other land uses that are given priority or would harm the landscape.)

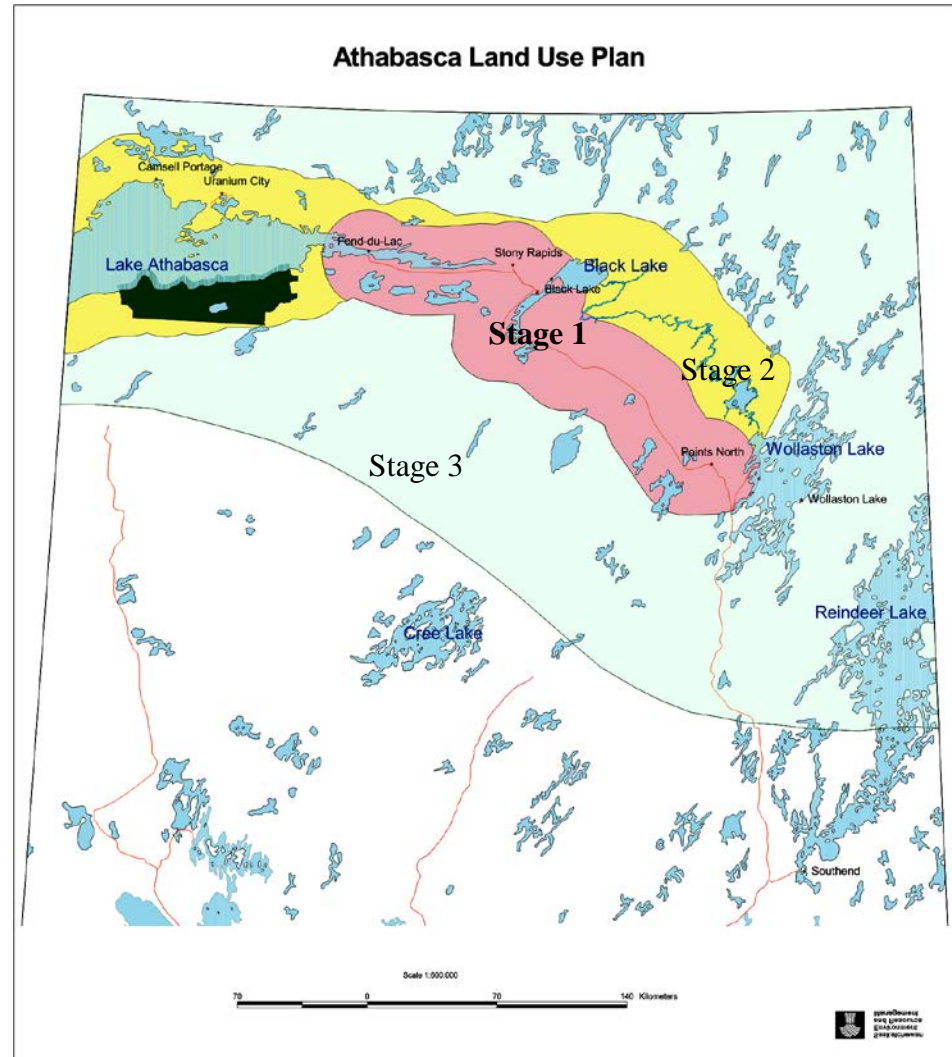
Source: www.sahtulanduseplan.com

## 1.4 Planning Stages

Land use planning is happening in **three stages** (Figure 1.1).

Stage 1 will focus on the 25km area along each side of the new Athabasca seasonal and winter road (red area). This is where the greatest impact is expected from the improved road access.

The **three stages** of the Athabasca Planning Area will encompass approximately 11.6 million hectares of land.



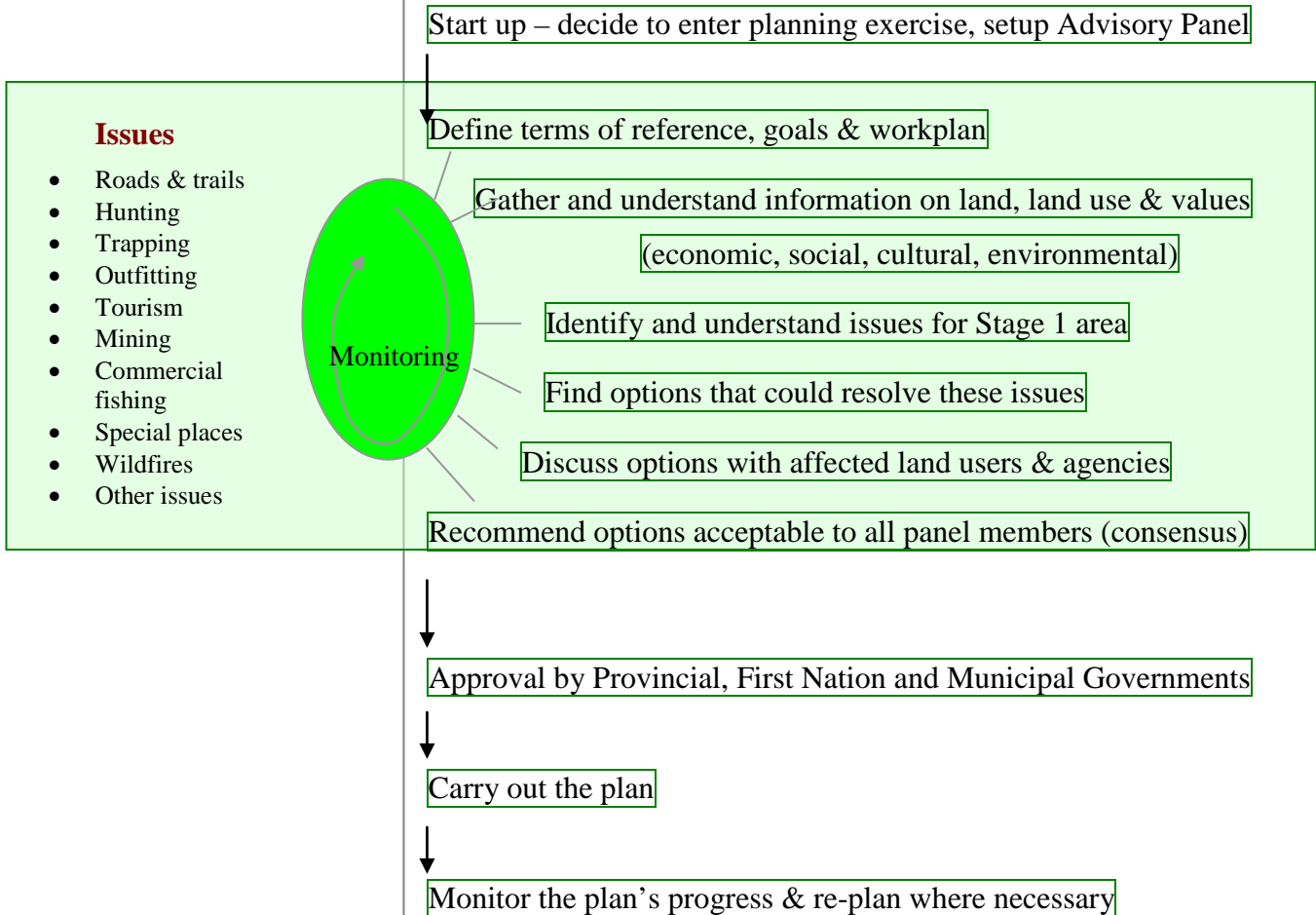
**Figure 1.1 Planning area**

Stage 1 land use plan is due March 2003, although the timeline is flexible.

For more details, refer to *The Agreement*.

## 1.5 Planning Process

*The Agreement* Section 4.0 outlines principles to guide the planning process. The panel follows a general planning process outlined below. We use participatory planning methods where possible to achieve better two-way communication and understanding of discussions. We evaluate each planning experience in order to find better ways of working and planning with people.



**Development** is more than buildings, industry, and other physical things. People can 'develop' or 'use' land to achieve spiritual, cultural, and other values.

## 1.6 Why Would People in the Region Want to Participate?

The intent of *The Agreement* is to give Athabasca people a say about what happens to lands in their 'own backyard', by putting into effect a land use plan and local management structure.

The plan makes it possible for Athabasca people to:

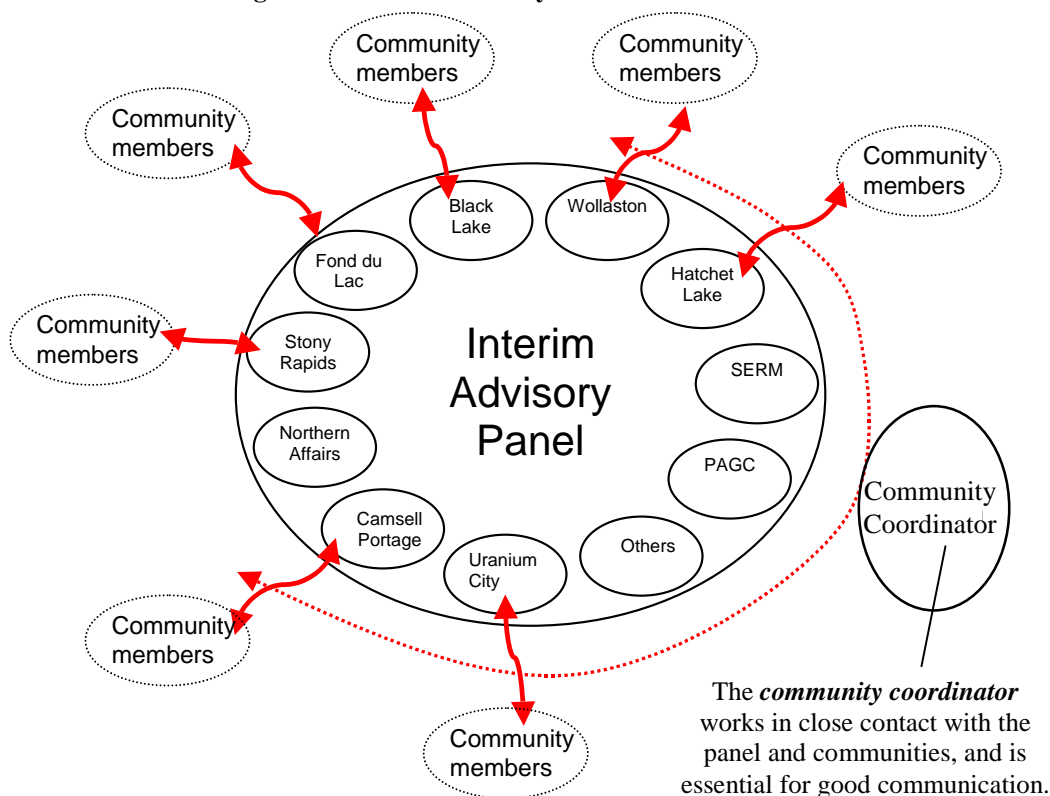
- Say how they want the land to be used;
- Mark important areas for protection;
- Make the most of **development** opportunities.

## 1.7 How Can People Participate in the Plan?

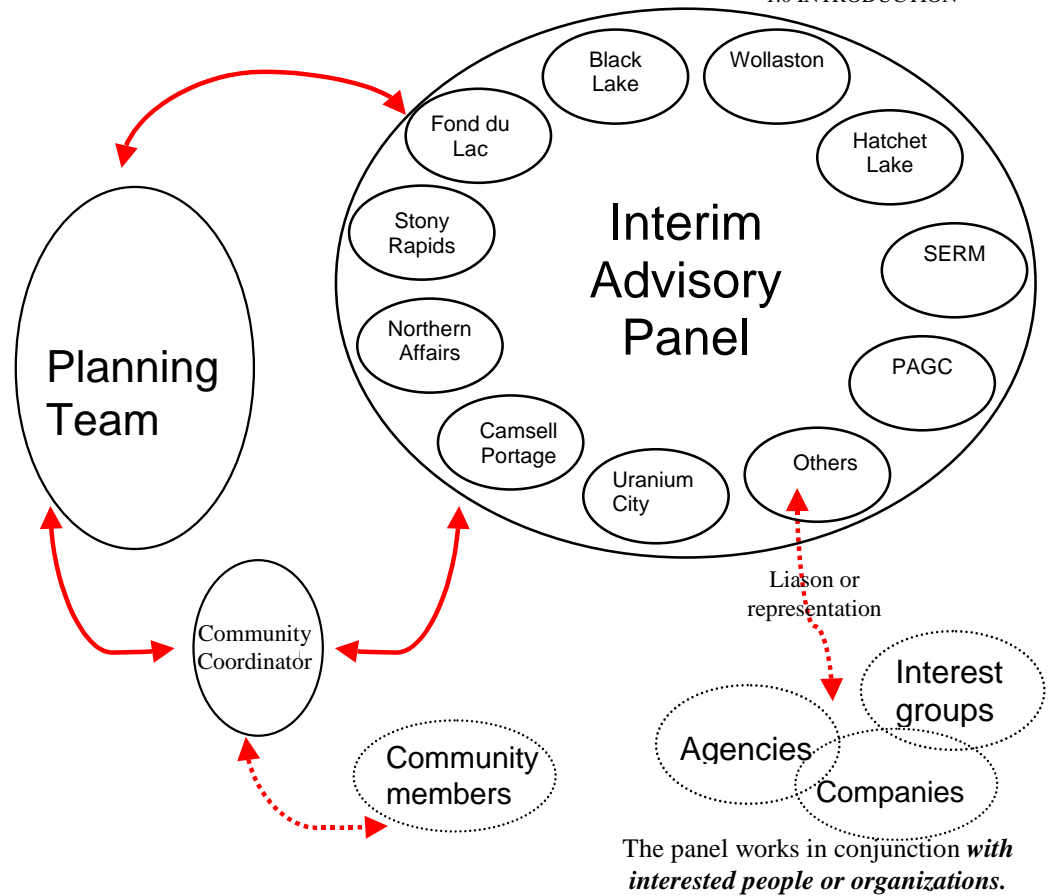
*The Agreement* created an Interim Advisory Panel, stipulating the majority of seats be allotted to people from the region (Figure 1.2). Athabasca communities' leadership decides who should represent them on the panel. The panel has invited a broad range of interests to participate (Figure 1.3) in the planning process.

Planning is an open process for all people and interests in the region. The panel holds planning meetings locally, advertising on the radio and community notice boards to encourage public involvement. Community participation is also targeted through general information-sharing meetings, small group workshops about issues of concern, Use and Occupancy Mapping, and individual contact through Interim Advisory panel members.

Figure 1.2 Interim Advisory Panel structure



The *planning team* consists of planners and technical people from PAGC and SERM.



**Figure 1.3 People involved in preparing the land use plan**

Panel members share information with other community members by word of mouth, newsletters, posters, radio interviews and notices, participation in other processes such as local governments and regional boards, and making available all minutes and planning information. Translation for meetings is provided and participatory tools are used in discussions, striving for effective participation from people with diverse backgrounds.

The Interim Advisory Panel considers available information based on the knowledge of scientists, and the local and **traditional knowledge** of residents.

**Traditional knowledge** can be defined as the knowledge held by a person(s) or community, which has been passed down through generations in oral teachings or learned through first-hand experience.

## 2.0 The People of the Athabasca

The Athabasca region has a population of about 5,344 people. This number includes people in Black Lake, Fond-du-Lac, Camsell Portage, Stony Rapids, Uranium City, Hatchet Lake, and Wollaston Lake (Figure 2.1). Roughly 98% of the population are Metis, Cree or Dene. Population information is from Statistics Canada and Indian and Northern Affairs Canada.

**Population Characteristics in the Athabasca Region :**

- 32% of northern families are in the low-income level (compared to a provincial total of 14%)

- Unemployment rates in the north are 25% (compared to a provincial total of 7%)

- There are more people per household in the north (4.0 persons per household compared to the provincial total of 2.7)

- Access to safe water and sewer systems is not available to everyone (Population Health Unit, 1998).

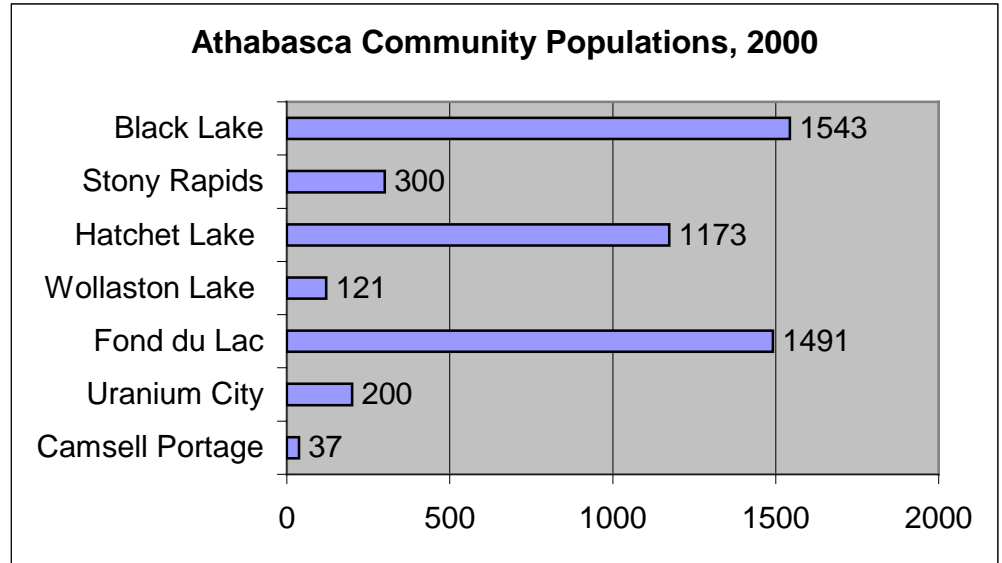


Figure 2.1 Population by Community

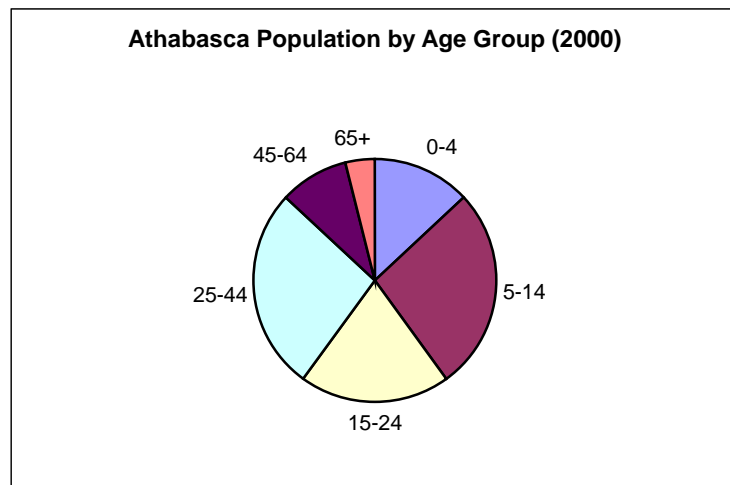


Figure 2.2 Population by Age Group

Approximately 40% of the population is under 15 years of age (Figure 2.2). The population increased by 5.5% between the 1986 and 1991 censuses while the provincial population decreased by 2%.

Compared to southern Saskatchewan, people living in the Athabasca region face higher unemployment, housing shortages, sewer system shortages, low income, and a range of health challenges.

Infant deaths are higher in the north, although infant death rates have declined by 10% since the 1950's.

Cancer rates in the north are slightly less than the provincial rates, however the rate of lung cancer is much higher in the north. Diabetes is becoming a significant health issue, along with complications of heart disease, kidney failure, blindness, and blood vessel disease in legs.

Infectious diseases, including hepatitis A, tuberculosis, chlamydia, gonorrhoea, and intestinal diseases from bacteria and parasites, are higher in the north compared to the provincial occurrences. Intestinal diseases are 3 times greater in the north.

### *Black Lake (people over 15)*

- 81% of the population have completed some grades up to 12,
- 0.5% have completed grade 12,
- 5% have trade certificate or diploma,
- 7% have some post-secondary education,
- 7% have some level of university education  
(Stats Canada, 2001)

### *Hatchet Lake (people over 15)*

- 80% of the population have completed some grades up to 12,
- 1% have completed grade 12,
- 3% have trade certificate or diploma,
- 5% have some post-secondary education,
- 6% have some level of university education  
(Stats Canada, 2001)

## **2.1 Black Lake**



The population of Black Lake includes 1,244 persons living on-reserve and 299 persons living off-reserve for a total of 1,543 persons registered as members of the Black Lake First Nation (INAC, 2001). Total reserve land is 32,219.7 ha on 3 reserves (No. 224, 225, 226). The community has a Northern Store, Band Office, school, community hall, health clinic, a church, 2 pool halls, and a new health facility, which is being built on the Louie Chicken Reserve #224 (Internet-5, 2001). The school provides education from nursery to grade 12. There is a road from Black Lake to Stony Rapids; access to the Athabasca seasonal road lies between the two communities. Planes land on the lake and on the nearest airstrip, which is in Stony Rapids.



Hatchet Lake Band

## **2.2 Hatchet Lake**

The total population of Hatchet Lake is 1,173 persons (INAC, 2001) with 1003 persons living on reserve. Total reserve land is 11,020 ha. A river separates the communities of Wollaston Lake and Hatchet Lake. Medical services are provided by regular doctor visits from La Ronge. Community services are shared with residents of Wollaston Lake, the majority of which are owned by Hatchet Lake First Nation.

Community facilities include a co-op store, post office, air strip, theatre, band office, band store, economic development office, education office, Northern Settlement Office, 2 pool rooms, 2 community halls, 2 charter

### *Fond du Lac (people over 15)*

- **84% of the population have completed some grades up to 12,**
- **3% have completed grade 12,**
- **2% have a trades certificate or diploma,**
- **3% have some post-secondary education,**
- **8% have some level of university education**  
(Stats Canada, 2001)

### *Stony Rapids (people over 15)*

- **53% of the population have completed some grades up to 12,**
- **10% have completed grade 12,**
- **23% have trade certificate or diploma,**
- **7% have some post-secondary education,**
- **7% have some level of university education**  
(Stats Canada, 2001)

### *Uranium City & Camsell Portage (people over 15)*

- **48% of the population have completed some grades up to 12,**
- **7% have completed grade 12,**
- **29% have trade certificate or diploma,**
- **7% have some post-secondary education,**
- **10% have some level of university education**  
(Stats Canada, 2001)

air companies, 2 schools for nursery to grade 12, a health clinic, a SERM office and an RCMP detachment office.

There is a road from the south (La Ronge) to Wollaston Lake barge landing. Hatchet Lake community is accessible by winter road or by barge in the summer.

## **2.3 Fond-du-Lac**



The total registered population of Fond-du-Lac is 1,491 persons with 815 on-reserve residents and 671 off-reserve residents, 5 persons are registered residents living on other reserves (INAC, 2001).

Total reserve area is 36,812.1 ha on 5 reserves. The community has a small nursing station, community hall, 2 retail band controlled grocery-hardware-dry goods stores, elementary school, high school, catholic church, RCMP detachment office, a lodge, day care center, and Northlands college office. There is a winter road to Stony Rapids and an airstrip.

## **2.4 Stony Rapids**

Stony Rapids has a population of about 300 persons (Internet-5, 2001). The first Metis arrived during the 1920's and the community began to grow in the 1940's and 50's (SERM#5/01, 2001). Community services include a Northern store (clothing, household appliances, toys, games and hunting equipment), Scott's General Store (snowmobiles, grocery and hardware, Prince Albert Credit Union), Northern Settlement Office, post office, school (K to 9), Northlands College, a motel, water base, health clinic, SERM office, Saskatchewan Highways Office, RCMP detachment office, 2 charter air companies, construction companies, and an airstrip.

Stony Rapids is accessible by road via the Athabasca Seasonal Road, the Fond-du-Lac winter road, and the Black Lake - Stony Rapids road.

## **2.5 Uranium City**

The once booming population of Uranium City has now decreased to about 200 persons due to the closure of mines in the area during the early 1980's. Community facilities include a post office, general store, hotel, hospital, school, organized recreation activities, and a bulk fuel outlet (SERM#5/01, 2001).

Uranium City was established as a town in 1952 to provide safe housing to mine workers off the mine site in case of military attack, and to avoid

problems associated with administering a community as a private company.

Uranium City's mining history dates back to the 1930's. By the late 1950's, the population of Uranium City reached 4,600 (SERM#5/01, 2001). Forty-five abandoned mine sites exist in the Uranium City region. The major refining sites were at Gunnar, Eldorado and Loreda mines. Smaller mine sites moved their ore to those sites for processing. By the early 1980's the mine sites around Uranium City had closed and the population began to decrease and Uranium City became a northern settlement.

Uranium City is accessible only by air and water.

## **2.6 Camsell Portage**

The population of Camsell Portage is 37 persons. The community was once larger, however the closing of the mines in the early 80's caused the population to decline. The community has a Northern Settlement Office, church, school (K to 9; with fewer than 20 students), and an airstrip (Internet-5, 2001). The community is only accessible by water and air.

The community was settled by trappers who arrived during the 1900's from Lac La Biche, the North West Territories and Fort Fitzgerald, Alberta (SERM#5/01, 2001). The population was once 250 persons, but with the creation of Uranium City many peoples and services moved. The community is on an important historic portage route to the north.

## **2.7 Wollaston Lake**

The northern settlement of Wollaston Lake is located on the eastern shore of Wollaston Lake and has a population of 121 residents. The majority of these residents are members of the Hatchet Lake First Nation.

The Wollaston Lake community started up during the 1950's when a fish plant and government store were established. The majority of residents are Dene, and during the 1950's some peoples of Cree-Metis ancestry moved to Wollaston Lake from Pinehouse Lake (Snake Lake) (SERM#5/01, 2001).

Community facilities include a Co-op store, providing services in dry-goods, fuel, groceries, restaurant and a motel. There is a post-office, privately-owned general store, and a recently upgraded airstrip with two charter airways. Transportation to the settlement is by air, barge, boat, or winter ice road.

## Overview of Regional Public Infrastructure

***Public Infrastructure includes:***

- *Water treatment systems*
- *Sewer treatment systems*
- *Gas and electricity networks*
- *Schools*
- *Community facilities*
- *Roads*
- *Telephone services*

All communities in the north have access to electricity, although there may be homes that are not hooked up to the local power grid. Power comes from three hydro-electric stations on the Charlot River system. All communities have telephone access.

Highway 905 extends from La Ronge to Wollaston Lake. The Athabasca Seasonal Road links Highway 905 with the Stony Rapids - Black Lake Road. There is a winter road between Stony Rapids and Fond-du-Lac.

Water treatment services exist in Hatchet Lake, Fond-du-Lac, Black Lake and Uranium City. In 2002 Stony Rapids will see their water treatment system upgraded and expanded. A water treatment facility is to be established in Camsell Portage in 2002.

### 3.0 The Land and Resources

This chapter provides a brief overview of the forest, vegetation, fish and wildlife, geological, water, and archaeological resources that characterize the Athabasca area.

Most of the information in Section 3.0 and 4.0 is from agencies, scientists, and industry. Athabasca Dene, Cree, and Metis people who have spent a large part of their life on the land possess undocumented knowledge about the land, wildlife and fisheries ecology. This is an information gap, which future research can help to fill, building upon the baseline 2001/2002 Use and Occupancy research.

#### 3.1 Ecoregions of Athabasca

Western science often breaks data down into smaller pieces, in order to understand the whole complex ecosystem. The Athabasca region can be broken down into different 'Ecoregions' representing areas of different climate, soil and plant types. Figure 3.1 shows the Athabasca Ecoregions and vegetation types. The Athabasca has short, cool summers, and long cold winters.



*Amisk Lake Representative Area  
Internet-34 Source Saskatchewan  
Environment*

Tazin Lake Upland Ecoregion:

- Sparse, thin glacial deposits in low-lying areas
- Bedrock outcrops create ridged hills, up to 100m high
- Moderately well-drained clay-sand, and organic soils
- Widespread distribution of permafrost, some areas are permanently frozen



*Athabasca sand dunes  
Source: Kirsten Ketilson*

Athabasca Plain Ecoregion:

- Mostly broadly rolling hills and wetlands
- Flat sandstone bedrock is covered by sandy glacial deposits
- Drumlins, eskers, and meltwater channels.
- Well drained soils, organic soils and a few sand dunes



*Drumlinfield, northwestern Manitoba:  
Internet-19*

Churchill River Upland Ecoregion:

- A thinner layer of glacial deposits overlying the bedrock.
- Exposed bedrock and broad, smooth hills up to 90m
- Little soil formation
- Bogs and fens are likely to have permafrost with organic soils



*Source: Allan Adam*

Selwyn Lake Upland Ecoregion (SERM #1/98, 1998):

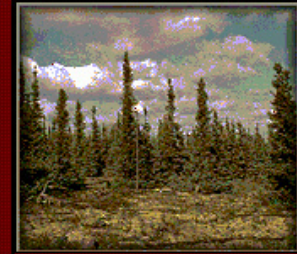
- Broad, gently sloping hills, up to 50m high
- Drumlins, bedrock outcrops, and glacial till plains.
- Moderately well-drained clay-sand soils
- Southern part - patchy organic soils, fens
- Northern part - patchy permafrost under one meter of soil

Figure 3.1 Athabasca Ecoregions



- Black Spruce / Jackpine Forest
- Rock Lichen
- Lichen Woodland
- Peatlands
- Boreal Wetlands

Tazin Lake Upland



- Lichen Woodland
- Rock Lichen
- Peatlands
- Boreal Wetlands

Selwyn Lake Upland



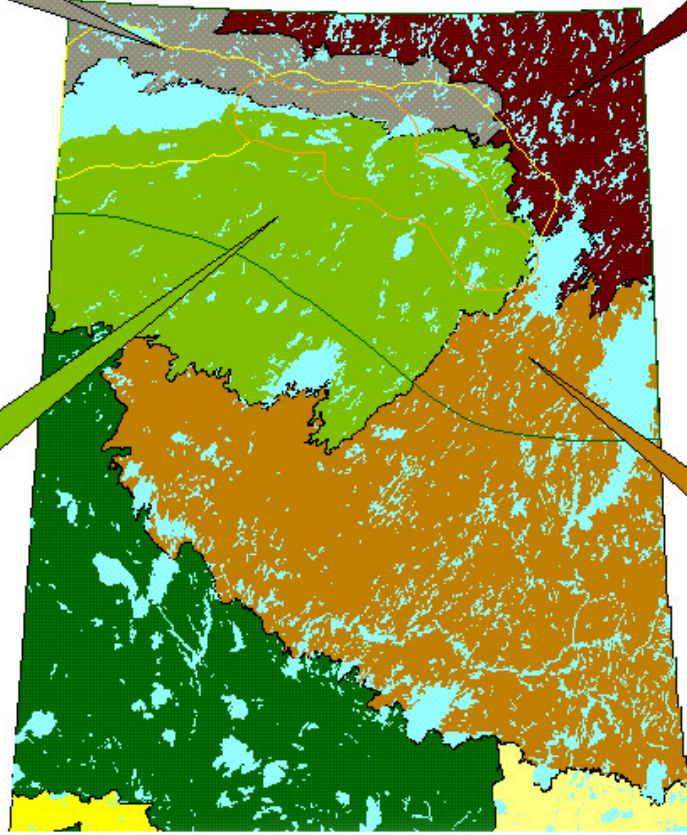
- Black Spruce / Jackpine Forest
- Mixed Wood Forest
- Peatlands
- Boreal Wetlands

Athabasca Plain



- Black Spruce Forest
- White Spruce Forest
- Jackpine Forest
- Mixed Wood Forest
- Peatlands
- Boreal Wetlands

Churchill River Upland



## 3.2 Mineral Resources

### 3.2.1 Geology

Mid-Proterozoic sedimentary rocks of the Athabasca Group of the Athabasca Basin underlie most of the plan area (**Figure 3.2**). These consist mainly of sandstone, conglomerate, and siltstone that were deposited in an inland sea atop older Precambrian basement rocks. The (yellow) Athabasca Basin occupies an area of about 100,000 km<sup>2</sup> and is up to 1,400 meters thick. The majority of the Stage 1 plan area occurs in the northeast corner of the Athabasca Basin.

The *Athabasca Basin* contains the largest uranium resource in the world.

