# Wollaston Lake: The Uranium Mining Industry and the Perceptions of Health Risks©

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# WOLLASTON LAKE:
# THE URANIUM MINING INDUSTRY
# AND THE PERCEPTION OF HEALTH RISKS

## Final Report

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## 1.0 Introduction

In 1988, a critical assessment was conducted on how governments and industry address potential impacts of industrial developments in northern regions of Canada. The Canadian Environmental Assessment Research Council held several regional workshops across Canada to foster discussion on northern and Aboriginal understandings of environmental health issues. Many broad recommendations emerged:

- *the health of a community should be understood before a development project is underway;*
- the *impacts of an existing industrial site on a community over time should be understood by actually studying whether there is industry-related diseases (such as cancer or lung problems) developing in that community;*
- *a communication approach that provides scientific information on contaminants to northern communities should be developed;*
- *a constructive and respectful way of understanding what northerners consider to be a danger to their health should be developed.*

This study is a response to these recommendations. It is also an inquiry into a debate concerning various competing perceptions of what an environmental health risk is.

Communities, scientists, governments, industry, and environmental groups have all been involved, one way or another, in this debate. Communities and their advocates have recommended that we should respect community perceptions as an important source of knowledge and that they should be given equal weight when a development project is being assessed. It has been proposed that the "public's judgements about risk are not inferior, but different, and arguably richer than those of the experts."[1] It has also been recognised that, although communities may face difficulties due to "differing conceptions of risk, lack of resources, poor access to information, and unresponsive government", their involvement is "necessary to make progress in health care and health policy."[2] In other words, their close involvement with professional scientists in socially constructing perceptions of environmental health risks is both a social movement and a new scientific paradigm that constructively challenges the scientific canons of risk assessment and management.

Some risk assessors, according to Shrader-Frechette, have contended that government, science and industry still know what is best, and if the public does not trust them, this lack of trust must be a sign that they are misguided, irrational, ignorant, or suffering from mass paranoia.[3] Scientists, as a result, have advocated an objective way

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1 Daniel J. Fiorino, "Technical and Democratic Values in Risk Analysis," *Risk Analysis*, Vol. 9, No. 3, 1989. p. 296.

2 Phil Brown, "Popular Epidemiology and Toxic Waste Contamination: Lay and Professional Ways of Knowing," *Journal of Health and Social Behavior*, Vol. 33 (September), 1992. pp. 278-9.

3 K. S. Shrader-Frechette, *Risk and Rationality: Philosophical Foundations for Populist Reforms*, Berkeley: University of California Press, 1991. pp. 15-17.

of assessing risk; a world view that minimises the importance of diverse accounts which represent a multiplicity of views and interests.[4] The danger of such scientific objectivity is that it restricts people who are not scientists from having any say about the substance of scientific work; a process described as “boundary work” by Jasanoff.[5] When scientists label the lay public as non-scientists, they unknowingly construct the perception that lay perceptions have no authority in describing what is a risk to health.

Other scientists have thought otherwise. An alternative approach suggests that perceptions of risk are culturally defined, and should be understood within that context.[6] Consequently, a number of scientists have attempted to account for diversity in perception, while attempting to balance the views of community, science, government, and industry. It is thought that experts need to adopt a middle ground by emphasising better hazard assessments and the democratic control of environmental risks.[7] In short, it is argued that the lay public must be involved in the scientific and regulatory discourse on environmental health risk as equals. It is further thought that such involvement would bring cultural rationality into the risk analysis project thereby creating a way of talking about environmental risks that utilises the strengths of both forms of rationality, while attending to their weaknesses.[8] This study is an attempt to assess this possibility.

### 1.1 Methodology

The study, overall, involved three community case studies conducted in different regions of Canada. The first case study occurred in Wollaston Lake; a Dene community located in Northeastern Saskatchewan. Over the years, this community has directly and indirectly experienced the impacts of uranium mining. It has also been participating in a number of joint Federal-Provincial environmental impact assessments concerning several proposed Uranium mining projects. The second case study occurred in Kuujjuarapik; an Inuit community located on the Eastern shore of Hudson Bay in Northern Quebec. This community was taking part in a joint Federal-Provincial environmental impact assessment of Hydro-Quebec's Great Whale Dam. The third case study occurred in Sagkeeng First Nation; an Ojibway community located in Manitoba at the mouth of the Winnipeg River and Lake Winnipeg. The impacts, in question, involved the pulp and paper industry and hydroelectric developments on the Winnipeg River.

This report is an analysis of the Wollaston Lake Case Study; a case study that was conducted in 1993. Prior to initiating the actual study, research access was negotiated with Chief and Council. After much discussion, the study was accepted as a means to foster an understanding of development impacts on the environment and their health.

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4 See Dennis J. Paustenbach, *The Risk Assessment of Environmental and Human Health Hazards: A Textbook of Case Studies*, New York: John Wiley & Sons, 1989.

5 Sheila Jasanoff, *The Fifth Branch: Science Advisors as Policymakers*, Cambridge, Massachusetts: Harvard University Press, 1990. p. 14.

6 See Mary Douglas and Aaron Wildavsky, *Risk and Culture: An Essay on the Selection of Technological and Environmental Dangers*, Berkeley: University of California Press, 1982.

7 Shrader-Frechette, *Risk and Rationality*, p. 52.

8 Thomas Webler, Horst Rakel and Robert J. S. Ross, "A critical theoretic look at technical risk analysis," *Industrial Crisis Quarterly*, Vol. 6, 1992. p. 34.

The research essentially involved a health risk perception survey, complimented by open-ended interviews.

A questionnaire, based on past and ongoing research into uranium mining impacts in northern Saskatchewan, was drafted for the community. It covered many diverse and inter-related environmental health issues that had emerged in the Athabasca region. For comparative purposes, some questions were added from the Health Canada national study of environmental health risk perceptions.[9] This questionnaire was then pre-tested with community members with the assistance of a community researcher, and subsequently revised in response to their concerns. The final version covered contemporary cultural patterns (i.e., land use activities and country food consumption) and the following environmental health risk areas: 1) land use activities, 2) everyday living activities, 3) medical treatments/procedures, 4) global environmental impacts, and 5) uranium mining dangers.

A sample framework was then established. The band membership list was updated to best reflect the on-reserve population as of July 1993. This population was then divided into the following age groups: a) 18-25 years, b) 26-39 years, c) 40-54 years, and d) 55 years and older. These age groups were then divided by gender to ensure that men and women had an equal opportunity to participate in the survey, and to secure a representative sample of the adult population. A sample of 100 adult community members (18 years and older) was determined as representative of this community. Lists of names were then generated to reflect these age and gender groups. With the aid of these lists, community members were approached and asked to participate in the study.

A sample of 105 people was finally attained of which 63% were randomly selected and 37% were surveyed in an opportunistic manner. When compared across age, gender, and educational lines, no significant differences between the random and the opportunistic group were found. As a result, we feel confident that this sample is representative of this community. Of the 105 community people who responded to the survey, 51.4% were women and 48.6% were men. A very large majority of this group (73.3%) were between the ages of 18 and 39 years; 26.7% were 40 years or older.

We also conducted open-ended interviews to attain a greater understanding of the issues and perceptions concerning Uranium mining impacts. Twenty community members agreed to discuss their sense of their history on the land, their opinions of uranium mining, and their thoughts on what is a risk or danger to their health. For instance, stories of land use activities or impacts of uranium mining were recorded to get a better sense of what was considered dangerous or not dangerous. These interviews essentially provided the social and cultural context to situate perceptions of these developments and other Western societal impacts. Additional documentation and literature was gathered to further locate these impacts in a broader context. Our analysis of this material is framed in the following way.

### 1.2 Framework of Analysis

[9] Health Protection Branch. Health Risk Perception in Canada. A Research Report to the Department of National Health and Welfare 1993.

Our analysis begins with an historical review of the relationship of the Lac la Hache First Nation with the Federal and Provincial government. This review covers the creation of reserve lands to make way for industrial developments and new settlements, as well as the erosion of the aboriginal people's relative autonomy over their economy and their way of life. This development is also examined in relation to such industries as the fur trade, the commercial fishery, and the uranium mining industry. It is proposed that the fur trade and the commercial fishery largely complimented the traditional knowledge system of the Athabascan Denesuline - the “people of the barrens”. The knowledge generated in pursuit of these activities essentially complemented traditional forms of cultural rationality. Uranium mining, however, alienated these knowledges and encroached upon their traditional land in ways that were not complimentary to indigenous use of the land.

The community is then profiled to illustrate the importance of traditional land use activities. In this discussion, it becomes apparent that their long association with the land has led to an accumulation of observations that provide the basis for a form of cultural rationality that can situate the health impacts of uranium mining. Following this discussion is a section describing biophysical impacts and bio-accumulation effects of uranium mining, as discussed by science, government, and industry. The next section describes the way in which the community of Wollaston Lake perceives risks from such developments. Comparisons are made within the context of traditional land use activities and in relation to contemporary sources of risk. The discussion also examines the link between local and global health risk discourse. The overall objective is to ascertain to what extent the production of a local discourse on health risks is tied to community-based risk assessment, management and communication activities. There is also an attempt to determine to what extent community discourse on risk is related to discourses generated from outside the community.

## 2.0 Geopolitical Boundaries and Economic Development

The community of Wollaston Lake is located in Northern Saskatchewan within a region commonly known as the Athabasca. This region is part of a Sub-arctic area that covers most of Canada as well as Alaska's interior.[10] Coniferous woodlands of mostly pine, spruce, fir, aspen, willow and birch are found throughout this area along with many lakes, ponds, swamps, bogs, rivers, and streams. Lake Athabasca is one of many large lakes that form its landscape. Wollaston Lake, a somewhat smaller lake, is located in the north-eastern corner of the province, and this is where the Lac la Hache First Nation settled.

The community of Wollaston Lake is located approximately 700 km north of Prince Albert, Saskatchewan. It is situated on the east shore of Wollaston Lake on Welcome Bay. The community spatially follows the contours of the land and the bay. Household clusters are predominant on the north-east and north-west points, and the bay naturally divides them. A road following the shoreline connects these clusters. The community is further divided by federal and provincial jurisdictional boundaries. According to federal surveys, the north-west and north-east points fall within the Lac la Hache reserve lands (which extend north-east out towards Fidler Bay and then inland). The provincial Hamlet is what connects the north-west reserve lands to those on the north-east side of the bay.

[10] Carl Waldman, *Atlas of the Northern American Indian*, New York: Facts on File Publications, 1985.

The Athabasca Denesuline are also know as the Ethen-eldeli - "the Caribou Eaters" because of the overwhelming importance of the caribou to the Chipewyan people.[11] The Denesuline settled in this region because of the caribou, and today, they contend that their land and everything associated with it is not limited to or by these reserve boundaries. This understanding has long been the perception of the Lac la Hache people. During the field research, Elder Louie Benoanie stated that the Lac la Hache people may have negotiated an adhesion to Treaty 10 back in 1907 two years after the Province of Saskatchewan was established, but that negotiation process had not involved dislocation from the land:

> *The only life the people had was hunting, fishing and trapping so they figured if they moved here they would still be spread out in the North so they could make use of all the land ... When people started moving out here in the 1950's the people who control the money [i.e., government] drew a line for the reserve that would be given to them ... But before, the people were warned by one half of each [i.e., Metis]. He told the people that if you take the money meaning - if you sign the treaty, some time in the future things will be closed from you. Even setting up nets. There will be a limit to the length of nets and a time to fish ... The people thought that if it is going to be that way, we should not take the money - sign the treaty. Then they started talking about it. If we cannot have access to anything in our land, we cannot take anything. If they are going to talk to us about our land in that way, we will not take anything from them. Somebody said the land that you live on is not going to be talked about. Everything about how you live on fish, birds, animals are not going to be talked about anyway. As long as the sun is shining and the rivers are flowing, you will be like children of the royal. Then they agreed because they said that they would not take anything away from them and that they would not talk about the land that they live on and on what we survive on.*

Then like now, the land was essential for well-being, along with the right and freedom to use, occupy, and culturally manage it at one's discretion.

The territory of the Athabasca Denesuline extended south towards Cree Lake of the Saskatchewan interior, west towards Alberta, north to the shores of Dubawnt Lake of the North-West Territories, and east to the Hudson Bay shoreline in northern Manitoba. The land base of this territory provided the people of Wollaston Lake with country food such as berries, caribou, moose, birds, and fish, along with plant medicines, fuel, clothing, and spiritual well-being. A comment made by Louie Benoanie and cited in the Athabasca Denesuline Inquiry (1993) best summaries this relationship with the land:

> *A lot of people lived on this land for a long time ... And some of the people even though they live in the south here, they would still travel north for trapping, hunting, to carry on traditional practices. That's how people lived on the land in those days; there were no boundaries. They traveled all over. Because they were told in the treaties that this was your land, you are to live on the land as you feel. That's what we were told and that's what we continue to do.*[12]

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[11] *Athabasca Denesuline Inquiry into the Claim of the Fond du Lac, Black Lake and Hatchet Lake First Nations*, December 21, 1993, pp. 13-4.

[12] *Ibid.,* p. 17.

However, by the turn of the century, the Dominion Government of Canada expressed an interest in these lands. As early as 1892 and 1894, members of the Geological Survey of Canada began mapping the development potential of this region. During these surveys, there was little consideration given for Aboriginal proprietary claim to the land, as understood by Aboriginal people. The only knowledge of interest to the surveyors was the knowledge of what the land could yield in terms of development potential. As a result, the surveyors only expressed a selective interest in the Denesuline and their management of their territory. The surveyor Tyrrell, for instance, approached the Denesuline along the Fond du Lac River to recruit guides to map out the trip to the barren lands (North West Territory), which is located just north of Lake Athabasca. The Denesuline may have shared their knowledge of the land, but they also expressed a form of resistance, which is based on indigenous territorial knowledges:

> *During the evening most of the Indians paddled across to where we were, and from some of them sketch-maps and useful information were obtained; but their attention was chiefly devoted to filling our men with alarming stories of the fearful dangers and certain disasters which we would encounter should we attempt to pursue the route we were following. They said we would meet with great impassable canyons, and that the country through which it led was inhabited by savage tribes of Eskimos, who would undoubtedly eat us. These and similar stories produced a deep impression on the minds of some of our men ...*[13]

The Department of the Interior (Canada) sponsored the Geological Survey and other data collection activities to ascertain natural resource potential and to determine whether certain lands were suitable for settlement.[14] By 1914, this Federal department gathered all available information on the natural resources of the "unexploited" regions of northern Canada. Chambers best described the intent behind this collection of data:

> *While the trend of immigration is turning northward, the eyes of the capitalist are attracted in the same direction. Information concerning the resources of the country once ignored is now sought for. Facts about the climate, the soil, the timber, the rivers, the lakes, the minerals, the fish, the game obtained at the risk of life and limb by fur trader, explorer, missionary, geologist and sportsman, even those facts regarded not so long ago as merely interesting, have now a practical value.*[15]

What was evidently missing from this compilation of knowledge was the full participation of indigenous peoples. When there was participation, any knowledge contributed by Aboriginal people was transformed by fur traders, geologists, and government officials into a knowledge base that would primarily serve non-indigenous interests. There was also no assessment done on what impacts would follow the dissemination of this knowledge.

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13 J. W. Tyrrell, *Across the sub-Arctic of Canada: A journey of 3,200 miles by canoe and snow-shoe through the Barren*, Toronto, Ontario: W. Briggs. 1897. p. 71.

14 Department of the Interior (Canada), *New Northwest Exploration: Report of Exploration by Frank J. P. Crean in Saskatchewan and Albert, North of the surveyed area, Seasons 1908 & 1909*, Ottawa: Government Printing Bureau, 1911.

15 Ernest J. Chambers, *The Unexplored West: A compilation of all available information as to the resources of Northern and Northwestern Canada*, Ottawa: Department of the Interior - Railway Lands Branch, 1914., p. v.

A major criticism of these and other acts suggests that there had been no place in Western society's idea of progress for Aboriginal proprietary knowledge of the land.[16] Indeed, according to Canadian law, the land surrounding the community of Wollaston Lake is still treated as either unoccupied Crown land or occupied Crown land that has undergone a licensing process. In short, the Government, through such concepts of law, transformed the land into the exclusive jurisdiction of a mining company, forestry company, hydro-electric company, or wildlife management block of a department of natural resources. This transformative process, until the mid-1980s, had been legitimised in the courts through case law, resulting in Aboriginal knowledges to be undervalued or even negated as valid knowledge.[17] Aboriginal land claims, however, have attempted to undo this somewhat entrenched way of thinking.

Like many other First Nations people, the Athabasca Denesuline conducted their own land use and occupation study in 1993 to support a land claim that sought to secure their Treaty Rights north of the 60th parallel. This claim primarily contested the jurisdictional boundaries established in the Nunavut Agreement, which emerged after a lengthy negotiation process held between the Inuit of the Eastern Arctic and the Federal Government. The land use and occupation studies of the Inuit, the Denesuline, and other Aboriginal peoples are supported by the internal consistencies of traditional land use knowledge shared by hunters, trappers, fishermen, and their families.[18] The objective of this production of knowledge was to demonstrate that they had, since time immemorial, used and occupied the lands in question as a sovereign people and that they should continue to do so.[19] A product of the Athabasca Denesuline study was the following map (Figure 1) which illustrates their extensive traditional land use territory of which Wollaston Lake and the "reserve" lands of the Lac la Hache people are just a part:[20]

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16 Rick Riewe, "*Environmental Glastnost and the Great White North: Ecological Impacts on Northern People*," in Rick Riewe and Jill Oakes (Editors), *Human Ecology: Issues in the North*, Edmonton: The Canadian Circumpolar Institute, 1992., pp. 127-8.

