WEST KITIKMEOT / SLAVE STUDY SOCIETY

Re: Traditional Knowledge in the Kache Tue Study Region:
Phase Three – Towards a Comprehensive Environmental Monitoring Program in the Kakinene Region

STUDY DIRECTOR RELEASE FORM

The above publication is the result of a project conducted under the West Kitikmeot / Slave Study. I have reviewed the report and advise that it has fulfilled the requirements of the approved proposal and can be subjected to independent expert review and be considered for release to the public.

Study Director Date

INDEPENDENT EXPERT REVIEW FORM

I have reviewed this publication for scientific content and scientific practices and find the report is acceptable given the specific purposes of this project and subject to the field conditions encountered.

Reviewer Date

INDEPENDENT EXPERT REVIEW FORM

I have reviewed this publication for scientific content and scientific practices and find the report is acceptable given the specific purposes of this project and subject to the field conditions encountered.

Box 2572, Yellowknife, NT, X1A 2P9 Ph (867) 669-6235 Fax (867) 920-4346
e-mail: wkssa@internorth.com Home Page: http://www.wkss.nt.ca

WEST KITIKMEOT / SLAVE STUDY SOCIETY

BOARD RELEASE FORM

The Study Board is satisfied that this final report has been reviewed for scientific content and approves it for release to the public.

June 2/03

Chair West Kitikmeot/Slave Society Date

Box 2572, Yellowknife, NT, X1A 2P9 Ph (867) 669-6235 Fax (867) 920-4346
e-mail: wkssa@internorth.com Home Page: http://www.wkss.nt.ca

Łutsel K'e Dene Band
Post Office Box 28
Łutsel K'e, Northwest Territories
X0E 1A0

Traditional Knowledge in the Kache Tué Study Region:

Phase Three - Towards a Comprehensive Environmental Monitoring Program in the Kakinÿne Region

FINAL REPORT

May 2002

Submitted to:

West Kitikmeot Slave Study Society (WKSS)

Submitted by:

Wildlife, Lands and Environment Department

***Åutsÿl K'e** Dene First Nation*

Prepared by:

***Åutsÿl K'e** Dene Elders and land-users*

Stephen Ellis - Project Directors

Beverly Catholique, Stan Desjarlais, Bertha Catholique, Henry Catholique, Marcel Basil, Nancy Casaway – Traditional Knowledge Researchers

Shawn Catholique, Jeanette Lockhart – GIS Database Technicians

STUDY SUMMARY

Phase Three of the *Traditional Knowledge in the* Kache Tué *Study Region* (Kache Tué) project took place between April 2001 and March 2002. The study was based upon the premise that Denesôåine (Åutsÿl K'e Dene) oral histories, knowledge and experiences concerning the Kache Tué study region form the essential foundation for the *monitoring of environmental change* within the traditional territory of the Denesôåine people.

The overriding goal of Phase Three of this study was to design and test a traditional knowledge-based plan for monitoring the changes, both natural and un-natural, that are occurring in the traditional territory of the Denesôåine. Based upon preliminary indicators of change developed in Phase One and related contextual stories gathered in Phase Two of the study, a model for a traditional knowledge-based environmental monitoring plan in the Åutsÿl K'e traditional territory was designed. Suites of indicators for caribou, fish, ducks and geese, small fur-bearing animals, chicken and ptarmigan and berries were refined, and techniques for gathering, verifying and interpreting indicator information were designed. A database was designed as a means of organizing and storing indicator information.

A test of the monitoring program was tested through a comprehensive one-year trial. Information was gathered from land-users around indicator suites. This information was then verified, organized and interpreted by the methods outlined in the design of the monitoring plan. The implications of this monitoring information for the traditional territory of the Denesôåine was explored, as well as lessons learned and refinements suggested by the one-year trial program.

The results of this study provide an effective and functional model for the incorporation of traditional knowledge into the monitoring of environmental change. The model presented herein and the lessons learned from its testing can greatly aid the future design and implementation of cumulative effects monitoring initiatives for the entire Slave Geological Province.

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Åutsÿl K'e Elders and Land-Users

Åutsÿl K'e Wildlife, Lands and Environment Committee

Åutsÿl K'e Chief and Council

Bertha Catholique, Sarazine Basil, James Marlowe - Interpreters

University of Waterloo

Dr. Robert Gibson

University of Manitoba

Anne Kendrick, Dr. Phil Lyver

Harvard University

Andrew Preston

West Kitikmeot Slave Study Society

John McCullum

De Beers Canada Exploration Inc.