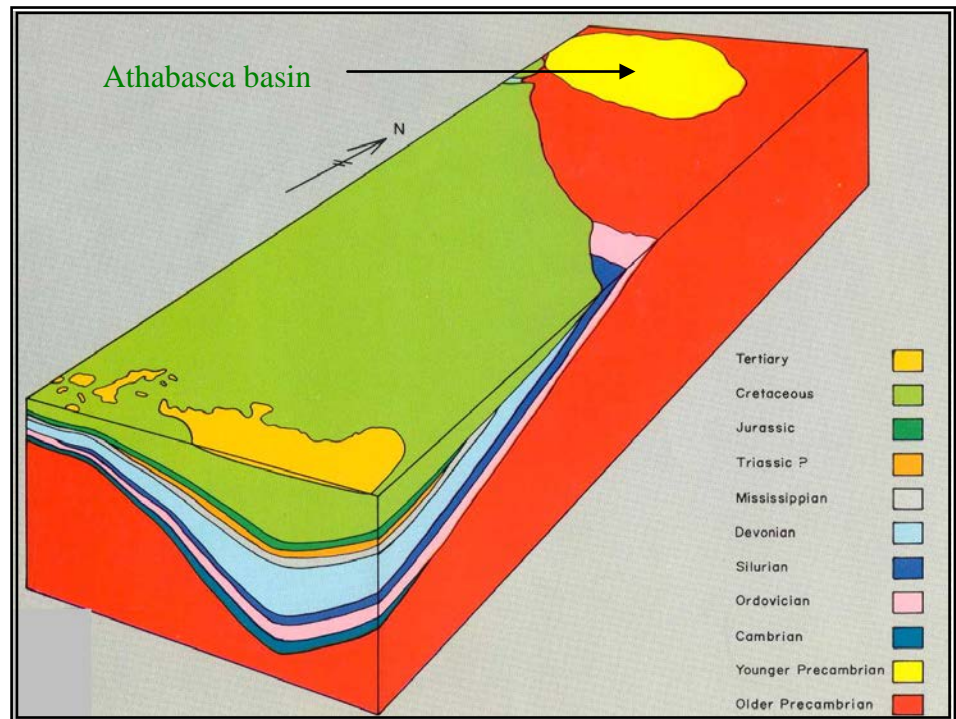


Figure 3.2 Saskatchewan Geology

### 3.2.2 Mineral Potential

The Athabasca Basin contains the world's largest uranium resource, making up about a third of global production. The uranium deposits occur near to the contact between the younger Athabasca Group sedimentary rocks and the older underlying rocks of the Precambrian Shield (SEM, 1994). Significant deposits include the McClean Lake Mine, the Midwest property, and the suspended Rabbit Lake Mine in the eastern part of the plan area. Uranium deposits also occur in the Black Lake (e.g. Nisto deposit) and Fond du Lac (e.g. Fond du Lac deposit) areas. These uranium deposits are commonly contain other valuable metals such as nickel and rare earths.



McArthur River Mine site,  
Source: PAGC, 2001

The Wollaston area contains copper, zinc, lead, silver, Molybdenum, gold, and iron deposits (SEM, 1994). Iron is found at Axis Lake, Riou Lake and the west shore of Black Lake. Pine Channel area contains gold deposits.

### 3.3 Water Resources

Water is the basis of all life. It creates habitable environments for forests and plants to grow. Lakes, streams, rivers, wetlands and underground waters create habitats vital to the survival of humans and wildlife. More than 30% of the Athabasca surface is lakes.

The Athabasca region has relatively low precipitation because of the sub-arctic to arctic transitional climate (Figure 3.3). Most of the precipitation is rainfall, with a smaller portion being snowfall.

Figure 3.4 shows the region's major drainage basins and the directions of water flow. The major drainage basins are the Athabasca and the Churchill River systems.

Lake Athabasca flows down the Athabasca, Slave, and MacKenzie River systems to the Beaufort Sea.

The Churchill basin drains through the Nelson and Churchill river systems to Hudson's Bay.

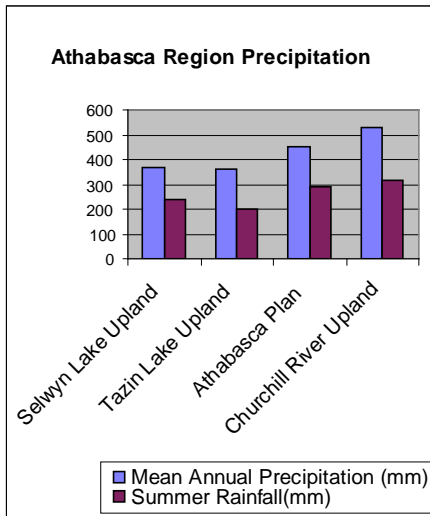
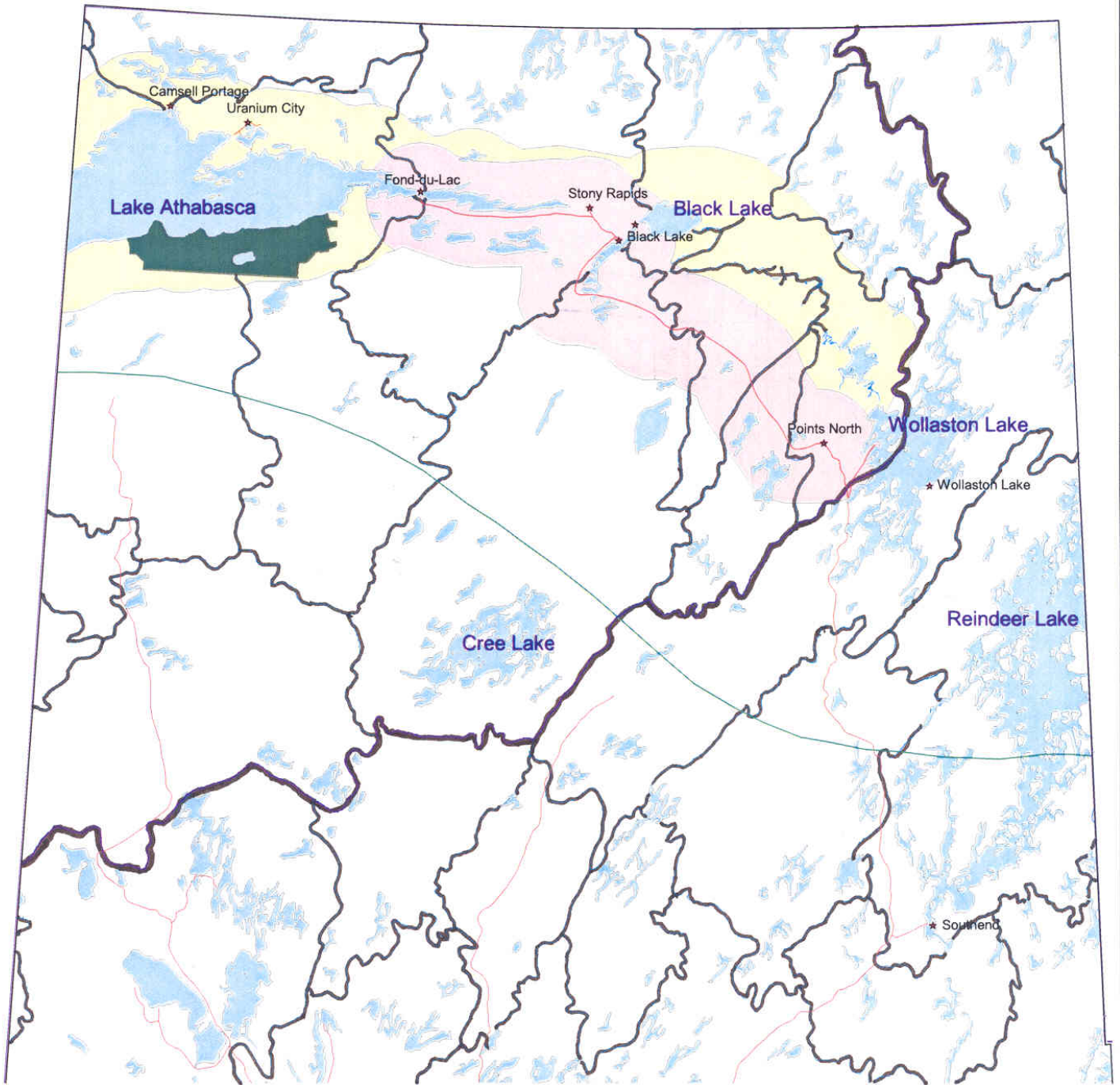


Figure 3.3 Athabasca precipitation

# Figure 3.4 Athabasca Land Use Plan

Drainage Basins and Watersheds



100 0 100 Kilometers





Commercial Fisherman, Source: Sask. Education

**Diversity** is the variety of species present and the variation in genetic make-up within each species.

### 3.4 Fish Resources

Fish **diversity** in the Churchill River Upland is moderate while the Athabasca Plain, Tazin Lake Upland, and Selwyn Lake Upland experience lower fish diversity (respectively). Aquatic and invertebrate fauna are less abundant than in more southern regions due to the less productive sandy bottoms of lakes and streams. Organisms cannot attach to constantly shifting sediments and so there is a lack of breeding and feeding grounds for invertebrate and aquatic fauna. Fewer insects and shoreline plants result in lower fish populations.

Fish population counts are not conducted regularly given the geographic location of the thousands of water bodies in the Athabasca region. However, information on the amount of fish taken to the commercial fishery indicates fish populations in the region are healthy and maintaining size. It is important to note that records are only applicable to lakes allocated to commercial fisheries.

#### Athabasca fish species:

- Lake whitefish
- Lake trout
- Walleye
- Northern pike
- Arctic grayling
- Yellow perch
- Burbot
- White sucker
- Longnose sucker

#### Athabasca forage species:

- Trout-perch
- Cisco
- Lake chub
- Spottail shiner
- Ninespine stickleback
- Longnose dace

(SERM<sup>#1/98</sup>, 1998).

#### 3.4.1 Vegetation

Figure 3.1 shows where the main Athabasca vegetation groups occur. Notably, the Athabasca sand dunes along the south shore of Lake Athabasca and 25 km south, are a rare example of desert like conditions in a sub arctic region. Active dunes have little or no vegetation, while inactive dunes may have their loose sandy soils held down by dry, open jack pine forests. Ten plant species exist that are native to the area, and 52 rare species occur in the Athabasca sand dunes (SERM, 1994).

Some important watershed features are the mixed-wood forests found along rivers and streams including white birch and poplar. The forest diversity and density is higher here because there is more water available for vegetation growth

Black Spruce Forest, Source: Gwich'in Renewable Resource Board, Internet-36

**Rare Plant** - a plant that is not common, but has little risk of disappearing.

### 3.5 Wildlife Resources

#### 3.5.1 Wildlife Populations

Wildlife density is low to moderate in the Athabasca region due to the harsh environment created by adverse climate, sandy, sometimes shallow soils, and high fire frequency. The dry uplands are poor habitat for most species, however abundant riparian vegetation draw in mammal and bird species. The following table represents the number of species recorded in each Ecoregion and is not conclusive (see Appendix 4 - species listings).

**Table 3.1 Wildlife Species in the Region (SERM#2 1998)**

|                        | Mammals | Birds | Fish | Amphibians | Reptiles |
|------------------------|---------|-------|------|------------|----------|
| Selwyn Lake Upland     | 15      | 82    | 18   | 1          | 0        |
| Tazin Lake Upland      | >40     | 218   | 30   | 4          | 1        |
| Athabasca Plain        | 43      | 176   | 22   | 4          | 1        |
| Churchill River Upland | 41      | 204   | 30   | 4          | 1        |

Mammal populations in the region are low to moderate. In the Churchill River Upland the number of mammal species is moderate and numbers decline further north. Moose, Woodland Caribou, Barren-Ground Caribou, and species of Voles, Shrews, Mice, Porcupine, Woodchuck, Northern Flying Squirrel, Northern Bog Lemming, Little Brown Bat, Snowshoe Hare, River Otter, and limited Beaver populations are present. Predators include Gray Wolf, Black Bear, Least Weasel, Lynx, Wolverine, and Marten (SERM, 2001 and SERM, 1999).

Overall bird density is low to moderate estimated at 140 individuals per 100 ha, concentrated in riparian areas. In the dry uplands, species density drops to between 12 and 37 individuals per 100 ha (SERM, 1998, EcoR). Resident birds include: Common Raven; Gray Jay; Hairy, Downy and Three Toed Woodpeckers; Boreal Chickadee; White Winged Crossbill; Red-Breasted Nuthatch; Spruce Grouse; and Ruff Grouse. Migratory breeding populations include: Bald Eagle; Red-Tailed Hawk; Belted Kingfisher; Palm Warbler; Hermit Thrush; Yellow Warbler; Dark-Eyed Junco; Olive-Sided Flycatcher; and Bohemian Waxwing. (Nero, 1963; SERM#5/01, 2001 and SERM#2/99,1999).

Migratory bird sites are landscape areas or water bodies which fulfill a life cycle or seasonal function such as breeding, foraging, or staging for a specific species (Adams, et al., 1986). Waterfowl densities are low given



*Caribou,  
Source: Cliff Buettner*

the lack of habitat productivity. Species include Mallard; Common Merganser; Common Loon; Ring-Necked Duck; Lesser Scaup; and Bufflehead. (SERM#1/98, 1998).

Given the abundant and diverse riparian vegetation, amphibian and reptile species are at a medium level of diversity. 5 species of amphibians are present and include Canadian Toad; Wood Frog; Northern Leopard Frog; and Boreal Chorus Frog. The Red-Sided Garter Snake is the only reported reptile in the Athabasca. (SERM#1/98, 1998)

### 3.5.2 Species of Concern

**Threatened species** – species likely to become endangered if its limiting factors are not reversed.



*Peregrine Falcon, Source: Internet-24, Robert Benson*

There are several species of concern in the Athabasca region. One bird species is listed by COSEWIC<sup>1</sup> as a **threatened species**. Furbearers are important to trappers, outfitters and families as they provide food and money for Athabasca residents. Barren-ground and Woodland caribou are also important species for life in the north. Caribou have been and continue to be an important part of life on a cultural, social, and economic level for Athabasca peoples.

#### **Peregrine Falcon** (*Falco peregrinus*, anatum subspecies)

The peregrine falcon is listed by COSEWIC as a threatened species (COSEWIC, 2000). During the 1950's and 60's, organochlorine pesticides caused the peregrine falcon population to decrease significantly. Organochlorine pesticides used further south in their migratory range caused reproductive failure.

The peregrine falcon is a migratory bird with breeding habitat in the northwestern corner of the Athabasca region. Breeding falcons in this area are considered a historic wild population, as other falcons found further south in larger cities may or may not breed. The peregrine falcon is scientifically and ecologically significant as an indicator species of habitat availability.

#### **Marten** (*Martes americana*)

The marten is a tree-dweller often feeding off the ground in trees. It is a solitary animal. They do not begin to reproduce until their third year and rarely live longer than 10 years (SERM#3/01, 2001). Humans are its main predator and because of its curious nature, is easily caught in traps. High fur demand in the 1800's and early 1900's triggered a decrease in marten numbers.



*Marten, Source: Hazel Barton*

<sup>1</sup> COSEWIC is a committee of representatives from federal, provincial, territorial and private agencies as well as independent experts that assigns national status to species at risk in Canada.



*Fisher, Source: Hazel Barton*



*Woodland Caribou, Source: Managing Life in the Forest – Saskatchewan Forest Habitat Project*



*Barren-ground Caribou, Rennie Lake, Source: Allan Adam*

### **Fisher** (*Martes pennanti*)

Fishers are found only in North America. Some of their habitat has been lost due to logging, trapping, human development and the use of strychnine in the 1900's. The fisher population is beginning to re-establish itself in some ranges. Commonly found throughout the Athabasca region, with fewer numbers in the Taiga Shield region (SERM#3/01, 2001).

### **Woodland Caribou** (*Rangifer tarandus caribou*)

A low population of woodland caribou is present to the south of Lake Athabasca. During the last 40 years their population has declined due to human pressures and activities such as logging (SERM2, 2001 NatrNeigh). Their range extends from the forest fringe north of Prince Albert to Lake Athabasca and in rare cases further north. Woodland caribou are listed by COSEWIC as a threatened sub-species. Reports of woodland caribou herds are noted in the Key Lake and Cigar Lake Environmental Impact Statements, as the survey area was near the mine sites.

### **Barren-Ground Caribou** (*Rangifer tarandus groenlandicus*)

Current population estimates from 1994 surveys are 276,000 for the Beverly herd and 496,000 for the Qamanirjuaq herd (BQCMB, 1996). Figure 3.5 shows the range used by Beverly and Qamanirjuaq caribou. The range includes spring migration to the calving grounds, summer movement to unidentified areas to escape mosquitoes and bot-flies, fall migration and rut, and winter migration is guided accordingly to food availability.

The population of caribou is largely dependent on the amount of food available and levels of predation. Predation includes human hunting activities and wolves. In years of famine, the Beverly and Qamanirjuaq caribou herds will move as far south as Wollaston Lake in search of food. Lichens are the main source of food for caribou, during the winter while summer feeding includes grasses and understory plants on ridgetops. Esker systems are important travel corridors used by caribou during migration.

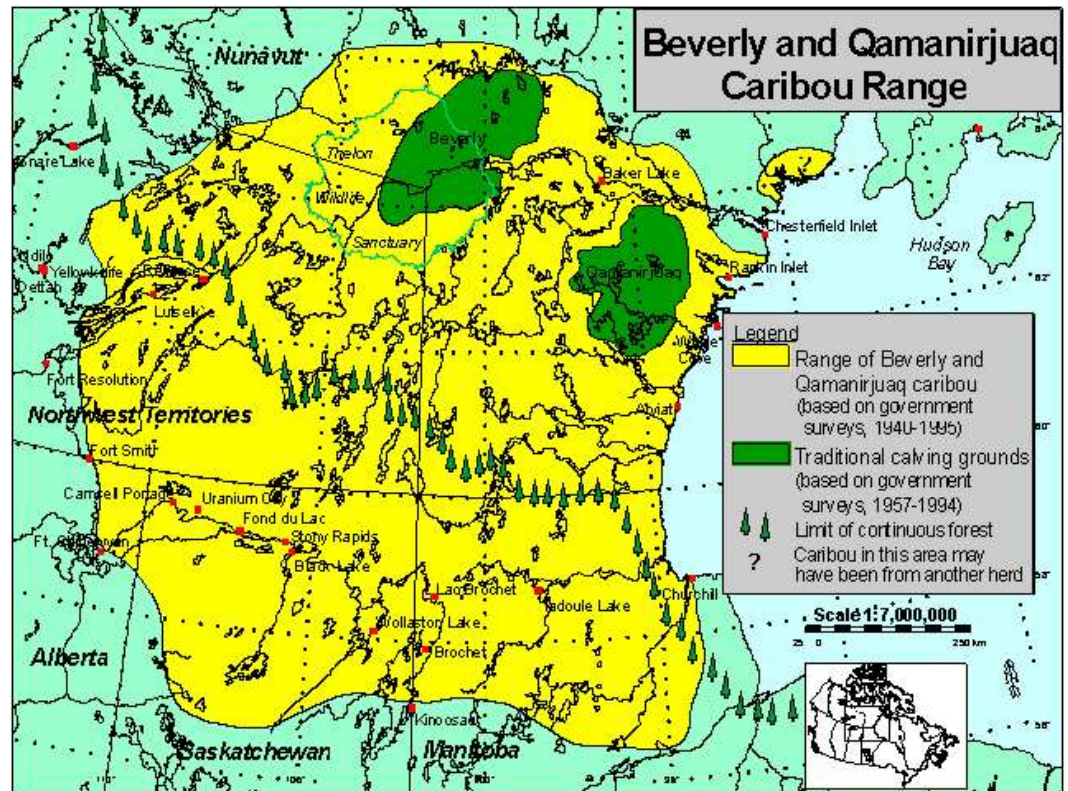


Figure 3.5 Beverly and Qamanirjuaq Caribou Range - Source: BQCMC



Wolf, Source:  
Hazel Barton

### Wolf (*Canis lupus*)

Wolves once occupied areas of the southern prairies following bison herds, however, their range is now limited mainly to the boreal plain, boreal shield and taiga shield. Wolves mostly live in packs and have a complex social structure. They ambush large prey in groups and help control ungulate populations (such as caribou, moose, deer). Wolf populations are controlled by disease, famine, and humans. Caribou are an important source of food for wolves in the Athabasca region. Wolves will follow the Beverly and Qamanirjuaq caribou as they migrate to different winter feeding grounds. Esker systems are important to the denning, travel, and prey capture activities of wolves.

Prior to 1973, there was a bounty on wolves accompanied by a misguided poison control program (SERM#3/01, 2001). The program was discontinued at the recommendation of local people and as scientists recognized the wolf species' role in maintaining a balanced ecosystem.



*Moose, Source: Cliff Buettner*

### **Moose** (*Alces alces*)

Moose populations are moderate in the Athabasca Plain region at an average of one per 25 km<sup>2</sup> (SERM#1/98, 1998 and Key Lake Mining Corporation, 1998). The number of moose decrease as you move more northerly, where there is less food due to climate and soil conditions (Pers. Comm., Trottier, 2001). Moose are solitary mammals and favor areas in the early stages of forest succession for the dense shrub layer. They are also found in peatland and wetland areas feeding on nutrient rich riparian vegetation. According to 'Natural Neighbours' (SERM#3/01, 2001), the moose population in northern Saskatchewan is stable and may be increasing.

### **Black Bear** (*Ursus americanus*)

Black Bear populations are moderate at one per 25 km<sup>2</sup> (SERM, 1998). While the black bear is common throughout the boreal, and shield Ecoregions, there are fewer living in the taiga shield region. The black bear is the largest predator living in Saskatchewan. It is a solitary animal with a large range.



*Black Bear, Source: Saskatchewan Environment*

## **3.6 Fire**

### **3.6.1 Fire History**

Forest fires are the largest agent of change in Saskatchewan's boreal shield and taiga shield forests. Northern forests have a natural fire cycle of about 80-140 years as seen in Figure . The 80-140 year cycle is a generalization and does not take into account slope gradient, moisture index, local features, and fire suppression activities. SERM coordinates forest fire management activities throughout the province.

Forest fires in the Athabasca region have covered an area of 2.03 million hectares within the last 10 years (about ¼ of the land area). Figure 3.7 represents the amount of forest burned over the last 50 years. The patchwork effect is an indicator of a healthy forest and a balanced ecosystem.



*Candling Fire – Raven Fire  
Internet-35, Source: Saskatchewan Environment*

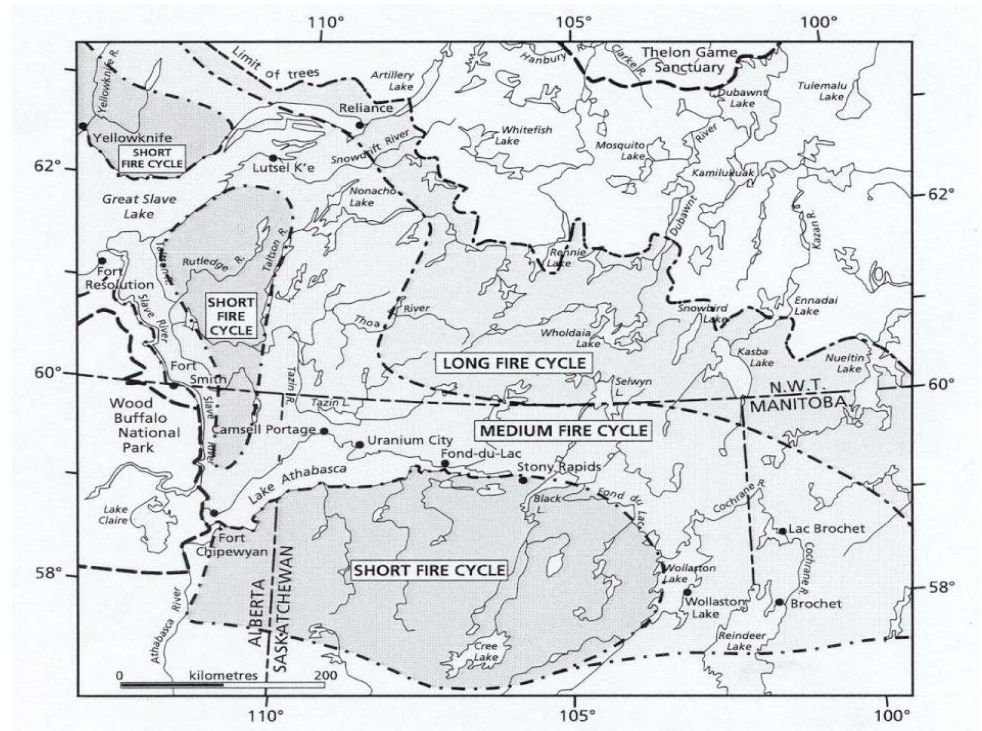


Figure 3.6 Fire Cycle Map (BQCMB, 1994)

### 3.6.2 Provincial Fire Management

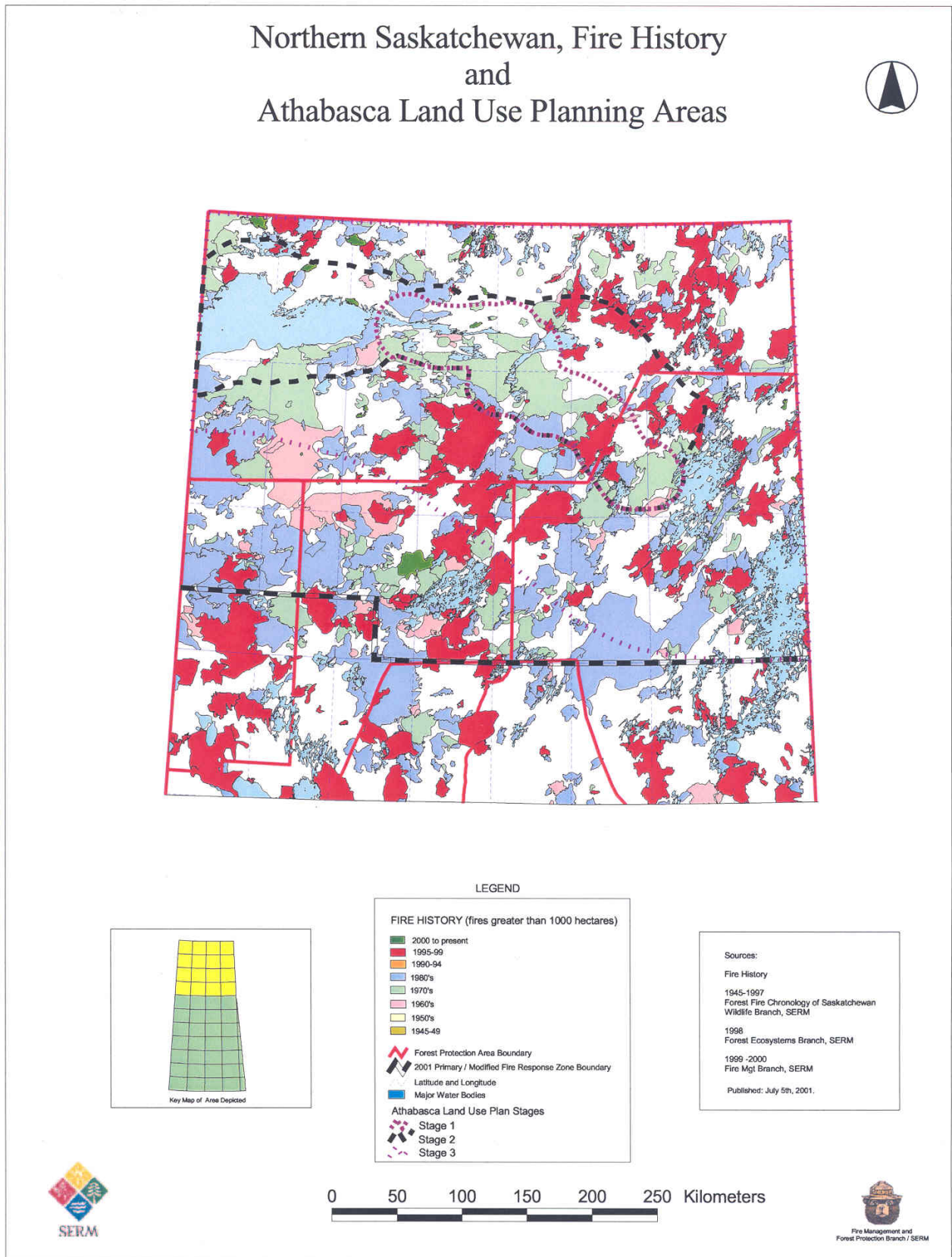
Fire has an important role in the balance of the ecosystem. Trees and plants growing well in sunny areas will grow first (such as jack pine). They will grow fast and their density will be thick because of the new nutrients available in the soil after the fires. Over time, competition for sunlight and soil moisture will become intense and the density of plant growth will decrease. Thus leaving space for slower growing, shade tolerant species, such as spruce and fir trees.

Without fire, forests build up fuel; there is more understory to burn. However, the understory stays low to the ground, resulting in smaller more frequent wildfires. This helps maintain a patchwork of different aged forests, and maintains biodiversity (Pers Comm., Maczek, 2001).

*Fire suppression is the human attempt to control a forest fire*

The Athabasca land use planning region lies within SERM's 'modified response zone'. With limited money, SERM cannot put out all fires in this region. Using a 'values at risk' model, SERM places priority on protecting human life and property, and is guided by local input and other recommendations such as by the Beverly Qamanirjuaq Caribou Management Board (Figure 3.8). SERM's fire management policy is currently under review.

**Figure 3.7 – Fire History of the Athabasca Region**



Fire suppression action for the modified response zone consists of initial attack crews, emergency fire fighting crews, and aircraft such as helicopters and waterbombers.

- Initial action on containable fires occurs in the first two burning periods (days);
- Action is taken for fires which are out of control and near a community, camp or mine;
- Action is taken on large fires if it is early in the season and the potential exists for the fire to be a threat to life or property;
- Action can be taken on other fires if the cost of fire suppression action justifies limited action to protect values such as outfitting camps, highways and public infrastructures (SERM#1/01, 2001).

The Beverly-Qamanirjuaq Caribou Co-management Board (BQCMB) has outlined recommendations for fire management to protect important caribou habitat (Figure 3.8). SERM is using these recommendations at the local level to guide decisions on where to put out fires.

A zoned approach for fire management would allow important caribou habitat areas to be protected. The recommendations are to set up 4 zones of protection based on productive caribou range for feeding and natural fire cycles. Communities involved in the BQCMB Plan rated the caribou range into 4 zones for varying levels of fire suppression. The zones were designed taking into consideration that to change the natural fire cycle of an area through fire suppression would be expensive and could be ecologically counter-productive. More information can be found in the 'Fire Management Recommendations for Forested Range of the Beverly and Qamanirjuaq Herds of Caribou', Management Report 1, BQCMB, 1994.

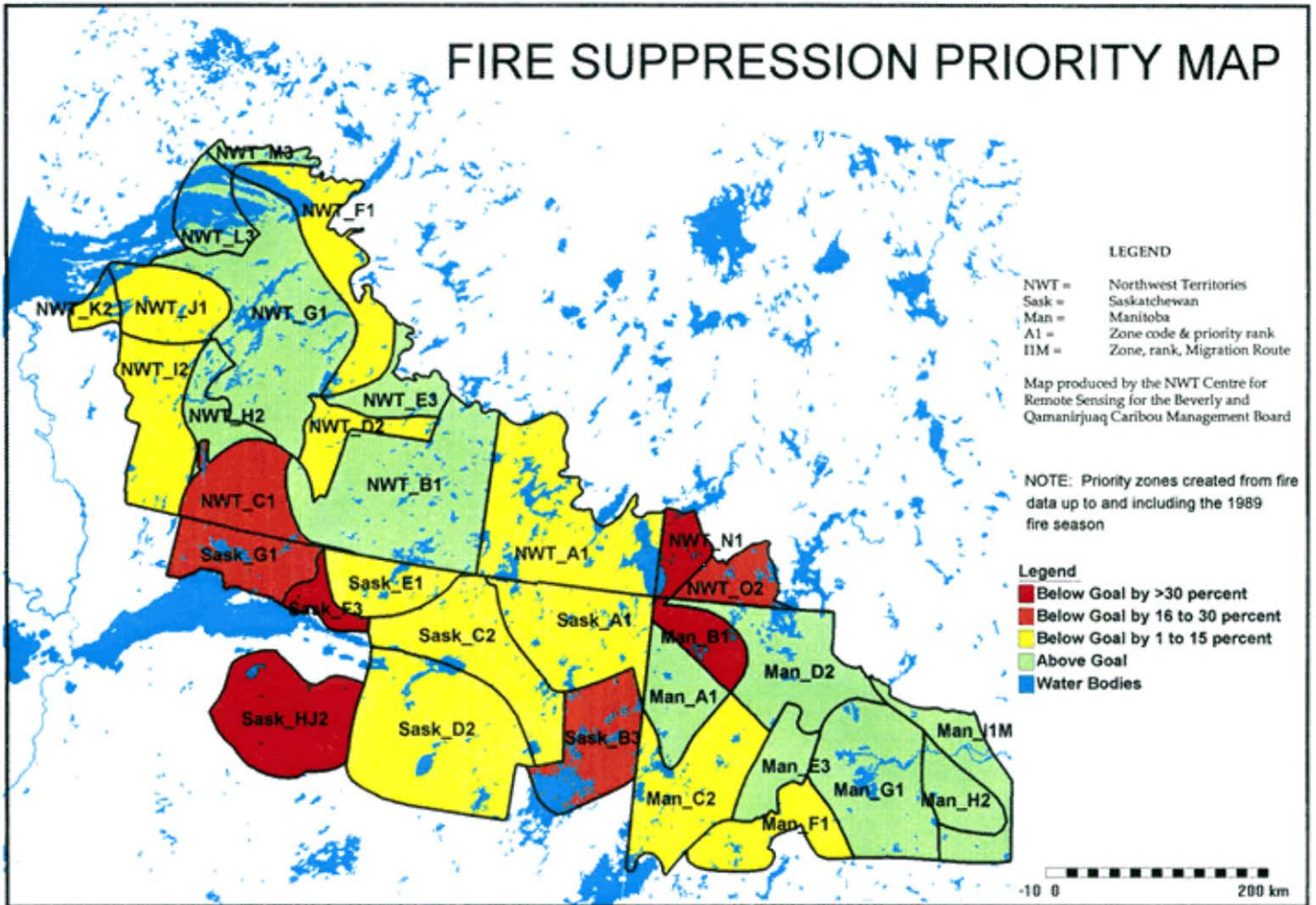


Figure 3.8 Fire suppression priority map for the forested winter range of the Beverly and Qamanirjuaq herds.