17 Ken McNeil, *Indian, Hunting, Trapping and Fishing Rights in the Prairie Provinces of Canada*, Regina: University of Saskatchewan Native Law Centre, 1983.

18 Hugh Brody, *Maps and Dreams*, Vancouver: Douglas & McIntrye, 1981., pp. 146-7. Also see Martha Johnson, *Lore: Capturing Traditional Environmental Knowledge*, Ottawa: International Development Research Centre (and the Dene Cultural Institute), 1992 and Carl Hrenchuk, *Native Land Use and Common Property: Whose Common?*, in Julian T. Inglis (Editor), *Traditional Ecological Knowledge: Concepts and Cases*, Ottawa: International Program on Traditional Ecological Knowledge and the International Development Research Centre, 1993., pp. 69-79.

19 Richard H. Bartlett, "*Reserve Lands*," in Bradford W. Morse (Editor), *Aboriginal Peoples and the Law: Indian, Metis and Inuit Rights in Canada*, Ottawa: Carleton University Press, 1985., pp. 467-578.

20 *Athabasca Denesuline Inquiry*, p. 11.

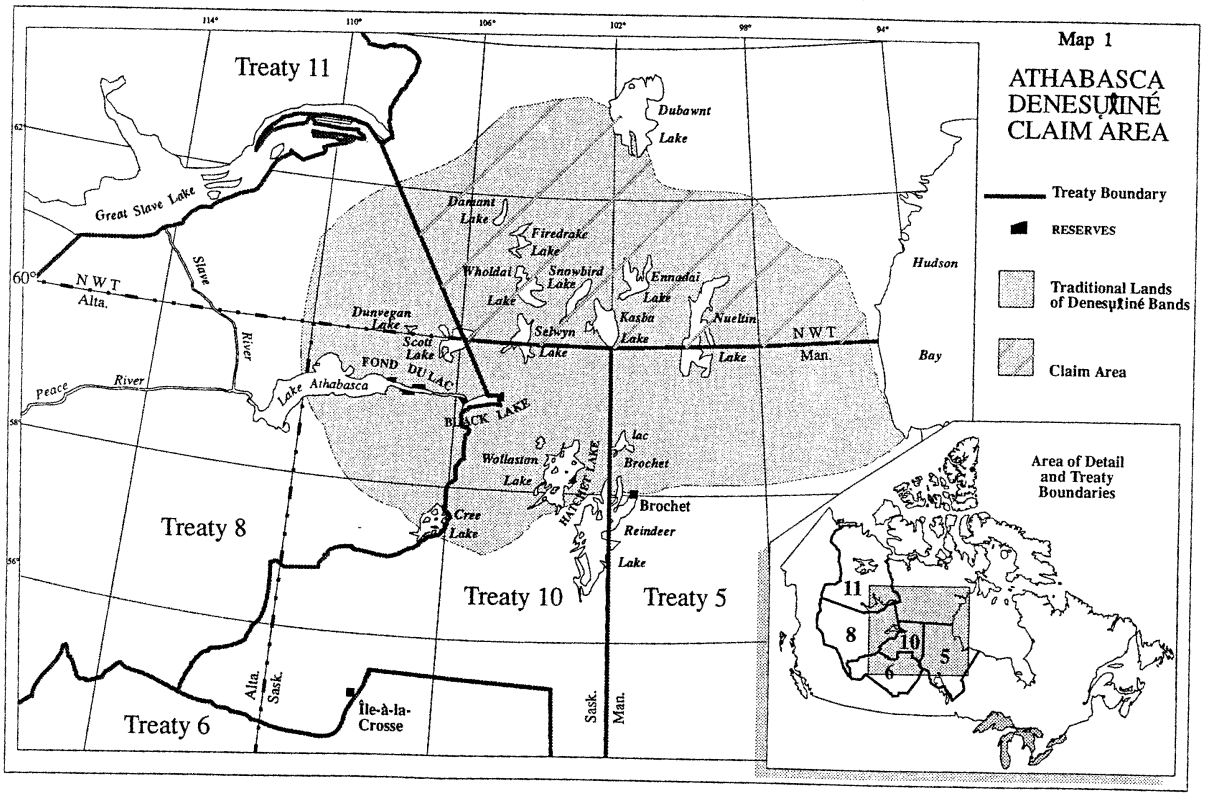


**Figure 1:** Traditional Lands of the Athabasca Denesuline: Hatchet Lake, Black Lake, and Fond du Lac First Nations of Saskatchewan, and the Northlands Band and the Barren Lands Band of Manitoba.

Below the 60th parallel, the vast majority of Aboriginal peoples have little or no access to a land base that can support them economically. This development is a primarily a by-product of their relationship with the Provincial and Federal governments. In the pre-contact period, land use management occurred through Denesuline inter-and-intra-family groups. It was also managed through conflicts that periodically arose between themselves and the Inuit and the Cree. The Treaty process, as previously mentioned, was not perceived as an instrument that alienated their rights to the land. However, the early Governments of Canada and the provinces, had thought otherwise. By the 1930s, the Federal government initiated a series of acts that confined the aboriginal people to limited tracts of land which, at that time, were perceived as having little or no value. Inventories of what the reserve lands had to offer were conducted in most or all reserve communities. As these surveys proceeded, other surveys were conducted to assess the natural resource potential of other lands, especially in the Provinces of Manitoba, Saskatchewan and Alberta, through the Natural Resources

Intelligence Service of the Federal government.[21] This knowledge was important for the Government of Canada was negotiating the transfer of ownership over natural resources to these provinces in exchange for public lands that could be used to establish reserve lands.

In 1930, the transfer occurred when then British North America Act was amended to transfer title of public lands to the Government of Canada in the right of the provinces. Ownership of natural resources were transferred from the Government of Canada to the prairie provinces, and in return, each province would make unoccupied Crown land available to the Government of Canada so they could fulfil any outstanding land entitlements to Aboriginal peoples. This obligation was set out in the Natural Resources Transfer Agreements, signed in 1929 and 1930 between Canada, Alberta, Manitoba and Saskatchewan.

The setting aside of reserve lands was very much a process of fragmentation that was fraught with problems. Not all of the Aboriginal people lived a settlement life. In the Athabascan Denesuline Land Claim, it was reported that attempts to negotiate reserve lands were complicated by their traditional use of the land.[22] Indeed, from the 1930s through to the 1960s, the Denesuline spent much of their life travelling from camp to camp, from trading post to trading post, occupying and utilising their extensive territory as they had always done. The Government of Canada supported this way of life because it was "cheaper to allow Indians to fend for themselves" when game was plentiful and no settlements or developments in the area would disrupt their traditional life.[23] The reserve system, as a result, would only be implemented when a traditional way of life was not possible. Reserve lands would only be set aside when hunting areas were required for non-Aboriginal settlements or for "economic developments" like mining.[24]

As a result, trading posts such as Brochet and Fond du Lac were treated by the Denesuline as transitory places that embodied those elements of Western society that could be readily integrated into their way of life. For instance, the Denesuline would return to these "meeting places" only to receive provisions, practice the religion of the missionaries, exchange stories with other family groups, educate their children during the summer months, or pick up their Treaty monies. By the 1950s and 1960s, the Government was of the opinion that reserve lands have to be established throughout

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21 Kent McNeil, *Indian Hunting, Trapping and Fishing Rights in the Prairie Provinces of Canada*, p. 20. See Department of the Interior (Canada), *New Northwest Exploration: Report of Exploration by Frank J. P. Crean in Saskatchewan and Alberta, North of the surveyed areas, Seasons 1908 & 1909*, Ottawa: Government Printing Bureau, 1911; Department of Interior (Canada), *Natural Resources: A Brief compilation bearing on the Natural Resources of the Prairie Provinces*, Ottawa: Natural Resources Intelligence Brand, 1919; Department of the Interior (Canada), *The Province of Saskatchewan, Canada: Its Development and Opportunities*, Ottawa: Natural Resources Intelligence Branch, 1919; Department of the Interior (Canada), *Natural Resources of the Prairie Provinces*, Ottawa: F.A. Acland Printer to the King's Most Excellent Majesty, 1925;

22 *Athabasca Denesuline Inquiry*, p. 43.

23 J. L. Tobias, "*Indian Reserves in Western Canada: Indian Homelands or Devices for Assimilation?*" in Bruce Cox (Editor), *Native People Native Lands*, Ottawa: Carleton University Press, 1991., pp. 148-57.

24 *Ibid.*, p. 149.

northern Saskatchewan. As reserve lands were set aside, the Athabascan Denesuline expressed their concern with the possibility that they may be restricted to these lands in the future. In the case of Stony Rapids, the Denesuline were given assurances that they would be able to continue to "camp, live, fish, trap, and travel" as in the days prior to the reserve lands.[25] Many of the Denesuline family groups continued their traditional way of life, and it was not until the mid-1960s that they finally settled within permanent settlements on a year round basis.

The Government decision to establish reserve lands coincided with the development of the commercial fishery and the uranium mining industry in this region. Both these developments, like trapping, would impact the life of the Denesuline. Some of the impacts would be beneficial and complimentary (i.e. trapping and commercial fishing), whereas others would never achieve that level of integration (i.e. uranium mining). Today, the potential impacts of uranium mining are being assessed, and there is concern that uranium mining may impact their health and their economic and historic relationship with the land; a relationship that fur traders first attempted to exploit back in the 18th century.

### 2.1 Trapping and the Fur Trade:

The fur trade (with Western Society) dates back to the time when the North West Company and the Hudson's Bay Company competed for furs throughout an extensive land base (Rubert's Land) that covered much of Canada and parts of the United States. In the 18th and 19th centuries, the fur trade expanded west in search of new trading relationships. Peter Pond (1778-79) of the North West Company travelled to Lake Athabasca and established Fort Pond in 1782 and 1785.[26] In 1791, Philip Turnor, Malcolm Ross and Peter Fidler of the Hudson's Bay Company explored the Lake Athabasca region. Malcolm Ross and David Thompson (HBC) later returned to secure a trading relationship with the Denesuline. In 1796, Thompson explored the Wollaston Lake area in search of another route to Lake Athabasca, and found that Wollaston Lake to be too treacherous for their canoes, so it was abandoned for more favourable routes.[27]

By the mid-1800's, the Hudson Bay Company had established a presence in Northern Saskatchewan, and trading posts were built in Fond du Lac and Lac du Brochet. The Oblate missionaries, with the blessing of the Hudson's Bay Company, soon followed and established the missions of St. Peter's (1847) in Lac du Brochet and Our Lady of Seven Dolours (1853) in Fond du Lac. The intent was to extend Catholicism to the Athabascans and to forestall the advancement of Protestant practices to the north.[28] By the 20th Century, the Oblate Missionaries had established a presence in this

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25 *Athabasca Denesuline Inquiry*, pp. 42-4.

26 *Isaac Ogden, Quebec to David Ogden, London; An extract of a Letter from Isaac Ogden, Esq. at Quebec, to David Ogden, Esq., of London, dated Quebec, 7th November, 1789* in Henry R. Wagner, *Peter Pond: Fur Trader & Explorer*, Yale University Library, 1955., pp. 94-5.

27 Eric W. Morse, *Fur Trade Canoe Routes of Canada, Then and Now*, Toronto: University of Toronto Press, 1969.

28 M. M. C. McCarthy, *The Missions of the Oblates of Mary Immaculate to the Athapaskans 1846-1870: Theory, Structure and Method*, Winnipeg: Ph.D Dissertation - The University of Manitoba. p. 181.

region, and the Hudson's Bay Company had transformed the Athabasca Denesuline's territory into the Athabasca, English River and Churchill trading districts.[29]

The administration of Rubert's Land, however, had been transferred to the Dominion of Canada (1870), which opened up of the north to other fur trading interests. By the turn of the century, American interests expanded north into the Athabasca-Mackenzie region. Other raw fur trading operations were established in Fort Chipewyan, Fond du Lac, Fort Resolution, and Fort Rae. The Lamson and Hubbard Canadian Company Ltd. established a presence, as did the Northern Trading (Transportation) Company.

Throughout the history of the fur trade, the fur trading companies were greatly dependent upon the Aboriginal peoples.[30] Their traditional knowledge systems made survival from season to season possible. Pre-existing trade routes and established relationships (based on mutual respect or conflict) with various Aboriginal groups were also in place.[31] To procure furs, the companies had to promote trapping as a way of life. Hunting and trapping equipment were provided to the Dene and Cree. However, the overhead costs of this policy increased over time forcing the companies to reconsider the merits of this policy. At the same time, Aboriginal peoples grew reliant upon this form of economic assistance. Nevertheless, the argument can be made that the Denesuline were not overly dependent on the fur trade. Historically, they had little regard for fur traders or geological explorers such as Tyrrell.[32] Their involvement in the fur trade should not imply then that they accepted European notions of trade. The Aboriginal peoples already had their own system in place, and the fur trade was just another way of procuring trade goods to supplement their way of life. Indeed, the Hudson's Bay Company archives have shown, as Smith (1988) has argued, that their way of life was dictated by the migratory patterns of the caribou and not by the demands of the fur traders:

> *If caribou were scarce, the Chipewyan went to where they could be found, and trapping and fur returns declined. If caribou were abundant, trapping results returned to normal, although "normal" reflected the limited number of trade goods the Chipewyan considered necessary.*[33]

In the Wollaston Lake area, the Denesuline continued to follow the caribou herds; and with no favourable transportation routes through their lands, they continued to exclusively manage their territory as they had always done. The following maps illustrate this point. A regional characterisation of the fur trade, as constructed through the Hudson Bay Company accounts, illustrates that their lands were still acknowledged as

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29 Arthur J. Ray, *The Canadian Fur Trade in the Industrial Age*, Toronto: University of Toronto Press, 1990.

30 *Ibid.*, p. 199.

31 Arthur Ray, *Indians in the Fur Trade*, Toronto: University of Toronto Press, 1974.

32 Paul C. Thistle, *Indian-European Trade Relations in the Lower Saskatchewan River Region to 1840*, Winnipeg: The University of Manitoba Press, 1986., p. 45-7. Also see James W. Tyrrell, *Across the Sub-Arctic of Canada*, p. 55-9.

33 James G.E. Smith, *"Chipewyan and Fur Trade Views of Rupert's Land,"* in Richard C. Davis, *Rupert's Land: A Cultural Tapestry*, Waterloo: Wilfred Laurier University Press, 1988., p. 135.

"Remote Traditional" areas throughout the late 1800s and well into the 1920s (as illustrated in Figure 2 and Figure 3).[34]

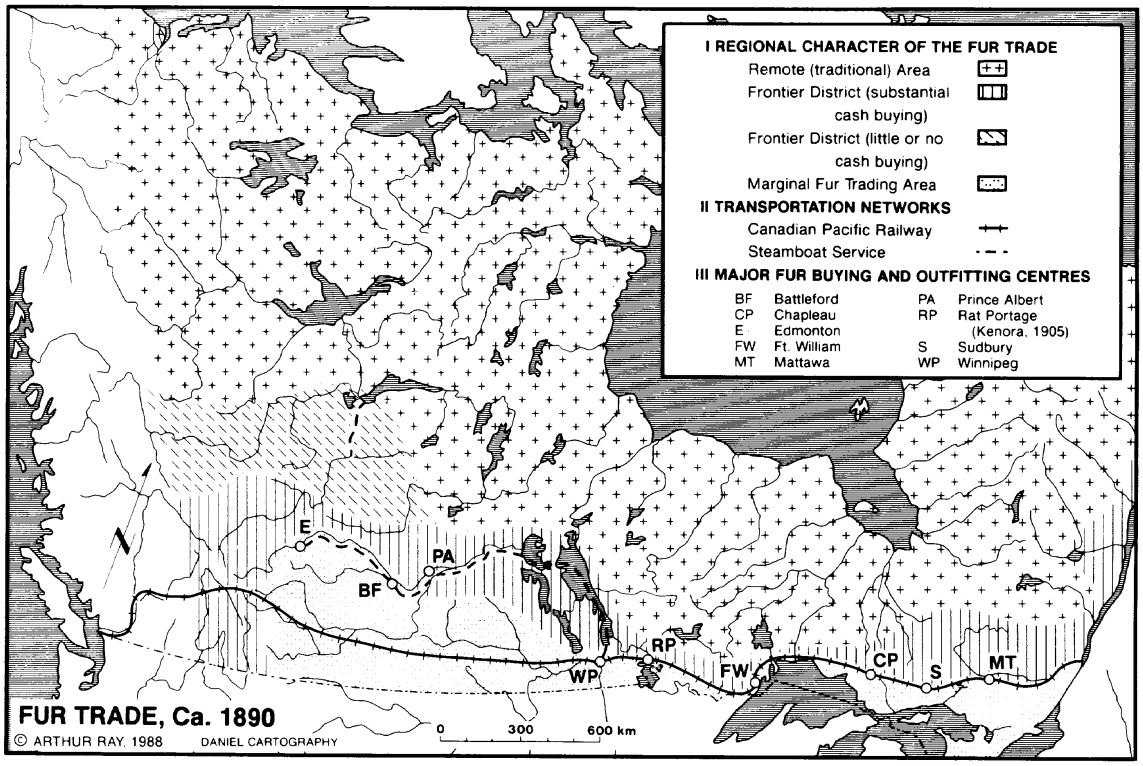


**Figure 2:** Regional Character of the Fur Trade (Ca. 1890).

[34] Arthur J. Ray, *The Canadian Fur Trade in the Industrial Age*, Toronto: University of Toronto Press, 1990., p. 75.