Shirley Standafer Pfister

BHP Billiton Diamonds Inc. / Kitikmeot Meridian

1.0 STUDY DESCRIPTION

> *Back from 1918 - I can remember how things looked. It was so different. Some people who don't care so much won't notice the changes. How we do things is also changing. We are supposed to be working together. My grandfathers used to sit around together and think about these things and predict what would happen. That is what we are doing now; Elders can predict what will happen in the future. Maybe our children will be very poor. We talk about a lot of things. What we are talking about is very important. Our grandfather used to talk about these things. (ML 11 05 00)*

The way of life of the Denesôåine (Åutsÿl K'e Dene) is based on ways of knowing that have been passed on for generations. In addition to the socio-economic, cultural and spiritual relationships that exist among people, the Denesôåine have a complex and sacred relationship with the land around them. By respecting this sacred relationship and recognizing the richness of the knowledge held by the Elders about their traditional territory, much can be learned about the health of the land and how it is changing.

As a bit of background, Phase One of the project *Traditional Knowledge in the* Kache Tué *Study Region* followed the *harvesting patterns* of the Denesôåine through the spring geese and duck hunting season, through the summer fish harvest, the fall caribou hunt at Artillery Lake (Æedacho Tué) and the winter harvest of fur-bearing animals. During this phase, researchers learned about the history of region as an area of *great diversity* and *abundance*. They also learned about how changes in the land were assessed using traditional means, from which preliminary *indicators of change* were developed. Among the most important lessons was the importance of *respecting the land*. Researchers learned that those people who respect the land and live according to the knowledge of the Elders benefit from what the Creator has provided. An in-depth exploration of the results of Phase One can be found in the 1999-2000 Annual Report submitted to the WKSS.

Phase Two of the study focused more on documenting the *oral history* and *legends about the land*. These legends provided the researchers with tremendous insight into the spiritual and physical relationships between the Denesôåine and the land. These legends also provided important *contextual information* for the *interpretation* of the previously developed indicators of change. Community researchers also worked to address gaps in what had been documented in Phase One relating to the health of wildlife and wildlife habitat. Additional information was gathered about the grizzly bear, raven, moose and beaver. Results of Phase Two can be found in the 2000-2001 Final Report submitted to the WKSS.

Phase Three of the *Traditional Knowledge in the* Kache Tué *Study Region* project took place between April 2001 and March 2002. This Phase of the study was based upon the premise that Denesôåine oral histories, knowledge and experiences concerning the Kache Tué study region form the essential foundation for the *monitoring of environmental change* within the traditional territory of the Denesôåine people. From this rich knowledge base, we can seek to better understand the changes that are or may happen upon the land.

Based upon preliminary indicators of change developed in Phase One and the related contextual stories gathered in Phase Two of the study, Phase Three of the study sought to design a model for a traditional knowledge-based environmental monitoring plan in the Åutsÿl K'e traditional territory. Such a monitoring plan is of critical importance for the traditional territory, particularly due to the unprecedented resource pressures the region has experienced in the recent past from diamond mining, hydro and tourism interests.

As such, the overriding goal of Phase Three of this study was to design and test a plan for monitoring the changes, both natural and un-natural, that are occurring in the traditional territory of the Denesôåine. The Denesôåine are in a unique position to spearhead such an initiative. The people have a unique and in-depth understanding of the ecology and natural variation in this region, as well as time-tested wisdom concerning a healthy relationship between human and natural activities. Only through the careful consideration of this knowledge and wisdom can it be ensured that the wisest decisions are made regarding the pace and type of change in the study region.

2.0 OBJECTIVES

The specific objectives of Phase Three of *Traditional Knowledge in the* Kache Tué *Study Region* were as follows:

1. To create a comprehensive series of traditional indicators of environmental change and to design a suite of indicators for important environmental features of value (animals, plants, etc.) to the Denesôåine.

2. To design a methodology for information gathering around suites of indicators using traditional skills, knowledge and values. This methodology is based upon a system of seasonal cycles.

3. To complete the design of a searchable (Access), geo-referenced (GIS) database to store information and stories gathered around indicators.

4. To complete the design of a methodology to analyze, verify and interpret gathered indicator information using cultural values, historical context and land-based experience.

5. To test and fine-tune the designed indicators, methodologies and database through a one-year trial run of the monitoring program.

6. To determine the significance, in relation to the natural world and the Dene way of life, of observed changes gathered through the pilot project.

7. To draw implications and conclusions from the pilot project for the whole Slave Geological Province.

The objectives of this study can be grouped into two larger categories: Objectives 1-4 concern the *design* of the traditional knowledge monitoring *plan*, whereas Objectives 5-7 pertain more to the *testing* of the traditional knowledge monitoring *program*.