***Athabasca archeological sites:***

|                               |            |
|-------------------------------|------------|
| <b>TOTAL SITES</b>            | <b>364</b> |
| <i>artifact finds</i>         | 104        |
| <i>artifact scatter</i>       | 218        |
| <i>single feature</i>         | 7          |
| <i>artifact/feature combo</i> | 22         |
| <i>multiple features</i>      | 3          |
| <i>burials</i>                | 8          |
| <i>pictographs</i>            | 57         |

## Archaeology

The archaeology of the Athabasca region is largely undocumented. Our knowledge is limited to 364 documented Athabasca sites. The remaining areas are regarded as potential sources of information waiting to be researched.

Figure 3.9 illustrates the general location of the 364 sites noted above based on site type. All sites were initially recorded, confirmed or updated after 1989 by Heritage Branch staff.

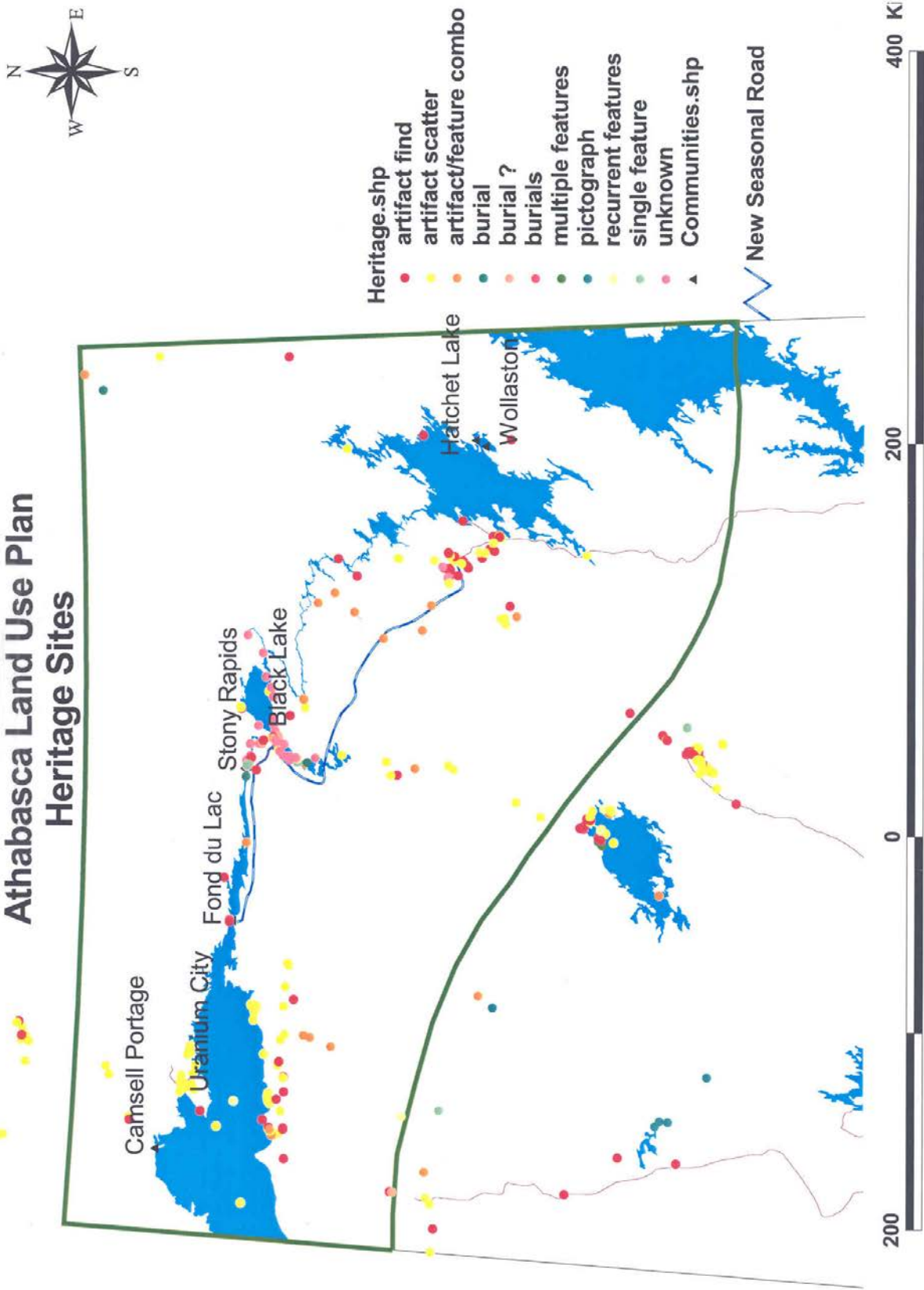
There have been several Heritage Resources Impact Assessments (HRIA) conducted by consultants for some mining operations. It is important to note that the assessments for the HRIA's have only covered previously recorded heritage resources. The investigation and recording methods vary widely, but are well documented

### 3.6.3 Heritage Resource Protection

The Canadian Environmental Assessment Act is the federal act guiding the protection of physical and cultural heritage resources. It requires that consideration be given to cultural resources in federal environmental assessments. The Act is of particular importance to new developments, especially within the resource industry. The following quotation describes the main purpose of the Act:

"...any change that the project may cause in the environment, including any effects of change..., on physical and cultural heritage on the current use of lands and resources for traditional purposes by aboriginal persons, or on any structure, site or thing that is of historical, archeological, paleontological or architectural significance" (Section2[1]) (CEAA, 1996).

Figure 3.9  
Athabasca Land Use Plan  
Heritage Sites



## Protected Sites and Other Designated Areas

Figure 3.10 illustrates protected areas within the Athabasca region. In addition to the Athabasca Sand Dunes Wilderness Park, there are three Provincial Recreation Sites within the Athabasca region. All 3 recreation sites are located in the Wollaston Lake region.

The Courtenay Lake Recreation Site is semi-maintained by Wollaston Lake fire fighting crews. Semi-maintained means maintenance work is carried out approximately once per week pending fire fighting activities. The Courtenay Lake Recreation Site has 8 designated campsites, no boat launch and is 15 ha in size. Wollaston Lake (Hidden Bay) Recreation Site is semi-maintained, has 12 campsites, and a boat launch, it is 100 ha in size. The Geikie River Recreation Site is also semi-maintained, has 8 designated campsites, boat launch, and is 8 ha in size. The Geikie River recreation site is used as a sub-headquarters for SERM.

### 3.6.5 Provincial Wilderness Park

The Athabasca Sand Dunes Provincial Wilderness Park is 192,500 ha in size and has 6 designated camping areas.

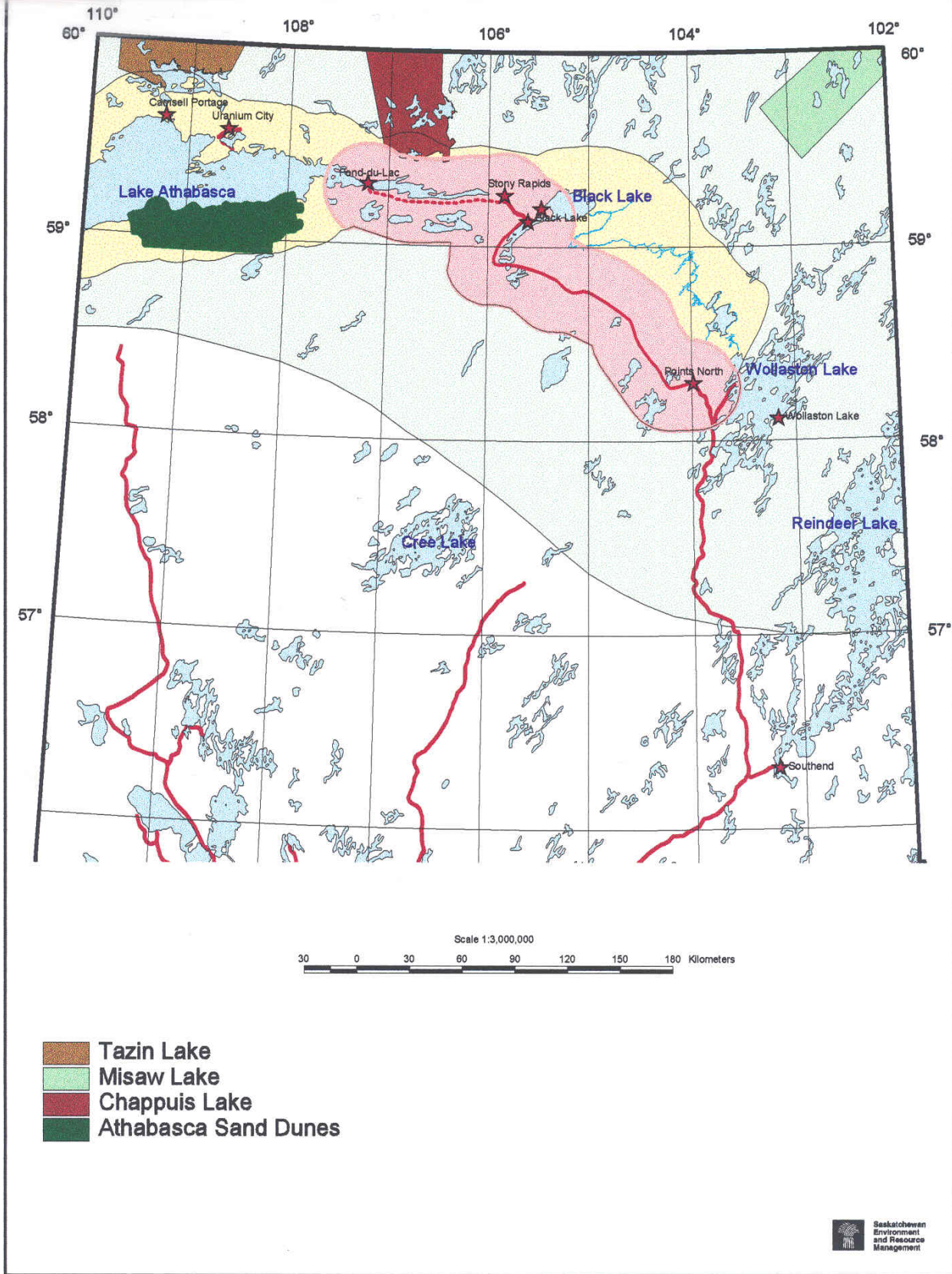
The Athabasca Sand Dunes Park Management Strategy provides a base of information and guidelines for managing the park. The Athabasca Sand Dunes contain the most northerly active sand dune formation in the world, some of which are the largest in North America (SERM, 1998). The park is classified as a wilderness park and the primary objective of its classification is preservation. The mandate of the park to protect this unique ecological area also includes the pursuits of outdoor recreational activities following backcountry and sensitive area recreational use guidelines.

The park is remote and only accessible by boat or float plane. Public facilities will not be built in the park. Guided tours may operate under strict guidelines.

### 3.6.6 Representative Areas Network (RAN) Program

In June 2001, SERM designated three temporary Special Management Areas (See figure 3.10) These are temporary designations for a period of 10 years. The future of these areas will be determined in the course of land use planning, including their final boundaries and allowable uses.

**Figure 3.10- Map of Protected Areas in the Athabasca Land Use Planning Area**



## 4.0 How People Use the Land and Resources

Different land **uses** provide different **values** for different people. These values can be scientific, ecological, aesthetic, cultural, or economic in nature.

The panel will make recommendations to allocate resources according to the range of uses and values, balancing:

- Care for the land, plants, animals and water;
- Benefits to Athabasca people;
- Benefits to the people of Saskatchewan and Canada;
- Benefits for industry and government.

The panel's recommendations will go to Cabinet and Athabasca leadership for approval. The approved recommendations will become management guidelines for Athabasca land use.

### 4.1 History

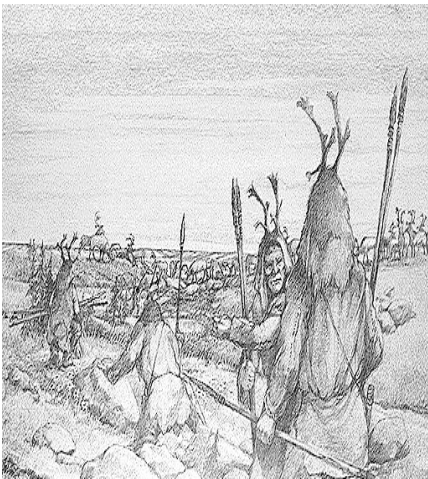
This section draws from historical accounts to give context to the use and occupancy of the region. While documented information on traditional and local land use in the region is limited, the 2001/2002 Athabasca Use and Occupancy Research will make a significant contribution here.

#### 4.1.1 Pre-Contact History

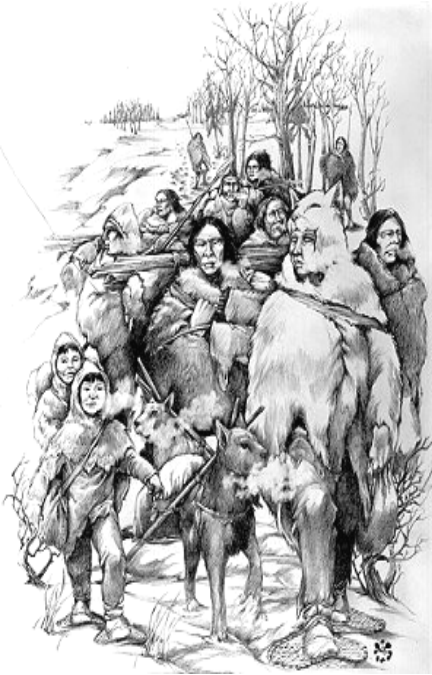
According to archeological evidence the Dene, 'Caribou-Eaters' have lived in northern Saskatchewan for an estimated 8,000 years (Meyer, 1981). Life in the region revolved around the migration of the caribou, and resulted in frequent moves and temporary settlements. "The cultural chronology is centered around four periods of distinct traditions Palaeo-Indian, Shield Archaic, Arctic Small Tool and Taltheilei" (Meyer, 1981), based on a linear scale of technology-based cultural definition. The Palaeo-Indian tradition came from southern bison hunters who migrated north where the barren-ground caribou were. It is presumed that hunting techniques for bison and barren-ground caribou were directly transferable.

The climate 10,000 to 7,000 years ago was warmer in the region than in present day, and therefore the treeline would have extended further north. This would indicate that the caribou range did not extend as far south as it does today and would also explain the lack of archeological evidence in what is now northern Saskatchewan. Two sites have been identified, one on Black Lake, and another at Hara Lake, north of Wollaston Lake.

There is little evidence of the Shield Archaic tradition in what is now northern Saskatchewan. This could be because there were not peoples



*Artist's (Larry Jameson) rendition of Taltheilei caribou hunt, Courtesy of Manitoba Heritage and Tourism – Historic Resources Branch*



Artist's (Larry Jameson)

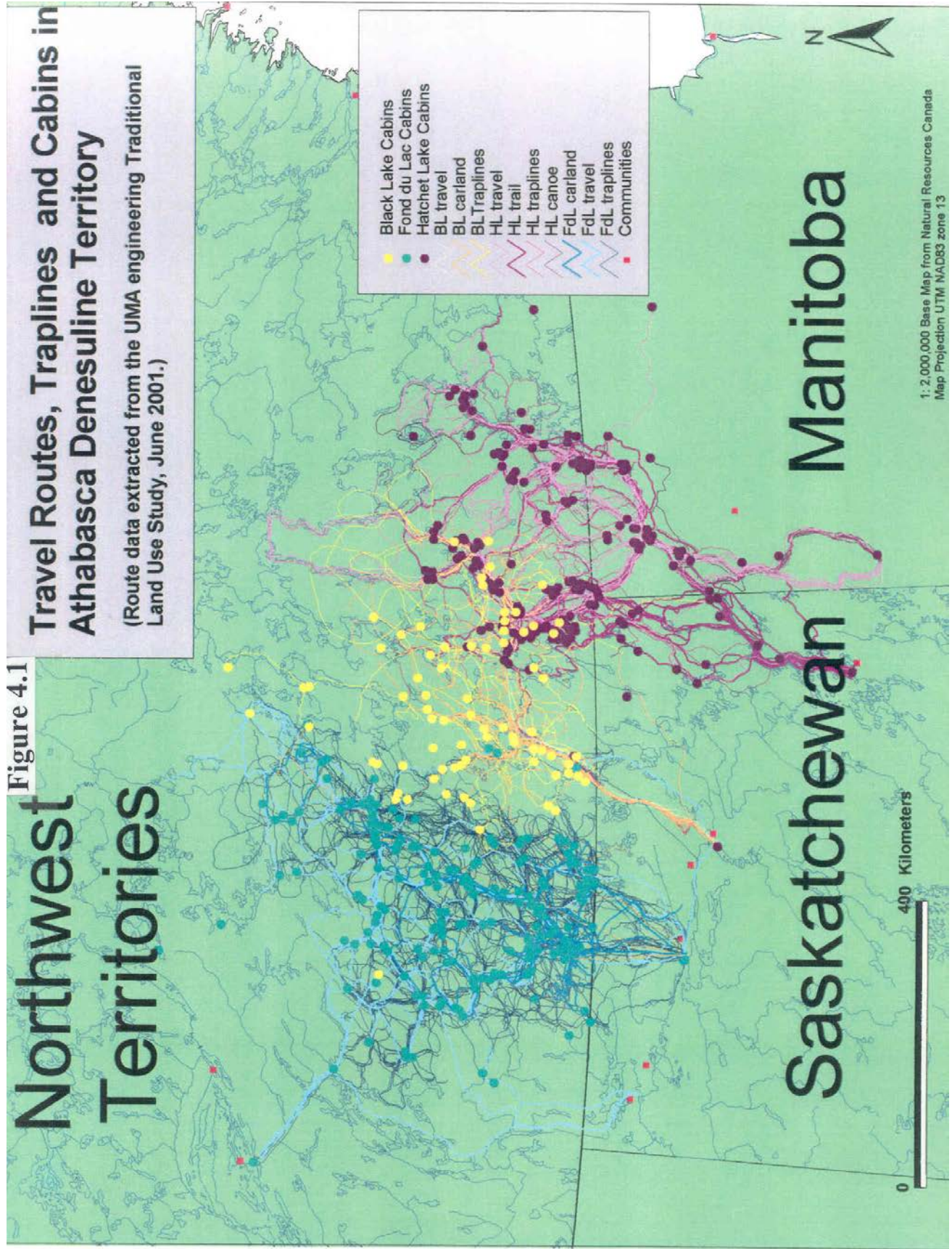
rendition of Middle **Taltheilei**

from this group living in the area, or it could be a condition of archeological research in the area. The points used by persons from this cultural tradition were side-notched projectile points. Between 7,000 and 5,000 years ago, the region was warm and moist and the treeline extended to its furthest known north limit. It is speculated that the Shield Archaic peoples followed the caribou further north and did not occupy the area during that time period. It is also speculated that at that time, cousins of the northern plains peoples lived and hunted in northern Saskatchewan. About 3,500 years ago the climate became cooler and the movement of a new population moved into the region, along with the barren-ground caribou and a retreating treeline.

The Arctic Small Tool tradition is characterized by tools knapped from fine cherts and quartzites. It is believed that more northern peoples (Inuit ancestry) migrated south to follow the caribou and escape increasingly severe northern climate conditions, 3,500 to 2,700 years ago. The northern peoples displaced the Shield Archaic peoples on the barren ground caribou range. Archeological remains classified as Pre-Dorset artifacts have been recorded at several locations on Black Lake and Lake Athabasca. It is believed that Pre-Dorset artifacts are relatively common in northern Saskatchewan and further south of Black Lake and Lake Athabasca.

The **Taltheilei** tradition has been divided into early, middle and late periods. Denesuline peoples living in the northern Saskatchewan region at this time are believed to be descendents of the Taltheilei tradition (introduced by Athapaskans) of about 2,700 years ago. The early period dates 2,700 to 2,100 years ago are defined by stemmed projectile points. Lanceolate points became more common during the middle period, 2,100 to 1,500 years ago. The late period, 1,200 years ago, was defined by side-notched and corner notched points, which were used up to the time of European contact. There are numerous archeological sites displaying artifacts from this period.

Other archeological finds indicate that the area was used by other cultural groups, such as the Pelican Lake culture (3,000 to 2,000 years ago) and the Clearwater Lake culture. The Clearwater Lake complex is associated with the Algonkians, direct ancestors of present-day Cree peoples. Artifacts from the Clearwater culture complex have been found as far north as Fond-du-Lac.





Competition between the Hudson's Bay Company (HBC) and the NorthWest Trading Company (NWTC) caused trading posts to be built inland. In 1788 the NWTC built Fort Chipewyan on Lake Athabasca. The inland forts were meant to make trading easier for Aboriginal peoples by decreasing the distance they had to travel to sell their furs (Bone, 1992). Fort Chipewyan was set up specifically for trade with the Dene. The area was reported to have the highest quality beaver pelts in North America. The Chipewyan Dene also sold products from Aboriginal peoples living further north. The trade and sale of furs and other provisions between the Denesuline, HBC, NWTC, and inter-tribal trade continued on for the next hundred years and continues today.

In 1867, the Dominion of Canada was formed. With the creation of a formal Canadian government, the Indian Act of 1876 attempted to solve the problem of how Europeans (and other immigrants) could occupy land that was first inhabited by Aboriginal people. As European activity on traditional Denesuline land increased there was much discussion about the making and signing of a Treaty.

As early as the 1890's the Canadian government began exploratory drilling for minerals in the region. The government attempted to speed up the Treaty process when the Klondike gold rush came. The gold rush caused conflict between miners and Aboriginal peoples (Office of the Treaty Commissioner, 1998). Present day Aboriginal populations include Dene, Cree, and Metis peoples. Uranium mining operations brought new people to the region from the 1950s onwards. Cree and Metis peoples were amongst the mine workers who moved to the region for employment. Since then, Cree and Metis populations have increased and continue to have significant roles in the Athabasca region.

#### 4.1.2 Treaty Rights

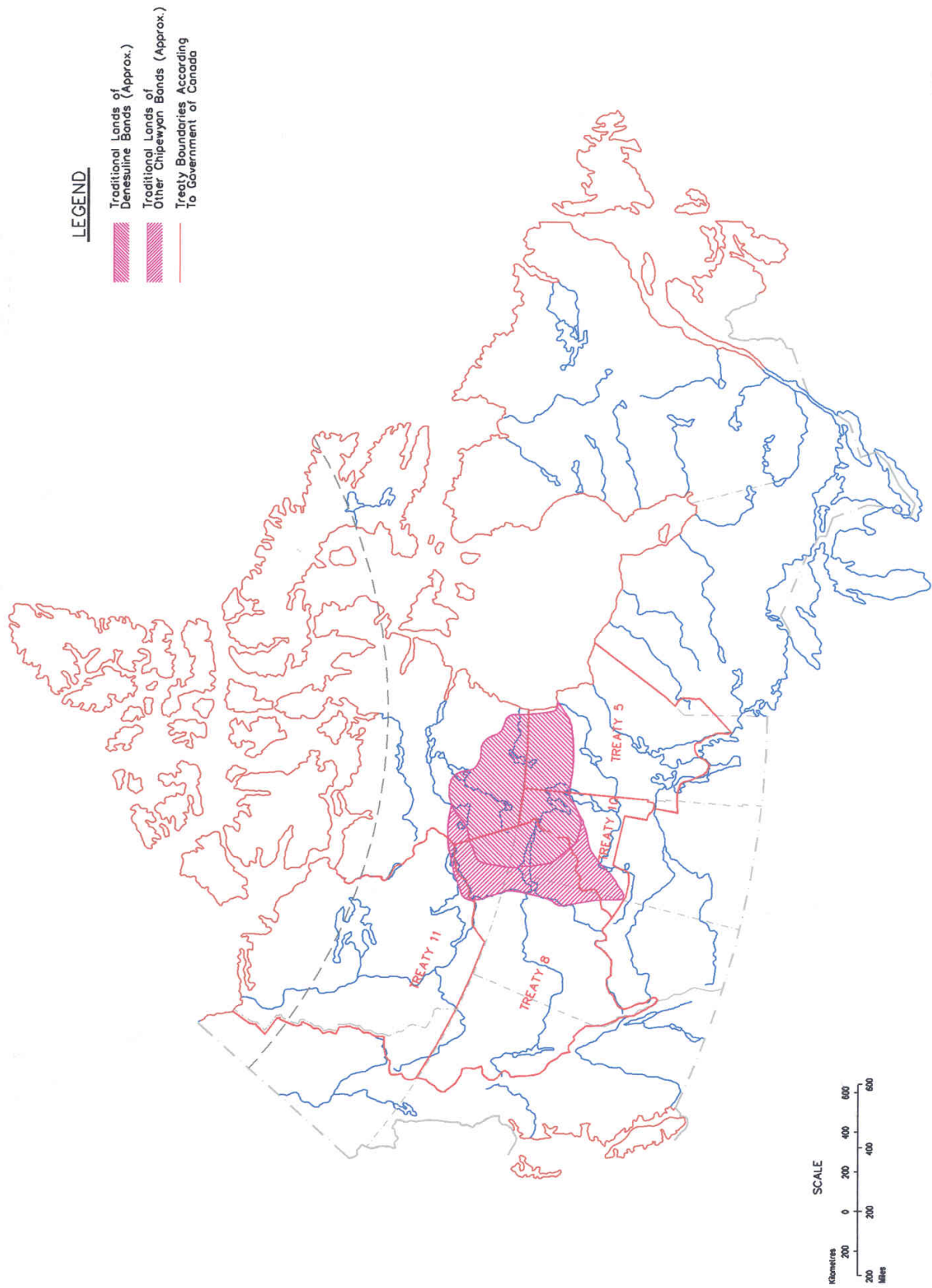
The treaties in Athabasca are peace and friendship treaties between nations, an agreement to share lands. Arguably, the exact nature of this sharing was never clarified, and will be determined with the passage of time.

Figure 4.2 illustrates the Athabasca treaty areas. Black Lake and Fond-du-Lac signed Treaty 8 in 1899, and Hatchet Lake Band signed Treaty 10 in 1907.



Front of the Treaty Eleven medallion,  
Source: Fumoleau, R. "As Long As This Land  
Shall Last"

Figure 4.2 – Treaty areas and traditional Denelands





Back of the Treaty Eleven medallion.  
Source: Fumoleau, R. "As Long As This  
Land Shall Last"

At the time of Treaty negotiations, Aboriginal peoples were promised that they would be as free to hunt and fish as if they never signed the treaty and their way of life would not be changed or impacted by the treaty (Office of the Treaty Commissioner, 1998). Federal and Provincial government actions in later years were often contradictory to these promises (Fumoleau, 1979).

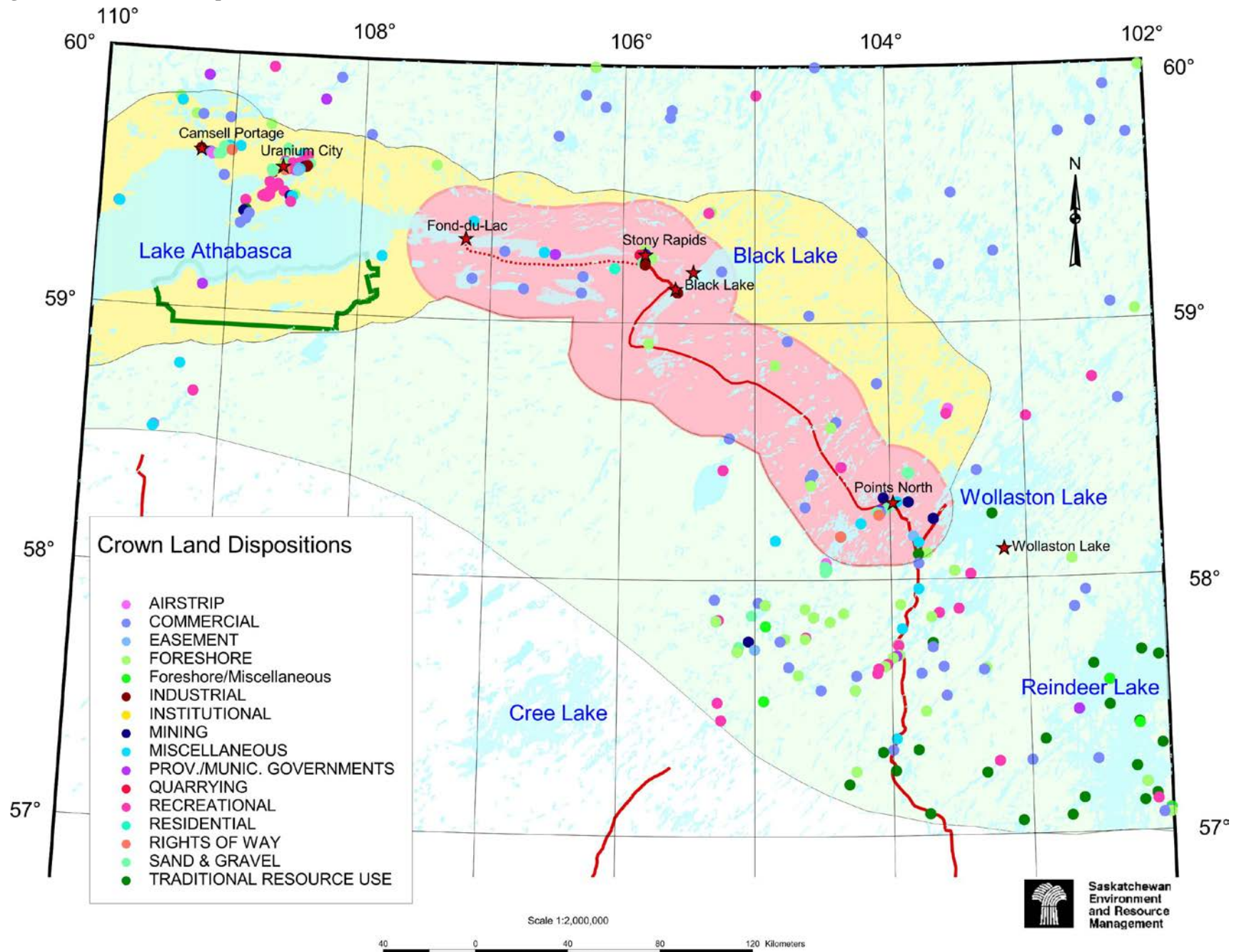
The Indian Act (1876) gave power to ruling government parties to implement treaties in a manner which best-represented government interests. Passing of the Northwest Game Act (1917) was one of the first government infringements upon northern Aboriginal resource use (Abel 1993:189-190). In 1930, the Natural Resources Transfer Agreement imposed another major impact on Aboriginal people's rights to hunt, fish, and trap on all unoccupied Crown lands. It handed over the control of local Crown land and natural resources to the prairie provinces, allowing them to benefit from resource royalties (Rotman, 1996:71). As a result of this legislation the provinces began to subject First Nations living within their boundaries to provincial regulations, creating more restrictions on native livelihoods, in spite of the fact that section 88 of the Indian Act (1876) ensured that treaty rights were to have precedence over provincial laws of general application (Kulchyski 1994:9).

In 1992, the Athabasca Denesuline Inquiry requested that the Indian Claims Commission inquire into the denial for Athabasca Denesuline peoples to fish, hunt and trap in the lands north of 60°. They were previously informed that their Treaty rights to hunt, fish, and trap did not extend past the Treaty boundaries. In 1995, the Minister's of Justice and Northern Affairs agreed to re-examine the issue following a refusal in 1994.

## **4.2 Provincial Crown Land Dispositions**

A disposition is a right granted by the province to use land for building cabins or lodges, and developments such as outfitting or mining (Figure 4.1). On Crown land within the region there are 4 airstrips, 70 commercial dispositions, 4 industrial dispositions, 6 institutional dispositions, 12 mining dispositions, 7 provincial/municipal government dispositions, 59 foreshore dispositions, and 37 miscellaneous dispositions which include radio towers, mineral exploration, churches, agriculture, etc. Map information is current as of March 2001.