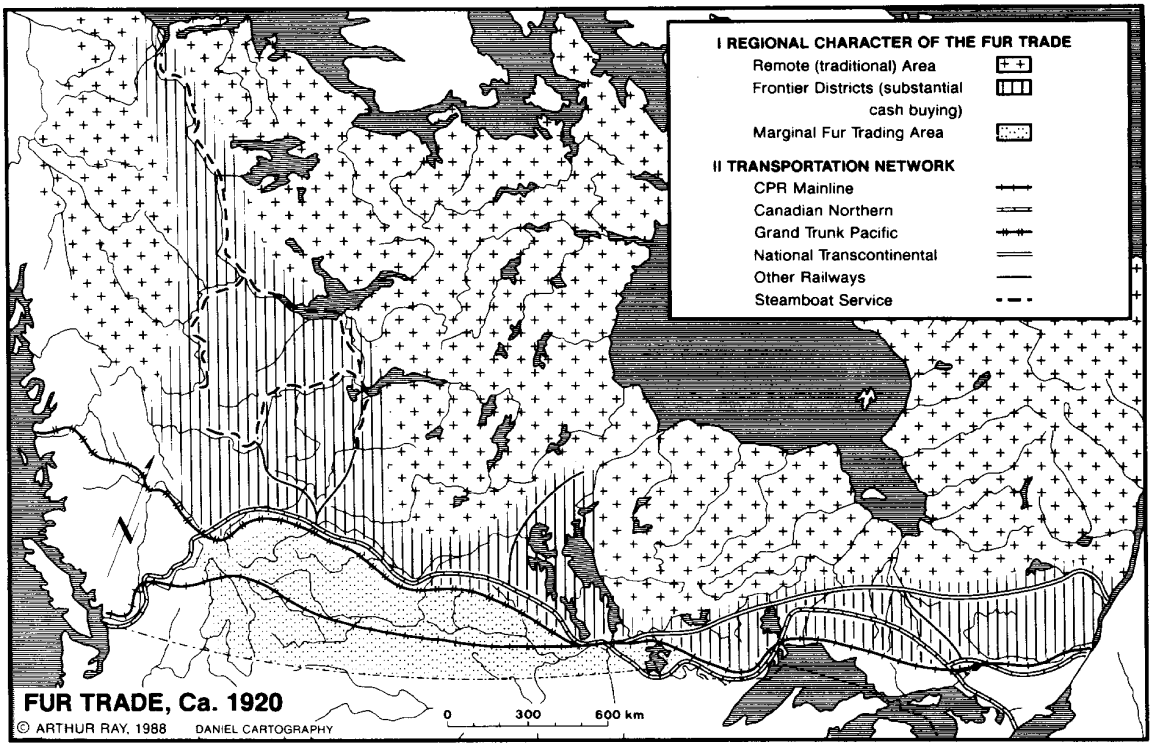


**Figure 3:** Regional Character of the Fur Trade (ca. 1920)

The fur trade boomed well into the 1920s, and several trappers benefited from high fur returns. In a statement of furs traded in 1917, over one million dollars had been paid to trappers in Saskatchewan alone.[35] Fox pelts ranged from $30.00 (white fox) to $200.00 (silver fox) per pelt. Elder Jimmy Dzeylion (1993) of Wollaston Lake reflected on what trapping offered them in the late 1920s:

> *My parents lived way up north where there are no trees ... I was 8 years old. That's where my father used to trap around that area. We lived up there for three years ... In those days those white foxes use to be worth a lot of money and that was what he was after. White foxes, wolves, and different foxes used to be worth a lot of money in those days.*

However, the Aboriginal peoples, by the 1930s, no longer exclusively controlled trapping in this region. Many white people moved into the traditional trapping areas of the Cree and the Denesuline and took up trapping to survive the depression. According to Ray (1990), this development fragmented the traditional trading stronghold of the indigenous people and contributed to further encroachments into their way of life, some of which were disregarded:

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[35] Kitto, *The Province of Saskatchewan*, p. 133.

> *… the Fur Trade Review reported that there were more men in the bush than ever before prospecting and trapping because jobs were scarce. This observation serves to highlight another problem. Fur trapping, often combined with trading, served to grubstake other primary pursuits such as logging, mining, and prospecting. The growing use of the bush plane in the 1930s opened most of the more remote areas of the north to white trappers for the first time, breaking the Indian trapping monopolies there. In some areas, such as in northern Saskatchewan, these newcomers worked out satisfactory accommodations with local Indian bands. In fact, the Chipewyan of Patuanak, Saskatchewan, regarded these depression-era invaders as entertaining anomalies or hotet'stini (bushmen).*[36]

In the late 1920s and 1930s, the Aboriginal peoples still exercised much control over their trapping regions. However, government encroachments soon followed in the wake of the Natural Resources Transfer Agreement (1930). By the 1940s, the prairie provinces extended their constitutional right to administer these commercial activities and others related to natural resource extraction.[37] In Saskatchewan, a co-operative administrative system was advocated, which was in keeping with the philosophy of the co-operative movement led by the C.C.F. government of T.C. Douglas. At a Special Session of the Saskatchewan Legislature (1944), legislation was introduced to establish the Department of Co-operation and Co-operative Development. The Hon. L. F. McIntosh, Minister, explained that

> *[the] Act empowers the minister to take measures he deems advisable "for the encouragement generally of co-operation and co-operative development in the province," and particularly to "encourage and assist in the organisation of co-operative enterprise" among those who wish to do so "on a non-profit, co-operative self-help basis."*[38]

Following the passage of this Act, five Crown corporations were established. The Fish Marketing Service, Saskatchewan Timber Board, Fur Marketing Service, Government Trading, and Government Airways were created to eliminate or minimise the profits of private dealers. By the 1950s, fish and fur marketing services were firmly established throughout northern Saskatchewan, and a government co-operative store was built on Hungary Island (i.e., Moose Island); a large island that is located in the southern basin of Wollaston Lake.

As these developments unfolded, the fish and fur trading monopoly of the Athabascans', like other indigenous peoples of the Prairies, had withered. The Denesuline, as a result, were restricted to playing a minor role in the maintenance and development of their economic interests. Trapping, nevertheless, was still perceived as a good way of life, according to Elder Louie Benoanie (1993):

> *I use to take my furs to an old guy and then after that to the store built at Moose Island. Even though the store didn't buy fur, they gave out an advance and then*

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36 Ray, *The Canadian Fur Trade in the Industrial Age*, p. 117.

37 Ibid., p. 168.

38 Saskatchewan, *Plans for Progress: A Summary of Legislation passed at the Special Session of the Saskatchewan Legislature, October 19 - November 10, 1944*, Regina: The Bureau of Publications - Legislative Building, 1944., p. 13.

*they forwarded the furs to some place in Winnipeg. That was good, and if the fur was good, they would pay the people.*

The global anti-fur trade movement, however, turned what was left of this way of life into an act of economic futility. Anti-fur campaigns disrupted the market of furs by transforming it into an inhumane activity best to be avoided in the name of animal rights. Communities, like Wollaston Lake, have chosen to resist this movement and have actively defended trapping as a way of life.[39] This way of life and the maintenance of this knowledge base, although altered by time and demand, still continue today. It persists as a form of cultural rationality that is based on close observation of the subtle changes that the environment can take. For example, at the end of field research in 1993, families traveled north to their camps along the Cochrane River to trap. The number of families that go may vary from year to year. However, a trapping assistance program had been implemented to make this activity a viable alternative to a welfare existence, and to extend their rights to the land.

Nevertheless, there is the recognition that such programs, which support the future of this knowledge base, can be disrupted not only by financial considerations, but also by uranium mining. To date, a number of trapping families who had traditionally trapped on the west side of Wollaston Lake had been impacted by both the Rabbit Lake and Eagle Lake uranium mines. Only one family, however, had received a small amount of compensation for the disappearance of their trapline. Other families, at the end of the research period, were still struggling to get compensation for their own loss. Other community members wondered whether this impact would be felt by other families who trap throughout the Cochrane River system; a development, according to one Band Official (1993), which may occur given that a number of families had already been impacted by both mining and exploration work:

*The trappers that trap there ... you know it can impact on them. There are roads all over the country and when you are trapping ... you don't want to make too many tracks. So the trappers that were trapping in that area [around the mine and Hatchet Lake] kind of got turned down, and they didn't bother to trap too much because they said there was too much exploration work going on ... There are 4 to 5 families who are effected by that.*

This struggle to deal with dislocation and lack of compensation had also carried over into the Denesuline's subsistence and commercial fishing activities.

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[39] Barry Barton, *Defending World Markets for Fur: Aboriginal Trapping, the Anti-Harvest Movement and International Trade Law*, in Kerry Abel and Jean Friesen, *Aboriginal Resource Use in Canada: Historical and Legal Aspects*, Winnipeg: University of Manitoba Press, 1991., pp. 329-30. For example, a member of the European Parliament voiced his support of the Canadian fur trade while in Saskatoon. See Winnipeg Free Press, *Fur Pelt Sales Touted*, Saturday May 1, 1993. This visit had been announced by Edward Benoanie, a Lac la Hache Councillor, on April 14, 1993 but within the context of assessing proposed uranium mining in Northern Saskatchewan. See *Transcript of the Public Hearings held by the Joint Federal-Provincial Panel on Uranium Mining Development in Northern Saskatchewan on the Dominique-Janine Extension, McClean Lake Project, and Mid-West Joint Venture*, Wollaston Lake, April 14, 1993., p. 96. On May 6, Gordon Peters - Ontario regional Vice-Chief of the Assembly of First Nations commented at the North American Fur and Fashion Exposition that the "*EC has not considered the socio-economic impact on our communities and families*." See Winnipeg Free Press, "*Trappers under pressure to switch to more humane, quick-kill devices*", Thursday, May 6, 1993.

## 2.2 Subsistence and Commercial Fishing

Commercial fishing was another outside market driven activity that had complimented the traditional land use activities of the Dene and Cree. Their knowledge base of this activity was first recorded in 1796 by Thompson (HBC) while wintering with the Chipewyans on Reindeer Lake, which is located south east of Wollaston Lake:[40]

> *When the land is scarce of deer, or long calms come on, they take to the lakes to angle trout or pike, at which they are very expert, and although they use our hooks, for large fish [they] prefer their own, which are of bone, and a fish caught with their bone hooks does not get loose as sometimes happens to our hooks ... One day, as usual, I had pierced the ice with new holes or cleared out the old holes with an ice racket. An old Chipewyan Indian came to me... He remarked ... that I came too soon and stayed too late; that the trout took bait only for a while after sunrise to near sunset, but that about noon was the best time ... I followed the Chipewyan's advice, and was more successful.*

After hunting, subsistence fishing formed an integral part of the Denesuline knowledge base, which they drew upon to procure food for survival when game was in limited supply. It also had economic value. Fish was traded at fur trading posts, and it was also given to missionaries when their food was in short supply.

The Dominion of Canada, during the geological survey, noted the potential of the fresh water lakes of northern Saskatchewan. In 1919, the Natural Resources Intelligence Branch described this region as ideal for the "exploitation of inland fresh water fisheries."[41] Transportation, however, would be a problem. In their records, it was recorded that:

> *Freighting at ... any season of the year is out of the question owing to lack of any suitable roads and the impossibility of maintaining an adequate refrigeration service ... These obstacles ... prohibited the exploitation of such tremendous areas as Reindeer, Wollaston, Hatchet, Black and Cree Lakes and Lake Athabasca, bodies of water in the far northern regions of the province most lavishly stocked with many varieties of fish of unsurpassed quality and generous size.*[42]

In the 1940's, the Saskatchewan government extended the commercial fishery, along with a transportation system to the far northern lakes. The commercial fishery initially employed mainly white farmers from the South. However, the Denesuline, Cree and the Metis were not the initial or major beneficiaries of this development even through a major philosophical shift had occurred:

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40 David Thompson, *Travels in Western North America, 1784-1812*, Victor G. Hopwood (Editor), Toronto: MacMillan of Canada, 1971., pp. 131 and 143.

41 F. H. Kitto, *The Province of Saskatchewan, Canada: Its Development and Opportunities*, Canada: Department of the Interior - Natural Resources Intelligence Branch, 1919., p. 133.

42 *Ibid.*, p. 137.

*... with new licensing regulations the northern lakes [would be] reserved for northern residents. In the absence of white men from the South, Indians and Metis could become fishermen and share in the industry's advance.*[43]

The extension of the commercial fishery to northern Saskatchewan resulted in the building of a government store on Hungary Island (Moose Island) to service white fishermen who were brought up from the south to commercially fish the lake. According to Elder Jimmy Dzeylion (1993), the Denesuline took an interest in what they could gain from this development:

*When the white men came, we worked with them. When these white people came we didn't have any nets or anything to fish with. They were the ones that brought lots of nets with them, and they were the ones that were fishing. We wanted to fish more too so we worked with them so they would notice that we wanted to fish like them as well ... They treated us fair. You could tell that they cared for us. When we finished ... they would give us stuff that was helpful and stuff that we needed. They would even give a boat and motor to people who needed it when they left for the winter. That's how they treated us, and those people that treated us good are all dead now.*

The Denesuline approached the commercial fishing industry from a knowledge system that secured their survival. After spring break-up, they would travel down from their northern winter camps (which were located along the caribou migration route) to Wollaston Lake where they would fish for both subsistence and the commercial fishery. Throughout the summer, they would inhabit the many islands of Wollaston lake; and according to Elder Eugene Benoanie (1993), some families even stayed the winter to cut ice for the ice house where next years catch would be stored:

*Over there at Moose Island ... that is where I worked long ago in 1952. That is when I worked for the white man. That's when the people didn't move to Welcome Bay yet. There wasn't any settlement here then ... Everybody was living in that area [ie. west side of the lake] because the fishing boat would go there to pick up fish. The fish boat would make rounds around where people lived - around the islands towards Larson Island and possibly down to Gillies to pick up fish. That is how I had seen it. The people would be fishing around these islands and the fish would be brought to certain spots - two, three spots, and the fish boat would come and pick up the fish and take them to Moose Island. I was working helping people weigh fish on Moose Island ... It wasn't for long. Just one summer. I harvested ice there for people too. I harvested ice for the whole winter that year.*

By the fall, many families returned to their winter camps in search of caribou and fur-bearers, while a few families stayed to work for the fishing industry. Father Megret (1993), the very first Catholic priest to serve this community, described this seasonal movement:

*When I got here [around 1949], the people were all nomadic ... In the spring-summer, they got a little bit together, but not all of them. Just the bigger groups. In the fall, they all scattered across the north looking mostly for the caribou. So if the caribou was down this way, they would settle down here for the winter. Probably*

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[43] Helen Buckley, J.E.M. Kew and John B. Hawley, *The Indians and Metis of Northern Saskatchewan: A Report on Economic and Social Development*, Saskatoon: Centre for Community Studies, 1963., p. 32.

*all winter - two, three, or four families together. There was no big village ... In 1949, I took a census, and the population was 110 including children.*

By the mid-1950's, the commercial fishery was well established on Wollaston Lake. However, the existing fish co-operative was not located at a suitable site. A new location for the co-op owned filleting plant and ice house was required. According to Father Megret (1993), the white fishermen were of the opinion that Hungary Island was no longer suitable for an expanding industry, and after much debate, the current Welcome Bay site was selected to serve this industry and to create a new settlement for the white fishermen. In 1956, the settlement took shape with the building of the fish plant. According to Elder Louis Benoanie (1993), this site was not intended to house the Denesuline families, as it does today:

*People didn't live around here before. They were out living on the islands because they were not allowed to stay near here. It was the white fishermen that said that - the white person that was building the fish plant. I lived on the other bay [known as Second Bay].*

Eventually, the Denesuline moved down to the Welcome Bay site from the Cochran River, which is located on the northern basin of Wollaston Lake. According to Father Megret (1993), what prompted their move was the relocation of the first Catholic Church (ca. 1953) which he built near the Cochran River for Easter (i.e., spring) and Christmas meetings. In 1957, he relocated it to Wollaston Post, which helped established Wollaston Post as a Dene settlement:

*... progressively, people started to come here more often. They came here starting in 1959 and 1960 ... Prior, they only came here for the shopping and to sell their furs ... and then they said "You have a house here how about we stay at the post for Christmas." I would say, that by the mid-60's, only then did this place become a village with people living here all the year.*

As the settlement site developed, the Denseuline continued to fish on a subsistence and commercial basis. They also continued to live on the islands at specific sites on lake, which they knew would yield fish. Some of that fishing, according to Elder Jimmy Dezyline (1993) was done on the western side of the lake near the existing uranium mines:

*There was a camp out there in between Hidden Bay and Points North. People use to go there lots with the catch. There are a couple of places on the west side of the lake and on this side of the lake. People use to live all around that area and there would be this big boat to pick up the fish. That boat would come back to town ... From there this plane that would look like it was swimming in the water would take the fish down south.*

Overall, commercial fishing provided a very important source of income for the people of Wollaston Lake. Women worked in the filleting plant, and men went out on the lake to net fish. The filleting plant continued to operate until 1978.

In 1979, however, the fish plant was deemed unprofitable, and it was subsequently closed because transporting fish to Lynn Lake (Manitoba) had become too costly. During the 1980s, a holding and packing plant was built on the Western side of the lake near Barge Landing, and at the end of the field research, it was still in operation. Its location, however, has created a new economic burden which community members

have to carry. They have to transport their fish by boat at their own expense to this new location. From there, it is then transported by truck to southern markets.

Up until the end of the field research, the market for fish was depressed. Commercial fishing, however, had continued. Community members felt strongly that fishing should be sustained as a way of life. Like trapping, it perpetuated an existing knowledge system that secured their survival. As a result, they have actively sought and secured markets for their own fish; and to off set high transportation costs, they have attempted to obtain funding to assist community fishermen. They had also submitted a proposal to government, which presented the merits of a community owned transportation system that would ensure that fish orders are met. While working at revitalizing this industry, they are also debating existing and potential impacts of uranium mining. The following comment of a band government representative summarized the dilemma community member's face with a declining fish industry and one that is expanding:

> *You know we had a major spill [at Rabbit Lake Mine] that was a great concern to the people. Our big fear of what they heard from other people [environmental groups] is that it could effect the fish in the lake, effect the wildlife that feeds along the shoreline like the beaver and muskrat. So there is a big concern to the people. But a lot of people are looking for work [at the mine as well].*

The uranium mining industry has its disadvantageous and advantageous. The physical activities of mining and exploration, such as the construction of mine sites and exploration and drilling sites, are visually apparent on the west side of the lake. Its impact on trapping is also quite evident in that several access roads to exploration sites have cut right through trap lines. The old fish camps are also no longer used because of their proximity to the mine. However, this industry is expanding, and it does offer some forms of employment to young people and those community members who are out of work.

### 2.3 Uranium Mining and Indigenous Participation

At the 1992 EIA scoping hearing into uranium mining, Prince Albert Grand Council (PAGC), on behalf of the First Nations of northern Saskatchewan, made the observation that historically First Nations had little or no input into the development or operation of uranium mines in Northern Saskatchewan:

> *First Nation people have lived off the land in harmony with the environment for generations. We are witnessing disruption to the regional ecosystems. Changes are occurring to the wildlife, fish, air and water. We have a constitutional protected Treaty Right to participate and a valuable contribution to make ...*[44]

They also contended that uranium mining has disrupted the social, physical, economic and cultural health of their people and their land:

[44] Prince Albert Tribal Council, *Presentation Notes to Joint Federal-Provincial Environmental Assessment Review Panel Scoping Session*, Lac La Ronge, Saskatchewan, March 5, 1992.

*Mining companies, federal and provincial regulatory authorities have never adequately addressed the cumulative impacts by northern mining operations on the traditional economic livelihood of Indian people.*

*The traditional pursuits of hunting, fishing, trapping and gathering activities have continued to be eroded by the presence of mine activities impacting reserve and traditional lands.*

Rather than creating economic stability, PAGC has suggested that the industry had created uncertainty and that the people of this region have not enjoyed access to major employment and training benefits. They recommended that if mining and exploration is to continue, First Nation communities should be involved as equal governing partners in all stages of planning, development, assessment, production, and royalty sharing to ensure that their well-being is respected and secured into the future. These recommendations emerged out of the socio-historical context of the uranium mining industry and of governments promoting their interests through these industries.

In the late 1930s, the needs of Western society changed in a political, economic and technological sense. The United States and Germany, and later the Soviet Union, were intent on harnessing atomic energy to solely secure their geopolitical presence in the world through nuclear weapons. At a later time, it was also thought that atomic power could provide a cheap source of energy. This source of energy was uranium, and it was discovered that the Athabasca region of Saskatchewan was rich in uranium deposits. With this discovery, another outside-directed economy made its way into the Athabasca region. This time, however, it did not promote the existing knowledge base of the Denesuline. Instead, the uranium mining industry would rely on an entirely different cultural knowledge system that would transform the region and landscape into an area renowned world wide for the richest and most promising deposits of relatively high-grade uranium ore. Except for a few who guided for exploration teams, worked at the mines, or prospected for uranium ore, the Denesuline were excluded from all levels of this development from the very beginning. Unbeknownst to many, this exclusion delimited their knowledge by not giving them the opportunity to incorporate new ways of thinking into their own system of cultural rationality.

The early beginning of this practice began at the turn of the century when the Dominion Government commissioned the Geological Survey of Canada to record the mineral wealth of Canada. Tyrrell first reported the “economic minerals” of the Athabasca region on behalf of this survey. In 1892 and 1893, he noted the presence of huronian quartzite in several areas along the Northeast side of Lake Athabasca.[45] By 1919, the Natural Resources Intelligence Branch reported the following progress made in the assessment of that regions mineral wealth:[46]

*[the] Fond du Lac district at the eastern end of Lake Athabasca ... gained considerable notice through alleged discoveries of silver ore, and C. Camsell was dispatched to examine the field. His reports were issued in 1915. The work in this area was continued by F. J. Alcock during the following year ... Silver has been*

[45] Chambers, p. 123.

[46] Kitto, *The Province of Saskatchewan*, p. 120 and 128.

*reported at Fond du Lac at the easterly end of Lake Athabasca. A number of claims have been staked, but very little work has been done.*

Mineral exploration continued well into the 1930s. Prospectors and mining companies explored this region and that of the North West Territories (N.W.T.). This time, however, they had a technological advantage. Special air-equipped prospecting companies quickened the race to stake mineral claims. Rather than crawling on the ground over a map grid, a quick over-flight and a stop over to explore interesting outcrops quickly opened up the north to mining interests. With each discovery, a working party trenched and drilled ore bodies and established caches of supplies for the next season.[47] In 1929, it was reported that there were no less than 500 men and 70 planes searching for gold or base metals in the region. In 1930, radium-bearing ores were discovered along silver veins at Great Bear Lake (N.W.T.). This site was later developed as the Port Radium Mine of Eldorado Gold Mines Ltd.

As new discoveries were made, related technological advancements further contributed to the development of the Canadian uranium mining industry. These discoveries helped support an "Allies" weaponry program known as the Manhattan Project, jointly run by the United States, Canada and Great Britain during World War II. This program contributed to the discovery of atomic power, to conflict between nation-states, and to the U.S. government's decision to detonate the nuclear bomb on a civilian population in Japan. Overall, they all contributed to the world nuclear arms race, resulting in the expansion of the uranium mining industry in the 1950s.

In the wake of weaponry development, the movement shifted to include uranium as a commodity for peaceful purposes. In 1965 alone, U.S. power companies ordered twenty-six nuclear plants, compared to the five ordered between 1955 and 1964.[48] Nuclear reactors were also in demand in Europe. When these demands slumped in the 1970s, the sale of nuclear power technology took off in third world countries as oil prices dramatically increased. By 1976, there was tremendous optimism in the benefits of nuclear power, especially in the developing world. Several nuclear power reactors or stations were either under construction, on order, or firmly planned (e.g., 9 Brazil, 5 Egypt, 5 India, 3 Indonesia, 5 Iran, 10 South Korea, 9 Mexico, 3 Thailand, 8 Cuba, and 2 each for South Africa, Yugoslavia, Kuwait, and Libya).[49] This optimism quickly subsided due to high inflation, cost over-runs, and reliability problems. Nevertheless, these developments contributed to a power struggle over who was going to control the supply of uranium for these potential sources of energy.

In North America, several national initiatives contributed to this struggle. In the United States, the McMahon Act of 1946 (also called the Atomic Energy Act) was passed by Congress to establish the U.S. Atomic Energy Commission. It also legislated government control over research and development for both military and peaceful uses of uranium ore products. The intent was to secure atomic power for strictly U.S. authorized interests. In fact, the Act denied other countries access to knowledge,

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47 G.G. Duncan, '*Using Plane Speeds Work of Finding Mine,' Financial Post*, (26 March 1931, p. 7.

48 Jim Falk, *Global Fission: The Battle over Nuclear Power*, Melbourne: Oxford University Press, 1982.

49 Daniel Poneman, *Nuclear Power in the Developing World*, London: George Allen & Unwin, 1982. p. 27.

technology and materials that could have any bearing on nuclear development. The Act, of course, was limited to only the United States. Canada, Britain and the USSR had already developed an extensive knowledge base.[50] Control over raw materials was another issue. The McMahon Act fostered the development of a domestic market in the United States (from family operations operating out of the trunk of their car to large open pit and underground uranium mining operations), which once established would limit any need to buy from outside suppliers. However, until the United States could fully develop a stable domestic market, uranium supplied by other countries such as Canada was still in demand.

The demand for uranium throughout these decades encouraged exploration activities in areas where there was speculation that uranium ore could be found. With a confirmed find at Great Bear Lake (N.W.T.), mining companies and prospectors shifted their interest to northern Saskatchewan, which was along the shipping route (water) to Great Bear Lake. The first mine in the Athabasca region was Cominico's since abandoned “Box” mine. It operated from 1939 to 1942 on the north shore of Lake Athabasca. Eventually pitchblende, associated with uranium deposits, was discovered at the Nicholson gold-copper mine located on the north shore of Lake Athabasca. This discovery sparked both aerial and surface prospecting for uranium. In 1946, the "Ace" uranium deposit was discovered by aerial surveillance just Northeast of Lake Athabasca between Beaverlodge Lake and Verana Lake along the St. Louis Fault. Most other discoveries, like the Gunnar Mine site (1952), were discovered by prospectors walking the land looking for surface uranium associated mineralization.[51] In the wake of these discoveries, the mining sites of Eldorado Mining and Refining Ltd. and Gunnar Mining Ltd. emerged.

Settlements to house mining and prospecting interests soon followed the commitment to develop these mines. The Beaverlodge community of Eldorado Mines was the first settlement, followed by Uranium City in 1952. Uranium City largely developed out of field of resistance. The federally owned corporation, Eldorado, the Saskatchewan government, and the Federal government contested the financing of its construction and maintenance.[52] The Saskatchewan CCF Government rejected the prospect of supporting an Ontario-style mining shanty, town. They wanted a "model city" that was fully planned. Prospectors, entrepreneurs, miners and the mining companies, however, resisted the government’s planning efforts. A town site was eventually agreed upon, and it was located eight miles from the Beaverlodge community.

The discovery of uranium ore and its development accelerated the transformation of the territory of the Athabasca Denesuline into a region licensed to mining companies. Although they were the first inhabitants, they were not regarded as the first inhabitants

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[50] June H. Taylor and Michael D. Yokell, *Yellowcake: The International Uranium Cartel*, New York: Pergamon Press, 1979.

[51] R.H. McMillan and P.R. Heenan (Western Mines Limited), *"Uranium Exploration in Canada, 1979,"* in Canadian Energy Research Institute, *Markets for Canadian Uranium*, Proceedings of a Seminar Held on October 25, 1979, Calgary, Alberta., p. 63.

[52] Robert Bothwell, *Eldorado: Canada's National Uranium Company*, Toronto: University of Toronto Press, 1984., pp. 290-98.

of this transformed site. They, along with the Cree and Metis, were relegated to the margins of this new development, as the following observation suggests:

> *Mining people came from everywhere ... Numerous natives mostly Metis, came from surrounding villages of Goldfields, Camsell Portage and Fond du Lac. These tended to stay out of the town proper, in cabins in the woods beyond the survey. No survey meant no services, but it also meant no taxes. It came to pass, therefore, that Uranium City's first inhabitants were white people in business or intending to be in business. Eldorado offered [them] low-interest mortgages covering 90% of house costs.*[53]

The "new inhabitants" instead came from all over Canada, as well as Central and Eastern Europe to capitalize on a development that was making topical news. In 1954, Schiller of Macleans' magazine described the "booming" nature of Saskatchewan's uranium industry, as well as its accessibility to those individuals who had no skill in mining or prospecting:

> *… the discouraging feature of uranium hunting to the old pros is that, in contrast to any other type of prospecting, it requires no skill, experience or geological knowledge. It helps to know that uranium ore is usually found in rock with a red discoloration, or that a flaky, yellowish oxide that looks like unappetizing shreds of dried scrambled eggs sometimes appears on its surface. But outside of these bits of knowledge, a forty dollar Geiger counter is all that is necessary.*[54]

Another method, which required little skill but a keen eye, was the tying of claims next to those claims that had been "scientifically" prospected. This method apparently was used quite successfully by several people, including one Chipewyan who received nine thousand dollars plus two hundred thousand shares of mining stock for a tie near Tazin Lake.[55] These reported success stories occurred at a time when the Canadian economy was depressed, which further fostered the "Athabasca Atom Boom."

Uranium City, in the wake of this success, became the processing center for about 30 small producing mines in the area. During the boom, it was home for approximately 4,500 people who helped produce 3,835 tonnes of uranium. The composition of this workforce was predominantly white with only a few aboriginal people employed at the Eldorado mine as handymen or semiskilled laborers (e.g. mill operator, cage tender, assay-crusher, and warehouse clerk).

Between 1952 and 1955, Canadian mines supplied milled uranium to the United States Atomic Energy Commission. By 1958, the U.S. uranium market had developed, which decreased their reliance on uranium imported from Canada and other countries. The U.S. government program to stockpile uranium to meet future demands, however, decreased the demand for U.S. processed uranium. Eventually, this policy contributed to the collapse of the world uranium market.

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53 *Ibid.*, p. 298.

54 Ronald Schiller, '*Athabasca's Atom Boom, Macleans'*, (1 March 1954), pp. 12-3, 51-2. Also see reference in Bothwell, *Eldorado*, p. 327.

55 *Ibid.*, p. 13.

During this economic downturn, a few Canadian companies were able to find other markets, such as supply contracts with the United Kingdom Atomic Energy Authority.[56] Other mines simply closed. The 1959 peak of twenty-three producing mines had been reduced to ten by 1960 when the U.S. government shut out foreign suppliers. This action continued with the 1963 embargo. By 1964, many Saskatchewan uranium mines had closed down. The federal and provincial governments intervened to protect their stake in this industry. To retain its foothold, Canadian sales were often made at prices far less than production costs. Canada even had to establish its own stockpile to keep Rio Algom Mines Limited, Eldorado Nuclear Limited, and Denison Mines Limited operating. The boom-bust nature of natural resource extraction and its link to a competitive geopolitical environment also had an impact on the people in Uranium City and from the surrounding area. In this period, the population of Uranium City declined from approximately 4,500 to 2,000 people.[57]

Although the boom was over, both governments continued to support the transfer of mining related skills at the local level. In 1959, the Native Prospector's Assistance Plan was created to provide funds to cover transportation, grubstake, and equipment loan costs. This plan, however, more or less subsidized a program to produce Native guides that could later be exploited by geological surveying companies in their quest to stake promising claims over knowledge (uranium ore later processed to create atomic power). One major criticism of this program was that it was under funded and useless as a vocational program for Aboriginal people.[58] There also were the Saskatchewan Prospectors' Assistance Plan and short courses to instruct "Northern residents" in elementary geology and prospecting techniques to further open up the North to mining. The residents targeted for this training, however, were predominately white trappers, which to this day prompts the question of who is a northerner and why Aboriginal peoples were excluded from this provincial program.

As training programs produced new prospectors, more and more of northern Saskatchewan was staked. The stockpiling of uranium had encouraged geological exploration, land acquisition, exploration drilling, development drilling, site construction, and the milling of uranium ore. By 1969, several large uranium deposits were discovered, and their potential explored. The area that generated the most interest was the "Wollaston Lake Fold" that intersects the "Athabasca Sands" and the lands traditionally occupied by the Athabasca Denesuline (Figure 4). These deposits eventually proved worthy to mine. In the 1970s three major sites developed along the Wollaston Lake fold.[59]

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[56] Hugh C. McIntyre, *Uranium, Nuclear Power, and Canada-U.S. Energy Relations*, Montreal: C. D. Howe Research Institute (Canada) and the National Planning Association (U.S.A.), 1978., p. 15.

[57] Stephen Salaff, *The Prospects for Canadian Uranium*, Working Paper No. 27, Kingston, Ont.: Centre for Resource Studies, Queens University, 1983.

[58] Buckley et. al., p. 60.

[59] *An overview of the Biophysical Environmental Impact of Existing Uranium Mining Operations in Northern Saskatchewan*, Prepared for the Joint Federal/Provincial Panel on Uranium Mining Developments in Northern Saskatchewan, October 1992.

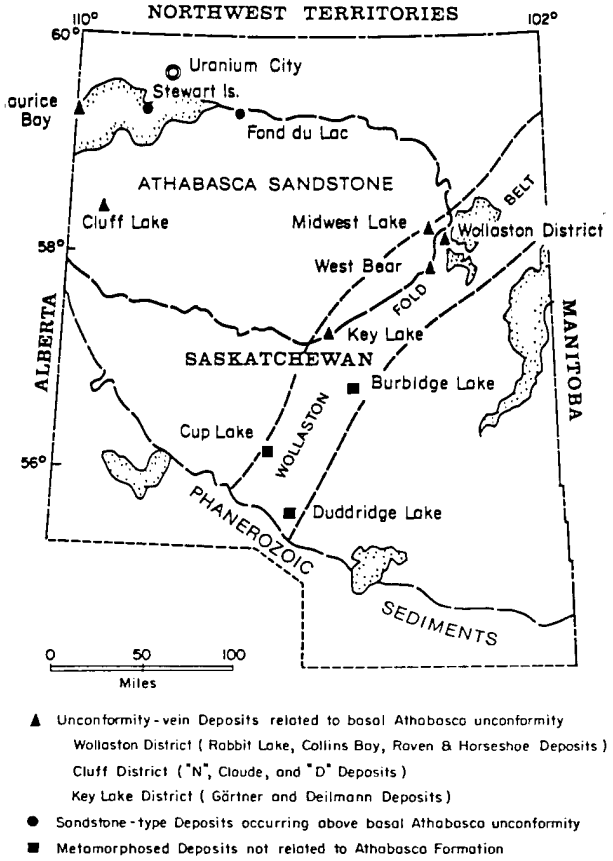


**Figure 4:** Uranium Deposits in the Wollaston Fold Belt and Athabasca Sandstone, 1979.

In 1975, the Rabbit Lake Open Pit Mine on the west side of Wollaston Lake went into production. The first phase of the Cluff Lake mine, jointly owned by Amok Ltd. (80%) and Cameco (20%), was approved after a government assessment was conducted (Bayda Inquiry, 1977), and by October 1980, it was processing uranium ore. In May 1981, the world's largest uranium mine opened at Key Lake after it too underwent an environmental impact assessment. The mine-mill complex at this site was established by a consortium called Key Lake Mining Corporation, which at the time of the field research was owned by Cameco (66.67%) and Uranerz (33.33%) after Saskatchewan Mining and Development Corporation and Eldorado Nuclear Limited merged in 1989.