Figure 4.1 Crown Land Dispositions





*Filleting Fish*

Source: Sask. Education

## 4.3 Fisheries

### 4.3.1 Traditional Use

Fish provide food for people in the Athabasca region. Lake whitefish is a preferred fish species because it is easily smoked. Other food species include lake trout, walleye, northern pike, arctic grayling, perch and suckers. Traditionally, fish have been a vital part of life in the Athabasca region and continues to be prepared for consumption based on local, social, and cultural practices - fried, roasted, dried, and in soup (Marles, et al., 2000).

### 4.3.2 Commercial Fishing

While commercial fishing has occurred in Saskatchewan since 1885, it began in the Athabasca region around 1929. At that time, it was mostly southern persons fishing commercially, which raised the concerns of local residents. In 1945 the provincial government became involved in fish marketing with the establishment of the Saskatchewan Fish Board (SFB), which guaranteed the prices for all species of fish. In 1946, the SFB established 6 filleting plants, including one at Wollaston Lake. By 1950, the SFB changed its name to the Fish Marketing Service and local fishermen co-op's began to take over the management of local fish plants, filleting plants and marketing of fish especially on the east side of the province. McInnes Fish Products on Lake Athabasca operated as a private buyer. In 1958, Co-op Fisheries Ltd.(CFL), an umbrella organization selling local co-op fish was established and operated plants on the east side of the province including Wollaston Lake, Fond du Lac and Gunnar. In 1969 the Freshwater Fish Marketing Corporation (FFMC) was established and ran like a local co-op with a system of initial and final payments to fishermen, marketed fish products, and paid allowances for filleting, packaging, and freezing activities. By 1974, the local plants were no longer viable and the FFMC constructed a processing plant in Winnipeg. By 1978 the co-op fisheries were in receivership and the FFMC took over and closed the Gunnar and Wollaston plants. (Internet-2).

The FFMC has expanded from exporting to U.S. markets and supplying national demand to exporting to European markets. This is more profitable for both the FFMC and to commercial fishermen.

Today, independent commercial fishermen and 3 fishermen's co-op's operate in the Athabasca region. The Wollaston Lake Commercial Fishermen's co-op is operating. The Fond-du-Lac and Black Lake fishermen's co-op are in the process of setting up their co-op licenses and



*Commercial Fishing Source: Sask. Education*

#### *History of Commercial Fishing in the Athabasca Region:*

**1929** - Commercial Fishery in Athabasca region begins.

**1946** - Filleting Plant opens at Wollaston Lake.

**1958** - Gunnar plant opens,

**1969** - FFMC established.

**1978** - Gunnar and Wollaston plants closed due to economic pressures.

**2000** - Wollaston opens new plant

*There are 3 fisherman's Co-ops in the Athabasca Region:*

- Wollaston Lake
- Fond du Lac (setting up)
- Black Lake (setting up)

choosing lakes to fish. Each co-op develops their own guidelines and rules for how the co-op members are to fish, who can become a member and under what circumstances co-op membership can be changed or increased.

Wollaston opened a new fish plant in 2000. Through the Traditional Resource Use disposition program, the Wollaston Lake Fishermen's co-op has icehouses to store their fish before it is sold to the Freshwater Fish Marketing Corporation.

SERM sets guidelines for commercial fishery operation. Many of the lakes open to commercial fishing are currently in use. There are approximately 950 lakes allocated to commercial fisheries (Figure 4.2). Of these 950 lakes, about 726 lakes are registered to an independent commercial fisherman or co-op (Figure 4.3). The minimum size for a lake to be considered by commercial fisheries is 200 ha (Less than 200 ha size may be considered for 3-year **pulse fisheries**, and lakes between 200 – 750 ha are 2 year pulse fisheries); the minimum size for lakes with lake trout population is 400 ha. If lakes are smaller than 400ha and contain trout the quota is removed as populations in lakes this small are quickly fished out.

*A **Pulse fishery** uses a small lake for a short period, then allows fish numbers to build up again.*

SERM sets co-op quota limits at 2.5 kg of game fish per hectare of lake. The general quota is broken down according to individual fish species productivity on each lake. Whitefish are generally allocated at 1.0kg/ha.yr and lake trout at 0.5kg/ha/yr. If specific studies are done on specific lakes, the quotas may vary accordingly. Once the quota for one species has been reached, SERM closes the fishery on that lake so that no more fish of that species are caught. This is an attempt to prevent over-harvesting of one species on a lake.

Figure 4.2 Commercial Fishing Quotas

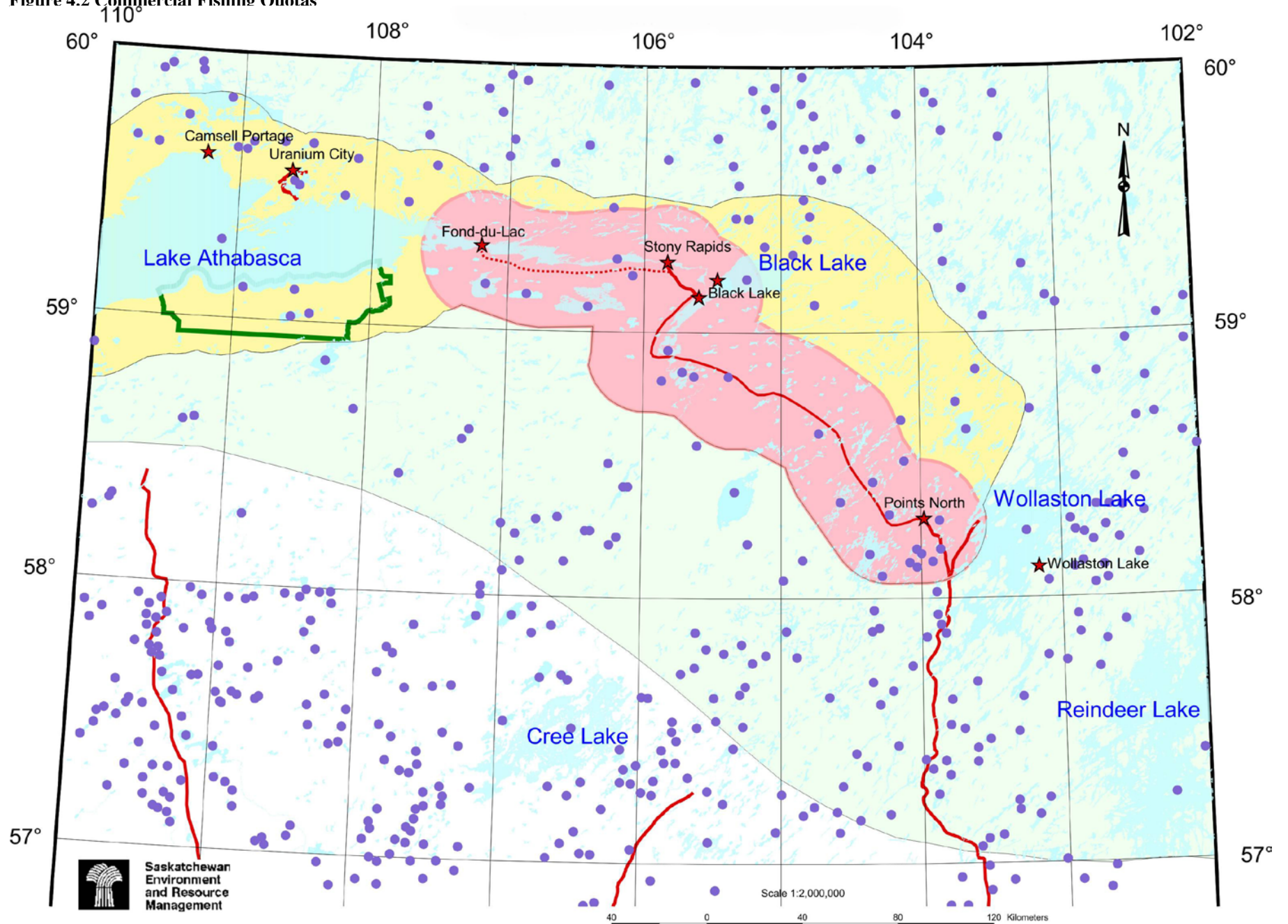
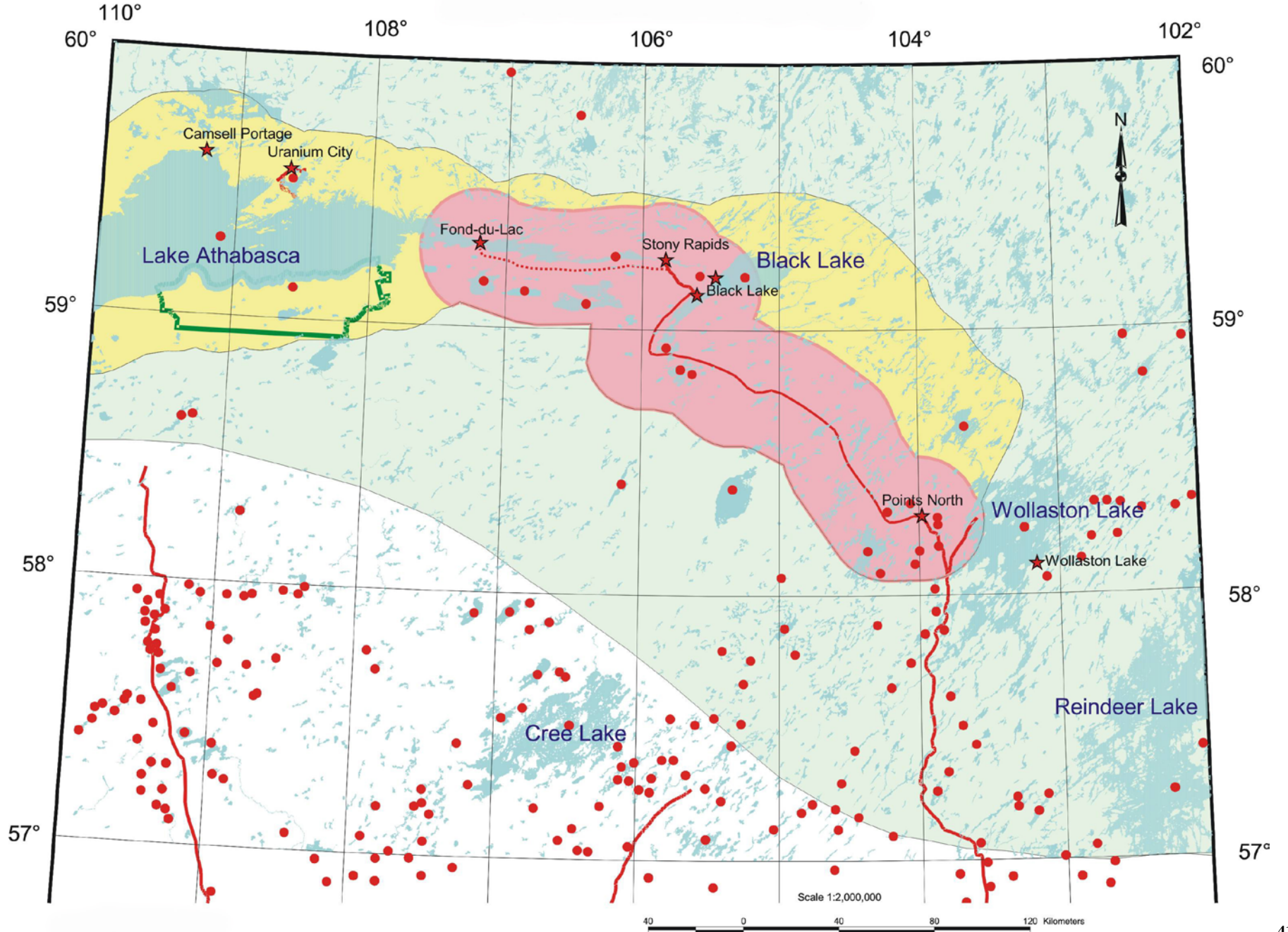


Figure 4.3 Commercial Fishing Licences



The study, "Examination of the Commercial Fishing Industry in Saskatchewan" was conducted in 1999 by Trimension Group and Spruce River Research consulting firms. In response to the Trimension study, SERM released "Options to Revitalize Commercial Fishing in Saskatchewan: The Year 2000 & Beyond" (2000), outlining options to revitalize the commercial fishing industry. Issues raised included:

- marketing
- fish supply and access
- processing and transportation requirements supporting resources
- ecosystem management issues

SERM, Saskatchewan Northern Affairs, and the Saskatchewan Commercial Fishermen's Co-operative Federation Ltd. (SCFCFL) are working in partnership to resolve issues within Saskatchewan's commercial fishing industry. One of their goals is to double commercial fish revenues by 2005.

### 4.3.3 Sport Fishing

Sport fishing is an important part of the northern tourism industry. With the new seasonal and winter road extending to Lake Athabasca, more lakes are accessible to sport fishermen. There is no requirement that sport fishermen have a guide to fish in the region although that is the preference of peoples living in the Athabasca region.



*Sport Fishing, Source: Gord Sedgewick*

### 4.3.4 Other uses

Fish are also an important part of the food web within the forest community. Black bears, birds, and other predator species consume fish as part of their regular diet. Fish are an important indicator of water quality. A healthy fish population is an indicator of a balanced lake ecosystem.

## 4.4 Outfitting

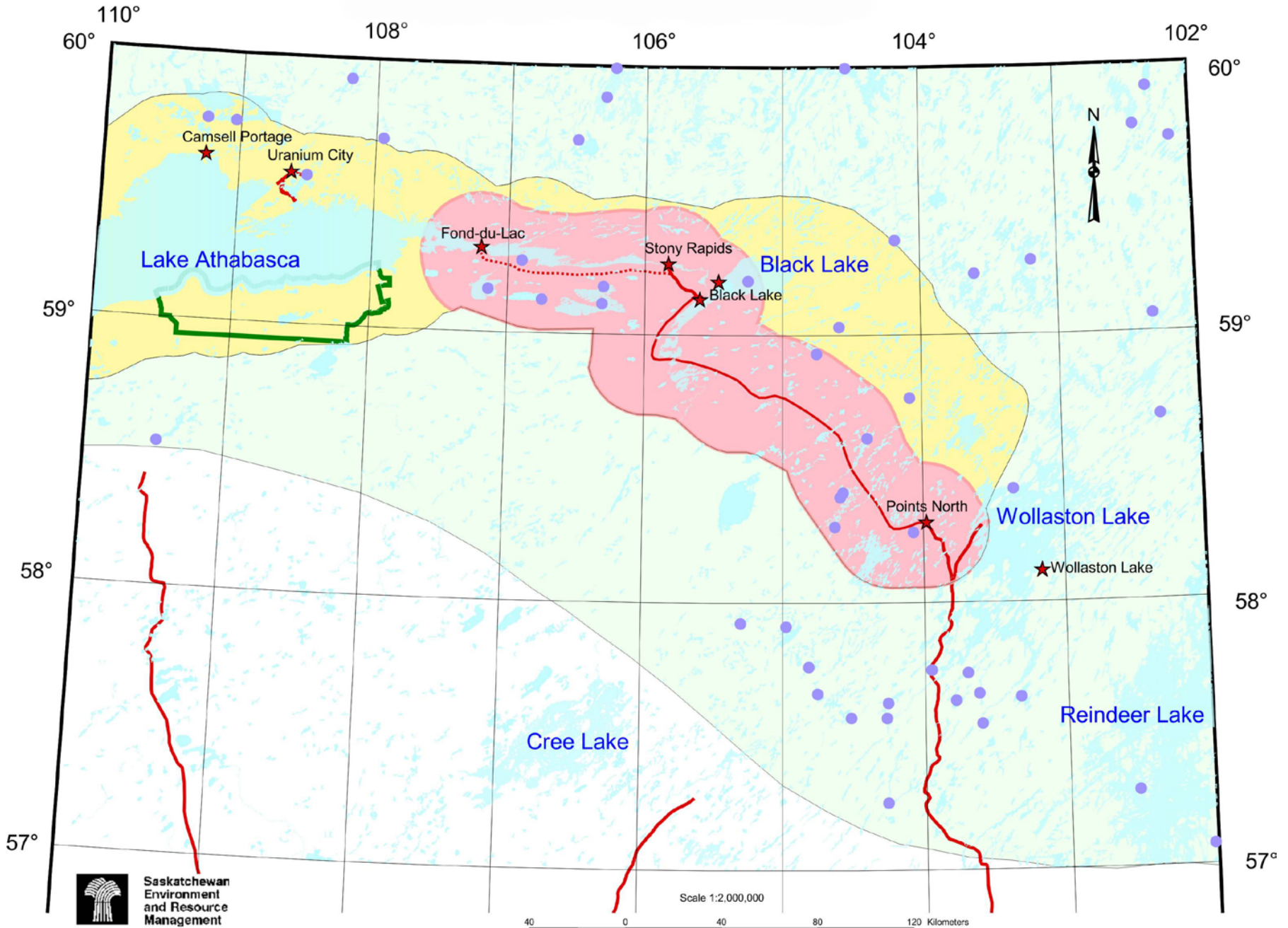
The outfitting industry in the Athabasca region focuses on fishing and hunting opportunities. There are 47 outfitters with 50 tourist camps currently operating in the Athabasca region. While fish outfitting is the most common type of outfitting in the region, many fish outfitters also provide hunting opportunities. There are very few outfitters in the region offering hunting alone.

Game fish include arctic grayling, lake trout, lake whitefish, walleye and northern pike. Hunting outfitters in the region offer bear and moose hunting to both resident (mostly southern) and non-resident hunters.



*Hunting outfitters offer moose to clients*

Figure 4.4 Outfitters in the Athabasca Region



Of the 177 Licensed outfitters within the Shield region of the NAD:

- 53 are owned by NAD residents;
- 89 are owned by Saskatchewan residents outside the Shield region of the NAD;
- 23 are owned by Canadian residents outside of Saskatchewan;
- 12 are owned by Non-residents of Canada;
- 18 are owned by Aboriginal people.

(2000-01 NAD Outfitting Businesses)

NAD = Northern Administration District



Source: Sask. Education

There are 78 trappers within the Athabasca region. A total of 1948 pelts from the Athabasca region resulted in \$58,342.08 paid out to 78 trappers.

Outfitters must have permits for all of their clients and hunters are responsible to purchase a hunting license. SERM establishes hunting allocation numbers, hunting season dates, areas, and hunting methods.

Most sport hunters coming to the region use the services of an outfitter, bringing economic benefits to the region. Although few outfitters reside in the region, they sometimes employ local guides and camp staff.

## 4.5 Wildlife

### 4.5.1 Trapping

Trapping is an important traditional resource use and it is central in Athabasca society and economy. The 1950s saw the introduction of the Fur conservation area (fur block) system in Athabasca. It was believed that this new system would, "...foster individual initiative among trappers and gradually educate Native trappers in the idea and ideal of conservation" (Abel 1993:218). Aboriginal people, with their own systems of wildlife conservation, were frustrated by this new development, arguing that, "...by treaty they have a trapping right over a vast amount of country..." (ibid 219).

Five trapping blocks cover the Stage 1 planning area (Figure 4.7). Stage 2 planning area covers parts of 8 blocks. Each block usually elects one trapline owner to represent the block on the Northern Saskatchewan Trappers Association. They meet several times a year and make recommendations to government and other agencies regarding trapping industry issues.

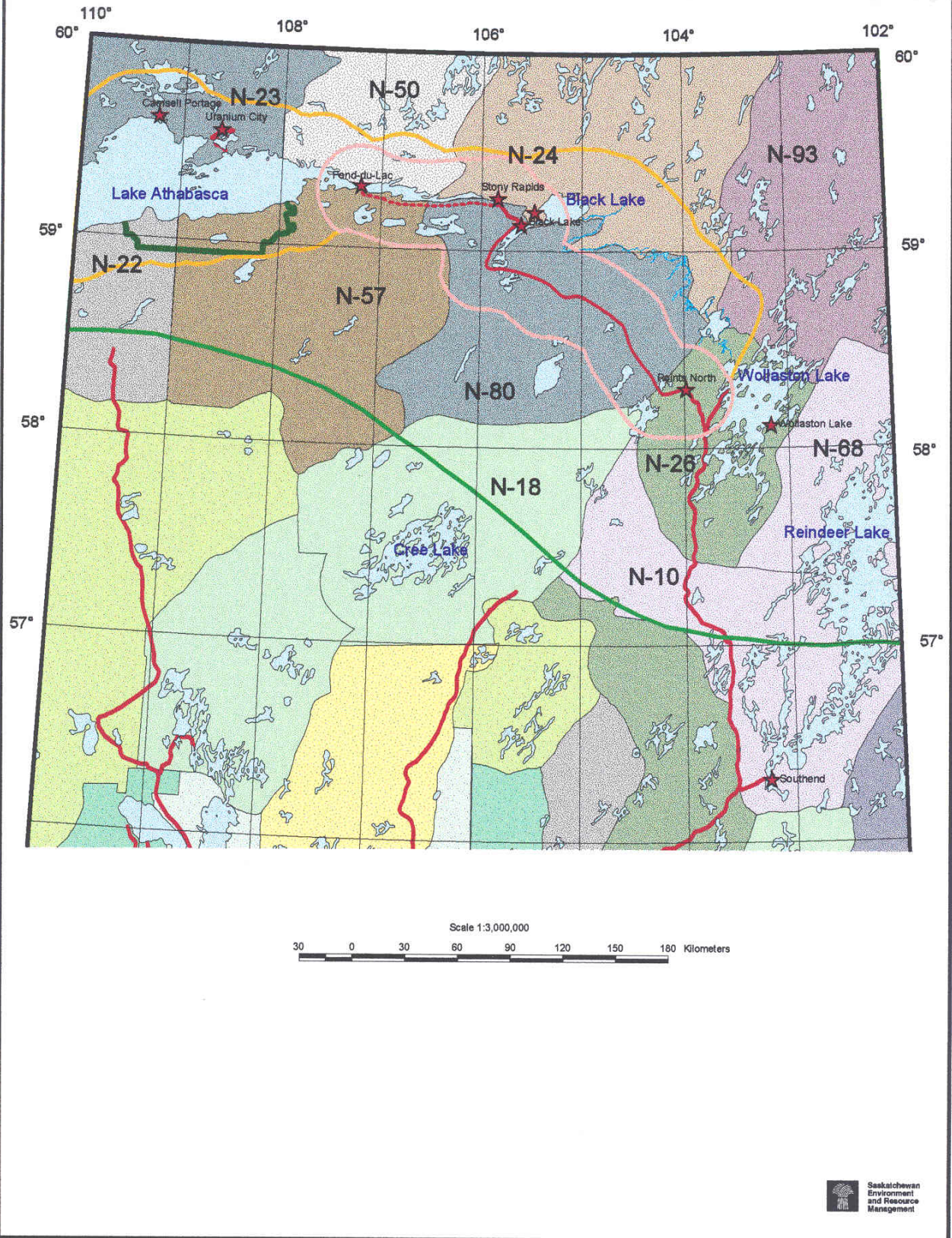
A drop in fur prices over the last decade has resulted in less trapping activity. According to the 2001 Individual Trapper [Harvest Statistics](#) there are 78 trappers within the Athabasca region. Species trapped included Arctic Fox, Badger, Bear, Beaver, Coyote, Fisher, Fox (cross), Red Fox, Silver Fox, Lynx, Marten, Mink, Muskrat, Otter, Raccoon, Skunk, Squirrel, Weasel, Wolf, and Wolverine.

#### Number of Trappers by Fur Block

|      |    |      |    |
|------|----|------|----|
| N-10 | 24 | N-93 | 14 |
| N-26 | 3  | N-23 | 6  |
| N-80 | 5  | N-22 | 3  |
| N-57 | 3  | N-18 | 1  |
| N-50 | 9  | N-68 | 4  |
| N-24 | 6  |      |    |

There are 28 registered traditional resource use cabins in the region, although many others exist.

**Figure 4.7- Map of Fur Conservation Areas in the Athabasca Region**





*Caribou Crossing, Source: Internet-22*

*There are 53 recreational cabin leases in the Athabasca Region*

### **Other Traditional Uses**

Athabasca people depend on wildlife for subsistence. Barren-ground caribou are of prime cultural and economic importance. Woodland caribou, moose and black bear are also game animals people hunt by tradition in the Athabasca region. Animals are hunted and trapped for food and hides to make coverings, mats, clothing and other household articles. Traditionally, bones were used for soups and utensils such as hide scrapers, sewing needles, knives, kitchen utensils and other tools. Other parts of animals were used to make rawhide sinew, which was used as thread. Some medicinal properties are associated with different animal organs, and they may have spiritual use in ceremonies.

The opening of the Athabasca seasonal road in 1998 created improved access to the barren-ground caribou winter range, resulting in increased traffic of non-traditional Aboriginal hunters on the caribou range.

### **4.5.2 Sport Hunting**

Access to the region by southern hunters has become much easier with the opening of the Athabasca seasonal road. Hunters are not required to be accompanied by a local guide although that is the preference of peoples living in the Athabasca region. Many sport hunters coming to the region go through an outfitter and so there is some economic benefit to the region, although not all outfitters reside in the region.

### **4.6 Recreation and Tourism**

Non-consumptive and low impact guiding activities for recreation are economically beneficial to the tourism industry in the Athabasca region. Recreation activities include canoeing, hiking, photography, cultural camps and other activities. This type of tourism is currently operating in the Athabasca Sand Dunes Provincial Wilderness Park. In a 1999 report, the Northern Saskatchewan Tourism Task Team rates the potential for recreational tourism in the region as high.

Non-guided recreation in the region is unregulated and there are not specific numbers for how these activities contribute to the local economy. Due to the remoteness of the most sought after recreation areas, non-guided recreation is limited. Figure 4.9 shows the two recreational canoe routes (#26 and #38) in the region. Ecotourism operators can provide guiding and other support to such activities.



*Recreational Canoeists*

## 4.7 Water



*Fond du Lac River falls,  
Source: Cliff Buettner*

### 4.7.1 Traditional and Local Use

Water is an important resource for people in the Athabasca region. Historically, water travel was by canoe. To this day waterways continue to be used for travel. Hatchet Lake reportedly used Cochrane River then followed land trails to hunt caribou, whereas Black Lake and Fond-du-Lac mainly used land routes (Pers. Comm., Dr. Elias, 2001). Contemporary use of waterways is equally important for traditional life in the Athabasca region. Today, the most common forms of transportation are by powerboat in the summer and snowmobile in winter.

Waterways are used for subsistence fishing, hunting, gathering and general transportation. During the summer, powerboats and canoes are used for fishing, gathering and transport. Fishing takes place during the winter on frozen water bodies. Winter use by ice crossing for hunting, trapping, and transportation is also significant.

### 4.7.2 Hydro-Electric Development

Hydropower generating stations in the Athabasca region produce approximately 20% of the province's annual total of hydro generation.

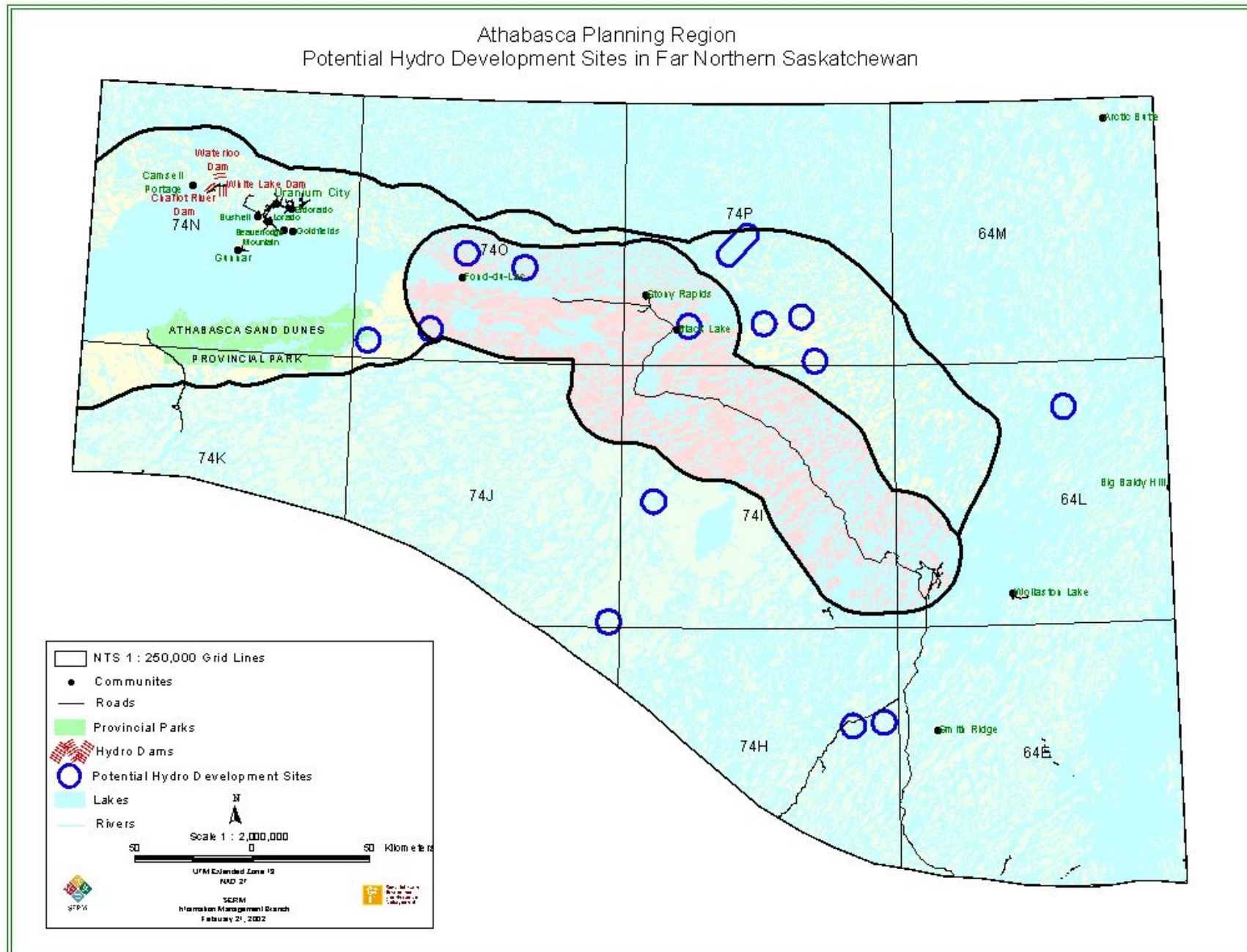
Historically, there have been numerous hydroelectric stations built for individual mine sites and mining communities. Operation of those generating stations ceased when the mines closed. There are currently 4 operating hydroelectricity generating stations in the Athabasca region, on Tazin Lake, and the Waterloo, Wellington, and Charlot River systems.

Saskpower has identified potential areas within the Athabasca region for future development, but nothing has been planned for the next 5 years (Figure 4.5).