The decisions to develop these mines occurred at a time (between 1973-77) when international uranium prices jumped from $6.50 to $41.00 per pound. The discourse on why the prices dramatically increased varied. The following observation is but one

explanation as to why there was a dramatic increase; an increase that has often been associated with the rhetoric of the Arab oil embargo:

> *the new high price for oil ... provided a psychological basis for higher uranium oxide prices. Sellers expected higher fuel prices and buyers became resigned to paying them.*[60]

Other critics attributed the increase to the formation of a uranium cartel involving Canada, Australia and France. Others had blamed the increase on domestic markets, as the following comment illustrates:

> *[T]he prices reportedly established by the 'cartel' at its periodic gatherings were .. below those then prevailing in the domestic marketplace. The cartel was, in fact, in a position of trying to catch up.*[61]

As the debate continued, the two marked outcomes of higher uranium oxide prices were large profits and a substantial increase in national exploration. According to Finch (1986), less than $4 million per annum was expended nationally on uranium exploration in the early 1970s.[62] In 1978 alone, $70 million was spent.

By the early 1980s, the industry slumped on the world market, but not to pre-cartel levels. In Canada, uranium interests were somewhat shielded from this market downturn. Both provincial and federal governments, as shareholders, had a vested interest in supporting the uranium mining industry. By the 1990s, Canada was able to regain its position as the world's largest producer in uranium.[63]

In the early 1990s, several proposals for new uranium mines, including the expansion of existing mines and milling operations had been made to both the provincial and federal government. After the federal government reviewed these requests, two independent Federal-and-Provincial Environmental Impact Assessment (EIA) Panels assessed the merits of these projects in 1992-93. Public hearings, as required by EIA legislation, were held in the Athabasca region (e.g. Black Lake, Fond du Lac, and Wollaston Lake), in communities on the Northwest side of Saskatchewan and in larger centers such as La Ronge, Prince Albert, Regina and Saskatoon.

After the technical and public hearings, the EIA Panels' submitted their recommendations to the Minister, and upon review, the Federal government approved several of the proposed projects. Cameco's MacArthur River Underground Exploration Program was recommended to proceed, as well as their proposal to mine the Eagle Point ore body at Rabbit Lake uranium mine. The Cogema Dominique-Janine Extension (Cluff Lake) proposal was also given the green light. The government also cleared the

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60 Hugh C. McIntyre, *Uranium, Nuclear Power, and Canada-U.S. Energy Relations*, Montreal: C.D. Howe Research Institute, 1978. pp. 16-7.

61 Ibid., p. 17.

62 Ron Finch, *Exporting Danger: A history of the Canadian nuclear energy export programme*, Montreal: Black Rose Books, 1986, pp. 120-1.

63 See Metaleurop 1992 Statistical Yearbook and International Consultative Group - Nonferrous Metals Statistics, 1994.

McClean Lake project (near Rabbit Lake Mine) for the Atomic Energy Commission's normal licensing process, contrary to the time lines and additional assessments recommended by the Panel. Only one project was not approved. The Mid-West venture was not able to proceed as proposed, and it is currently up for reassessment, along with several new projects.

The overwhelming support of these projects by the Federal Government is, in some respects, quite the opposite of some of the Panels' findings, but is historically consistent with their long relationship with the uranium mining industry. In their announcement of support (1993), they acknowledged the benefits in continuing to extract uranium ore from the north:

> *Uranium is a very important commodity for Canada. Since the beginning of the commercial era in the 1960s, Canada has exported $17 billion worth of uranium (constant $1992). As the world's leading producer and exporter of uranium, Canada accounted for almost 30 percent of total world output in 1992.*[64]

Throughout the EIA process, the Canadian and Saskatchewan economy has been depicted, in many ways, as the beneficiaries of this development. On the scale of provincial and national economies, this may in fact be true. However, local community economies, such as Wollaston Lake, may not benefit as much as political or economic rhetoric may suggest.

Up until the early 1990s, the Athabasca communities have largely been alienated from the development of this industry. However, by the end of the field research, the Lac la Hache First Nation was participating as a member of an Athabasca Working Group to deal with such issues as mining employment training, environmental impacts, community infrastructure development, all-season roads, compensation for impacts on land use areas, and royalty sharing. The intent behind their participation was to secure the future of their community. At the end of the field research, they were cautiously optimistic that through strong negotiations they would achieve what they considered to be long over due. Some community members, however, were not that confident, as the following comments illustrate:

> *All we know is that there is a mine across there [the lake]. Only just a few people work over there. Every time there is a meeting [FERO Panel Meeting] the young people now need jobs but there are only a few people working over there. But if they really want to help people they should hire them from the community.*
>
> *I don't see anything that will come of the mine. Because like I said, they are tampering with nature, and after they tamper with nature nothing is going to be the same. But they say that they are going to make everything look like nothing had happened.*
>
> *Even though we have a concern they are still going to go ahead. All this money will be going to the government so it makes no different whether we say no or not. They say ... like ... anything that is not good is going to happen to the indigenous people. They are the ones that always get the worst of it.*

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[64] Government of Canada, *News Release: McLellan announces Federal response to Panel Report on uranium mining proposals in northern Saskatchewan*, December 23, 1993.

> *Everything around the mine that comes out of D-Zone causes disease. If one person gets it, the next person who they come in contact with would get it. It's contagious. Everything around D-Zone will be diseased.*

The following chapters attempt to situate both this cautious optimism and reluctance.

## 3.0 Profile of Lac la Hache Community

A somewhat stark contrast to the monetary success of uranium mining is the community of Wollaston Lake. In the previous chapters, geopolitical and economic factors as they relate to the Lac la Hache people of Wollaston Lake and to uranium mining have been discussed. In this chapter, the community's demographics and socio-economics, transportation accessibility issues, and overburdened infrastructures and programs are described. The prevalence of contemporary cultural patterns such as language, country food consumption, and traditional land use activities are also discussed. Whenever possible, these socio-cultural indicators are situated in relation to uranium mining.

The intent of this discussion is to illustrate the barriers that the community must face, as it develops its own self-governing structures to deal with some very serious and diverse issues relating to uranium mining. At the end of the research process, the community was carefully considering its future in relation to the risks and benefits of uranium mining and the prospects of continuing a traditional way of life.

### 3.1 Demographic and Socio-Economic Considerations

The on-reserve land use area of the Lac la Hache First Nation is predominately inhabited by the Athabasca Denesuline. A number of Cree and Dene-Cree families also form an integral part of this community. Somewhat apart from the community is a small number of non-Aboriginal people who reside on a semi-permanent or temporary basis, in either the Hamlet (i.e., police officers, conservation officers, private business operators) or on-reserve (i.e., teachers, nurses). In 1991, the Aboriginal People's Survey reported that approximately 625 aboriginal people resided on the reserve. Of the 625, a majority of the respondents (52.8%) were children under the age of 15 years. Chief and Council indicated that the population was actually well over 800 in that year and that by 1993, it had increased by 10-15 percent.

Overall, this community can be characterized as quite a young population, and it is projected that it will continue to grow well into the future at its current rate. With a youthful, growing population, there is considerable emphasis on institutional education and the opportunities it can offer young people. The characteristics of our survey respondents illustrate the low emphasis placed on education prior to the expansion of the institutional system through self-government initiatives. Approximately one-third of the respondents had achieved grade 6 or less, whereas a very large minority (47.6%) had at least some junior high education. Only a few people (17.2%) had some high school or more. This distribution of Western education attainment is quite consistent with many other communities in northern Saskatchewan. What accounts for this distribution is the emphasis placed on a traditional life style, as well as the lack of infrastructure provided by Indian Affairs. Secondary education programming for on-reserve schools, for instance, was either non-existent or inadequately funded. At the end of the field research, there had been significant changes made regarding education. The community controlled Board of Education built a new primary/secondary school, much to the pride of the community. However, the school did not have adequate classroom space to accommodate the high primary grade enrolment. As a result, a new school was built in the following year to accommodate the demographic shift in their community.

With the recent shift to First Nation control over education, there was more optimism regarding increasing education levels for the younger generation and for those students who wish to return to secondary school. While these challenges are met, there is still the problem of upgrading community members to compete for more jobs at the mine. For instance, there were many community members who did not have the education to successfully compete for the mining jobs requiring tradesmen apprenticeship training (e.g. diesel mechanic, pipe fitter, welder, electrician, etc.). As a result, this lack of Western education became a barrier for many residents who would have liked to work in trade positions at the mine.

For this segment of the population, the only jobs available were those of which some community members perceived as non-challenging (i.e., house cleaning, cooking, or mill operator). They viewed these types of work as detracting from rather than enhancing their knowledge base. According to one respondent, "anyone can push a button" as a mill operator. Pre-employment training programs are attempting to dismantle this barrier, and during the field research, a small number of younger community members were able to attend a pre-employment training program that prepares them for a trade apprenticeship program. Although some progress has been made in this area of knowledge transfer, only a few community members work at the mine on a full-time basis.

When mining opportunities are compared to what is available in the community, it is all too apparent that mining offers the most employment potential to community members. In this community, the only full-time jobs available are those offered through the band government or the service sector. Of the jobs available, women, more so than men, are employed in clerical, management, education and health positions. Men, generally, are seasonally employed in jobs related to construction (e.g. carpentry) and land use activities (e.g. guiding, fire fighting, trapping and fishing). Only a few men are employed full-time, and those jobs are related to community infrastructure maintenance (e.g. roads, garbage pick-up, water delivery, and building up-keep). Large scale construction work, such as the building of the new school or installing water and sewer services, are some additional sources of high paying jobs in this community. Some community members often view jobs associated with this type of work as more appealing because they develop new skills and enhance existing ones. In terms of their maintenance, they also provide work for some community members on a more or less full-time basis. However, once construction is complete, the only other related work available on a year to year basis is house construction, which is highly dependent on federal funding levels. In short, the community can only offer short-term work in the long run. At this time, long-term full-time employment possibilities reside largely with the mines. Improving education as well as access appears to be a key factor, along with ensuring that a high percentage of the jobs will be strictly reserved for aboriginal northerners.

### 3.2 Transportation Accessibility Issues

Accessibility issues can also be found in the domain of transportation. To date, the community is accessible by vehicle or air, all of which are dependent upon the seasons. At the end of the field research, you can drive from Prince Albert by way of Highway 102 to Southend and from there by Highway 905 to “Barge Landing.” Near the “Landing,” there is a parking lot, a provincial campground and an old airstrip that is still used today. The “Landing” is located on the west side of the lake and is 45 Km by boat from the

community. A barge, operated by the Saskatchewan Highway's department, has served as an important transportation link for the people of Wollaston Lake. It begins operation in June when the ice has cleared from the lake. Passengers ride for free, but vehicles and freight are charged. On a busy day the barge may make two trips to the community. The trip is about three-hours one-way, and like other northern travel, it is dependent on the weather. In early October, as the ice begins to form in the shallow bays, the barge is forced to suspend operations for the year. By late December when the ice is sufficiently thick, a winter road is constructed to connect the community to the highway. It is only during this season that the community is completely accessible by truck or car. Snowmobiles and boats provide alternative means of travel to barge landing. Some community members park their vehicles at the parking lot near the landing for easier access to the highway during the summer months and when the ice on Wollaston Lake has left the lake.

Road accessibility is an important issue as more community members purchase vehicles and as new markets are secured for fish. There are, however, other dimensions to this issue. At past EIA hearings, there had been considerable debate on improving road access to this community. Community residents who were "pro-road" related the difficulties they had encountered when, on short notice, they needed to transport their vehicles across the lake. The barrier most often cited is that the "barge is always booked" by local businesses. In this community, businesses and the Band are given priority, because they can generally anticipate when the barge is required. In addition, food, supplies, and building materials will always take precedence over other community needs. A road would certainly solve this problem. There is, nevertheless, another side to this benefit.

Not everyone in the community is in favor of direct road access. A number of community members' view increased accessibility as a hazard that has more risks than benefits. For instance, greater access, as in the more southern communities, could increase the importation of alcohol and drugs thus jeopardizing a community they perceive as "a much more settled community." Nevertheless, stable transportation costs could level out the cost of food and other necessities, which currently are priced to reflect seasonal transportation costs. These costs generally are higher in the spring and fall when the barge is not running. In these seasons, local stores have no choice but to rely on air freighting services that operate out of Points North; a food and material distribution center that is located near Rabbit Lake Mine and services other Athabascan communities.

The community is also highly reliant on commercial air services operating out of major northern and southern centers. At the end of the field research, two airlines offered return flights daily 5 days a week to Wollaston Lake from La Ronge, Prince Albert, and Saskatoon. A local airline, located in the community, also flies charters and emergency medical flights out of Wollaston Lake. The viability of these airlines, in many ways, is dependent on the uranium mining industry. Both airlines compete for contracts that involve flying workers in and out of mining operations during the 7 days in and 7 days out work schedule. When required, they also provide air freight service. Indirectly, both airlines experience the benefits of having a local working population, which utilizes their services to visit family members or friends in other communities on a more regular basis. The cost of air transportation, however, is high, and if Uranium mining activity substantially decreased in the years to come, one possible outcome would be increased

air transportation costs to offset limited demand. A road would therefore alleviate both short-term and long-term costs for this community.

At the end of the field research, the question of whether a road would be built was an interesting one. In the community, there was the perception that there is only money to build exploration roads and roads to actual mines. A road to the community would only be seriously considered if high-grade uranium ore was discovered near the community; a scenario that is not far from the truth. Community members commented during one Panel Hearing that a road would be built to Fond du Lac if the uranium ore bed in that area was rich enough to sustain a viable mine/mill operation. The irony faced by this community, like other Athabascan communities, is that despite an expanding uranium mining industry in the region, improvements to community accessibility and infrastructures are not assured unless they directly benefit the industry.

### 3.3 Overburdened Infrastructures and Programs

At the time of fieldwork, education, health care, housing and other infrastructure services were under pressure in this community. In 1993, classrooms were over-crowded, and nursing staff worked long hours to meet the demands of a growing population. The existing sewage lagoon servicing the school and nursing station was also inadequate. It was identified as a potential health risk to community members. Plans were made to expand this system in 1995 to accommodate household utilization.

Like other Aboriginal communities, water and sewer services were first made available to households rented or owned by white teachers, nurses, and R.C.M.P. and Conservation Officers. In 1993, these services were finally made available to on-reserve households. At the end of the field research, approximately half the homes located on the northeast point received these services. By the end of 1993, there was much uncertainty as to whether the funding would be in place to connect the rest of the community. The Department of Indian Affairs, in the last few years, have agreed that such infrastructures have to be in place. As a result, funding has been allocated to increase the level of these services in this community.

Housing was another problem highly dependent on funding. In 1993, there were several new homes under construction. However, the emphasis was on expanding the number of homes for teachers who largely come from outside the community. Renovations to existing homes (e.g., insulated doors, interior doors, windows, efficient wood burning stoves and new flooring), although high in demand, were not adequately addressed because of limited funding. In summary, new houses, home renovations, and access to water and sewer services were still in demand well into 1995. These short falls are indeed a product of limited funding. These inequities, however, really stand out when compared to the tremendous investment in uranium exploration, expanding existing mines and mills, conducting environmental impact assessments, hearings, and facilitating more in-depth consultations between the involved parties.

The community had to struggle with other problems on a day to day basis. One respondent summed up what she considered to be the most serious problems that this community had to face:

> *Alcohol! Communication! Co-operation! I feel and firmly believe that this community is slowly destroying itself because there is no communication and no*

*co-operation between the younger generation and the Elders. The drinking society is growing rapidly because nobody cares.*

At the end of the field research, alcohol, drugs, sniffing and consequently episodes of family violence were identified as the most serious problems in this community. A major factor linked to these problems was the high unemployment and welfare rate; a social determinant issue that the Band Government was attempting to correct. During the EIA hearings, the Band fought to improve employment conditions through ongoing negotiations with the uranium mining companies. The community was also taking an active part in addressing social problems through workshops and on-going counseling programs. However, programs are inadequately funded, yet overburdened by demand.

Some community members, while recognizing the debilitating effects of these problems, were still confident that, through self-government at the individual, family, community and regional level, they would overcome these barriers. It was hypothesized that a constructive relationship with the uranium mining industry and the provincial and federal governments may help in dismantling these barriers. However, some community members were not persuaded by company or provincial/federal government rhetoric. They were of the opinion that any involvement in uranium mining may further contribute to these problems, as well as create new ones.

### 3.4 Contemporary Cultural Patterns

In this community, language, traditional land use, and consumption of country food are considered important qualities in maintaining what it means to be Denesuline or Cree.[65] This emphasis occurred in spite of colonial policies such as those formulated in the 1950s when the traditional subsistence economy of the North was thought to be unspecialized, inefficient and unproductive.[66] In this period, the Aboriginal peoples were depicted as not providing surplus capital or a productive labor force adaptable to large-scale industrial enterprise. It was thought that their entire way of life had to be transformed because they were still operating in ways not complimentary to the commercial ambitions of Canada and their provincial counterparts. Indeed, the Center for Community Studies of Saskatoon was funded in 1963 by the Saskatchewan Department of Natural Resources to improve the social and economic conditions of the Indians and Metis of northern Saskatchewan. Their mandate was consistent with the rhetoric of colonialism. Aboriginal people were viewed as unspecialized, inefficient, and unproductive and in need of care, which is illustrated in the following passage abstracted from their annual report:[67]

*The man owns a small canoe in poor condition, one used fish net, 30 small traps, a .22 calibre rifle, and a single-barreled shotgun. The children's scanty clothes are in rags...The children appear under-nourished...Part of the reason why this kind of*

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[65] David E. Young and Elizabeth Olsen, *"Use of Wild Plants for Food and Medicine by Northern Natives"*, in R. Riewe and J. Oakes (Editors), *Human Ecology: Issues in the North*, 1992.

[66] Thomas R. Berger, *A Long and Terrible Shadow*, Vancouver: Douglas & McIntyre Ltd., 1991., p. 129.

[67] Helen Buckley, J. E. M. Kew, and John B. Hawley, *The Indian and Metis of Northern Saskatchewan: A Report on Economic and Social Development*, Saskatoon: Centre for Community Studies, 1963., p. 30.

*misery exists lies with the man and wife themselves. He speaks no English, is withdrawn, lacks ambition and initiative for the simplest tasks. He had...enquired about social assistance, but had not made any application. Our interpreter said the man was fearful that if he received assistance he would be forced to live in the settlement, which he did not wish to do so. Clearly this man was in need, not just of an opportunity to work, nor of a monthly dole to ensure full stomachs for his children, but also of personal counseling, perhaps even psychiatric help. This type of assistance is not available to him, or perhaps we should add, to his eight children.*

Contrary to this perception, the people of Wollaston Lake have been able resist colonial ways and continue with the Denesuline way of life. The survey data on language, traditional land-use activities, and country food consumption illustrates to some extent the maintenance of this way of life.

**Language**

From a Denesuline perspective, the importance of language cannot be underestimated. According to the Aboriginal People's Survey (1991), almost all community members indicated that they spoke an Aboriginal language. Field research complimented by survey data confirmed this predominance. Nearly everyone (91.4%) considered Dene to be his or her first language. There was much concern, however, that the higher language skills of the Denesuline have not been acquired by the younger people, especially those students who attend schools where English is the only language of instruction. So today the Dene language is taught in a Band controlled school system. The intent is not just to ensure that the old language is retained. Language also serves to maintain inter-community relationships, knowledge of the land, and the time honored traditions of hunting, trapping, and fishing. Overall, language maintains and advances cultural, mental, physical, and spiritual well-being.[68]

The emphasis placed on the Dene language should not be construed as a means to undervalue the use of the English language. The English language is also valued in this community, especially when they have to deal with outside interests. Some respondents, however, believe that they are at a disadvantage when negotiating with the uranium mining industry because they have not mastered English. According to one Band Official, there was the perception that the industry used this disadvantage to manipulate community perceptions when presenting their side of a complex issue; a discourse in which community members could not fully participate because they were delimited by the predominance of the English language in negotiations. When comparing their position to that of other aboriginal groups in the south, he found that southern communities were better able to understand and use white ways to negotiate more equitable arrangements. To improve their position, the Lac la Hache Band had little choice but to rely on outsiders who had a better understanding of white ways.

Some of these communication barriers have been addressed in the environmental impact hearing process through the exceptional translation skills of some Dene

[68] Federation of Saskatchewan Indian Nations - Indian Government Commission, *Discussion Document on Special Representation - Northern First Nations*, Prince Albert, Saskatchewan, Thursday, September 2, 1993 in Federation of Saskatchewan Indian Nations - Indian Governments of Saskatchewan, *Executive Report to the Denesuline Nations - Wollaston Lake*, September 7, 1993.

translators. However, even professional translators have problems in communicating contaminant risks when the scientific language of hazards and risks (dose-response relationships, exposure assessments, etc.) are largely a product of Western science. Up until now, there has been little thought given as to how to situate contaminant information and other technical knowledge into a cultural context.

**Consumption of Country Food**

Community perceptions of health risks largely focus upon possible contaminant impacts on country food and traditional land use activities. The Denesuline, like many Aboriginal peoples, are concerned about hazards that may impact their country foods and the activities that make its consumption possible. There is also a concern that lies at the heart of what country food means to the Denesuline. As in other cultural groups, country food is an integral part of which the Denesuline are as a people. Elder Louie Benoanie (1993) commented on this value, as it related to their long, historic and spiritual relationship with the caribou:

> *The caribou, if one went in one direction they would follow. The caribou travel as one. Just like us. When we say that we are going to go somewhere and then we take off, the caribou are the same way. The elders in the past had a saying. A herd of caribou is like one caribou with one mind. We think alike.*

Health professionals have a somewhat different understanding of the value of country food. Many professionals assess its value by its nutritional contribution (i.e., vitamin A, calcium, protein, etc.) to health. This understanding, however, is currently being expanded, as appreciation of what country food represents to indigenous people increases. Health Canada now acknowledges that indigenous peoples have long understood the vital role country food plays in maintaining their physical, emotional, intellectual, and spiritual health.[69] However, communities, like Wollaston Lake, are forced to deal with potential hazards that may possibly impact the very food that constitutes who they are as a people. The potential for impact is evident in the number of survey respondents who continue to consume country food on a seasonal basis.

In the Table 1, caribou, moose and fish are reported as the country foods that make up a major part of their diet. Moose, for instance, is hunted around the Wollaston Lake area, and caribou can be found within the range of the Beverly Caribou herd that extends down from the N.W.T. and borders on Wollaston Lake. When available, caribou is generally taken in large numbers during the winter months.

**Table 1**: Percentage of Respondents who report eating Country Food at least once a month (n=105)

| COUNTRY FOOD | SUMMER | FALL | WINTER | SPRING |
|---|---|---|---|---|

[69] Health Canada, *Native Foods and Nutrition: An Illustrated Reference Manual*, Ottawa: Medical Services Branch, (revised) 1994., p. 18.

| | | | | |
|---|---|---|---|---|
| Animals | 95.2 | 98.1 | 98.1 | 95.2 |
| Birds | 50.5 | 79 | 31.4 | 54.3 |
| Fish | 97.2 | 91.4 | 87.6 | 89.5 |
| Berries | 61 | 46.6 | 24 | 21.9 |

* Lower percentages reflect variable availability in different seasons.

From land animals, the organ meats are also consumed when available. For many, they are a delicacy that forms an integral part of their cultural well being, such as the consumption of fresh kidney immediately after a caribou is harvested. Nearly everyone reported that they ate the kidney, heart, or liver of the caribou. Although moose is not harvested in the same quantity as caribou, organ meats are also consumed, but not as extensively favored. Most people, for example, preferred just the heart and kidney of the moose. These meats, nevertheless, have provided the Denesuline with some very important nutrients. Liver, for instance, is a good source of protein, iron, vitamin A, folic acid, and niacin. Kidney is also a good source of vitamin A, while the heart is a good source of protein, riboflavin and iron.

Lake trout and white fish, generally low in fat, are consumed throughout the year. They are harvested predominately from Wollaston Lake on a subsistence or commercial basis. The setting of nets, except when the ice is severely rotting or just forming on the lake, ensures an ample supply of either fresh or frozen fish all year round. Wild birds, such as ducks and ptarmigan (grouse), are also found around Wollaston Lake. However, their consumption is determined by seasonal availability. The consumption of birds, for instance, is highest in the fall (79%). In the other seasons, they are only consumed when available (i.e. hunting or freezer storage).

Cranberries, blueberries and raspberries are the only fruit found in abundance around Wollaston Lake. They not only provide carbohydrates, but are also a source of vitamin A, vitamin C, folacin, thiamin, and fibre. These foods are only seasonally available and are consumed predominately during the summer (blueberries and raspberries) and fall (cranberries) months. Some families, however, will freeze berries for those months when they are not seasonally available (winter or spring).

Although drying or freezing country food is possible, country food remains seasonally availability on an irregular, although somewhat predictable basis. In each season, climatic change, location of game, and the health of wildlife will dictate the quantity that will be available for harvesting. Local diets, as a result, have to be supplemented by processed foods. These foods, available at the community stores, are quite costly due to high transportation costs and, at times, are of poor nutritional quality when compared to country foods.

Overall, any impact on country food can be described as an nutritional impact. However, impacts can also be described as cultural. Any negative impact on country

food could eventually lead to the diminishment of their cultural relationship to these foods.

### Traditional Land Use Activities

Traditional land use activities constitute a very important part of the everyday lives of community members. In 1993, ninety-seven percent of the community reported that they had participated in land use activities. When lifetime participation was compared with the year prior (Table 2), land use activities still continued to play an important part in the maintenance of their way of life.

**Table 2**: Percentage of Respondents engaged in Land Use Activities

| TYPE OF ACTIVITIES | LAND USE ACTIVITIES | |
|---|---|---|
| | LIFETIME (n=105) | LAST YEAR (1992) (n=103) |
| Hunting | 75.2 | 51.5 |
| Prepare Game after Hunt | 88.6 | 68 |
| Smoke Meat/Fish | 74.3 | 46.6 |
| Trapping | 63.8 | 25.2 |
| Skinning/Tanning | 74.3 | 34 |
| Fishing | 84.8 | 55.3 |
| Berry Picking | 78.1 | 43.7 |
| Gather Wood for Fuel | 92.4 | 66 |

Although 1992 suggests a decrease in most activities, this decrease can be attributed to many factors. The availability of game and the costs associated with going out on the land are two major determinants of their participation in these activities. The shift to create a specialized and more productive northern labor force to serve the uranium industry is another consideration. Temporary work force demands generated within the community or by the mine is another factor. There is also the emphasis among the young on acquiring western societal knowledge rather than the traditional knowledges of the men and women who continue a traditional way of life.

In this community, all these factors operate simultaneously. Young people are looking for work in other economic sectors such as mining, teaching, and construction work. Local construction work (i.e., new school, water and sewer installations, and housing for teachers), casual work at the mine, and the number of pre-employment training programs have increased. The predominance of seasonal or casual work, at times, makes it difficult for food harvesters to finance the maintenance or acquisition of equipment necessary for food harvesting (i.e., snowmobiles and boats and motors). In addition, a new primary/secondary school has encouraged many older children to attend school in the community, rather than go out on the trap line. Many adults have also enrolled in up-grading courses offered during the winter months. The 7-day work schedule at the mine has also impacted families of some mine employees. The demands of family life, sustaining a labor, intensive household (gathering wood and hauling water), and working at the mine has limited the amount of time available to spend on the land. In summary, these developments have resulted in many families spending most of their time in the community, rather than out on the land. Indeed, some families have chosen to stay in the community on a full-time basis, and they only attend to traditional land use activities when time allows.

Other barriers to maintaining a traditional way of life were evident in this community. In 1992, fur prices were low discouraging many trapping families from going out to their winter camps, located along the Cochrane River. The high cost of fishing and low fish

prices have also had a negative impact on commercial fishing. In the fall of 1993, several initiatives were developed in an attempt to reverse this downward trend. The trapper's assistance program and the creation of a satellite school at the Cochrane River are just two programs that have encouraged more families to continue their relationship with the land. As these initiatives emerge, there is still the debate concerning the viability of traditional land use activities as a way life for the youth. The mines do offer an alternative in that they provide the potential for jobs and training. The Denesuline, however, have already experienced the boom and bust nature of mining. Some mines only have a life span of 10 years (e.g. McClean Lake) because advanced technology makes it possible to mine and mill uranium ore far more quickly and efficiently.

These issues are clearly understood by community members. Some respondents have recognized that uranium mining in the short-term is one of the few opportunities they have for employment and training. Others, however, believe that there is a price to be paid for such short-term benefits, such as chronic health problems that may arise in the future. There is also the perception that uranium mining may have a long term impact on the land (and water), which may, in turn, effect any existing or new initiatives to perpetuate land use activities. In other words, the very cultural fabric of their way of being in the world may be adversely effected by these developments.

Other community members are of the opinion that both kinds of economic activities should be made available and that they have the right to choose which way best represents their present and future life. What this means is that traditional land use activities should be supported for those members who are most interested. At the same time, a constructive relationship should be developed with the uranium mining industry and governments through job training, employment opportunities, environmental monitoring of cumulative impacts, and, most of all, through royalty sharing. The overall intent is to foster a positive relationship that considers future costs that may be incurred by First Nation people, the province and the Federal government when the uranium mining industry no longer perceives northern Saskatchewan as a viable place to do business. The critical link that will connect these positions is a willingness, expressed by all parties concerned, to equally understand, share and appreciate the risks and benefits of uranium mining. The following chapter explores this possibility.

## 4.0 Uranium Mining and the Perception of Risk

In this chapter, the idea that both experts and the public have risk perceptions and that no one has privileged access to the truth about risk acceptability is explored. In addition, the idea that both groups rely on value judgements, that can be contextualized to make up for incomplete information, is examined. All forms of cultural rationality include context specific knowledge which, like all knowledge, is constituted from rules about how knowledge should be gathered and understood. This notion is examined by comparing perceptions of environmental health risks that are produced by Western science about biophysical, bio-accumulation, and biomedical risk assessments, and with community perceptions. The intent is to illuminate any common or diverging opinions, as well as any uncertainties that have been expressed regarding the impacts of uranium mining.

### 4.1 Bio-physical impacts and Bio-accumulation Effects of Uranium Mining[70]

The mining and milling of uranium ore produce a variety of contaminants. Radionuclides, heavy metals, and chemical compounds are the primary contaminants in question. They enter the environment either by air in the form of dust and gas (i.e., atmospheric emissions), or dissolved and suspended in surface or ground water (i.e., hydrospheric emissions).

Some contaminants occur naturally in the environment, such as Uranium-238 and various elements of its decay process (e.g. radon-222 gas and radon progeny). However, large-scale intervention has resulted in the release of highly concentrated levels. Uranium mining and milling processes has increased the amount of radionuclides naturally released. The same can be said for nickel and arsenic. Although they are naturally found in ore, mining and milling accelerate their dispersion into the environment. Chemical compounds, such as sulfur dioxide, are also released through mining production processes. Unlike other contaminants, these compounds are not found naturally in the environment. They are a manufactured product of chemicals transported up from the south to process uranium ore into uranium oxide (i.e., yellow cake). The following table is a breakdown of radioactive and non-radioactive contaminants produced at Cluff Lake, Key Lake and Rabbit Lake uranium mines (Table 3). The amount produced, of course, depends on the nature and composition of the mined ore bodies and the milling processes at each mine.

[70] This section is based on the synopsis of existing research produced by the following research group: Environmental-Social Advisory Services (ESAS). An Overview of the Biophysical Environmental Impact of Existing Uranium Mining Operations in Northern Saskatchewan. Prepared for the Joint Federal/Provincial Panel on Uranium Mining Developments in Northern Saskatchewan. October, 1992.

**Table 3:** Contaminants by Mining and Milling Source

| TYPES OF ATMOSPHERIC AND HYDROSPHERIC EMISSIONS | SPECIFIC CONTAMINANTS | MINING AND MILLING SOURCE |
|---|---|---|
| Radioactive substances | Uranium-238 | Mined Ore |
| | Uranium-oxide | Mill End Product |
| | Radium-226 | Waste Rock and Tailings |
| | Thorium-230 | Waste Rock and Tailings |
| | Radon-222 & Decay Products | Mining, Milling & Tailings |
| | Polonium-210 | Mining, Milling & Tailings |
| | Lead-210 | Mining, Milling & Tailings |
| Non-radioactive Compounds | Nickel | Present in Ore |
| | Arsenic | Present in Ore |
| | Sulfur-dioxide | Acid Plant |
| | Nitrous oxides | Power plant & Heavy Machinery |

The mines employ a variety of methods to assess the amount of contaminants released into the environment. Sampling locations, for example, are set up at the mill and ore storage sites to monitor the contaminant load of arsenic, nickel, radionuclides, radium-226, lead-210, and thorium-230. The main stack at the mill and the sulfur dioxide plant are monitored for sulfur dioxide emissions, radionuclides, and heavy metals. Some mines have established sampling sites at or near mine-mill complexes to assess radionuclide and heavy metal content in natural vegetation (e.g. soil and lichen). Water quality assessments, at the Rabbit Lake mine, have also been conducted at such locations as Pow Wow Bay, Hidden Bay, Collins Bay, Ivison Bay, the main body of Wollaston Lake, and the Umpherville River.

During normal operations, contaminants are released in amounts that are considered by some regulators and scientists to be within acceptable limits. At other times they are not. For instance, water quality assessments of mining/milling operations have suggested that contaminant concentrations were relatively high in 1984 and 1985. These levels rapidly declined, and have remained fairly constant. Throughout this period, government scientists and company officials had declared these levels within current Saskatchewan Surface Water Quality Objectives. These limits, nevertheless, can change as new knowledge is produced on contaminant impacts and as new technology becomes available to monitor and to prevent their release in the environment.

When assessing all hazards, there is always a degree of uncertainty related to changes in scientific methods for assessment. This indeterminacy is evident at the Rabbit Lake Mine; the oldest operating facility in Saskatchewan built before strict regulations came into effect to control the release of contaminants into the environment. In 1992, the mine/mill site was assessed as environmentally unsound. In a report to the

Joint Federal-Provincial Panel reviewing uranium developments, the following processes and structures were identified as not being up to standard. The mill structure, for example, was not constructed on an impervious base or lining, resulting in some leakage of contaminants into the ground water. The original tailings area had seepage problems due to poor design, which, according to some scientists, could affect Parks Lake. At the time of the assessment, elevated sulfate levels had been detected and increased radionuclide levels, especially uranium-238, were expected. Scientists were also concerned with potential contaminant leakage at the B-Zone deposit at Collins Bay. In this zone, arsenic, which is a highly mobile, toxic element, is at relatively high concentrations in the ore and waste rock storage areas. Both regulators and mining company officials have debated the potential release of this contaminant by way of decommissioning. In 1992, regulators insisted that the dike separating the ore pit from Collins Bay should be maintained until the waters within the dike meet surface water standards. Cameco officials, on the other hand, were of the opinion that an early breach of the dike would allow the contaminated waters to be diluted by the waters of Collins Bay and Wollaston Lake.