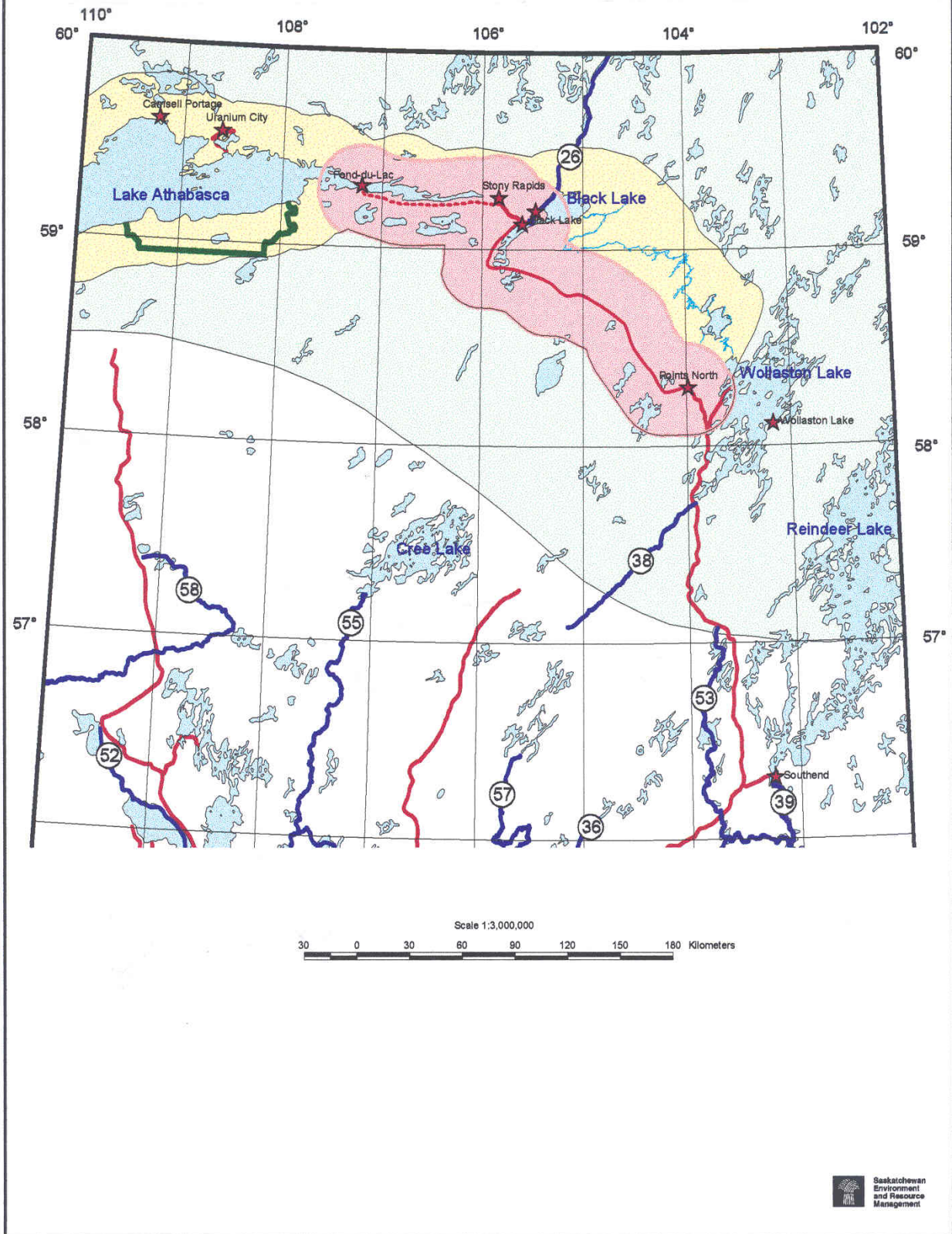


*Whitesand Hydro-Electric Station Source:  
Bob Reed*

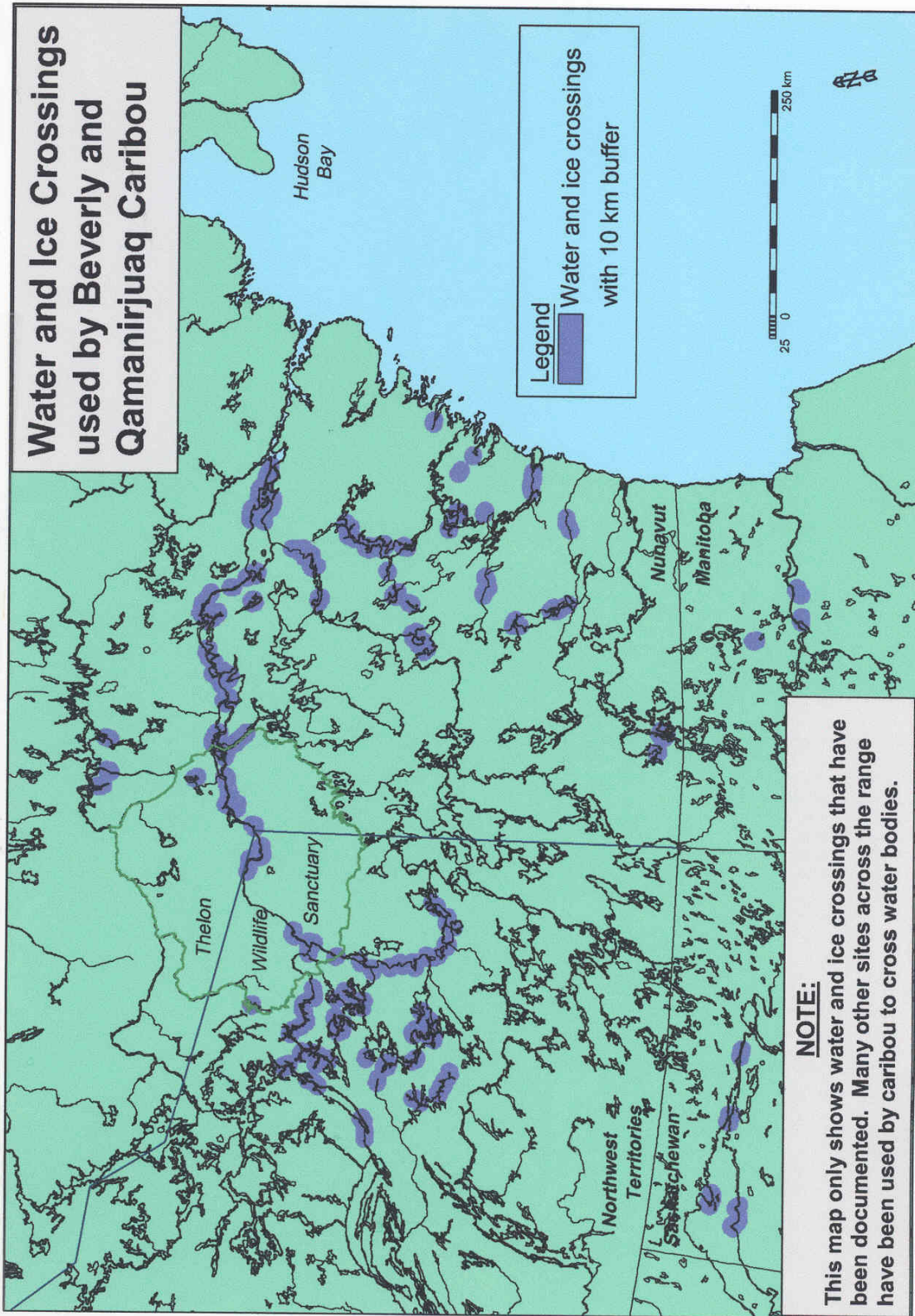
Figure 4.5 Potential Hydro-Electric Development Areas



**Figure 4.9 – Map of Numbered Canoe Routes in the Athabasca Region**



**Figure 4.10 – Documented historical Barren-Ground Caribou ice crossings**



### Other Uses

*In 1998 the mining industry provided 6,315 direct jobs, 10-12,000 indirect jobs, and \$243.5 million in royalties to the Province, from an annual production valued at \$2.27 billion (Pers. Comm., Rogers, 2001).*

Since the 1940's the Canadian Coast Guard (Department of Fisheries and Oceans) transported goods to the communities of Camsell Portage, Uranium City, Fond-du-Lac, Stony Rapids and Black Lake by barge on Lake Athabasca. The service required dredging of the Athabasca River on the Alberta side, and ran from June 1 to the end of September. Service discontinued with the proposal and building of the Athabasca seasonal road from Points North to Black Lake.

Waterways are used by caribou to move between winter feeding grounds. Figure 4.10 shows some documented ice crossings used by the Beverly and Qamanirjuaq herds in the Athabasca region.

## 4.8 Mineral Industry

Saskatchewan Energy and Mines (SEM) is responsible for the administration of all Crown-owned mineral and petroleum commodities, including quarried commodities, in the Province, with the exception of aggregates (sand, gravel, and structural clay) and horticultural peat which are administered by Saskatchewan Environment and Resource Management (SERM).

There are currently 33 sand and gravel quarries in the Athabasca region. The majority of quarries are for road maintenance by the province, municipality, or mining company.

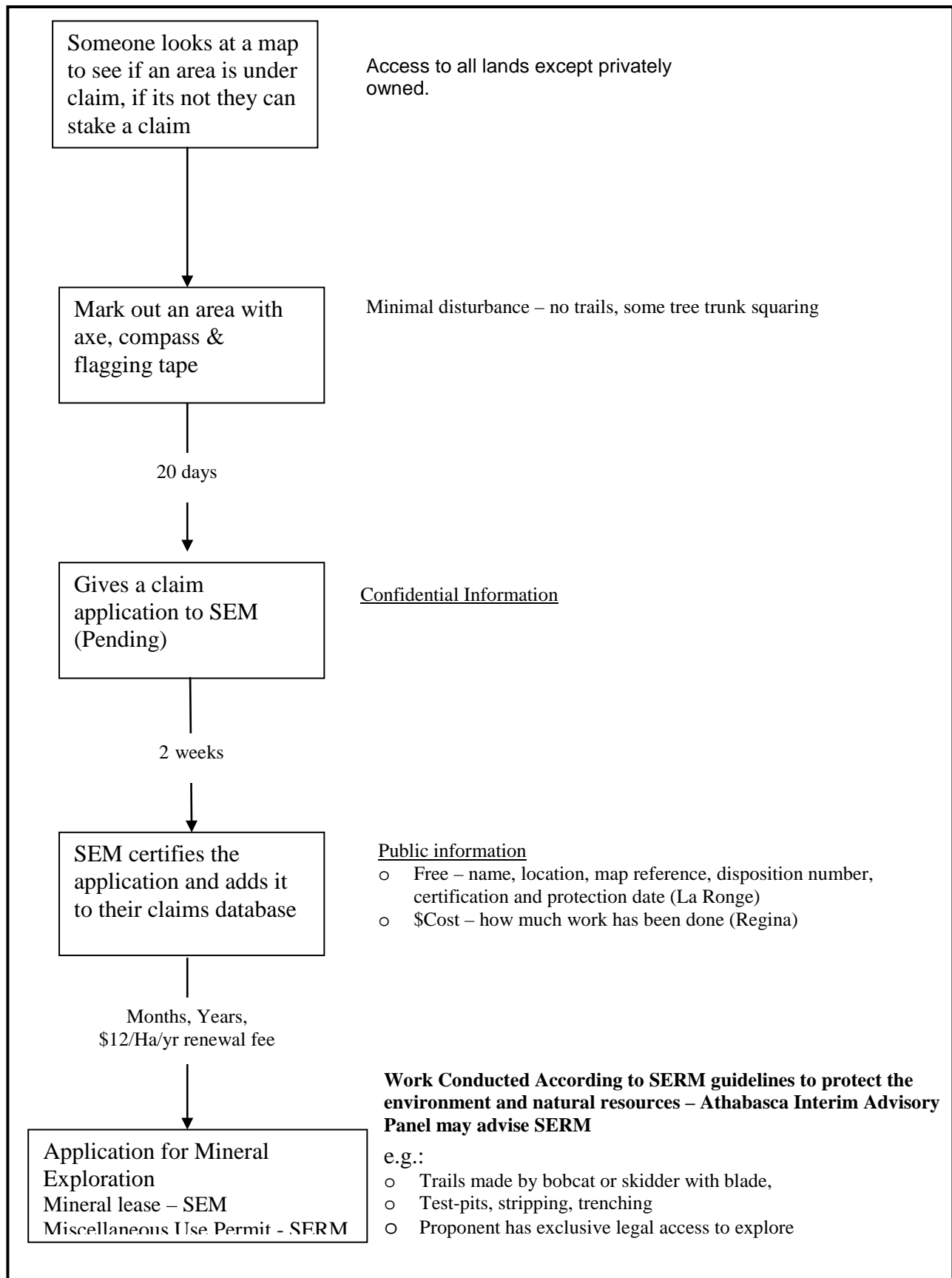
SERM administers the Crown surface rights for the Province in the planning area. This includes monitoring the environmental regulation of mining operations and the rehabilitation of sites. SEM controls the disposition of the Crown mineral rights through the Crown Minerals Act and related regulations. The two main types of mineral dispositions are, mineral claims and a mineral leases. A mineral claim allows the claim holder the exclusive right to explore for minerals within the claim area (Figure 4.6). The claim is held on a year-to-year basis by expending the required amount on exploration and by filing the work for assessment credit. The claim holder has a guaranteed right to convert the claim into a lease assuming that all of the requirements are met. A mineral lease allows the lease subject to fees and royalty payments to the provincial holder, the exclusive right to develop and produce from the government. A mineral lease has a renewable term of ten years. Mineral claimants and leaseholders are guaranteed right of access to their dispositions, subject to meeting the requirements of the surface permits and leases issued by SERM. Surface Leases are developed by SERM and Saskatchewan Northern Affairs, and are approved by cabinet.

There are currently 17 active mineral leases in the region spanning over 18,317.34 ha. There are approximately 809 mineral claims in the region (Figure 4.12). There are 45 abandoned mine sites north of Lake Athabasca and the Fond-du-Lac River (Figure 4.13). The Abandoned Mines Assessment Program was implemented cooperatively by SERM and Northern Affairs to inspect abandoned mine sites and identify and rank public safety risks and potential impacts that the sites may be having on the surrounding environment (KHS, 2001).

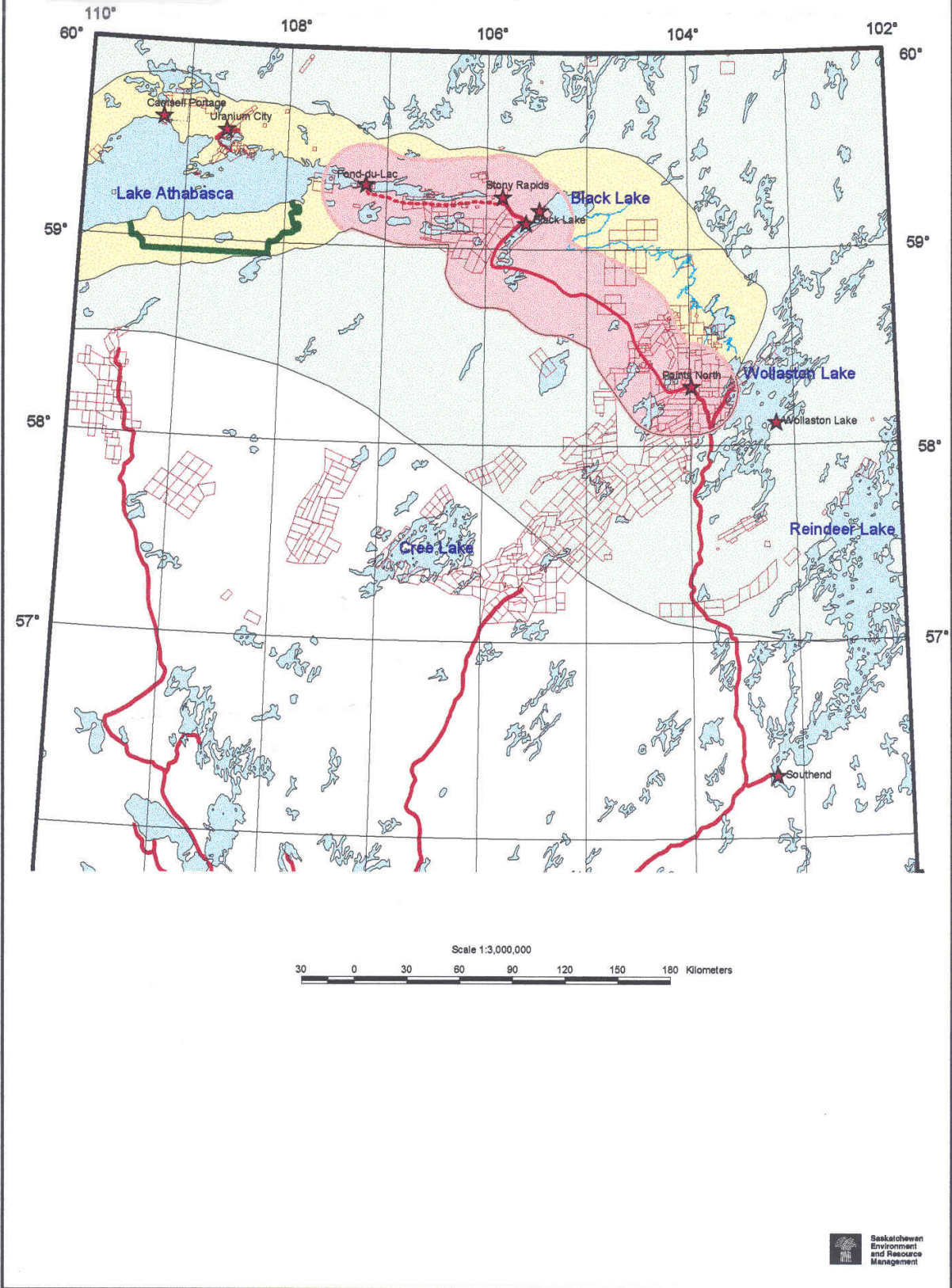
**Athabasca EQC** - *McLean Lake, Rabbit Lake, Cigar Lake and Midwest Lake mines*  
**West Side EQC** - *Cluff Lake mine*  
**South Central EQC** - *Key Lake and MacArthur River mines*

Environmental Quality Committees (EQCs) with members of local communities and industry are currently working with the SERM Shield EcoRegion to assess all abandoned mine sites within the region, and to recommend remediation measures to ensure that the quality of the environment is safe for people, wildlife, and plants.

Figure 4.6 Mineral Claims Process



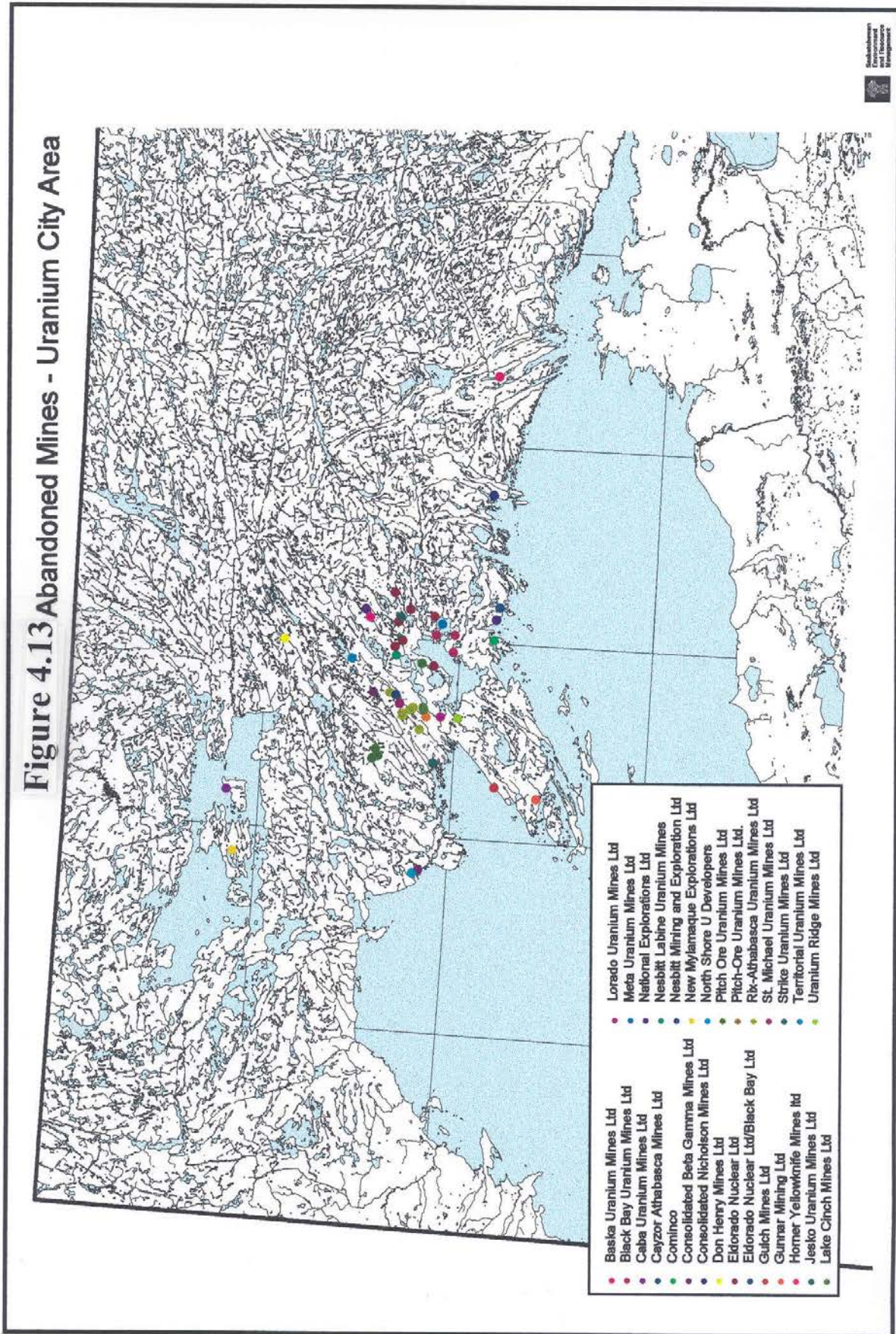
**Figure 4.12 – Map of Mineral Claims in the Athabasca Region**



The creation of the 3 EQCs - the Athabasca EQC, the West Side EQC, and the South Central EQC has also allowed communities to bring forward concerns and provide recommendations on the decommissioning of abandoned mine sites. The EQC initiative was established following a recommendation from the 1995 Federal-Provincial Panel on Uranium Mining in Northern Saskatchewan. The purpose of the EQC's, which are comprised of community members from 30 communities, is to learn about the industry and convey this knowledge to the communities. They also bring community concerns on mining to industry and government (EQC, 2000). The EQC's are administered by the Northern Mines Monitoring Secretariat of Saskatchewan Northern Affairs

The Uranium Mining Cumulative Effects Monitoring (CEM) Program was established in 1994 as part of the Government of Saskatchewan's and Government of Canada's response to recommendations of the Joint Federal/Provincial Panel on Uranium Developments in Northern Saskatchewan. The Program is administered by the Environment Section, of the Shield EcoRegion, of Saskatchewan Environment and Resource Management. The central focus of the program is to detect and evaluate cumulative effects of discharges from uranium mining operations in Northern Saskatchewan. To that end, sampling of key environmental components such as water, sediment, and fish takes place in three regions of Northern Saskatchewan: the west side of Wollaston Lake; the Cluff Lake area; and the Key Lake/McArthur River area. The Program continues to involve and inform northerners of its activities primarily through presentations to students in northern high schools, with the participation of EQC members and the assistance of the Northern Mines Monitoring Secretariat. On several occasions, students and EQC members have also accompanied and assisted CEM staff in the field for collection of samples.

**Figure 4.13 Abandoned Mines - Uranium City Area**





*Hand Drilling, Source: Darwin Parkinson*

### Mineral Exploration

Initial mineral exploration requires large land areas where the exploration activities have little impact on the landscape. Successive stages of exploration target progressively smaller areas where some impact on the landscape may occur. These stages of exploration require surface exploration permits issued by SERM, with specific regulations governing activities and the reclamation of disturbed sites. The following describes the general mineral exploration process:

1. Initial research to outline a region of interest, usually for a specific mineral deposit type. This may include:
  - Government geology and mineral reports and maps, assessment files, mineral deposit index, mineral disposition maps, etc.;
2. Regional "grassroots" exploration to define more specific areas of interest (thousands to hundreds of thousands of hectares).
  - Prospecting, reconnaissance geologic mapping, reconnaissance geochemical sampling (e.g. rock, soil, lake and stream sediment) and airborne geophysical surveying.
  - These activities take place over large areas and have little impact on the landscape.
3. The staking of mineral claims over specific areas of interest.
  - A mineral claim grants the holder the sole right to explore within the claim boundary.
  - Claim tags and registration forms must be acquired from the local mining recorder's office prior to the staking of the mineral claims.
  - Up-to-date mineral disposition maps from the mining recorder's office should be checked before any staking is done to ensure that there is not a conflict with existing dispositions or reserves.
  - The claims are rectangular in shape and are marked on the ground with four, tagged corner posts joined by cut and flagged lines.
  - The claims must be registered with the mining recorder's office.
4. Property-scale exploration to identify and define targets (hectares to hundreds of hectares).
  - A surface exploration permit from SERM is required before any of this work can be done on Crown land.
  - Typically the first step in property-scale exploration is the cutting by hand of a reference grid over the area(s) of interest.
  - The initial work may normally consist of geologic mapping, prospecting and rock sampling, geochemical sampling, and geophysical surveying.

- These activities have minimal impact on the landscape.
- If specific exploration targets or sites of mineralization are identified they will be examined in detail (scale of hectares).
- If the mineralization occurs at or near surface, the area is often trenched or stripped by hand or with equipment and sampled.
- The depth and length portion of surface mineralization and/or undefined geophysical or geological targets may be evaluated with diamond drill holes that produce cores of rock which can be examined, logged, and sampled.
- Other types of drilling such as reverse circulation may be used to sample poorly consolidated material.
- This phase of exploration typically has a significant impact on localized areas, as heavy equipment is commonly involved, and temporary access roads may be required.
- Reclamation of disturbed sites is required as necessary.



*Drilling into the shield,  
Source: Sask. Education*

5. Mineral deposit delineation program (hectares to tens of hectares).
  - In the very rare situation where significant mineralization is discovered, a delineation diamond drill program is carried out to define the dimensions and grade of the deposit.
  - Commonly other exploration activities are also conducted such as mapping, trenching, stripping, rock sampling, and geophysical surveying.
  - Several phases of **drilling** may be carried out. In the later stages of this delineation process underground exploration will also sometimes be conducted which requires the excavation of an exploration shaft or ramp.
  - Underground excavations may require the approval of an Environmental Impact Assessment (see Mining below).
  - Bulk samples often weighing hundreds of tonnes are commonly taken for metallurgical testing.
  - This stage of exploration involves a high level of surface disturbance on a small area (reclamation required).
  
6. Mining of the ore body (ten to a few hundred hectares).
  - In the rare situation where an economic ore body is found, mining may take place following a rigorous Environmental Impact Assessment (EIA) process that assesses environmental and societal impacts of the proposed development.
  - Mining will have a high impact on a small area, typically from ten to a few hundred hectares.
  - The EIA includes the requirements for rehabilitating the site following production.
  - The company posts a performance bond to guarantee the rehabilitation.
  - SERM and SNA develop and negotiate a surface lease for the mining operation which must be approved by cabinet

## 4.8.1 Mining Operations



*McArthur River Mine,  
Source: Diane McDonald*

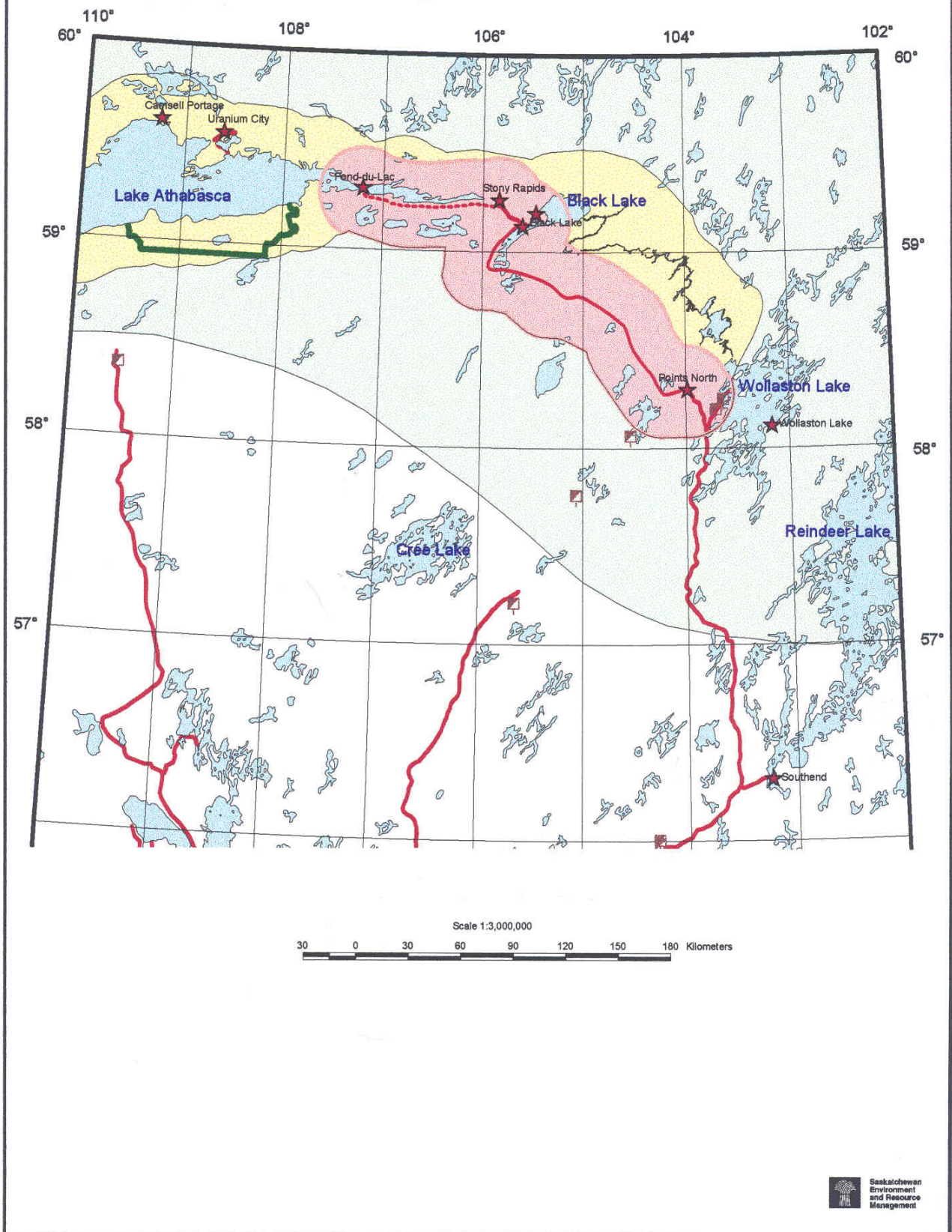
There are currently 6 mine sites operating in the region (Table 2, Figure 4.7). These include **McArthur River**, Cigar Lake, Key Lake, McClean Lake, Rabbit Lake, and Cluff Lake. Each mine site was involved in the exploration of the area prior to mine development, and filed an Environmental Impact Assessment and Statement with the provincial government according to the requirements of the Environmental Assessment Act. The Canadian Environmental Assessment Act also governs uranium mines

**Table 2 Highlights of Currently Operating Mines in the Athabasca Region**

| Mine                  | Owner(s)  | Operators                     | Discovered                                  | Operating Since                               | Notes   |
|-----------------------|---|-------------------------------|---|---|---|
| <b>McArthur River</b> | Cameco (69.8%)<br>COGEMA (30.2%)  | Cameco Corporation            | 1988 by Cameco                              | December 1999                                 | -annual production capacity of 6,900 tonnes of uranium (U3O8)   |
| <b>Key Lake</b>       | Cameco (83.3%)<br>COGEMA (16.7%)  | Cameco Corporation            | 1975 by Uranerz Exploration and Mining Ltd. | 1983  | -mining until 1999<br>-beginning in 2000, milled ore from McArthur River/ Key Lake  |
| <b>Cigar Lake</b>     | Cameco(50.0%)<br>COGEMA (37.1%)<br>Idemitsu Uranium Expl.Can. Ltd. (7.9%)<br>TEPCO (5.0%) | Cigar Lake Mining Corporation | 1981 by COGEMA                              | Test mining continues                         | -during first 12 years of operation, 57% of ore will be taken to Cameco's Rabbit Lake Operation and 43% will be taken to the McClean Lake Operation for milling |
| <b>Cluff Lake</b>     | COGEMA (100%)   | COGEMA                        | 1971 by COGEMA                              | 1980  | -mining and milling operations to be suspended in 2001<br>-currently filing decommission plans  |
| <b>McClean Lake</b>   | COGEMA (70%)<br>Denison Mines Ltd (22.5%)<br>OURD Canada Co.Ltd. (7.5%)                   | COGEMA                        | 1979  | Mining began in 1995<br>Milling began in 1999 | -the project, combined with the nearby Midwest project, will operate for 16 years   |
| <b>Rabbit Lake</b>    | Cameco (100%)   | Cameco                        | 1968 by Gulf Mineral Resources              | 1975  | -7 open pits closed (1984, 1991, 1996, 1997)<br>- one underground mine began in 1994  |

(adapted from Internet-8)

**Figure 4.14– Map of Operating Mines in the Athabasca Region**



**Figure 4.7 Operating Mines in the Athabasca Region**  
ATHABASCA BACKGROUND DOCUMENT

**Some traditional uses of forest resources:**

*Fish net floats* - et'áidzéré (Dene)  
*baskets* - t'ili (Dene)  
*snowshoes* - ay (Dene)  
*tipi poles* - nibáli (Dene)  
*meat drying racks* - dzi<sup>n</sup>lhtí (Dene)  
*hide stretcher* - edhé dechëné (Dene)  
*windbreaks* - ónuré<sup>n</sup>tthel (Dene)  
*toboggans* - beth chëné (Dene)  
*deadfall traps* - dachét'a<sup>n</sup> (Dene)  
*spring-pole snares* - xuíé (Dene)  
*toss-pole snare* - dalhá't'a<sup>n</sup> (Dene)  
*dragging pole snares* - bí<sup>n</sup>lh (Dene)  
*canoe* - Ts'I (Dene)  
 Api cheman (Cree)  
 (Marles, et al. 2000).

## 4.8.2 Traditional Uses

**Traditional uses** of forest plant species are numerous. Trees and plants have cultural uses including medicinal, ceremonial, and spiritual use. Many understory plants have very strong ties to human health and though some information can be obtained through books, much of the plant knowledge is passed on through oral teachings.

Traditional gathering grounds have been used for centuries to provide food for Athabasca region communities, these grounds also play an important role in the social structure of the community.

## 4.8.3 Timber Production

Timber production in the Athabasca region is not commercially viable. There have not been any commercial saw timber permits issued in the last 5 years for the region. (Pers. Comm., Flodell, 2001). Most people cut firewood for their own use. Timber permits are issued for small areas for commercial firewood. Exploration companies and contractors received timber permits from SERM for the construction of the Athabasca seasonal road and Fond-du-Lac winter road. Timber cutting for home construction, and local carpentry also occurs.

## 4.8.4 Non-Timber Forest Products

While there is little business in non-timber forest products in the Athabasca region, there is local trade, sale, and gift-giving of non-timber forest products (Pers. Comm., Flodell, 2001). Non-timber forest products include:

- gathered goods such as berries, herbs, mushrooms, medicinal plants
- **labour intensive goods** such as snowshoes, hide clothing articles cultural items

2001 was the first year that mushroom buyers operated in Athabasca.



*Labour Intensive goods,  
 Source: Sask. Education*

## 4.8.5 Other Uses

Forests and plants are a vital component of the ecosystem and provide a base for the food chain. Wildlife species rely on forests for food. Humans rely on the health of forests to provide them with animals to hunt. Pharmaceutical companies have been using forest plants for research in solving human health problems for a long time. Currently, little pharmaceutical research is happening in the Athabasca region.

## 5.0 Appendices

|     |   |    |
|-----|---|----|
| 1.0 | Appendices  | 62 |
|     | Appendix 1 Some land use and resource issues.....           | 63 |
|     | Appendix 2. Other agencies and organizations.....           | 76 |
|     | Appendix 3. Species inventory of the Athabasca region ..... | 83 |
|     | Appendix 4. List of references.....                         | 90 |

## **Appendix 1 Some land use and resource issues**

### **X1.1 Global Warming**

The Athabasca region is an ecological crossroad, where climate, soils, plants and animals from the Boreal Shield and the Southern Arctic ecozones meet. Climate change issues in the region include impacts on the environment, the economy and on the way people live both now and in the future.

Global warming is expected to lead to higher average air temperatures and changes in the amounts, seasons, and location of rainfall. These changes will affect terrestrial and freshwater habitats. An increase in the amount of greenhouse gases in the atmosphere could cause changes within the Athabasca region:

- Increased annual mean temperatures
- Decreased flows and levels in northern flowing rivers
- Rise in lake temperatures
- Reduced ice season in streams, rivers and lakes, or longer ice-free seasons
- Increased evaporation and transpiration
- Degradation of permafrost and accelerated release of methane and carbon dioxide from bogs and/or;
- Increased occurrence of catastrophic weather events such as severe thunderstorms, tornados, droughts and flooding" (SERM#5/01, 2001).

Ecosystem impacts may include the following:

- A change in species diversity as the climate becomes more suited for some species than for other species
- A change in climate could affect food and water availability to wildlife and humans
- An increase in forest fires along with more insects and a longer growing season
- An unstable climate could shift the balance between human activities and the ecosystem, thereby affecting individual and community health for all living things

Economic impacts may include the following:

- Expansion of economic activities (forestry, mining, and agriculture) could require expanded air, water, and land transportation
- Increased permafrost instability would increase road maintenance costs
- Fish populations and harvest levels could increase, as shrinking ice cover permits greater nutrient cycling
- Increased air temperatures will result in a longer season for summer construction activities; however, heavy construction that requires frozen ground would face a shorter season.

Traditional and Recreational Land Use impacts may include the following:

- Higher temperatures may lead to lower water levels in the lakes and thicker bush cover may make some Traditional travel routes more difficult to navigate and some recreation activities less pleasurable
- The boating season would be lengthened, but the water levels would make navigation more difficult

- Increased incidence of weak ice on lakes and rivers would lead to hazardous travel by snowmobile
- The grassland ecozone is also expected to shift north followed closely by the local wildlife
- Rapid climate change could mean that many plant and animal species are unable to adapt and may become endangered
- Warmer temperatures are expected to benefit the recreation and tourism industries
- Hunters and wildlife enthusiasts will more than likely follow the wildlife north or learn to hunt and view other forms of wildlife that move into the areas that the wildlife usually frequent" (SERM#5/01, 2001).

Scientific research has not identified how climate change might happen or the impacts climate change will have. However, there needs to be ecologically, economically, and socially safe ways to adapt to future climate change.

## **X1.2 Acid Precipitation**

Acid precipitation is well documented in areas such as northern Europe, northeastern United States and Ontario, Canada. Concern over the last 30 years for widespread acidification of lakes from the movement of acidic pollution in the air has lead research to identify the sensitivity of northern freshwater lakes to acid precipitation. In addition, industrial development of the Athabasca tar sands in Alberta has caused increased concern over the possible long term-effects of emissions.

Acid precipitation can be rain or snow and has a pH level less than 5.6 (Lockhart, 1981). Acid precipitation is mainly sulphuric and nitric oxides that have been converted to acids. They can be carried long distances by prevailing winds to fall as acidic rain, snow and fog droplets. Fossil fuel combustion, base metal smelting and electricity produced using coal are the human causes of acidic precipitation. There are also natural processes such as decomposition, volcanic activity and ocean processes which produce acidic precipitation. However, in North America approximately 90% of sulphur oxides and 95% of nitric oxides are human caused (Internet-13).

The impacts of acidic precipitation differ depending on the type and concentration of acidic content in water droplets, how they have been transported and regional sensitivity to the acidic precipitation (Lockhart, 1981). The lakes in the Athabasca region are classified as either moderately or highly sensitive to acid precipitation (Lechner et al, 1987). The buffering capacity of lakes in the Shield ecosystems is very low due to the dominant bedrock formations. The 'buffering capacity' is the ability of an ecosystem to offset the acidic effects of acid precipitation with naturally occurring alkaline chemicals (Lockhart, 1981). When an ecosystem cannot neutralize acid precipitation, the acidity builds up and forests, lakes, fish, wildlife and humans can be affected. An acidic environment can result in:

- Lower fish production increase in soil weathering process
- Highly acidic vegetation which enters the food chain through wildlife and human consumption
- Corrosion of building, archeologically significant sites, and public infrastructure such as sewer and water treatment facilities.

An acidic lake, below pH 5.0, will have little or no plant life, few to no invertebrate or fish populations, and wildlife will not use the lake for their survival. As the acidity of a lake increases, the reflection of surrounding trees on the waters surface becomes clearer because there is less living

material to diffract the sun's light - causing a clearer reflection. Crystal clear reflections with no outline diffractions are a sign of a 'dead' lake with a pH below 5.0 (highly acidic).

Acid precipitation is very mobile and given the sensitive nature of lakes within the Athabasca region (Canadian Shield) and their low buffering capacity, acid precipitation is a concern. However, the source of acid precipitation is not within the region. This has become a federal issue, and government, industry and non-governmental organizations are working to reduce sulphuric and nitric oxides emissions, which will also reduce the probability of acid precipitation affecting lakes in the Athabasca region.

### **X1.3 Abandoned Mines**

There are 45 abandoned mines in the Uranium City area and one abandoned mine north of Black Lake (Nisto). Figure 4.13 depicts the locations of abandoned mines in the Uranium City area. There is currently a major project underway to assess and inspect abandoned mine sites in northern Saskatchewan. The Abandoned Mines Assessment Program was implemented by SERM to inspect abandoned mine sites and identify and rank public safety risks and potential impacts that the sites may be having on the surrounding environment (KHS, 2001). The majority of these properties were abandoned in the 1950's and 60's when environmental reclamation and decommissioning were not legally required. The assessment project will be completed in 2001 and 2002. Inspections in 2000 resulted in 27 top ranked sites to identify public safety and environmental risks. Site inspections include the following assessment areas:

- General site information
- Raises and/or adits
- Mine de-watering activities
- Waste rock disposal area
- Tailings disposal area
- Additional containment works
- Drill holes
- Drill core (storage)
- Waste disposal sites (industrial, domestic and/or chemical)
- Buildings
- Residual chemicals on site
- Scrap materials

Based on assessment criteria for each inspection, a rating was given which will indicate a site's level of priority for reclamation and decommissioning. The rating system is designed to give clean-up priority to those sites with the highest public safety, health, and environmental risks. Table 3 highlights each of the abandoned mine sites, what development occurred there and the current site status, including any remedial work conducted. The 2001 report 'An Assessment of Abandoned Mines in Northern Saskatchewan' (KHS, 2001) details the inspection and provide recommendations on required reclamation activities.

Assessments were completed in 2000 at:

- Amax Athabasca Uranium Mines Ltd. - Showing No. 50-CC1-61
- Amax Athabasca Uranium Mines Ltd. - Showing No. 49-CC1-11
- Amax Athabasca Uranium Mines Ltd. - Showing No. 50-CC1-39

- Black Bay Uranium Mines Ltd.
- Cayzor Athabasca Mines Ltd.
- Consolidate Beta Gamma Mines Ltd.
- Eldorado Nuclear Ltd. - Eagle Mine
- Lake Cinch Mines Ltd.
- Cenex Mines Ltd.
- Lorado Uranium mines Ltd. (Mine Site)
- Meta Uranium Mines Ltd.
- National Explorations Ltd. - Keiller Adit
- National Explorations Ltd. - Pat Claim, C Zone
- Nesbitt-Labine Uranium Mines Ltd. - ABC Mine (Site 1)
- Nesbitt-Labine Uranium Mines Ltd. - ABC Mine (Site 2)
- Nesbitt-Labine Uranium Mines Ltd. - Eagle Mine
- Nisto Mines Ltd.
- Pitch-Ore Uranium Mines Ltd.
- Rix-Athabasca Uranium Mines Ltd. - Smitty Mine
- Rix-Athabasca Uranium Mines Ltd. - Zone 62
- Rix-Athabasca Uranium Mines Ltd. - Leonard Mine
- Rix-Athabasca Uranium Mines Ltd. - No. 10 Adit
- St, Michael Mines Ltd.
- Strike Uranium Mines Ltd.
- Uranium Ridges Mines Ltd.
- Waste Disposal Site #1 - Cayzor Area
- Waste Disposal Site #2 - Lorado Mill Area
- Anglo-Rouyn Mines Ltd.
- Western Nuclear Mines Ltd.

Table 3 List of abandoned underground exploration/mining sites in the taiga shield ecozone

| Mine Company   | Mine Name *                                       | Location                         | Latitude          | Longitude          | Site Development **  | Remedial Work Conducted/Current Site Status   |
|--|---|----------------------------------|-------------------|--------------------|--|---|
| Amax Athabasca Uranium Mines Limited                       | Showing No. 50-CC1-61                             | South of Bertha Lake             | 59-33             | 108-42             | Short adit developed. May have residual ore on site.               | Adit plugged and sealed in 1979/80. Site assessment conducted in 2000.  |
| Amax Athabasca Uranium Mines Limited                       | Showing No. 50-CC1-39                             | Bertha Lake Area                 | 59-33             | 108-42             | Surface trench.  | Site assessment conducted in 2000.  |
| Baska Uranium Mines Limited                                | Dot Claims, Zone No, 103                          | Virgin Lake Area                 | 59-37-00 to 38-10 | 108-26-20 to 27-50 | 2 openings. Ore probably remains on site.                          | 1 adit and 1 raise open. Inspected in 1977-78.  |
| Black Bay Uranium Mines Ltd.                               | Black Bay Uranium Mine                            | Murmac Bay Area                  | 59-29-25 to 30-30 | 108-27-00 to 31-45 | 2 raises, 1 trench and 1 adit.                                     | Openings fenced and sealed with a drill steel/chain link fence grate. Site assessment conducted in 2000.  |
| Caba Uranium Mines Limited                                 |   | Tazin Lake - Dewdney Island      | 59-47-27          | 108-54-30          |  | Small shaft on lake edge.   |
| Cayzor Athabasca Mines Limited                             | Cayzor Mine                                       | Jean Lake                        | 59-34-35          | 108-38-20          | 1 main shaft.  | Surface debris, including steel and a generator, spread around site. Waste rock pile on site. Site assessment conducted in 2000.                              |
| Consolidated Beta Gamma Mines Limited/Lavant Mines Limited | Beta Gamma Mine (Chum Claims, Zones Nos. 1 and 2) | Bellegarde Lake Area             | 59-35-30 to 37-00 | 108-38 to 40       | 1 shaft. 500 to 1000 tonnes of waste rock at the site.             | Small shaft opening. Inspected in 1977-78. Site assessment conducted in 2000.   |
| Consolidated Beta Gamma Mines Limited                      | Tena Claims                                       | Lake Athabasca - Island Bay Area | 59-32-00 to 32-30 | 109-03-20 to 05-00 | Surface trenches. 1 prospect pit. 1 mineshaft.                     | 2 openings on surface. Inspected in 1977-78.  |
| Consolidated Nicholson Mines Limited                       | Zones 1, 2 and 4                                  | Nicholson Bay Area               | 59-27-10 to 27-45 | 108-25-10 to 26-15 | Three separate sites. A shaft was developed at each site.          | Remedial work conducted in 1989. Steel grate used to secure 2 vertical raises as well as 1 adit. 3 shafts capped with concrete and 2 adits covered with rock. |
| ***Cominco   | Box Mine  | Lake Athabasca - near Neiman Bay | 59-27             | 108-29             | Gold mine. Underground development. Structures and debris on site. | Site in need of reclamation and decommissioning. New mine development plan undergoing Environmental Assessment.   |
| Don Henry Mines Limited                                    |   | Gatzke Lake Area                 | 59-43-30 to 44-30 | 108-31 to 33       |  | Inspected in 1999. 1 open adit. Steel debris and 205 L (45 gal) drums on site.  |
| ***Eldorado Nuclear  | Beaverlodge                                       | Beaverlodge Lake                 | 59-32 to 35       | 108-23 to 36       | Shafts, structures, waste  | In decommissioning mode, Cameco is  |

| Mine Company  | Mine Name *  | Location                       | Latitude          | Longitude          | Site Development **   | Remedial Work Conducted/Current Site Status   |
|---|--|--------------------------------|-------------------|--------------------|---|---|
| Limited   | (Ace-Fay, Verna, Dubyna, Hab, Bolger, Martin Lake, Eagle, Shaft Lake and Bar 5-9 Claims) | Area                           |                   |                    | rock and tailings.  | administrator.  |
| ***Eldorado Nuclear Limited/Black Bay Uranium Mines Ltd.      | Fish Hook Bay Mine   | Fish Hook Bay Area             | 59-26             | 108-25             | At least 1 shaft and 1 adit developed.  | In decommissioning mode, Cameco is administrator.   |
| Gulch Mines Limited   | Gulch Mine (Gulch Zone)  | Lake Athabasca - Grunchy Point | 59-25-00 to 28-30 | 108-47-30 to 55-20 | 1 main site. Possibly other small sites. At least 1 adit.                                 | Open adit on the side of a cliff. Debris on the surface. Site assessment conducted in 2000.   |
| Gunnar Mining Limited   | Gunnar Mine  | Lake Athabasca                 | 59-23-11          | 108-52-48          | Open pit and underground mining.  | Federal/provincial negotiations are underway for clean-up. Public safety, radiation and chemical environmental hazards. Tailings, waste rock and buildings remain at the site.              |
| Homer Yellowknife Mines Limited and Nu-Age Uranium Mines Ltd. |  | Mathew Lake Area               | 59-26-45          | 107-47-25          | Unknown development.  |   |
| Jesko Uranium Mines Limited                                   | Car Claims, Showing No. 50-NN-31   | Lake Athabasca - Griffith Bay  | 59-30-50 to 32-30 | 108-48-30 to 50-30 | 1 inclined prospect/mine shaft developed.   | Approximately 4.5 m to water. May not be a public safety hazard.  |
| Lake Cinch Mines Limited                                      | Lake Cinch Mine and River Zone (Cenex Property)  | Cinch Lake Area                | 59-32-32          | 108-40-02          | 2 sites. At least 1 shaft at the Chinch Mine. At least 1 entrance at the River Zone site. | Remedial work conducted in 1989. 3 shafts filled with crushed rock and sealed with grates. 1 fuel tank and bridge remain. Crushed ore stockpile present. Site assessment conducted in 2000. |
| Lorado Uranium Mines Ltd.                                     | Lorado (Mill Site)   | Nero Lake                      | 59-31-33          | 108-41-45          | Milling site.   | Federal/provincial negotiations are underway for clean-up. Some remaining radioactive and chemical hazards to environment. Tailings and some foundations remain.                            |
| Lorado Uranium Mines Ltd.                                     | Lorado (Mine Site)   | Beaverlodge Lake - Hanson Bay  | 59-29-33          | 108-39-18          | Underground mining. 1 main shaft. Waste rock  | Site assessment conducted in 2000.  |

| Mine Company                                   | Mine Name *  | Location                                       | Latitude          | Longitude          | Site Development **   | Remedial Work Conducted/Current Site Status   |
|--|--|--|-------------------|--------------------|---|---|
| Meta Uranium Mines Limited                     |  | Beaverlodge Lake - Umisk Island                | 59-31-46          | 108-29-03          | 1 adit and 1 shaft. Surface exploration also conducted.                             | Openings fenced and sealed with a drill steel/chain link fence grate. Site assessment conducted in 2000.  |
| National Explorations Limited                  | National Explorations Mine (Pat Claims, C Zone and Keiller Adit) | Donoldson Lake Area                            | 59-36             | 108-27             | 1 main shaft and at least 1 adit.   | In 1994/95 cement used to secure main shaft and raises filled with rock. Keiller adit not filled and remains open. Site assessment conducted in 2000.   |
| Nesbitt Mining and Exploration Limited         |  | Reed Bay Area                                  | 59-29-56          | 108-06-10          |   | 1 open adit. Fuel tank and generator on site. Site assessment conducted in 2000.  |
| Nesbitt Labine Uranium Mines Limited           | Eagle Mine   | Eagle Lake Area                                | 59-34-28          | 108-29-23          | 1 shaft and 2 adits.  | Remedial work conducted in 1989. Openings filled with rock. Some slumping in area of old shaft or vent raise. Site assessment conducted in 2000.        |
| Nesbitt Labine Uranium Mines Limited           | ABC Mine   | Melville Lake                                  | 59-34-09          | 108-32-06          | 2 sites. 1 shaft and 1 adit. Surface trenches developed.                            | Remedial work conducted in 1989. Adit entrance filled with rock. Shaft secured. Adit now open   |
| New Mylamaque Explorations Limited             |  | Tazin Lake - Liard Island                      | 59-47-00          | 109-05-30          |   | 1 open adit.  |
| Nisto Mines Limited                            | Nisto Mine   | Black Lake - Fir Island - Chicken Reserve #226 | 59-13-15          | 105-25-45          | 2 main adits and stope.   | Site rehabilitation completed in 1999.  |
| North Shore U Developers                       |  | Lake Athabasca - Island Bay Area               |                   |                    | High-grade ore mining by Consolidated Beta Gamma Mines Ltd. site. Surface trenches. | Inspected in 1977-78.   |
| Pitch-Ore Uranium Mines Limited/Albex Minerals |  | Martin Lake Area                               | 59-31-30 to 32-30 | 108-32-30 to 34-30 | 2 adits and 1 main trench.  | Adit and raise sealed in the 50's/60's. Remedial work conducted in 1989. Adit sealed with crushed rock. Site assessment conducted in 2000.              |
| Pitch-Ore Uranium Mines Limited                | Orb Claims, Zone No. 6 A   | Augier Lake Area                               | 59-32-42 to 36-27 | 108-46-36 to 47-28 | 1 inclined shaft.   | Approximately 300 tonnes of waste rock on site. Last inspected in 1977-78   |
| Rix-Athabasca Uranium Mines Limited            | Leonard Mine and No. 10 Adit                                     | Bertha Lake Area                               | 59-33-12 to 33-50 | 108-40-12 to 41-26 | 4 levels. 2 main adits.   | Adits near the bottom of the hill sealed in 1979/80. At least 2 openings to the surface (raise and 1 other opening). Site assessment conducted in 2000. |

| <b>Mine Company</b>         | <b>Mine Name *</b> | <b>Location</b> | <b>Latitude</b>   | <b>Longitude</b>   | <b>Site Development **</b>   | <b>Remedial Work Conducted/Current Site Status</b>                                      |
|-----------------------------|--------------------|-----------------|-------------------|--------------------|--|---|
| Uranium Ridge Mines Limited | Pitchie Claims     | Hason Bay Area  | 59-29-00 to 30-00 | 108-40-00 to 41-00 | Extensive drilling and surface test work conducted. At least 1 adit and 1 deep surface trench developed. | Adit sealed. Ground subsidence observed in one area. Site assessment conducted in 2000. |

## Notes:

- \* Some of the sites may contain more than one development, such as separate adits or shafts, but have been combined within this table due to their proximity and mutual ownership.
- \*\* The data on site development was primarily obtained through literature research and may not include all public hazards, openings or other remains at the property. All of these developments are uranium exploration/mine sites unless noted.
- \*\*\* These sites are not abandoned but have been included within this list because they are older developments that have not been completely decommissioned or reclaimed.

## Data Sources:

- "Uranium Deposits of the Athabasca Region (NTS Area 74N, 74O, 74P)" (L.S. Beck - Saskatchewan Mineral Resources, 1969)
- "Rocks and Minerals for the Collector" (Ann Sabina - Geological Survey of Canada - Miscellaneous Report 42, 1987)
- "Abandoned Mine site Cleanup" Saskatchewan Environment and Public Safety Files (1989)
- "Abandoned Mines Remedial Action Program - 1989 Annual Report" (Saskatchewan Environment and Public Safety)
- "High-grade and Mine Site Environmental Inspections, Uranium City Area - 1976, 1977" (G.A. Mueller)

## **X1.4 Ecological Health and Mining**

Scientists, academics, and local people have a concern for the impacts of mining on the environment and how mining affects the health of the community and its individuals. Some research has been conducted to determine if the environment has been contaminated. When there is a known and confirmed source of contamination, reports are produced and circulated to provincial, municipal and First Nations government. This section highlights some reports of environmental contamination testing; more research is required to provide summaries of all contamination testing in the region.

Under the Canadian Environmental Assessment Act, all mine developments must have a plan for how they will set up, operate, clean-up and monitor the mine site. The environmental assessment report contains a resource history of the area, potential impacts of mining development, and mitigations to decrease any impacts (to below recommended levels). The environmental impact statement is then written and released for review. It is in the environmental impact statement that contingency plans for accidents, spills and other emergencies are described. The environmental impact statement is like a guideline for the development, operation and closing of a mine.

An ecological impact of mining that has received attention from researchers is the presence of radionuclides and trace elements in the environment and potential impacts of those elements on ecosystem, wildlife and human health. The following information provides a summary of current studies of radionuclide levels in the ecological system.

A report published in March of 1999 discussed the presence of Radionuclides and Trace Elements in Moose and other Meat Sources from Northern Saskatchewan. The report was prompted by concerns over the uranium mining industry in northern Saskatchewan. Samples were obtained in 1995 from the Hudson Bay area and in 1998 from the Wollaston Lake area. As monitoring of radionuclides and trace elements in moose and other meat sources for northern Saskatchewan did not begin until 1995, there is little data to compare results. Successful monitoring requires controlled sampling results to compare future sampling results to. In this way, any changes in the levels of radionuclides and trace elements are recorded. In this case, there were no controlled sample results taken before uranium mining began in the area and so comparative analysis is difficult. The 1995 sampling included testing for radionuclide and trace elements in nine moose livers collected from the Hudson Bay area. Limited sampling in 1998 included testing for radionuclides and trace elements in the bone, liver, kidney, muscle and rumen contents of seven moose collected in the Wollaston Lake area, two cattle collected in the Saskatoon area, and assorted cattle, deer and buffalo tissues.

The results of the testing are not conclusive as the sample size is too small draw any major conclusions. However, the existing data can be referred to visualize any possible trends. Continued testing will provide an indication of radionuclide and trace element levels in moose and other meat sources. The results from testing will assist resource managers in monitoring the impacts of uranium mining on wildlife. "Many contaminants were below the detection limits as analyzed by the Saskatchewan Research Council, including nickel and mercury. The most noticeable trends were: 1) higher U (uranium) levels in moose relative to cattle tissues; 2) higher <sup>226</sup>Ra (radium) concentrations in bone and liver from the Wollaston moose versus the other animals; 3) high <sup>210</sup>Pb concentrations in the two Wollaston moose closest to the mines, which may be due to laboratory error; and 4) higher cadmium, iron, strontium, titanium, and lower zinc

levels in the moose versus the cattle. The liver from the youngest moose from Foster Lake had considerably lower trace element concentrations than the older moose. The analyzed contaminant levels are within safe levels and are not an indication that consumption is unsafe. The data does not conclude a difference in contaminant levels between moose near mine sites and those far away from mine sites. A larger sample size is needed to make those conclusions.

The impact management agreement made in June 1999 between Cameco, Cogema, and the Athabasca First Nations Communities, also specifies a process of community-directed environmental monitoring for radionuclide levels, and other testing as communities require. As of June 2002, Athabasca Working Group (AWG) has done two rounds of lake radiation testing, as well as moose and lynx flesh testing. Although results were not available for this document, no significant levels of radiation were found in any samples (pers. comm., John Tosney). Contact local AWG representatives for copies of the report.

From 1955 to 1964 the Gunnar Uranium Mine produced about  $5 \times 10^6$  tonnes of waste rock tailings (Waite et al, 1998). Large quantities of tailings entered Langley Bay when the retainment dam was destroyed. Additional material continues to leach into the Bay from the upslope tailings area. The material consisted of a slurry of untreated acidic wastes (Waite et al, 1998). Radionuclide (uranium, radon, lead) levels in the Bay are reported to be much higher in the lake bottom sediment than in the control study areas (also on Lake Athabasca). This results in occasional high radionuclide levels in the water when the sediment bottom is stirred up (resuspension). These radionuclides and heavy metals are available for ingestion and absorption by plants, invertebrates and fish. Whitefish in Langley Bay were found to have higher radionuclide levels than whitefish in the control areas (and also the highest levels of any other fish tested in Langley Bay). Compared to whitefish, pike had much lower concentrations of radionuclides present. This could be because the pike are more likely to feed outside the Bay. It has also been suggested that the whitefish are more restricted in their movements, which would explain the higher concentrations of radionuclides in that species.

The Uranium Mining Cumulative Effects Monitoring Program was established in 1994 resultant from the 1993 Joint Federal/Provincial Panel on Uranium Developments in Northern Saskatchewan. The program is designed to conduct monitoring research on the ecological impacts of contaminants in uranium mining. In 1997, Wollaston Lake, Cluff Lake, Key Lake and Regional monitoring stations collected fish, water, sediment, lichen, and spruce grouse samples. For the Wollaston Lake area there was reported a slight increase in radionuclide levels. Reports conclude that more study is needed to examine the ecological/biological significance of higher radionuclide levels on the health of sediment dwelling organisms. Study areas on Wollaston Lake included Horseshoe Creek, Collins Bay, Pow Bay, Hidden Bay, and the Link Lakes Creek outlet.

## **X1.5 Some issues of public concern**

Athabasca people raised the following concerns about the land and resources in community and advisory panel meetings between January and April 2001. Consultation about issues and possible solutions with industry and communities has been ongoing. Please contact us for updated information.

Non-traditional caribou hunters:

- Increased traffic of non-traditional caribou hunters on the caribou range increases the threat to natural movements of the caribou herds, to caribou habitat and the livelihood of traditional caribou using people in the region. Specifically,
- Non-traditional caribou hunters are not causing the herd to decline now, but may contribute to a decline in the future;
- There are many more Treaty and Metis people with caribou hunting opportunities south of the caribou range than the caribou herds could stand;
- More and more hunters will use the Athabasca Seasonal Road;
- That increased hunting and associated disturbance could eventually lead to the herds no longer using portions of their range in Saskatchewan;
- That this would impact all hunters as non-traditional caribou hunters would no longer be able to hunt caribou, and the traditional caribou users would have much farther to travel to hunt;
- Action should taken now to prevent future problems before they happen
- Non-traditional hunters are not experienced in local landscape and conditions - safety issue
- Many non-traditional caribou hunters lack respect for Dene traditions such as:
  - Hunting practices
  - Butchering
  - Communication
  - Use of the whole animal, not just part
  - Traditions also apply to moose hunting
- Need to respect Aboriginal rights of non-traditional hunters
- Concern about sustaining herd numbers, by not taking too many, hunters shouldn't be able to fly in
- Opposition to satellite tracking methods

Roads and Trails:

- Risk of overhunting if the caribou move through the road corridor in the future;
- Athabasca people say that they are not informed about many proposals for new roads & trails before they're built, and have little opportunity for input.
- Road erosion can stop fish spawning and reduce fish numbers.
- Risk of man-made fires along the seasonal road
- More funding needed to upgrade the road to an all season road to Fond du Lac, right now it is more of a trail than a road
- Roads appearing on the side of the Seasonal Road may create future problems
- People are taking caribou meat down the road to sell illegally in the south

Fire related issues:

- Fires are destroying large trapping areas in the region, creating long term hardship on traditional users and trappers
- Fires is destroying large areas of important barren-ground caribou habitat, causing concern about possible impacts on the yearly migration

- Fires impacts traditional Dene land and land uses
- Loss of traditional hunting and trapping areas
- Compensation issue – other provinces compensate for fire damage to trappers, why not Saskatchewan?
- Need more protection and local employment (suggested solution: fire detection towers used by SERM could protect the area and employ local people)

#### Mining related issues:

- Concern about the environmental impacts of development activities, e.g. waste rock trucking into MacLean Lake? Radiation levels in water and disturbed ground.
- Concern about spills of toxic materials at mines
- Mining companies make a lot of money off the land, but the people living there see very little revenue from the exploitation of their resources.
- Concern about important cultural areas and impact of mine exploration and extraction; eg. Pine Channel, old Beaver Lodge site
- Little or no consultation is happening for mineral exploration in Athabasca.
- A concern was also noted about mineral exploration activities in the Riou Lake area (phase 1 planning area) and the negative impacts these activities are having on trapping area. Affects hunting and trapping for food, and also takes away from the only income the affected trapper can earn.
- There is a concern about the environmental impacts mining is having on wildlife
- Lack of economic benefits to local communities from developments in their homelands (e.g. total of three people from Wollaston employed at Rabbit Lake, no revenue sharing, very small amount of compensation for intrusion and impact on local land users)
- Fish deformities seen in Wollaston lake area – elders question if it is associated with nearby uranium mining on the west shore of the lake.
- Concern about environmental contamination and surface waste from the large number of abandoned mine sites in the region
- Concern as to whether or not SERM is cleaning up the abandoned mine sites

#### Fishing related issues:

- Competition for lakes between outfitters and commercial fishermen
- Majority of benefits from outfitting flow outside of the people in the region
- Concern about the impact on fish numbers from outfitting camps
- Very low level of local employment / business development in outfitting
- If catch and release (CR) programs not practiced correctly it ends up hurting or killing the fish, which defeats the purpose of CR designated lakes
- Lakes in Athabasca are cold-water lakes that regenerate very slowly
- SERM put CR designations on most lakes on the new Athabasca seasonal road, but barbs are still allowed. Increasing traffic (including industry) is a huge risk to fish resources in this road corridor. Some people are keeping the fish, others are killing them anyhow by poor fish handling.

#### Sensitive Areas:

- Pine Channel is important to protect from mining activities
- Proposed development for a goldmine at the old Beaver Lodge site, this is sacred ground

Widespread opposition to SERM's Representative Area Network (RAN) program in every Athabasca community, associated with the following:

- Mineral development can continue in RANs, which defeats the purpose of protecting representative areas
- The areas being selected ignored local aspirations to protect significant areas.
- Chosen RAN areas in Athabasca are more a reflection of low mineral potential areas, rather than areas of environmental significance.
- Concern that traditional pursuits might not be allowed and local economic development might be prevented
- Areas designated by SERM and not locals,
- Athabasca people felt they were being dictated to, rather than consulted. Consultation was 'after-the-fact'.
- Athabasca people say that they clearly stated to SERM their lack of support for the RAN designations, yet they heard the minister announce on the radio that local people were in favour of the program.

#### Trapping:

- Some areas are without wildlife because of poison program in past years
- Some individual trappers (European) are still using poison to trap animals
- Conflict between mineral exploration companies and traditional users
- Some fur blocks are closed to new members, even though new members have a long history of trapping in the area - people say it infringes upon treaty obligations.
- Federal Gun registration laws make it extremely difficult for Athabasca trappers to acquire ammunition to carry out their hunting activities

#### Other:

- Conflict over access / Boat ramp development areas around Cree River crossing
- Lack of designated rest areas and campsite areas along the road – man-made fire hazard, safety issues
- Sewerage pollution from cabins (Anun lake & several others)
- Expropriation of natural & cultural resources by outside groups & businesses
- More funding needed to convert the seasonal road to Fond du Lac into an all season road
- People from the Westside are cutting down trees in the Athabasca region.
- Forest product companies in our region cutting down trees without our knowledge and involvement
- ATV/Skidoo commercial venture taking place in the Athabasca Sand Dunes

## Appendix 2. Other agencies and organizations

The following is a listing of federal, provincial, municipal, First Nations, Metis and local governance groups that may have a role in land use planning for the Athabasca region.