Such uncertainty, however, can generate change. For example, it was agreed that a new lined ore storage facility should be constructed to reduce seepage, and a new in-pit tailings area, using new technology, is expected to reduce seepage into ground water. Other debates have also resulted in change. For instance, "accidental" spills caused by equipment failure, handling errors, storage tank leaks, or pipeline breaks have received attention after a history of mishaps. From 1981 to 1991, a total of 191 spills, involving three of the producing mines (i.e., Cluff Lake, Rabbit Lake and Key Lake) were reported to the Spill Center of the Saskatchewan Department of the Environment and Public Safety in Regina. Overall, pipeline breaks have been the most common and environmentally the most serious, as illustrated by the period of 1984 to 1989. The two most serious spills occurred at the Key Lake and Rabbit Lake Mines. At Key Lake, 87,000 cubic meters of contaminated mill water was released into Gerald Lake on January 5, 1984. Over topping of a retaining dike at the water storage reservoir was identified as the cause of significant concentrations of nickel, uranium, zinc, arsenic and radium-226 spilling into the environment. Four years later, a cracked pipeline valve at Rabbit Lake Mine leaked approximately 1,950 cubic meters of mine water over a sixteen hour period (November 6-7, 1989), despite two-hourly visual patrols employed to detect such problems. The spill waters, containing significant concentrations of arsenic and radium-226, entered Collins Creek, which flows into Collin's Bay of Wollaston Lake. In both cases, no significant impacts were detected in follow-up surveys conducted by consultants, mining officials, and scientists of the Mines Pollution Control Branch. Key Lake was assessed a fine of $500, and Rabbit Lake was fined a total $60,000 for their transgression.

To say that these spills had no significant impact is but a limited assessment at best. The community was never informed of any breaches to pipeline integrity until the community's Chief, Edward Benoanie, had by chance observed the Rabbit Lake clean up activities while on a return flight from down south. He was aware of what was going on at the mine since he had worked there for a number of years as a mill operator. He waited the remainder of the day to be contacted and was not informed. He had to take matters into his own hands and contact the various government departments to make the community concerns known and to assert their "right to know." Since then, the impact of past and potential spills are an ongoing concern in this community, but their

expressed desire to be involved in risk assessment and management processes have not been seriously considered.

The province and the uranium mining industry have retained control over all risk assessment and management processes. For instance, a process was initiated in December 1989 to examine spill prevention, detection, and containment procedures. In a letter to the Cameco Corporation, the Saskatchewan government voiced their concern over diminishing technical integrity:

> *the incidence of spills from pipelines will increase in future for several reasons. With reduced activity on the mine sites due to the recent economic downturn in the uranium market, we have seen some evidence that spill detection procedures have been relaxed. The development of new mines at Rabbit and Cluff Lake has resulted in recent additions to the pipeline networks at these sites. The Rabbit, Key and Cluff Lake operations are ageing and spills due to pipeline wear are becoming more common" (Letter from P.A. Courtney, SEPS to M. Babcock, Cameco Corporation, dated December 11, 1989).*

Surveillance was identified as the key to minimizing the risks of accidental spills. All pipelines containing and transporting contaminants had to be physically examined. Surveillance methods (instruments and visual checks), containment procedures and contingency plans had to be established, and potentially impacted water bodies had to be identified. No massive spills occurred after 1989. However, problems with pipeline integrity continued, and compromised pipelines were the major reason cited for the majority of reported spills in 1990 and 1991.

Although there is no documented evidence of direct damage from accidental releases of contaminants, scientists are concerned that such spills are cumulative; that is, they may contribute to the gradual build-up of chemical and radioactive loadings in water, sediment and biota in the region. A number of studies conducted in 1983 and 1990 have shown that contaminated waste water from tailings ponds or waste storage pits have had an impact on stream and lake systems. The assessed impact, however, fell below standards set by regulatory agencies (e.g. AECL, Provincial water standards). Nevertheless, scientists are still concerned with potential cumulative impacts, especially on the aquatic environment. Fish tissue samples have shown very low levels of radionuclides that are generally at or slightly above background levels. Although repeated testing has shown no marked increase in these levels, the scientific perception of risk still exists. It is felt that more long- term studies are required to offset any uncertainty that has been expressed in the scientific community. For example, scientists want Effluent Creek, which drains from the Rabbit Lake milling operation into Hidden Bay, to be closely monitored because Northern Pike feed and breed at its mouth. If contaminant loads increase in Hidden Bay, it is postulated that such increases may have a negative impact on this important commercial and domestic fishing area, long used by the community and a sport fishing camp.

Uncertainty is also evident when combined sources of risks are considered.[71] The process of contaminant transfer along aquatic and terrestrial flora and fauna pathways

[71] Ecologistic Limited. Assessing Cumulative Effects of Saskatchewan Uranium Mines Development. Prepared for the Joint Federal-Provincial Panel on Uranium Mining Developments in Northern Saskatchewan. December 1992.

and then into humans is quite complex, and according to the scientific community, requires much more study as evidenced by the work currently being done in the Arctic through the Arctic Environmental Strategy (DIAND).[72]

To date, there is no doubt that hydrospheric emissions, combined with atmospheric emissions, can have a cumulative impact. However, there is much uncertainty concerning the transference process and cumulative effects when uranium mining is factored into the equation. In terms of atmospheric emissions, the amount of radioactive and chemical dust, as well as sulfur dioxide aerosols are dependent on what is released from mining and milling operations (i.e., mill vents, haul roads, open pits, waste rock piles and tailings). Prevailing winds play a major factor in distributing these contaminants. Lichen, a major winter food source for Caribou, is considered a major pathway impacted by such emissions. Scientists have postulated that the ingestion of contaminated lichen by caribou results in an accumulation of radionuclides in their flesh, organs, and bone, which in turn could be transferred to humans through the consumption of caribou meat and organs, resulting in further accumulation of radioactive contaminants in human bone and tissue. At this time, this process of contaminant transfer is not well understood. There has been little to no studies commissioned to deal with this lack of understanding. The same can be said for aquatic/upland vegetation-moose-human transference. Little is known of the impacts on moose when they feed on vegetation (yellow pond lily, aspen, willow, white birch and other species) registering some level of contamination. Some scientists are concerned that community residents may accumulate radionuclides through the consumption of contaminated moose meat that is generally obtained in the vicinity of the uranium mine-mill complex.

Although fish, caribou and moose are identified as potential sources of a physical health risk for humans, the same cannot be said for fur-bearers. Scientific perceptions of uranium mining impacts on trapping have largely followed an economic deterministic model. In short, why study something that is no longer being done around the mine-mill complexes, and why study something that is not economically viable given low fur prices!

This negation of risk stands in start contrast to the position of the Athabasca Denesuline and their cultural and historical ties to the land. The harvesting study initiated by the Cree community of Pine House, located just south of Key Lake, is one attempt to put into perspective the importance of trapping and other harvesting activities, as well as the problems of dislocation from this way of life.[73] From this community's perspective and that of the Lac la Hache First Nation, trapping is still a viable way of life. This understanding and that of others is not fully appreciated or integrated into Western societal assessments of cumulative impacts. The same holds true when we look at biomedical impacts of uranium mining.

### 4.2 Bio-medical Impacts of Uranium Mining

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[72] DIAND. Synopsis of Research Conducted Under the 1993/94 Northern Contaminants Program. Environmental Studies No. 72.

[73] Pinehouse Planning Project, Technical Appendix 1, *Bush Harvest Surveys*, the Northern Village of Pinehouse, Saskatchewan, August 1987.

Competing understandings of biomedical impacts are also evident in health assessments. Generally speaking, uranium mining has been identified as a health risk to mine-mill workers and to the general public. Mine-Mill employees are exposed to radiation and other sources of risk associated with mining (i.e., accidents). Communities are also at risk from the dispersion of contaminants into the environment by atmospheric and hydrospheric methods, as well as through the transference process involving country food (e.g. fish, caribou and moose).

Occupational sources of risk are the predominate concern of many environmental and occupational epidemiologists. Over the years, scientists have determined that underground mines can have high atmospheric concentrations of radon progeny. In the beginning, however, there was little understanding, and the health impacts were vague and not well understood. Eventually, as medical perception of disease and disease processes became more sophisticated, there appears a more in-depth understanding of mine associated health problems. In the 16th century, for example, "bergkrankheit," a mysterious disease of silver miners in Joachimsthal, Czechoslovakia was identified as a mining impact of unknown source. In the late nineteenth century, cancer was specifically identified as a possible explanation for illness and death in the mining workforce. In 1913, a study of 665 Erzgebirge Mountain miners' between the period 1875 and 1912 confirmed that 40% of them had died of lung cancer. By the 1940s, the international scientific community made the link between uranium mining and lung cancer. Governments and the mining industry, however, were slow to respond to such findings.[74] During that time, occupational health standards, ventilated mines, and environmental monitoring of working conditions and workers were not a major concern of these organizations. As a result, the incidence of lung cancer among former miners reached what has been described as an "epidemic of major proportions."

The health effects of mining for uranium and other minerals in unventilated or poorly ventilated mines have been recognized for some time. However, the adoption of standards designed to limit exposure to radon and its decay products is relatively recent, and came on the heels of what was termed a lung cancer "epidemic of major proportions" among former miners. The conclusion that such an epidemic existed was based on a number of studies. For example, in 1950 the United States Public Health Service (USPHS) established a study of miners and millers in the Colorado plateau area (Wagoner et al. 1964).[75] In May 1952, the USPHS released an interim report reporting the high lung cancer mortality in miners in German and Czechoslovakian mines, where concentrations of radon and its decay products were similar to those in US mines, and warned of the dangers in the Colorado mines.[76] Conditions in the mines did not improve. In 1964 the USPHS published its first research paper, reporting on cancer mortality for 5,370 miners and millers followed through the end of 1962. This study noted an excess

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[74] Werner Schuttmann (1993). *"Schneeberg Lung Disease and Uranium Mining in the Saxon Ore Mountains (Erzgebirge)."* American Journal of Industrial Medicine. Volume 23, p. 263.

[75] J.K. Wagoner, V.E. Archer, B.E. Carroll, D.A. Holaday, and P.A. Lawrence (1964). *Cancer mortality patterns amoung U.S. uranium miners and millers, 1950 through 1962*. Journal of the National Cancer Institute, Vol. 17: 373-380.

[76] K. Yih, A. Donnay, A. Yassi, A. J. Ruttenber, and S. Saleska (1995). *Uranium Mining and Milling for Military Purposes,* in K. Yih, et. al. Nuclear Wastelands: A Global Guide to Nuclear Weapons Production and its Health and Environmental Effects. Cambridge, Massachusetts: The MIT Press.

mortality from accidents (mainly mine-related) and cancer of the respiratory system, with up to a 10 fold increase in lung cancer for underground miners with 5 or more years of underground experience.[77] The first published evidence of a substantially increased risk for lung cancer in American-Indian miners was reported by Archer et al (1976), and detailed further by Gottlieb and Husen (1982) and Samet et al (1984).[78] A study conducted by New Mexico miners also found that lung cancer risk increased with cumulative exposure to radon decay products.[79] In addition, studies found elevated levels of non-malignant respiratory disease.[80] It is now well known that underground miners have a higher risk of silicosis (a scarring disease of the lung).

Studies conducted in Canada also confirmed an increased risk of lung cancer and silicosis. These health effects in fact became a major focus of a royal commission on health and safety in Ontario mines (Ham Commission 1976). Even closer to home, a study was conducted of 8,487 workers employed at Beaverlodge Mine in Northern Saskatchewan between 1948 and 1982.[81] A total of 65 miners in the cohort died of lung cancer in this period, compared to 34 expected; this constituted a significantly elevated risk of dying of lung cancer from working in Northern Saskatchewan uranium mines. In addition, some of the Saskatchewan uranium mines have high concentrations of both arsenic and nickel, as noted above, posing an additionally increased risk of lung cancer.

From these studies, it is evident that uranium mining and milling processes a variety of radioactive materials, which are harmful to human health. It is important to note, however, that these materials are in the environment before the mines begin operation, but usually they are far underground and dispersed in the substrate. Any radiation, which may reach the surface is typically of a low level and is considered a form of background radiation. What uranium mining does is bring these materials to the surface in quantity. Milling then concentrates and contains them as a product, rubble, mine water or tailings, and also releases small proportions of them into the environment.

Tailings can have immediate somatic or genetic health effects if people are exposed to them. The American western states, and especially the Colorado Plateau states, have experienced significant health effects from old uranium mines and improperly decommissioned tailings. Evidence of health effects from living near uranium mines and mills have been difficult to conduct and interpret. Shields et al (1992) studied birth data

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77 Wagoner et. al. 1964.

78 V.E. Archer et. al. (1976). *Respiratory disease mortality among uranium miners.* Annals New York Academy of Sciences(271): 280-293. L.S. Gotlieb and L.A. Husen 1982. *Lung Cancer among Navajo Uranium Miners*. Chest (81): 449-452. J. M. Samet et. al. (1984). *Uranium mining and lung cancer in Navajo men.* New England Journal of Medicine (310): 1481-1484.

79 J.M. Samet et. al. (1989). *Radon progeny exposure and lung cancer risk in New Mexico Uranium Miners: A case control study*. Health Physics (56): 415-421.

80 R. J. Waxweiler et.al. (1981). *Mortality follow-up through 1,877 of the white underground uranium miners cohort examined by the United States Public Health Service.* In M. Gomes (ed). Radiation Hazards in Mining: Control, Measurement, and Medical Aspects. New York: Society of Mining Engineers, American Institute of Mining, Metallurgical, and Petroleum Engineers: 823-830.

81 L'Abble et. al. (1991). *Radon Exposure, Cigarette Smoking, and Other Mining Experience in the Beaverlodge Uranium Miner's Cohort.* Health Physics. Vol. 60(4): 489-95.

for 13,329 Navaho children born between 1964 and 1981 at the Indian Health Service Hospital in Shiprock New Mexico.[82] They found a statistically significant increase in adverse health outcome such as birth defects, stillbirths and deaths from illnesses during infancy in the off-springs of mothers living near mine dumps and mill tailing areas. However, this increase was not related to "reported" duration of exposure, and other possibilities may explain the increase, including paternal employment in the mines, which was marginally significantly associated with the elevated risk for adverse outcome. Nonetheless, clearly these sites pose a risk to the people of the area. Parts of the Navaho Reservation in Arizona are marked by numerous uranium mines, the remnants of small "mom and pop" uranium mining operations encouraged by the U.S. Government in the 1950s. Many of these abandoned mines have filled with water over the years, providing attractive, although clearly hazardous, summer swimming holes for Navaho children (Taylor, 1983).[83]

What is so striking about these findings, and results from other studies, is that they represent a cumulative history of the harmful effects of ionizing radiation. On the basis of this evidence at hand, it can be said that radiation is the most thoroughly studied environmental agent in the history of Western society. A consequence of such an accumulation of knowledge is the development of entrenched patterns of agreement as to what is a risk to health.[84] Needless to say, there is still a great amount of uncertainty over the biological effects of radiation and the mechanisms by which the disease processes proceed. It is further suggested that science will not be able to detect with confidence the levels of risk currently considered to be acceptable or unacceptable for either workers or the general public.[85] There is also diverging opinion on what is the cumulative risk to health and the very disease processes associated with that risk; a pattern of contention that is somewhat similar to the one that characterized the scientific and regulatory inquiry into biophysical impacts and bio-accumulation effects.

Radiation attributed deaths, however, are not the only health effects of uranium mining. Other risks, although overshadowed, are inherent to mining in semi-remote locations. The Ham Report found that dying from a violent death (suicides and vehicle or mine-related accidents) was proportionately much higher than the expected rate for dying from lung cancer.[86] Indeed, mines are dangerous places to work, regardless of what safety technology is at hand. It is not known, however, whether such dangers are the primary reason, over and above radiation exposure, as to why workers leave this line of work. Occupational risks to family members of uranium mining employees are also unknown. As a result, there is no knowledge base in Western science that accounts for

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82 L.M. Shields, W.H. Wiese, B.J. Skipper, B. Charley, and L. Benally (1992). *Navajo birth outcomes in the Shiprock uranium mining area.* Health Physics Vol. 63: 542-551.

83 L. Taylor (1983). *Resources for Self-Reliance, Uranium Legacy.* The Workbook. Vol. VIII, No. 6, Southeast Research and Information Centre, Albuquerque, New Mexico. November-December.

84 Arthur C. Upton 1992. *"The First Hundred Years of Radiation Research: What have they taught us?"* Environmental Research. Vol. 59, p. 36.

85 Morris Greenberg 1990. *"The Evolution of Attitudes to the Human Hazards of Ionizing Radiation and to its Investigators."* American Journal of Industrial Medicine. Vol. 20, p. 719.

86 J. M. Ham, Commissioner (1976). Report of the Royal Commission on the Health and Safety of Workers in Mines. Government of Ontario, Toronto.

these types of cumulative impacts. Likewise, there is little or no in-depth study of the impact of uranium mining on the overall well-being of community members throughout the Athabasca region. In addition, atmospheric or hydrospheric sources of risk have not been well studied from a community perspective. What is most surprising is that contaminant loads in country food have not been assessed from a community impact perspective, which is somewhat surprising since there are established research protocols throughout the Arctic to make such assessments possible.

### 4.3 Community Perceptions of Risk

In this study, community perceptions of risk were assessed, with the understanding that there are a several sources of potential hazards that community members can be exposed to on a day to day basis. For example, hazards can be specific or locally experienced (i.e., working in a mine, trapping, or smoking), whereas others are more global in nature (i.e., nuclear waste, AIDS, or chemical pollution). Some sources of risk are associated with a traditional way of life. Other sources result from exposure to modernization trends, such as medical care or uranium mining.