### Local Boards / Agencies

| Department/Agency  | Mandate / Responsibility   | Contact   |
|--|--|---|
| Athabasca Economic Development and Training Corporation                          | To facilitate and coordinate economic and training activities within the Athabasca Region that support increased job and business creation, economic development sensitive to local priorities, partnerships that improve the delivery of senior government programs and other agencies, improved environment for business and economic development, and building and expanding the human resource capacities of the local people.   | Jeoff Gay<br>(Hatchet Lake)<br>633-2050   |
| Athabasca Environmental Quality Control  | To provide a forum through which information from the government and the mining companies are made available to communities, and a forum for communities to ensure their comments on uranium mining to both government and industry are brought forward.   | Northern Mines Secretariat<br>(La Ronge)<br>1-800-577-2668                                  |
| Athabasca Health Authority   | The Athabasca Health Authority's (AHA) mandate is to create a place to heal northern people by: providing comprehensive health services in an integrated and holistic manner; to provide equal access to quality services comparable to provincial and federal standards in a culturally appropriate manner; to be an effective community-based organization wherever possible; and to promote partnership between the AHA and its peoples for excellence and sustainability in health care. | Dr. James Irvine<br>(La Ronge)<br>(306) 425-8585  |
| Athabasca Working Group  | The Athabasca Working Group was formed to address mining issues including: jobs; training and business; environmental protection; & benefits to the communities.   | Jamie McIntyre<br>(Saskatoon)<br>(306) 956-6337   |
| Beverly-Qamanirjuaq Caribou Management Board                                     | 'To safeguard the caribou of the Beverly and Qamanirjuaq herds for traditional users who wish to maintain a lifestyle that includes the use of caribou, as well as for all Canadians and people of other nations' (BQCMB, 1996) and to make recommendations and develop programs for the conservation and management of the caribou herds and their habitat (BQCMB, 1999).   | Jimmy Laban<br>(Black Lake)<br>284-2044<br><br>Tim Trottier<br>(La Ronge)<br>(306) 425-4237 |
| Keewatin Career Development Corporation  | The Keewatin Career Development Corporation is a non-profit organization of career service providing agencies for Northern Saskatchewan. The goals of the organization are to use technology to support career services and to expand the application of technology to education, commerce, health, and other services.  | (Air Ronge)<br>(306) 425-4778   |
| Northern Fur Areas<br>(N10, N18, N22, N23, N24, N26,<br>N50, N57, N68, N80, N93) | N-22 Brian McDonald<br>N-23 Billy Shott<br>N-24 Martin Robillard<br>N-50 George McDonald<br>N-57 Mervin Adam<br>N-80 Jimmy Sayazie   |   |

| <b>Department/Agency</b>   | <b>Mandate / Responsibility</b>  | <b>Contact</b>                               |
|--|--|--|
| Northern Fur Conservation Association                                      |  |  |
| Northern Medical Services  | Northern Medical Services (NMS) is affiliated with the University of Saskatchewan. Its role is to act as a liaison with health-care personnel, local community committees, and other agencies to provide equitable, accessible services to northern communities. NMS works cooperatively with District Health Boards and Tribal Councils to provide health-care services to northern communities.  | Kerri Balon<br>(Saskatoon)<br>(306) 665-2898 |
| Saskatchewan Association of Northern Communities - New North Services Inc. | The Saskatchewan Association of Northern Communities is organized to promote the interests and action on behalf of northern communities of the Northern Administrative District of Saskatchewan by: promoting fair and equitable policies and procedures for all northern communities; providing leadership to raise awareness of northern community issues; supporting existing and future community initiatives; capacity building of northern peoples and communities; creating job opportunities for northern peoples; developing physical and organizational infrastructure; and encouraging investment into training strategies and opportunities. | Stacey Lasas<br>(La Ronge)<br>(306) 425-5505 |
| Saskatchewan Mining Association  | To provide internal communications to the public about developments in the mining industry; to act as government liaison regarding the establishment of sound policies, laws, and regulations; to promote public education and awareness to the benefits of the mining industry in Saskatchewan.   | Phillip Reeves<br>(Regina)<br>(306) 757-9505 |

### Aboriginal Governance Agencies

| <b>Department/Agency</b>                  | <b>Mandate / Responsibility</b>  | <b>Contact</b>                  |
|---|--|---------------------------------|
| Black Lake First Nation                   |  | Chief Victor Echodh<br>284-2044 |
| Fond-du-Lac First Nation                  |  | Chief Eddie Martin<br>686-2102  |
| Hatchet Lake First Nation                 |  | Chief Louie Josie<br>633-2003   |
| Prince Albert Grand Council               |  | Peter Brook<br>(306) 953-7217   |
| Federation of Saskatchewan Indian Nations | The mandate of FSIN is to protect Treaty Rights and treaties; foster the progress of economic, education, and social endeavours of Indian peoples; promote cooperation with civil and religious authorities; adhere to democratic procedure; and promote respect and tolerance for all people. | (Saskatoon)<br>(306) 665-1215   |

| <b>Department/Agency</b>               | <b>Mandate / Responsibility</b>  | <b>Contact</b>  |
|--|--|---|
| Assembly of First Nations              | The Assembly of First Nations is the national representative organization of the First Nations in Canada. They represent First Nations in areas such as Aboriginal and Treaty Rights, economic development, education, languages and literacy, health, housing, social development, justice, taxation, land claims, and environment.   | Head Office<br>(Ottawa)<br>(613) 241-6789<br><br>Sask Office<br>(Saskatoon)<br>(306) 956-6916 |
| Metis Nation of Saskatchewan           | The goals of the Metis Nation of Saskatchewan are: to restore Metis lands and resources for future generations; to achieve full recognition of the Metis Nation and its jurisdiction within the Canadian federal system; to seek cooperative relations with other Canadian governments and peoples; to promote cultural, social, economic, and political progress and prosperity for Metis peoples; to achieve self-sufficiency for Metis people and institutions; to maintain and promote respect for individual Metis rights and freedoms; and to maintain the independence and integrity of the Metis Nation. | Wilf Blondeau<br>(Saskatoon)<br>(306) 343-8285  |
| Saskatchewan Treaty Association (FSIN) | The Saskatchewan Treaty Association (FSIN) is mandated to enter into appropriate arrangements for the implementation of the treaties and for recognition of First Nations jurisdiction.  | Daryl McDonald<br>(Saskatoon)<br>(306) 665-1215   |
| Office of the Treaty Commissioner      | The Office of the Treaty Commissioner provides a forum and process to facilitate a common understanding between the Federation of Saskatchewan Indian Nations and the Government of Canada on Treaty Rights and jurisdiction in the areas of: child welfare; education; shelter; health; justice; Treaty annuities; hunting, fishing, trapping and gathering; and other issues as raised.  | (Saskatoon)<br>(306) 244-2100   |

### **Municipal Government Departmental Organizations**

| <b>Department/Agency</b>               | <b>Responsibility</b> | <b>Contact</b>               |
|--|-----------------------|------------------------------|
| Northern Settlement of Camsell Portage |                       | Clara Larocque<br>498-5786   |
| Northern Hamlet of Stony Rapids        |                       | Georges Mercredi<br>439-2173 |
| Northern Settlement of Uranium City    |                       | Glen Thomson<br>498-3881     |
| Northern Settlement of Wollaston Lake  |                       | Terry Daniels<br>633-2165    |

### Provincial Government Departmental Organizations

| Department / Agency                          | Branch                             | Responsibility  | Contact  |
|--|------------------------------------|---|--|
| Environment and Resource Management          | Stony Rapids Field Office          | Enforcement and compliance.<br>Forest Fire Management<br>Permits and licenses for using crown land  | George Bihun<br>(Stony Rapids)<br>(306) 439-2062   |
|  | Environmental Assessment Branch    | Conducts provincial review and branch approval of environmental impacts of proposed developments.   | Larry Lechner<br>(Regina)<br>(306) 787-5786  |
|  | Sustainable Land Management Branch | Develops provincial land management plans, policies and programs.<br><br>Coordinate land use planning initiatives.  | Simon Kearney<br>(Prince Albert)<br>(306) 953-2621   |
|  | Shield EcoRegion                   | Delivers SERM programs in the northern part of the province from Creighton to Pinehouse and north of Clearwater Park to the NWT and Alberta borders.<br>Programs are: environment, forestry, crown land, fisheries, wildlife, forest fire, parks and enforcement. | John Schisler<br>Director (La Ronge)<br>(306) 425-4231<br><br>Dianne Allen<br>(La Ronge)<br>(306) 425-4234 |
| Agriculture and Food                         |                                    | Promotes sustainable use of lands and resources used for agricultural production.   | Lynette Hepper<br>(Regina)<br>(306) 787-5273   |
| Education                                    | Northern Regional Office           | To facilitate and coordinate the delivery of approved curriculum and instruction, and special education programs.<br><br>To monitor overall performance of K-12 education in provincial schools in the region.  | Glenn McKenzie<br>(La Ronge)<br>(306) 425-4382   |
| Post-Secondary Education and Skills Training | Northern Regional Office           | The mandate of the Department is to advance the societal, economic and personal well-being of Saskatchewan people by ensuring the availability of post-secondary, skills training and labour market programs.   | Earl Cook<br>(La Ronge)<br>(306) 425-4382  |

| Department / Agency                    | Branch                                     | Responsibility  | Contact                                     |
|--|--|---|---|
| Energy and Mines                       |  | <p>Management of the Crown mineral and oil and gas resources through legislation and related policies.</p> <p>Issuance of mineral and oil and gas dispositions for exploration and development.</p> <p>Collection of fees and royalties for the Province.</p> <p>Research, collection, organization, and distribution of information on the geoscience, non-renewable resources, and exploration and production activity for the Province.</p> <p>Promote full and responsible development of Saskatchewan's energy and mineral resources.</p>  | Murray Rogers<br>(Regina)<br>(306) 787-1932 |
| Highways and Transportation            |  | Develops roads and infrastructure.  | (Prince Albert)<br>(306) 953-3507           |
| Municipal Affairs, Culture and Housing | Municipal Development                      | <p>Provides technical and advisory support to municipalities for community planning and governance.</p> <p>Administers the subdivision approval process and use of dedicated lands.</p>   | 1-800-663-1555                              |
|  | Heritage                                   | Administers <i>The Heritage Property Act</i> , which facilitates heritage resource management and development. Through the Archaeological Resource Management Program, developments are routinely reviewed for possible heritage concerns.  | 1-800-663-1555                              |
| Northern Affairs                       | Policy, Planning, and Research Division    | Undertakes research, planning, and policy development that better enable northerners to identify and participate in northern development.   | (La Ronge)<br>(306) 425-4215                |
|  | Resource and Industry Development Division | <p>Addresses northern interests related to the development of northern resources and industries. This division administers programs such as the following ;</p> <p><i>Northern Mines Monitoring Secretariat and Environmental Quality Committees</i> : Provide information to communities on uranium mine site developments and activities; also, provide a forum to ensure the considerations of northerners in the way in which uranium mine development occurs in northern Saskatchewan.</p> <p><i>Mineral Surface Lease Agreements</i> : Negotiate, monitor and administrate Mine Surface Lease Agreements in northern Saskatchewan on behalf of provincial government departments. Surface leases contain Human Resource Development Agreements.</p> | (La Ronge)<br>(306) 425-4205                |
| Northern Affairs                       | Economic and Community Development         | Provides financial and business support services to northern entrepreneurs, businesses, co-operatives and other organizations. These services include the identification and evaluation of business opportunities, business plan development, financing through the Northern Development Fund and other sources,  | (La Ronge)<br>(306) 425-4261                |

| Department / Agency  | Branch                  | Responsibility   | Contact                                       |
|----------------------|-------------------------|--|---|
|                      |                         | organizational development, management counselling, business skills training, and other advisory services.<br><br>Programs administered by this Division include the <i>Northern Development Fund</i> , the <i>Commercial Fishing Freight Subsidy and Price Support Program</i> , and the annual <i>Northern Saskatchewan Business Opportunity Forum</i> . |   |
| Sask Power           |                         | Develops and maintains power and transmission lines.   | Kevin Horvath<br>(La Ronge)<br>(306) 425-8407 |
| Tourism Saskatchewan | Northern Tourism Region | Plans and develops tourism destination areas.  | (Shoal Lake)<br>(306) 427-2202                |

### Federal Government Departmental Organizations

| Department/Agency                        | Responsibility/Goals   | Contact        |
|--|--|----------------|
| Canadian Nuclear Safety Commission       | Regulates numerous uses of nuclear material. Including, the operation of uranium mines and refineries, and the use of radioactive sources for oil exploration and in instruments such as precipitation measurement devices.  | 1-800-668-5284 |
| Environment Canada                       | Preserve and enhance quality of the natural environment and renewable resources, including migratory birds, other non-domestic flora and fauna, and water; carry out meteorology; and coordinate federal environmental policies and programs.  | 1-800-622-6232 |
| Canadian Environmental Assessment Agency | Through administration of the Canadian Environmental Assessment Act, provide effective means of integrating environmental factors into federal planning and decision-making while taking into account public values and the goal of sustainable development.   | 1-800-622-6232 |
| Agriculture and Agrifood Canada          | To promote and support a growing, competitive, market-oriented agriculture and agrifood industry, which achieves farm financial security, environmental sustainability, and a safe, high quality food supply.  | 1-800-622-6232 |
| Fisheries and Oceans                     | Develop and administer policies and programs in support of Canada's economic, ecological and scientific interests in oceans and freshwater fish habitat, for conservation and sustained utilization of Canada's fisheries resources in marine and inland waters, and for safe, effective and environmentally sound marine services responsive to the needs of Canadians. | 1-800-622-6232 |

| Department/Agency                                  | Responsibility/Goals   | Contact                           |
|--|--|-----------------------------------|
| Indian and Northern Affairs Canada                 | Meet the federal government's constitutional, political and legal responsibilities to First Nations and the North, including sustainable development of natural resources (eg. Mining, oil and gas, forestry and water).   | (Prince Albert)<br>(306) 953-8522 |
| National Roundtable on the Environment and Economy | Identify, explain and promote, in all sectors of Canadian society and in all regions of Canada, principles and practices of sustainable development.   | 1-800-622-6232                    |
| Natural Resources Canada                           | Provide expert scientific and economic knowledge to Canadians, and promote sustainable development and use of Canada's natural resources and competitiveness of the energy, forest, mining, geomatic and geoscience sectors.                                       | 1-800-622-6232                    |
| Transport Canada                                   | Ensure high standards for a safe transportation system, contribute to Canada's prosperity, and protect the physical environment by evaluating the impacts of policy and regulatory decisions on the environment and promoting and meeting environmental standards. | 1-800-622-6232                    |

### Appendix 3. Species inventory of the Athabasca region

Table 3 Mammal species list (Saskatchewan Research Council, 1981)

| Scientific Name          | Common Name                      | Scientific Name      | Common Name                   |
|--------------------------|----------------------------------|----------------------|-------------------------------|
| Masked Shrew             | <i>Sorex cinereus</i>            | Norway Rat           | <i>Rattus norvegicus</i>      |
| Vagrant Shrew            | <i>Sorex vagrans</i>             | House Mouse          | <i>Mus musculus</i>           |
| American Water Shrew     | <i>Sorex palustris</i>           | Meadow Jumping Mouse | <i>Zapus hudsonius</i>        |
| Arctic Shrew             | <i>Sorex arcticus</i>            | Porcupine            | <i>Erethizon dorsatum</i>     |
| Pigmy Shrew              | <i>Microsorex hoyi</i>           | Coyote               | <i>Canis latrans</i>          |
| Little Brown Bat         | <i>Myotis lucifugus</i>          | Wolf                 | <i>Canis lupus</i>            |
| Silver-Haired Bat        | <i>Lasiorycteris noctivigans</i> | Red Fox              | <i>Vulpes vulpes</i>          |
| Big Brown Bat            | <i>Eptesicus fuscus</i>          | Black Bear           | <i>Ursus americanus</i>       |
| Hoary Bat                | <i>Lasiurus cinereus</i>         | Raccoon              | <i>Procyon lotor</i>          |
| Snowshoe Hare            | <i>Lepus americanus</i>          | Marten               | <i>Martes americana</i>       |
| Least Chipmunk           | <i>Eutamias minimus</i>          | Fisher               | <i>Martes pennanti</i>        |
| Woodchuck                | <i>Marmota monax</i>             | Ermine               | <i>Mustela erminea</i>        |
| Red Squirrel             | <i>Tamiasciurus hudsonicus</i>   | Least Weasel         | <i>Mustela nivalis</i>        |
| Northern Flying Squirrel | <i>Glaucomys sabrinus</i>        | Mink                 | <i>Mustela vison</i>          |
| Beaver                   | <i>Castor canadensis</i>         | Wolverine            | <i>Gulo gulo</i>              |
| Deer Mouse               | <i>Peromyscus maniculatus</i>    | Striped Skunk        | <i>Mephitis mephitis</i>      |
| Gapper's Red-Backed Vole | <i>Clethrionomys gapperi</i>     | River Otter          | <i>Lontra canadensis</i>      |
| Northern Bog Lemming     | <i>Synaptomys borealis</i>       | Lynx                 | <i>Lynx lynx</i>              |
| Heather Vole             | <i>Phenacomys intermedius</i>    | Caribou              | <i>Rangifer tarandus</i>      |
| Muskrat                  | <i>Ondatra zibethicus</i>        | Mule Deer            | <i>Odocoileus hemionus</i>    |
| Meadow Vole              | <i>Microtus pennsylvanicus</i>   | White-Tail Deer      | <i>Odocoileus virginianus</i> |
| Chestnut-Cheeked Vole    | <i>Microtus xanthognathus</i>    | Moose                | <i>Alces alces</i>            |

Table 4 Fish species list (SERM#2/99, 1999)

| Scientific Name       | Common Name                    |
|-----------------------|--------------------------------|
| Longnose Sucker       | <i>Catostomus catostomus</i>   |
| White Sucker          | <i>Catostomus commersoni</i>   |
| Cisco                 | <i>Coregonus artedii</i>       |
| Northern Pike         | <i>Esox lucius</i>             |
| Burbot                | <i>Lota lota</i>               |
| Pearl Dace            | <i>Margariscus margarita</i>   |
| Slimy Sculpin         | <i>Cottus cognatus</i>         |
| Spoonhead Sculpin     | <i>Cottus ricei</i>            |
| Deepwater Sculpin     | <i>Myoxoxephalus thompsoni</i> |
| Emerald Shiner        | <i>Notropis atherinoides</i>   |
| Spottail Shiner       | <i>Notropis hudsonius</i>      |
| Yellow Perch          | <i>Perca flavescens</i>        |
| Trout-Perch           | <i>Percopsis omiscomaycus</i>  |
| Round Whitefish       | <i>Prosopium cylindraceum</i>  |
| Ninespine Stickleback | <i>Pungitius pungitius</i>     |
| Lake Trout            | <i>Salvelinus namaycush</i>    |
| Walleye               | <i>Stizostedion vitreum</i>    |

Table 5 Reptile species list (Saskatchewan Research Council, 1981)

| <b>Scientific Name</b> | <b>Common Name</b>                                |
|------------------------|---|
|                        | Red-Sided Garter Snake <i>Thamnophis sirtalis</i> |

Table 6 Amphibian species list (Saskatchewan Research Council, 1981)

| <b>Scientific Name</b> | <b>Common Name</b>           |
|------------------------|------------------------------|
| Canadian Toad          | <i>Bufo hemiophrys</i>       |
| Leopard Frog           | <i>Rana pipiens</i>          |
| Boreal Chorus Frog     | <i>Pseudacris triseriata</i> |
| Wood Frog              | <i>Rana sylvatica</i>        |

Table 7 Vascular plant species list (SERM, 2000 &amp; SERM, 2001)

| <b>Common Name</b>               | <b>Scientific Name</b>                      | <b>Global Status</b> | <b>Prov. Status</b> |
|----------------------------------|---|----------------------|---------------------|
| Alaskan Clubmoss                 | <i>Lycopodium sitchense</i>                 | G5                   | S2                  |
| Alpine Azalea                    | <i>Loiseleuria procumbens</i>               | G5                   | S1                  |
| Alpine Bistort                   | <i>Polygonum viviparum</i>                  | G5                   | S1S2                |
| Alpine Bluegrass                 | <i>Poa alpina</i>                           | G5                   | S1                  |
| Alpine Chickweed                 | <i>Cerastium alpinum</i>                    | G5?                  | S1                  |
| Alpine Fescue                    | <i>Festuca brachyphylla</i>                 | G5                   | S1S2                |
| Alpine Grass-Of-Parnassus        | <i>Parnassia kotzebuei</i>                  | G4                   | S1                  |
| Alpine Or Northern Cliff Fern    | <i>Woodsia alpina</i>                       | G4                   | S1                  |
| Alternate-Flowered Water Milfoil | <i>Myriophyllum alterniflorum</i>           | G5                   | S1                  |
| American Scheuchzeria            | <i>Scheuchzeria palustris var americana</i> | G5T5                 | S3                  |
| Arctic Arnica                    | <i>Arnica angustifolia</i>                  | G5                   | S1                  |
| Arctic Blue Grass                | <i>Poa arctica ssp arctica</i>              | G5T?                 | S1                  |
| Arctic Eyebright                 | <i>Euphrasia subarctica</i>                 | G5Q                  | S1S2                |
| Arctic Rock-Cress                | <i>Arabis arenicola</i>                     | G4                   | S2                  |
| Arctic Starwort                  | <i>Trientalis europaea ssp arctica</i>      | G4G5T4               | S1                  |
| Arctic Willow                    | <i>Salix arctophila</i>                     | G5                   | S2                  |
| Arctic Wintergreen               | <i>Pyrola grandiflora var canadensis</i>    | G5T?Q                | S1                  |
| Arrowhead                        | <i>Sagittaria latifolia</i>                 | G5                   | S5                  |
| Arum-Leaved Arrowhead            | <i>Sagittaria cuneata</i>                   | G5                   | S5                  |
| Ashy Whitlow-Grass               | <i>Draba cinerea</i>                        | G5                   | S1                  |
| Athabasca Thrift                 | <i>Armeria maritima</i>                     | G5                   | S?                  |
| Awned Umbrella-Sedge             | <i>Cyperus aristatus</i>                    | G5                   | S1                  |
| Bear Sedge                       | <i>Carex arcta</i>                          | G5                   | S1                  |
| Beering's Chickweed              | <i>Cerastium beeringianum</i>               | G5                   | S1                  |
| Berchtold's Pondweed             | <i>Potamogeton pusillus var tenuissimus</i> | G5T5                 | S2                  |
| Bigelow's Sedge                  | <i>Carex bigelowii</i>                      | G5                   | S1                  |
| Bird's-Eye Primrose              | <i>Primula mistassinica</i>                 | G5                   | S3                  |
| Blue-Eyed Mary Or Blue-Lips      | <i>Collinsia parviflora</i>                 | G5                   | S2                  |
| Blunt-Leaved Pondweed            | <i>Potamogeton obtusifolius</i>             | G5                   | S2                  |
| Bog Adder's-Mouth Orchid         | <i>Malaxis paludosa</i>                     | G4                   | S1                  |
| Boreal Sandwort                  | <i>Minuartia rubella</i>                    | G5                   | S2                  |

|   |   |        |      |
|---|---|--------|------|
| Bristle-Leaved Sedge                        | <i>Carex eburnea</i>                          | G5     | S2   |
| Bristly Sarsaparilla                        | <i>Aralia hispida</i>                         | G5     | S4?  |
| Brown Sedge                                 | <i>Carex buxbaumii</i>                        | G5     | S2   |
| Brown-Bracted Pussytoes                     | <i>Antennaria umbrinella</i>                  | G5     | S2S3 |
| Canada Manna-Grass Or Rattlesnake Grass     | <i>Glyceria canadensis</i>                    | G5     | S1   |
| Canada Waterweed                            | <i>Elodea canadensis</i>                      | G5     | S2   |
| Chamomile Grape-Fern                        | <i>Botrychium matricariifolium</i>            | G5     | SU   |
| Climbing False-Buckwheat                    | <i>Polygonum scandens</i>                     | G5     | S1S2 |
| Common Butterwort Or Bog-Violet             | <i>Pinguicula vulgaris</i>                    | G5     | S2S3 |
| Common Moonwort Or Moon-Fern                | <i>botrychium lunaria</i>                     | G5     | S1   |
| Common Yarrow / Milfoil                     | <i>Achillea millefolium</i>                   | G5     | S5   |
| Cow Parsnip                                 | <i>Heracleum maximum</i>                      | G5     | S5   |
| Crested Shield-Fern                         | <i>Dryopteris cristata</i>                    | G5     | S3   |
| Cuckooflower; Meadow Or Cuckoo Bittercress  | <i>Cardamine pratensis</i>                    | G5     | S2   |
| Cut-Leaved Cinquefoil                       | <i>Potentilla multifida</i>                   | G5     | S2   |
| Cyperus-Like Sedge                          | <i>Carex pseudocyperus</i>                    | G5     | S2S3 |
| Delicate Cotton-Grass                       | <i>Eriophorum tenellum</i>                    | G5     | S1   |
| Dotted Water Smartweed Or Punctate Knotweed | <i>Polygonum punctatum var confertiflorum</i> | G5T?   | S1   |
| English Sundew Or Oblong-Leaved Sundew      | <i>Drosera anglica</i>                        | G5     | S3   |
| Fairy Slipper                               | <i>Calypso bulbosa</i>                        | G5     | S3   |
| Felt-Leaved Willow                          | <i>Salix silvicola</i>                        | G2     | S2S3 |
| Few-Flowered Ragwort                        | <i>Senecio pauciflorus</i>                    | G4G5   | SR   |
| Few-Flowered Sedge                          | <i>Carex pauciflora</i>                       | G5     | S2   |
| Flatleaf Or Robbin's Pondweed               | <i>Potamogeton robbinsii</i>                  | G5     | S2   |
| Flexible Naiad                              | <i>Najas flexilis</i>                         | G5     | S2   |
| Floating Bur-Reed                           | <i>Sparganium fluctuans</i>                   | G5     | S2   |
| Floccose Tansy                              | <i>Tanacetum huronense var floccosum</i>      | G5T3Q  | S2S3 |
| Fox Sedge                                   | <i>Carex vulpinoidea</i>                      | G5     | S2   |
| Fragrant White Bog- Or Rein-Orchid          | <i>Platanthera dilatata</i>                   | G5     | S2   |
| Garber's Sedge                              | <i>Carex garberi</i>                          | G4     | S2   |
| Glacier Sedge                               | <i>Carex glacialis</i>                        | G5     | S1   |
| Glaucous-Leaved Bog-Rosemary                | <i>Andromeda glaucophylla</i>                 | G5T5   | S2   |
| Golden Whitlow-Grass                        | <i>Draba aurea</i>                            | G5     | S1   |
| Great-Spurred Or Selkirk's Violet           | <i>Viola selkirkii</i>                        | G5?    | S2S3 |
| Hairy Butterwort                            | <i>Pinguicula villosa</i>                     | G4     | S2S3 |
| Hairy Long-Stalked Stitchwort               | <i>Stellaria longipes var subvestita</i>      | G5T?   | S2   |
| Hairy Or Woolly Panic-Grass                 | <i>Dichanthelium acuminatum</i>               | G5     | S2   |
| Hairy Wood-Rush                             | <i>Luzula acuminata</i>                       | G5     | S1S2 |
| Haupt's Alkali-Grass                        | <i>Puccinellia distans ssp hauptiana</i>      | G5T3T4 | S2   |
| Heart-Leaved Twayblade                      | <i>Listera cordata</i>                        | G5     | S2   |
| Hick's Quillwort                            | <i>Isoetes x hickeyi</i>                      | HYB    | S1   |
| Hidden Or Umbellate Sedge                   | <i>Carex abdita</i>                           | G3G5Q  | S2   |
| Hoary Whitlow-Grass                         | <i>Draba cana</i>                             | G5     | S1   |
| Hooker's Creeping Cinquefoil                | <i>Potentilla hookeriana ssp chamissonis</i>  | G4T?   | S1   |
| Horned Bladderwort                          | <i>Utricularia cornuta</i>                    | G5     | S2   |
| Horned Dandelion                            | <i>Taraxacum officinale ssp ceratophorum</i>  | G5T5   | S2   |

|  |   |        |      |
|--|---|--------|------|
| Hudson Bay Sedge                           | <i>Carex heleonastes</i>                                  | G4     | S2   |
| Hybrid Willow                              | <i>Salix x brachypurpurea</i>                             | HYB    | S1   |
| Hyssop-Leaved Fleabane                     | <i>Erigeron hyssopifolius</i>                             | G5     | S2   |
| Immaculate Lily                            | <i>Lilium philadelphicum var andinum f<br/>Immaculata</i> | G5TUQ  | S1   |
| Impoverished Pinweed                       | <i>Lechea intermedia var depauperata</i>                  | G5T1   | S1   |
| Indian Hemp                                | <i>Apocynum cannabinum</i>                                | G5     | S5?  |
| Inland Sea-Thrift                          | <i>Armeria maritima ssp interior</i>                      | G5T1T2 | S1S2 |
| Iowa Golden Saxifrage                      | <i>Chrysosplenium iowense</i>                             | G3G4   | S1?  |
| Knotted Pearlwort                          | <i>Sagina nodosa ssp borealis</i>                         | G5T5   | S2   |
| Labrador Lousewort                         | <i>Pedicularis labradorica</i>                            | G5     | S2   |
| Lady-Fern                                  | <i>Athyrium filix-femina</i>                              | G5     | S3   |
| Lake Huron Tansy                           | <i>Tanacetum huronense var bifarium</i>                   | G5T3?Q | S2   |
| Lanate Bluegrass                           | <i>Poa lanata</i>   | G5     | S1   |
| Lapland Reed-Grass                         | <i>Calamagrostis lapponica var nearctica</i>              | G5T?   | S2S3 |
| Large Roundleaf Orchid                     | <i>Platanthera orbiculata</i>                             | G5?    | S2S3 |
| Large-Headed Woolly Yarrow                 | <i>Achillea millefolium var megacephala</i>               | G5T1   | S1   |
| Large-Leaved Pondweed                      | <i>Potamogeton amplifolius</i>                            | G5     | S1   |
| Large-Leaved Sandwort                      | <i>Arenaria macrophylla</i>                               | G4     | S2   |
| Large-Spored Quillwort                     | <i>Isoetes macrospora</i>                                 | G5     | S1   |
| Leathery Or Broadleaf Grape-Fern           | <i>Botrychium multifidum</i>                              | G5     | S3   |
| Leiberg's Witchgrass Or Panic-Grass        | <i>Dichanthelium leibergii</i>                            | G5     | S1   |
| Lesser Bladderwort                         | <i>Utricularia minor</i>                                  | G5     | S2S3 |
| Limestone Oak Fern                         | <i>Gymnocarpium jessoense ssp parvulum</i>                | G5T4   | S2S3 |
| Long Or Narrow Beech-Bern                  | <i>Phegopteris connectilis</i>                            | G5     | S2   |
| Low Spike-Moss                             | <i>Selaginella selaginoides</i>                           | G5     | S2   |
| Mackenzie Hairgrass                        | <i>Deschampsia mackenzieana</i>                           | G2G3   | S2   |
| Male Fern                                  | <i>Dryopteris filix-mas</i>                               | G5     | S1   |
| Many-Flowered Woodrush                     | <i>Luzula multiflora</i>                                  | G5     | S2   |
| Marsh St. John's-Wort                      | <i>Triadenum fraseri</i>                                  | G4G5   | S1   |
| Michaux Sedge                              | <i>Carex michauxiana</i>                                  | G5     | S1   |
| Mingan Moonwort Or Grape-Fern              | <i>Botrychium minganense</i>                              | G4     | S1   |
| Moor Or American Bog Rush                  | <i>Juncus stygius ssp americanus</i>                      | G5T5   | S1S2 |
| Moss Champion                              | <i>Silene acaulis var exscapa</i>                         | G5T?   | S2   |
| Mountain Or Northern Club-Moss Or Fir-Moss | <i>Huperzia selago var densa</i>                          | G5T?   | S1   |
| Mountain Timothy                           | <i>Phleum alpinum</i>                                     | G5     | S2   |
| Mud Purslane                               | <i>Elatine triandra</i>                                   | G5     | S2   |
| Narrow-Leaved Labrador Tea                 | <i>Ledum palustre ssp decumbens</i>                       | G5T?   | S2S3 |
| Neat Bug-Seed                              | <i>Corispermum nitidum</i>                                | G5     | S2?  |
| Neat Spike-Rush                            | <i>Eleocharis nitida</i>                                  | G3G4   | S2   |
| Net-Leaf Willow                            | <i>Salix reticulata</i>                                   | G5     | S2   |
| Northern Bent-Grass                        | <i>Agrostis mertensii</i>                                 | G5     | S1S2 |
| Northern Bog Clubmoss                      | <i>Lycopodium inundatum</i>                               | G5     | S1   |
| Northern Bur-Reed                          | <i>Sparganium hyperboreum</i>                             | G5     | S1   |
| Northern Buttercup                         | <i>Ranunculus hyperboreus</i>                             | G5     | S1   |
| Northern Groundsel                         | <i>Senecio streptanthifolius</i>                          | G5     | S1S2 |
| Northern Or Confusing Wood-Rush            | <i>Luzula confusa</i>                                     | G5     | S1   |
| Northern Or Sweet White Violet             | <i>Viola macloskeyi ssp pallens</i>                       | G5T5   | S1   |
| Oregon Woodsia                             | <i>Woodsia oregana ssp oregana</i>                        | G5T4?  | S2   |

|   |  |        |      |
|---|--|--------|------|
| Pale Manna Grass  | <i>Torreyochloa pallida var fernaldii</i>    | G5?T4Q | S2   |
| Pale Three-Flowered Rush  | <i>Juncus albescens</i>                      | G5     | S1   |
| Pearly Everlasting  | <i>Anaphalis margaritacea</i>                | G5     | S2   |
| Pink Fringed Milkwort; Bird-On-The-Wing                             | <i>Polygala paucifolia</i>                   | G5     | S2   |
| Prairie Ragwort Or Groundsel  | <i>Senecio plattensis</i>                    | G5     | S3S4 |
| Prickly Sedge   | <i>Carex echinata ssp echinata</i>           | G5T5   | S1   |
| Proliferous Red Fescue  | <i>Festuca rubra var prolifera</i>           | G5T4   | S1   |
| Purple Or Northern Paintbrush                                       | <i>Castilleja raupii</i>                     | G5?    | S2   |
| Purple Or Swamp Lousewort   | <i>Pedicularis macrodonta</i>                | G4Q    | S2   |
| Purple Reed-Grass   | <i>Calamagrostis purpurascens</i>            | G5?    | S2   |
| Purple-Stem Or Canada Cliff-Brake                                   | <i>Pellaea atropurpurea</i>                  | G5     | S1   |
| Red Alpine Bearberry  | <i>Arctostaphylos rubra</i>                  | G5     | S3   |
| Ribbon-Leaf Pondweed  | <i>Potamogeton epihydrus</i>                 | G5     | S2S3 |
| Rock Clubmoss   | <i>Huperzia porophila</i>                    | G4     | S1   |
| Rocky Ground Or Bubble Sedge  | <i>Carex saxatilis</i>                       | G5     | S2   |
| Rocky Mountain Woodsia  | <i>Woodsia scopulina</i>                     | G5     | S1   |
| Sand Bitter Cress   | <i>Cardamine parviflora var arenicola</i>    | G5T?   | S1   |
| Sand Chickweed  | <i>Stellaria longipes ssp arenicola</i>      | G5T3   | S3   |
| Sand-Loving Barrenground Willow                                     | <i>Salix brachycarpa var psammophila</i>     | G5T2T3 | S2S3 |
| Scaly Oregon Woodsia  | <i>Woodsia oregana var squamosa</i>          | G5T?Q  | S1   |
| Scheuchzer Cotton-Grass   | <i>Eriophorum scheuchzeri</i>                | G5     | S1   |
| Sea Lyme-Grass; American Dune Grass;<br>Dune Wild-Rye; Strand-Wheat | <i>Elymus mollis</i>                         | G5     | S2   |
| Seaside Sedge   | <i>Carex maritima var maritima</i>           | G4G5T? | S1   |
| Siberian Or Wild Chives   | <i>Allium schoenoprasum var sibiricum</i>    | G5T5   | S2   |
| Siberian Yarrow   | <i>Achillea sibirica</i>                     | G5?    | S5   |
| Sierra Rush / Nevada Rush   | <i>Juncus nevadensis var nevadensis</i>      | G5T?   | S?   |
| Sleepy Catchfly   | <i>Silene antirrhina</i>                     | G5     | S1S2 |
| Slender Cliff-Brake   | <i>Cryptogramma stelleri</i>                 | G5     | SRF  |
| Slenderleaf Sundew  | <i>Drosera linearis</i>                      | G4     | S1   |
| Small False-Asphodel  | <i>Tofieldia pusilla</i>                     | G5     | S1   |
| Small White Water-Lily  | <i>Nymphaea leibergii</i>                    | G5     | S2   |
| Small-Flowered Anemone  | <i>Anemone parviflora</i>                    | G5     | S1   |
| Smooth Or Shore Cinquefoil  | <i>Potentilla pensylvanica var litoralis</i> | G5T?   | S2S3 |
| Smooth Sumac  | <i>Rhus glabra</i>                           | G5     | S1   |
| Smooth Woodsia  | <i>Woodsia glabella</i>                      | G5     | S2   |
| Sooty Beaked-Rush   | <i>Rhynchospora fusca</i>                    | G4G5   | S1   |
| Sparrow's-Egg Lady's-Slipper  | <i>Cypripedium passerinum</i>                | G4G5   | S2   |
| Spear-Leaved Arnica   | <i>Arnica lonchophylla ssp lonchophylla</i>  | G4T4   | S2S3 |
| Spike Trisetum Or Narrow False Oats                                 | <i>Trisetum spicatum</i>                     | G5     | S2   |
| Spreading Dogbane   | <i>Apocynum androsaemifolium</i>             | G5     | S5   |
| Stalked Moonwort  | <i>Botrychium pedunculosum</i>               | G2?    | S1   |
| Subterminal Bulrush   | <i>Scirpus subterminalis</i>                 | G4G5   | S1   |
| Swamp-Pink Or Dragon's-Mouth Orchid                                 | <i>Arethusa bulbosa</i>                      | G4     | S1   |
| Tall Blue Lettuce   | <i>Lactuca biennis</i>                       | G5     | S2   |
| Tall White Fleabane   | <i>Trimorpha elata</i>                       | G4?    | S2   |
| Three-Fruited Sedge   | <i>Carex trisperma</i>                       | G5     | S2   |
| Tomentose Or Northern Pussytoes                                     | <i>Antennaria neodioica</i>                  | G4G5   | S2   |
| Turnor's Willow   | <i>Salix turnorii</i>                        | G2     | S2   |
| Two-Color Sedge   | <i>Carex bicolor</i>                         | G5     | S1   |

|                                       |  |       |      |
|---------------------------------------|--|-------|------|
| Tyrrell's Willow                      | <i>Salix planifolia ssp tyrrellii</i>            | G5T2  | S2   |
| Various-Glumed / Interrupted Wild Rye | <i>Elymus interruptus</i>                        | G5    | S2   |
| Water Awlwort                         | <i>Subularia aquatica var americana</i>          | G5T5  | S2S3 |
| Water Calla                           | <i>Calla palustris</i>                           | G5    | S5   |
| Water Hemlock                         | <i>Cicuta maculata</i>                           | G5    | S5   |
| Water Lobelia                         | <i>Lobelia dortmanna</i>                         | G4    | S2S3 |
| Water Parsnip                         | <i>Sium suave</i>                                | G5    | S5   |
| Water-Marigold                        | <i>Megalodonta beckii</i>                        | G4G5  | S?   |
| Weak Arctic Sedge                     | <i>Carex supina var spaniocarpa</i>              | G5T?  | S1   |
| Western Mountain-Ash                  | <i>Sorbus scopulina</i>                          | G5    | S2   |
| Western Or Yellow Touch-Me-Not        | <i>Impatiens noli-tangere</i>                    | G?    | S3S4 |
| Western Prince's-Pine                 | <i>Chimaphila umbellata ssp occidentalis</i>     | G5T5  | S2S3 |
| Western Red Lily / Western Wood Lily  | <i>Lilium philadelphicum var andinum</i>         | G5T?  | S3S4 |
| Western Smooth Cliff-Brake            | <i>Pellaea glabella ssp occidentalis</i>         | G5T?  | S2   |
| White Beaked-Rush                     | <i>Rhynchospora alba</i>                         | G5    | S2S3 |
| Whorled Water-Milfoil                 | <i>Myriophyllum verticillatum var pectinatum</i> | G5T?  | S3   |
| Wild Sarsaparilla                     | <i>Aralia nudicaulis</i>                         | G5    | S5   |
| Wingless Bug-Seed                     | <i>Corispermum orientale</i>                     | G?    | S2   |
| Yellow Mountain-Avens                 | <i>Dryas drummondii</i>                          | G5    | S1   |
| Yellow Or Richardson's Anemone        | <i>Anemone richardsonii</i>                      | G5    | S1   |
| Yellow Sedge                          | <i>Carex cryptolepis</i>                         | G4    | S1   |
| Yellow-Rattle                         | <i>Rhinanthus minor</i>                          | G4    | S2S3 |
| Yukon Milk-Vetch                      | <i>Astragalus bodinii</i>                        | G4    | S1   |
|                                       | <i>Arnica alpina ssp attenuata</i>               | G5T?  | S?   |
|                                       | <i>Pinguicula macroceras var macroceras</i>      | G5T4  | S2S3 |
|                                       | <i>Tanacetum huronense</i>                       | G4G5Q | S2S3 |

**Table 4 Provincial and global rank definitions**

| Rank               | Status          | Definition   | Comments   |
|--------------------|-----------------|--|--|
| <b>S1 &amp; G1</b> | Extremely Rare  | 5 or fewer occurrences in Saskatchewan, or very few remaining individuals  | Critically imperiled; may be especially susceptible to extirpation because of some factor of its biology |
| <b>S2 &amp; G2</b> | Rare            | 6 to 20 occurrences in Saskatchewan or few remaining individuals   | Imperiled; may be susceptible to extirpation because of some factor of its biology                       |
| <b>S3 &amp; G3</b> | Rare - Uncommon | 21 - 100 occurrences in Saskatchewan; may be rare and local throughout province or may occur in a restricted provincial range (abundant in places) | Vulnerable; may be susceptible to extirpation by large scale disturbances                                |
| <b>S4 &amp; G4</b> | Common          | more than 100 occurrences; generally widespread and abundant but may be rare in parts of its range   | Apparently secure but may be of long-term concern  |
| <b>S5 &amp; G5</b> | Very Common     | more than 100 occurrences; widespread and abundant, but may be rare in parts of its range  | Demonstrably secure  |

\*Global Status is the same as Provincial Status - replace the S's with G's

**Codes and Modifiers** (refer also to COSEWIC table below)

**A-** accidental or casual in the province, including species (such as birds or butterflies) recorded infrequently that are far outside their range

**B-** for a migratory species, rank applies to the breeding population in the province

**C-** species presently exists in the province only in captivity or cultivation

**E-** exotic species established in the province, may be native to nearby regions

**H-** historical occurrence but without recent verification (e.g. within 20 years)

**HYB-** hybrid of species

**N-** for a migratory species, rank applies to the non-breeding population in the province

**P-** potentially exists in the province but no occurrences reported

**Q-** taxonomic difficulties, more information needed

**R-** reported in the province but lacks documentation which would provide a basis for accepting or rejecting the report (e.g. misidentified specimen)

**RF-** falsely reported for the province but the error persists in the literature

**SYN-** synonym; element reported as occurring in the province, but the province does not recognize the taxon.

**U-** status uncertain in Saskatchewan, because of limited information

**X-** believed to be extinct or extirpated.

**Z-** no practical conservation concern - no mappable and predictable occurrences (Migrants)

**?-** not yet ranked in Saskatchewan

**Table 5 COSEWIC status definitions**

| <b>COSEWIC Status</b> | <b>Definition</b>   |
|-----------------------|---|
| Special Concern (SC)  | A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events |
| Threatened (T)        | A species likely to become endangered if limiting factors are not reversed  |
| Endangered (E)        | A species facing imminent extirpation or extinction   |
| Extirpated (XT)       | A species no longer existing in the wild in Canada, but occurring elsewhere   |
| Extinct (X)           | A species that no longer exists   |
| Not at Risk (NAR)     | A species whose status has been reviewed by COSEWIC and is considered secure  |
| Data Deficient (DD)   | A species whose status remains uncertain due to insufficient information  |

## **Appendix 4. List of references**

### ***Literature Review***

Abel, D.J. and Robertson, P.K.

1993 Graphics and environmental decision making. *In* IEEE Computer Graphics and Applications.

Adams, L.W., Dove, L.E., T.M. Franklin.

1985 *Mallard Pair and Brood Use of Urban Stormwater-Control Impoundments*. Wildl. Soc. Bull

Anderson/Fast & Associates

1999 *Northern Tourism Industry Assessment Final Report*. Northern Saskatchewan Tourism Task Team-Government of Saskatchewan.

Athabasca Health Authority

2001 *A Place to Heal Northern People*. Athabasca Health Authority.

Athabasca Land Use Planning Interim Advisory Panel

March 19-20, 2001 Athabasca Land Use Planning Interim Advisory Panel Meeting Minutes. Not published.

Athabasca Land Use Planning Interim Advisory Panel

April 23-24, 2001 Athabasca Land Use Planning Interim Advisory Panel Meeting Minutes. Not published.

Athabasca Land Use Planning Interim Advisory Panel

May 10-11, 2001 Athabasca Land Use Planning Interim Advisory Panel Meeting Minutes. Not published.

Athabasca Land Use Planning Interim Advisory Panel

June 1-3, 2001 Athabasca Land Use Planning Interim Advisory Panel Meeting Minutes. Not published.

Athabasca Working Group Steering Committee

2000 *Athabasca Working Group Annual Report-1999*. Athabasca Working Group Steering Committee.

Beak Consultants Ltd.

1978 *Key Lake Access Study: An Environmental Overview of Four Proposed Alternates*.  
Department of Northern Saskatchewan.

Beck, W.

1962 *A Report on the Distribution Records of Mammals in the Lake Athabasca Area, Saskatchewan*. Institute for Northern Studies: University of Saskatchewan.

Beverly and Qamanirjuaq Caribou Management Board

1996 *1996-2002 Beverly and Qamanirjuaq Caribou Management Plan*. Beverly and Qamanirjuaq Caribou Management Board.

Beverly and Qamanirjuaq Caribou Management Board

1994 *Fire Management Recommendations for Frested Range of te Beverly and Qamanirjuaq Herds of Caribou*. Beverly and Qamanirjuaq Caribou Management Board.

Bone, R. M.

1992 *The Geography of the Canadian North*.

Brewer, G.

1995 Heritage Resources Impact Assessment of the Key Lake to McArthur River Haul Road: Permit #94-68. *In* McArthur River Project Environmental Impact Statement. Golder Associates Limited ed. Appendix 7.

Canadian Environmental Assessment Agency

1996 *The Canadian Environmental Assessment Act: Reference Guide on Physical and Cultural Heritae Resources*. Canadian Environmental Assessment Agency.

Couto, P. & Hoffman-Mercredi, L.

1999 *Ikonze: the Stones of Traditional Knowledge*. Thunderwoman Ethnographies.

Denesuline Resource Co-operative Ltd.

Date Unknown *Operational Guidelines*. Denesuline Resource Co-operative Ltd.

Environmental Management Group Ltd.

2001 *An Assessment of Abandoned Mines in Northern Saskatchewan*. Government of Saskatchewan.

Environmental Quality Committees & Northern Mines Secretariat

2000 *Report to Communities 1999-2000*. Environmental Quality Committees.

## Fond du Lac Development Corporation

1997 *Proposal to Construct Winter Road from Stony Rapids to Fond du Lac*. Fond du Lac Development Corporation.

## Freshwater Fish Marketing Corporation

1998 *Inspection of Incoming Product Procedures and Policies*. Freshwater Fish Marketing Corporation.

## Fumoleau, R.

1973 *As Long as this Land Shall Last*. Toronto: McClelland & Stewart Ltd.

## Gillis, D., Irvine, J., Tan, L., Chiu, S., Liu, L., &amp; Robson, D.

1990 Lung, Breast and Cervical Cancer Incidence and Survival in Saskatchewan Northerners and Registered Indians: 1967-1986. *In Circumpolar Health*.

## Gillis, D., Irvine, J., Tan, L., Chiu, S., Liu, L., &amp; Robson, D.

1990 Cancer Incidence and Survival of Saskatchewan Northerners and Registered Indians: 1967-1986. *In Circumpolar Health*.

## Gordon, A.

1979 *Geology of Saskatchewan*. Western Extension College Educational Publishers.

## Government of Saskatchewan

1993 *The Heritage Property Act*. Government of Saskatchewan.

## Harms, V. &amp; Fraser, W.

1982 A Plant Taxonomic Survey of the Uranium City Region, Lake Athabasca North Shore: Emphasizing the Naturally Colonizing Plants on Uranium Mine and Mill Wastes and Other Human Disturbed Sites. University of Saskatchewan.

## Hermesh, R.

1972 *Ecology of the Athabasca Sand Dunes – with Emphasis on the Phytogenic Aspects of Dune Formation*.

## Indian and Northern Affairs Canada

2001 *Black Lake First Nation Profile*. Government of Canada.

## Indian and Northern Affairs Canada

2001 *Fond du Lac First Nation Profile*. Government of Canada.

## Indian and Northern Affairs Canada

2001 *Hatchet Lake First Nation Profile*. Government of Canada.

## Intergroup Consultants Ltd.

1994 *McArthur River-Key Lake Socio-Economic Study Report*. Cameco Corporation.

## Kulchyski, P.

1994 *Tammarniit [Mistakes]: Inuit and Relocation Eastern Arctic 1939 to 1963 with Frank Tester*. Vancouver: University of British Columbia.

## Lechner, L. &amp; Howard, G.

1987 *Sensitivity of Saskatchewan Surface Waters to Acidic Inputs*. Government of Saskatchewan.

## Lockhart, J.

1981 *The Fishery and the People: A Study of the Potential Effects from Acidification of Lakes*. Monograph No. 10 Northern Saskatchewan. Petro-Canada and the Watershed Ecosystems Program.

## Mackenzie Valley Environmental Impact Review Board

2000 *Wildlife – Caribou*. Mackenzie Valley Environmental Impact Review Board.

## MacPherson Consultants Ltd. &amp; SENES Consultants Ltd.

1991 *Socio-Economic and Land Uses Study of the Northern Saskatchewan Recruitment Area*. In *McClellan Lake Project Environmental Impact Statement*. Supporting Document 6. Minatco Ltd.

## Marles, R. J., Clavelle, C., Monteleone, L., Tays, N., Burns, D.

2000 *Aboriginal Plant Use in Canada's Northwest Boreal Forest*. Natural Resources Canada, Canadian Forest Service: UBC Press.

## McCutcheon, M. &amp; Young, R.

Date Unknown *The Development of Uranium City*. Government of Saskatchewan.

## Meyer, D.

1982 *An Archaeological Investigation of the Stony Rapids Community and Resources Access Road: Stage 1*. Saskatchewan Research Council.

## Meyer, D.

1981 *Overview of Chipewyan Ethnohistory and Social Organization*. In *Stony Rapids Community and Resource Access Road: Stage 2: Environmental Evaluation of Alternative Corridors*. MacLaren Plansearch.

Meyer, D.

- 1981 Prehistoric Overview of Northern Saskatchewan. *In* Stony Rapids Community and Resource Access Road: Stage 2: Environmental Evaluation of Alternative Corridors. MacLaren Plansearch.

Minni, S. J.

- 1976 The Prehistoric Occupations of Black Lake, Northern Saskatchewan. Archaeological Survey of Canada Paper No. 53. National Museum of Man Mercury Series, Ottawa.

Nero, R.

- 1963 *Birds of the Athabasca Region*. Saskatchewan: Saskatchewan Natural History Society.

Notzke, C.

- 1994 *Aboriginal Peoples and Natural Resources in Canada*. Center for Aboriginal Management Education and Training.

Office of the Treaty Commissioner.

- 1998 *Statement of Treaty Issues: Treaties As a Bridge to the Future*. Office of the Treaty Commissioner.

Population Health Unit

- 1998 *Athabasca Health Area: Health Status Report*. Government of Saskatchewan.

Population Health Unit

- 1998 *Mamawetan Churchill River Health District: Health Status Report*. Government of Saskatchewan.

Poston, B., Ealey, D., Taylor, P. & McKeating, G.

- 1990 *Priority Migratory Bird Habitats of Canada's Prairie Provinces*. Canadian Wildlife Service.

Rogers, M. C.

- 2001 *Athabasca Road Corridor Land Use Plan Area-Mineral Resources*. Not Published. Pp. 7. Government of Saskatchewan: Saskatchewan Energy and Mines.

Saskatchewan Energy and Mines

- 2000 *Annual Report 1999-2000*. Government of Saskatchewan.

## Saskatchewan Energy and Mines

1994 *Saskatchewan Geological Survey-Geology and Mineral Resources of Saskatchewan*.  
Miscellaneous Report 94-6, 99p. Government of Saskatchewan.

## Saskatchewan Research Council

1981 A Multidisciplinary Study. *In The Athabasca Sand Dunes of Saskatchewan*. Volume 2-  
Appendices.

## Saskatchewan Environment and Resource Management #1/97

1997 *Athabasca Sand Dunes Provincial Wilderness Park*. Government of Saskatchewan.

## Saskatchewan Environment and Resource Management

1994 *Athabasca Sand Dunes Provincial Park-Park Management Strategy*. Government of  
Saskatchewan.

## Saskatchewan Environment and Resource Management #1/98

1998 *The Ecoregions of Saskatchewan*. Government of Saskatchewan.

## Saskatchewan Environment and Resource Management #1/99

1999 *Fire Management and Forest Protection Branch: Fire Suppression*. Government of  
Saskatchewan.

## Saskatchewan Environment and Resource Management #1/01

2001 *Fire Management and Forest Protection Branch: Fire Suppression Priorities*.  
Government of Saskatchewan.

## Saskatchewan Environment and Resource Management #2/01

2001 *Lease Property Status Report*. Government of Saskatchewan.

## Saskatchewan Environment and Resource Management #3/01

2001 *Natural Neighbours: Selected Mammals of Saskatchewan*. Government of  
Saskatchewan.

## Saskatchewan Environment and Resource Management #1/00

2000 *Options to Revitalize Commercial Fishing in Saskatchewan: The Year 2000 & Beyond*.  
Government of Saskatchewan.

## Saskatchewan Environment and Resource Management #2/97

1997 *Public Involvement Policy Framework and Guidelines*. Government of Saskatchewan.

Saskatchewan Environment and Resource Management #4/01

2001 *Provincial Summary of Outfitter Residence (2000-01)*. Information presented to Northern Outfitting Review Committee. Government of Saskatchewan. Not published.

Saskatchewan Environment and Resource Management #3/97

1997 *Saskatchewan's Representative Areas Network: Final Action Plan*. Government of Saskatchewan.

Saskatchewan Environment and Resource Management #2/99

1999 *Saskatchewan's State of the Environment Report – The Boreal Shield Ecozone: A Land of Lakes and Forests*. Government of Saskatchewan.

Saskatchewan Environment and Resource Management #5/01

2001 *Saskatchewan's State of the Environment Report – The Taiga Shield Ecozone: Land of the Caribou*. Government of Saskatchewan.

Saskatchewan Environment and Resource Management #2/00

2000 *Saskatchewan Wild Fur Harvest and Cash Values 1999-2000: Fish and Wildlife Branch Summary Report*. Government of Saskatchewan.

Saskatchewan Environment and Resource Management #6/01

2001 *Site Inspections Summary (January, February/March, April/May)2001*. Not Published: Government of Saskatchewan.

Saskatchewan Environment and Resource Management #3/00

2000 *Taiga Shield Special Management Areas: Identification, Management and Use of Specific Areas in the Land of Little Sticks*. Government of Saskatchewan.

(SERM#2 1998)

Sawchyn, W.

1973 *Environmental Survey of Wollaston Lake, Saskatchewan*. Saskatchewan Research Council.

Smith, A.

1996 *Atlas of Saskatchewan Birds*. Nature Saskatchewan.

Statistics Canada

2001 Division No. 18, Unorganized: Saskatchewan. Government of Canada.

Terrestrial & Aquatic Managers Ltd.

1994 *The Cigar Lake Project: Ecological Baseline*. Cigar Lake Mining Corporation.

Thomas, P.

1999 *Radionuclides and Trace Elements in Moose and Other Meat Sources from Northern Saskatchewan*. Toxicology Center University of Saskatchewan: Population Health Unit Saskatchewan Health.

Trimension Group & Spruce River Research Consulting Firms

1999 *Examination of the Commercial Fishing Industry in Saskatchewan*.

Uranium City School

1982 *The History of Uranium City and District*. Municipality of Uranium City.

Uranium Mining Cumulative Effects Monitoring Program

1997 *Sediment Quality in the Wollaston Lake Area of Northern Saskatchewan 1994/95*. Saskatchewan Environment and Resource Management: Government of Saskatchewan.

Waite, D., Joshi, S. & Sommerstad, H.

1998 The Effect of Uranium Mine Trailings on Radionuclide Concentrations in Langley Bay, Saskatchewan, Canada. *In Archives of Environmental Contamination and Toxicology* #17.

### ***Internet Sources***

Internet 1: <http://interactive.usask.ca/skinteractive/modules/fisheries/fish/types.html>

Internet 2: <http://interactive.usask.ca/skinteractive/modules/fisheries/commercial/history.html>

Internet 3: <http://serm-web/informationssystem/data/policies/w1%5Ffish/ran%5Fpolicy.htm>

Internet 4: <http://www.gov.sk.ca/deptsorgs/overview/?74>

Internet 5: <http://www.kcdc.sk.ca/index.php>

Internet 6: [http://www.ainc-inac.gc.ca/pr/trts/trty8\\_e.html](http://www.ainc-inac.gc.ca/pr/trts/trty8_e.html) (.../trty10\_e.html)

Internet 7: <http://www.ualberta.ca/~esimpson/claims/Athabdenesuline.htm>

Internet 8: [http://www.cameco.com/uranium/uranium\\_in\\_sk\\_99.html](http://www.cameco.com/uranium/uranium_in_sk_99.html)

Internet 9: <http://interactive.usask.ca/skinteractive/modules/fisheries/commercial/present.html>

Internet 10: <http://www.metisnation.ca/mnc/mncHOME.html>

Internet 11: [http://www.afn.ca/About%20AFN/description\\_of\\_the\\_assembly\\_of\\_f.htm](http://www.afn.ca/About%20AFN/description_of_the_assembly_of_f.htm)

Internet 12: <http://www.otc.ca/mandate.html>

Internet 13: <http://www.ns.ec.gc.ca/aeb/ssd/acidfaq.html>

Internet 14: <http://serm-web/informationssystem/data/public/bulletins/cem.htm>

Internet 15: [http://www.archives.ca/04/04240801\\_e.html](http://www.archives.ca/04/04240801_e.html)

Internet 16: <http://www.sicc.sk.ca/bands/treaty10.html>

Internet 17:  
<http://www.umanitoba.ca/faculties/arts/anthropology/manarchnet/chronology/taltheilei/middle.html>

Internet 18: <http://www.otc.ca/histphoto.html>

Internet 19: [http://sts.gsc.nrcan.gc.ca/clf/landscapes\\_physio.asp](http://sts.gsc.nrcan.gc.ca/clf/landscapes_physio.asp)

Internet 20: [http://interactive.usask.ca/SKInteractive/modules/forestry/tree/sask\\_trees.html](http://interactive.usask.ca/SKInteractive/modules/forestry/tree/sask_trees.html)

Internet 21: <http://interactive.usask.ca/SKInteractive/modules/tourism/secrets/island.html>

Internet 22: <http://www.arctic-caribou.com>

Internet 23: <http://nt2.advant.com/kuocgi2/morels/moreltypes.html>

Internet 24: <http://www.birdsofprey.org/what.htm>

Internet 25: <http://raysweb.net/wildlife/pages/08.html>

Internet 26: <http://www.washington.edu/burkemuseum/mamology/mape.html>

Internet 27: <http://raysweb.net/specialplaces/pages/caribou.html>

Internet 28: [http://www.scottshrader.com/pages/mammals/showcase/caribou\\_cross.html](http://www.scottshrader.com/pages/mammals/showcase/caribou_cross.html)

Internet 29:  
[http://interactive.usask.ca/SKInteractive/modules/environment/ecoregions/eco\\_athabasca\\_plain.html](http://interactive.usask.ca/SKInteractive/modules/environment/ecoregions/eco_athabasca_plain.html)

Internet 30: <http://www.fishbc.com/adventure/wilderness/animals/blackbear.html>

Internet 31: <http://www.for.gov.bc.ca/hfp/botan/chapt1.htm>

Internet 32: <http://www.cosewic.gc.ca>

Internet 33: <http://sahtulanduseplan.com/lup/strainer.html>

Internet 34: <http://www.serm.gov.sk.ca/gallery/default.asp?flag=1&directory=galedit/data/RAN-Sites.txt>

Internet 35:  
<http://www.serm.gov.sk.ca/gallery/default.asp?flag=1&directory=galedit/data/firemanagement.txt>

Internet 36: <http://www.grrb.nt.ca/forest.html>

### ***Personal Communication***

Bihun. George. Saskatchewan Environment. Ongoing.

Charles. M. Prince Albert Grand Council. Ongoing. 2001.

Dr. Elias. Ongoing. 2001.

Flodell. Mike. Saskatchewan Environment. Ongoing.

Housen. Trevor. Saskatchewan Environment. Fish and Wildlife Branch. 02/06/01.

Maczek. Paul. Saskatchewan Environment. Forest Ecosystems Branch. 17/07/01.

Prince Albert Grand Council. Ongoing. 2001.

Rogers. Murray. Saskatchewan Industry and Resources. 19/06/01.

Sigurdson. Brad. Saskatchewan Environment. Environment Protection Branch. 25/06/01.

Trottier. Tim. Saskatchewan Environment. Fish and Wildlife Branch. Ongoing. 2001.

Weatherbee. Kevin. Saskatchewan Environment. Parks and Special Places Branch. 26/06/01.

### ***Further Recommended Readings***

Calibre Strategic Services Inc.

1999 *The Northern Saskatchewan Strategic Opportunities Assessment Summary Report*.  
Interim Northern Development Board.

Mater Engineering Ltd.  
 1993 *Special Forest Products Market Analysis*. Saskatchewan Timberlands Division:  
 Weyerhaeuser Canada Ltd.

Saskatchewan Environment and Resource Management  
 2001 *Shield EcoRegion Ecological Operating Plan for 2001-02*. Government of  
 Saskatchewan.

Thomas, M. & Schumann, D.  
 1993 *Income Opportunities in Special Forest Products: Self-help Suggestions for Rural  
 Entrepreneurs*. United States Department of Agriculture.

### ***Photo References***

McArthur River Mine site. Source: Prince Albert Grand Council. 2001.

Caribou. Source: Cliff Buettner.

Fond du Lac River Falls. Source: Cliff Buettner.

Hand Drilling. Source: Darwin Parkinson.

McArthur River Mine. Source: Diane McDonald.

Whitesand Hydro-Electric Station. Source: Bob Reed.

Athabasca sand dunes. Source: Kirsten Ketilson.

Unnamed. Source: Allan Adam.

Black spruce forest. Courtesy of Gwich'in Renewable Resource Board.

Peregrine Falcon. Source: Robert Benson.

Marten. Source: Hazel Barton.

Fisher. Source: Hazel Barton.

Woodland Caribou. Source: Managing Life in the Forest – Saskatchewan Forest Habitat Project.

Barren-ground Caribou, Rennie Lake. Source: Allan Adam.

Wolf. Source: Hazel Barton.

Moose. Source: Cliff Buettner.

Black Bear. Source: Saskatchewan Environment.

Sport Fishing. Source: Gord Sedgewick.

Labour Intensive Goods. Source: Saskatchewan Education. Northern Heritage : Photographs from the archives of the Pahkisimon Nuye?áh Library System, 1998. Pahkisimon Nuye?áh Library System.

Drilling into the Shield. Source: Saskatchewan Education. Northern Heritage : Photographs from the archives of the Pahkisimon Nuye?áh Library System, 1998. Pahkisimon Nuye?áh Library System.

Sport Fishing. Source: Saskatchewan Education. Northern Heritage : Photographs from the archives of the Pahkisimon Nuye?áh Library System, 1998. Pahkisimon Nuye?áh Library System.

Filleting Fish. Source: Saskatchewan Education. Northern Heritage : Photographs from the archives of the Pahkisimon Nuye?áh Library System, 1998. Pahkisimon Nuye?áh Library System.

Commercial Fishing. Source: Saskatchewan Education. Northern Heritage : Photographs from the archives of the Pahkisimon Nuye?áh Library System, 1998. Pahkisimon Nuye?áh Library System.

Commercial Fisherman. Source: Saskatchewan Education. Northern Heritage : Photographs from the archives of the Pahkisimon Nuye?áh Library System, 1998. Pahkisimon Nuye?áh Library System.

Artist's rendition of Taltheilei caribou hunt. Courtesy of Manitoba Heritage and Tourism, Historic Resources Branch. Artist: Larry Jameson.

Artist's rendition of Middle Taltheilei Culture. Courtesy of Manitoba Culture Heritage and Tourism, Historic Resources Branch. Artist: Larry Jameson.