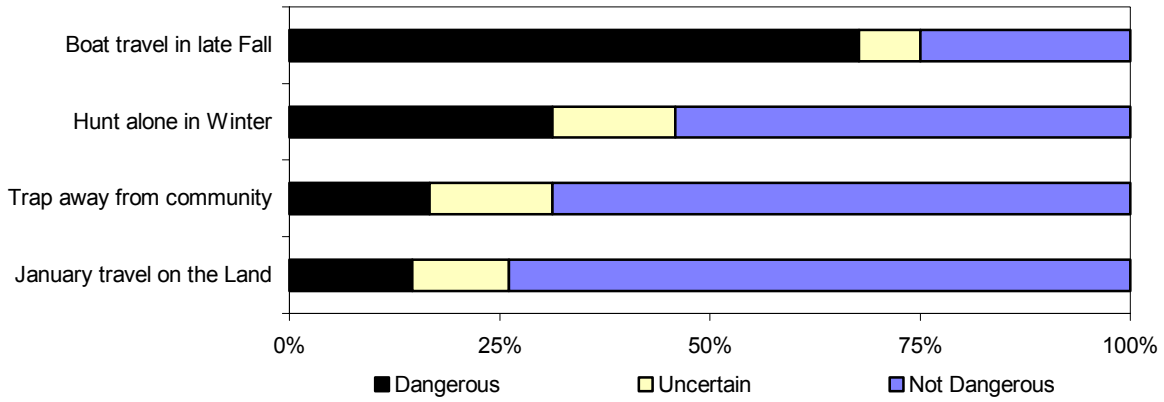
The following discussion examines such sources to develop an understanding of how community members view the risk of environmental health hazards by first ascertaining whether there is 1) a pattern of perception, 2) a shared discourse that contributes to these perceptions, or 3) whether diverging opinions are the norm. How risk perceptions of uranium mining hazards compare across various domains are also examined. In other words, is there a pattern of perception, or form of cultural rationality, that informs risk perception generally; or is risk perception simply a mosaic of cultural rationalities created in an ad hoc manner, depending on local circumstances?

As the previous chapters have indicated, the Denesuline's long association with the land has led to an accumulation of knowledge that provides clear understandings of people -environment relations. In the following section, it will become apparent that the Denesuline have drawn upon these forms of cultural rationality to assess the merits of rival explanations concerned with the impacts of uranium mining.

In our analysis, we found that traditional land use activities (hunting, trapping, and fishing) continue to persist in this community.[87] Dangers associated with such activities are a part of everyday life and the collective memory of the community, especially that of the older generation. In Table 4, a distinct pattern of risk perception associated with a long history of traditional land use (subsistence and commercial) activities is quite apparent. The overall pattern and its direction illustrate that the Denesuline appear to be quite confident in their assessment of danger, which is evident in the low proportion of "uncertain" responses. Indeed, such knowledge is highly respected for its cultural rationality, or predictive power tested by life experience.

**Table 4:** Perceptions of Land Use Dangers (n=96)

[87] J. O'Neil, A. Yassi, and B. Elias (1996). *Cultural Environmental Health Risk Perception in the Canadian North*. Circumpolor Health 96. Proceedings of the 10th International Congress on Circumpolar Health, Anchorage, Alaska (U.S.A.), May 19-May 24, 1996.




A considerable number of respondents (67.7%), for instance, perceived fall boat travel as the most dangerous, which is consistent with their knowledge of how unpredictable the weather can be, of boats icing up, and of the instability of the lake in these conditions. This perception is best illustrated by the following field note documenting one Elder's comment on how this knowledge is used to off-set the risks they take to continue a traditional life style:

> *By 10 in the evening the winds died down and the lake was relatively calm.[After waiting out the storm on an island], they left, and it didn't take long to get to the cabin. He stated that this time of year makes it dangerous to travel [so they have to be careful]. But travel they must even though the boats ice up so quickly and the lake can become too rough to travel.*

How such knowledge is used to mitigate the dangers of other land use activities was also evident in other domains of this figure. While most respondents (54.2%) perceived hunting alone in the winter as not dangerous, a large minority did regard it as dangerous. This split in perception should not be construed as unusual. One respondent captured this ambivalence in his comment that "it's fun providing you know what you are doing." Hunting alone in the winter can be dangerous, if no one else knows where you are, if you are unfamiliar with a particular area, or if you are not prepared with food and temporary shelter to wait out a storm.

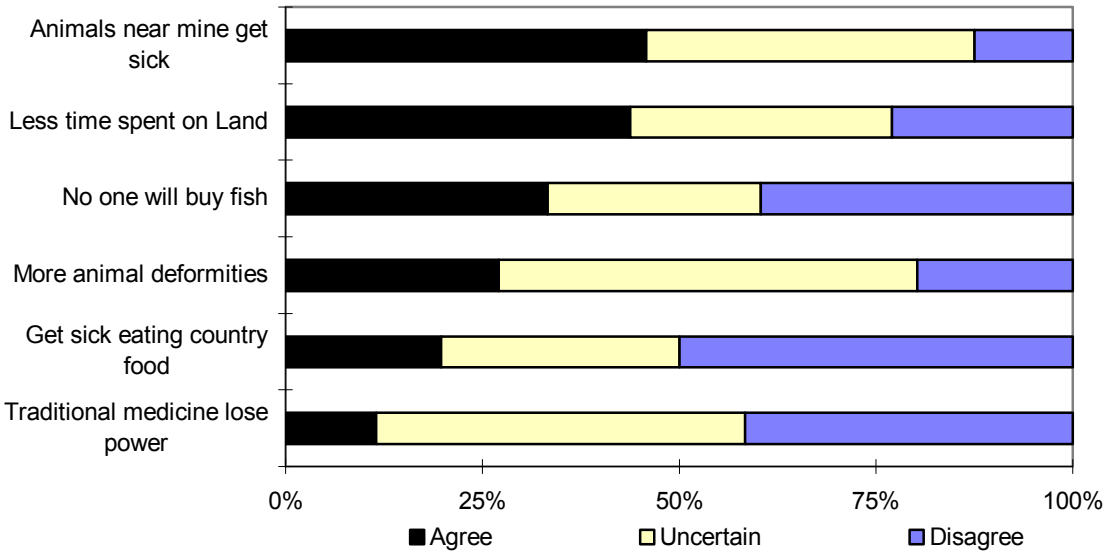
Similarly, a substantial number of respondents (68.7%) agreed that trapping away from the community is not dangerous. Experienced trappers noted, however, that although it is not typically dangerous, it could be. They cautioned that when working a new trap line, the ice could be too thin in some areas of your line, especially around rapids or due to underground springs.

Finally, we inquired into travelling on the land in January and found that a large number of respondents (85.5%) considered this activity as not dangerous. Travelling at this time of year is something community members greatly look forward to. Snowmobiles provide them with a more efficient and cheaper means of travelling to other communities. Indeed, many respondents indicated that they visit other Dene communities more in the winter than in the summer because of greater accessibility. Nonetheless, some respondents cautioned that snowmobiles can break down at any time and that many people can be unfamiliar with landmarks and direction.

The levels of uncertainty (ranging from 7.3% - 14.6%) expressed by respondents for the vast majority of these activities can be interpreted in several ways. Risk perceptions are strongly contextual for the Denesuline; contingent on broader environmental conditions that affect the “risk” of an activity. Uncertainty, in other words, may reflect a cultural rationality, which recognizes that risk is best contained by remaining non-committal, and by being open to contingencies and conditions that may affect the safety of a given activity. Uncertainty then may be interpreted positively, as an indication of wisdom and respect for the land, and not as an indication of ignorance or lack of knowledge.

Such contextuality is evident in the other figures, where we examine responses to statements made in the region concerning specific health risks associated with uranium mining. In Table 5, there is considerable variation in the extent to which people agree with various statements made about the impacts of uranium mining on land-use activities.

**Table 5:** Agreement with Perceptions concerning Development Impacts on Land Use Related Activities (n=96)




Agreement, for instance, is strongest for statements that suggest that the physical presence of the mine may have a direct impact on the health or behavior of animals. However, there was much less concern that individuals who consume plants and animals from the mining region will also get sick. This finding suggests that while most people are concerned about the direct effects of uranium mining on the local ecology, they are less concerned that their own health may be affected by their continued consumption of plants and animals that may be affected by mining activities. Our ethnographic work suggests that many people have a high level of confidence in their ability to recognize diseased or otherwise affected plants and animals. Traditionally, Denesuline hunters avoided taking animals that appeared “abnormal,” and likely continue to use similar empirical criteria in order to distinguish potentially “dangerous” animals, that if consumed might make them sick.

Uncertainty remains relatively constant in the range of 25 to 35%, and likely reflects the underlying cultural rationality of risk perception. Since Denesuline knowledge of animal behavior and well-being is rich and detailed, many respondents are likely unwilling to commit themselves to a statement that does not include the myriad of contingencies and contextual factors that could account for changes in the behavior or health of an animal population.

Contextual factors, for instance, may include perceptions of activities that are associated with the presence of the mining industry, but not necessarily directly connected to uranium and the risks of radiation. For example, the perception of fewer people spending time on the land is strongly associated with stories of "bad white men," such as prospectors or convicts from the South still told today. The stories describe the killing of Dene men by "bad white men," the stealing of their food, the abduction of their children, and the destruction of their camps. Overall, these stories carry much weight and have been mythologized throughout the Denesuline territory. During a recent EIA

hearing, the Chief of the community (1993) cautioned the mining companies and the Panel Members that the belief in "bad white people" still exists and generates fear in the Athabasca:[88]

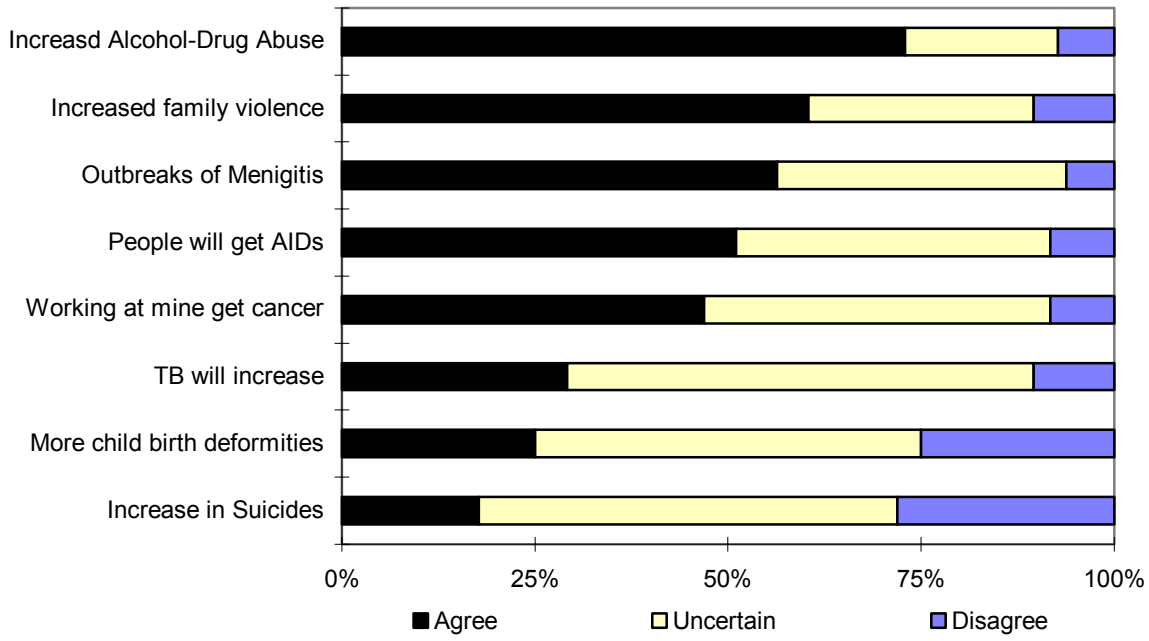
> *... it's more or less that they have the safety of living [here] instead of living out there again. So it has created also a psychological disturbance for the trappers, hunters, [and] fishermen.*

There are also many reasons why fish are not purchased. The decline in fishing, for example, has been strongly tied to economic factors (i.e., increased fishing and transportation costs). Needless to say, there are some people who are concerned with how markets will perceive the quality of their fish not only now, but also in the future as mining activity increases. On the other hand, most people (50%) are of the opinion that they would not get sick if they eat country food, but 30% were uncertain. This uncertainty was evident for other country foods and increased for mining impacts on traditional medicines. Overall, it appears that there is a pattern of similarly shared perceptions, which illustrates that members of this community continue to have confidence in their ability to detect change, yet they remain sensitive to the uncertainty of environmental risks.

Table 6 describes risk perceptions related to changes in community health. Once again, a similar pattern of perception emerges; as concern decreases, uncertainty increases. Agreement about risk is highest on the indicators that have been experienced first hand, and where there is broad historical experience.

[88] Transcript of the Public Hearings held by the Joint Federal-Provincial Panel on Uranium Mining Development in Northern Saskatchewan on the Cluff Lake, McClean Lake and Midwest Venture. April 14, 1993.

**Table 6:** Agreement with Perceptions concerning Development Impacts on Community Health (n=96)




For instance, the Denesuline are no strangers to impacts associated with the boom and bust cycle of resource development. In 1982, the milling and mining operations at Uranium City closed, and by 1986, it lost its town status when its population had dropped to less than 200. A recent study noted the impact of this closure on one of the northern Saskatchewan communities:[89]

> *There was a 50% increase in population with families returning from Uranium City. The alcohol and violence became so bad that Medical Services Branch refused to put a nurse in the community for 19 months.*

Knowledge of this problem is consistent with this community's experience with alcohol abuse and family violence. Community members associated these problems with the cyclical nature of sudden increases in household earnings due to the employment of a family member, followed by a sudden decrease in earnings when this family member is no longer employed, and by the emotional upheaval it creates.

Community respondents also shared the concern that some infectious diseases would persist or even increase with increased mining activities. Most people (56.3%) agreed that there would be more outbreaks of meningitis. However, a large minority (37.5%) was uncertain if this would actually be the case. It is important to note that outbreaks of infectious diseases have long been associated with increased contact with Western society. At the same time, public health discourse has focused attention on the threat of infectious diseases. This discourse has been integrated into local knowledge

[89] Ecologistics Limited. Assessing Cumulative Effects of Saskatchewan Uranium Mine Development. Prepared for the Joint Federal-Provincial Panel on Uranium Mining Developments in Northern Saskatchewan. December, 1992.

and is drawn upon by some to explain cumulative impacts of mining as illustrated by the following comment:

> *Everything around the mine that comes out of D-Zone causes disease. If one person gets it, the next person who they come in contact with would get it. It's contagious. Everything around D-Zone will be diseased.*

This linkage of infectious diseases to the socio-economics of uranium mining was also made for specific sexual transmitted diseases such as AIDS. The majority of the respondents (51.1%) agreed that the prevalence of AIDS might increase, as a result of uranium mining developments, but many (40.6%) were still uncertain. Community members appeared to know that uranium mining is not a direct cause of AIDS per se, but some believe that uranium mining has opened up the north to southerners that may bring the disease up with them.

Respondents, however, were divided over whether people working at the mine are at increased risk for cancer. Nearly half (46.9%) agreed, whereas 44.8% were uncertain. Respondents that agreed were aware of the link between cancer and exposure to radiation, whereas others were not sure because they had not had direct experience with a case of cancer that could be attributed to uranium mining exposure.

The trend toward high uncertainty continued with statements projecting increases in "Child birth deformities" (50%), "Suicides" (54.2%) and "Tuberculosis" (60.4%). This suggests that the community has had little direct experience with these problems (an interpretation supported epidemiologically). In the absence of tangible evidence of the problem occurring, people in the community remain non-committal about risk.

Overall, there is a distinct pattern of perception regarding traditional land use activities and community health risk. A pattern that suggests that the Denesuline have long practiced cultural risk assessment, management, and communication activities. It appears that traditional land use knowledge is used to mitigate the dangers of land use activities, providing caution is exercised. Reliance on this knowledge has created confidence in that community members are quite secure in their ability to assess an impact to their health, especially when they draw upon traditional knowledge.

Small but nonetheless considerable levels of uncertainty also suggests that perception is context specific, and that it can converge with other cultural knowledge systems, like those of Western society. Relatively high levels of uncertainty also suggest that uncertainty in risk perception is part of a cultural approach to survival and should be viewed positively. However, there is also a great amount of uncertainty and divergence in opinion when people lack either historical or recent experience with a potential environmental health threat. To some extent, Western explanations are adopted and adapted when they are compatible with local cultural understandings. However, uncertainty is enhanced when local cultural and Western explanatory frameworks are either in conflict, or, as is usually the case, simply unconnected.

Risk perception in this Denesuline community is therefore a product of several key factors. First, traditional cultural understandings of risk include relatively high levels of uncertainty that places positive value on remaining open to contingency and context. Second, when particular health problems are significant to the community, these problems are likely to be strongly associated with general environmental threats. Third,

people maintain a high level of confidence in their ability to detect problems in their food and other “traditional activities,” and are relatively resistant to external information which may suggest health risks. Finally, uncertainty as a positive traditional value, when compounded with conflicting information creates enormous ambiguity in risk perception.

## 5.0 Conclusions

This study has illustrated that the Lac la Hache First Nation, through their historic relationship with the land, had retained a traditional knowledge system, which served them well historically when assessing land use dangers. The creation of reserve lands to make way for new settlements and industrial developments may have eroded their relative autonomy over their economy, but their knowledge system has remained largely intact due to the remoteness of this region and the importance of hunting, trapping and fishing in sustaining their well-being. The fur trade and the commercial fishery essentially complimented such traditional forms of cultural rationality. Uranium mining, however, encroached upon their traditional land in ways that were not complimentary to indigenous use of the land.

The community, however, continues to value and practice traditional land-use activities. Their long association with the land has led to an accumulation of observations that provide the basis for a form of cultural rationality that can situate the health impacts of uranium mining. There is a distinct pattern of perception regarding traditional land use activities and community health risks. A pattern that suggests that they have long practiced cultural risk assessment, management and communication activities.