3.0 METHODS

Two separate sets of methods were used during this study. The first set of methods was used to satisfy Objectives 1-4, concerning the *design* of a traditional knowledge monitoring *plan*. A separate set of methods pertained more to the *testing* of the traditional knowledge monitoring *program* (Objectives 5-7).

Methodologies used for the *design of the traditional knowledge monitoring plan* were essentially identical to Phase Two of the study. These methods are briefly summarized in the following section. For a complete description of the methods employed during the design of the traditional knowledge monitoring plan, one can refer to the 2000-2001 Final Report of the *Traditional Knowledge in the* Kache Tué *Study Region* (Åutsÿl K'e Dene First Nation, Parlee et al. 2001).

The theory behind the methods used during the *testing of the traditional knowledge monitoring program* is largely derived from the Denesôåine Cycle of Knowledge as outlined in the Final Report of the *Ni hat'ni – Watching the Land: Cumulative Effects Assessment and Management in* Åutsÿl K'e study (Åutsÿl K'e Dene First Nation, Ellis et al. 2001). These methods will be completely outlined herein.

3.1 METHODS USED IN THE DESIGN OF A MONITORING PLAN

The methods used for the design of the traditional knowledge monitoring plan were a form of Action Research, involving the *participation* and *direction* of community Elders and the Wildlife, Lands and Environment Committee, the *training* and *application of the skills and knowledge* of community members and *coordination* with the local leadership. During the planning stages of the project, the Wildlife, Lands and Environment Committee defined the main interests and needs of the community as related to community participation. The main elements of community participation that were emphasized were (1) training, (2) the use of the skills and knowledge of local people, (3) coordination with the First Nation leadership, and (4) the broad participation of the community.

3.1.1 Training

The training of the researchers in both the western and Denesôåine concepts / methods of research was fundamental to the development of the project. Researchers raised primarily in the western ethic were trained in storytelling, communication with Elders, land-base skills and the history / legends of the people and their traditional territory. Researchers raised primarily in the Denesôåine ethic were trained in

information management, qualitative research techniques, English and Dene Yati literacy as well as database design and maintenance. The goal of this training process was to ensure that skills and knowledge were exchanged cross-culturally for better understanding between researchers regarding project design, results and conclusions.

3.1.2 Use of the skills and knowledge of local people

Traditional knowledge research requires using the ways of knowing and sharing of the Denesôåine. Typically such ways of knowing are experiential, oral and informal. Local study researchers, being raised in the Denesôåine way, are well versed in these ways of knowing and used their skills to interact with knowledge holders in a fashion that was both familiar and comfortable. As such, traditional knowledge was gathered from Elders and land-users through home-visit interviews (questionnaires) and small group discussions (workshops).

3.1.3 Coordination with the First Nation leadership

Coordination with the First Nation leadership was achieved through communication and information exchange with the Åutsÿl K'e Dene First Nation Chief and Council and the Wildlife, Lands and Environment Committee (WLEC). The WLEC was the primary body responsible for over-seeing the information gathering process. They were also involved in the evaluation of results and approval of reports before submission to the West Kitikmeot Slave Study Society.

3.1.4 Broad community participation

The Åutsÿl K'e Elders and land-users are recognized in the community as the primary holders of traditional knowledge about the study region. Their expertise distinguished them as the best suited to advise on the appropriate focus of interview questions, methods of data collection, evaluation and verification of results.

As well, the researchers aimed to make the project accessible to all interested community members. Elder meetings provided opportunities for members of the public to participate as observers. Where possible, on-the-land field trips have also included families, students or other interested members of the public. Researchers maintained an open door policy to community members to facilitate informal communication about the project and its results.

3.2 METHODS USED IN THE TESTING OF A MONITORING PROGRAM

The functional centerpiece tested during the 2001-2002 trial run of the Åutsÿl K'e environmental monitoring program was the Denesôåine cycle of knowledge as developed by Elders, land-users and WLE staff and detailed in the report *Ni hat'ni – Watching the Land: Cumulative Effects Assessment and Management in Åutsÿl K'e* (Åutsÿl K'e Dene First Nation, Ellis et al.).

The methods described herein shall focus on how environmental indicators and the Denesôåine cycle of knowledge were integrated together into a cohesive monitoring program.

The Denesôåine cycle of knowledge represents the flow of information through Denesôåine culture. It demonstrates how information is gathered and processed using Denesôåine values and techniques. This cycle is graphically represented in **Figure 1**, and described in the subsequent paragraphs.

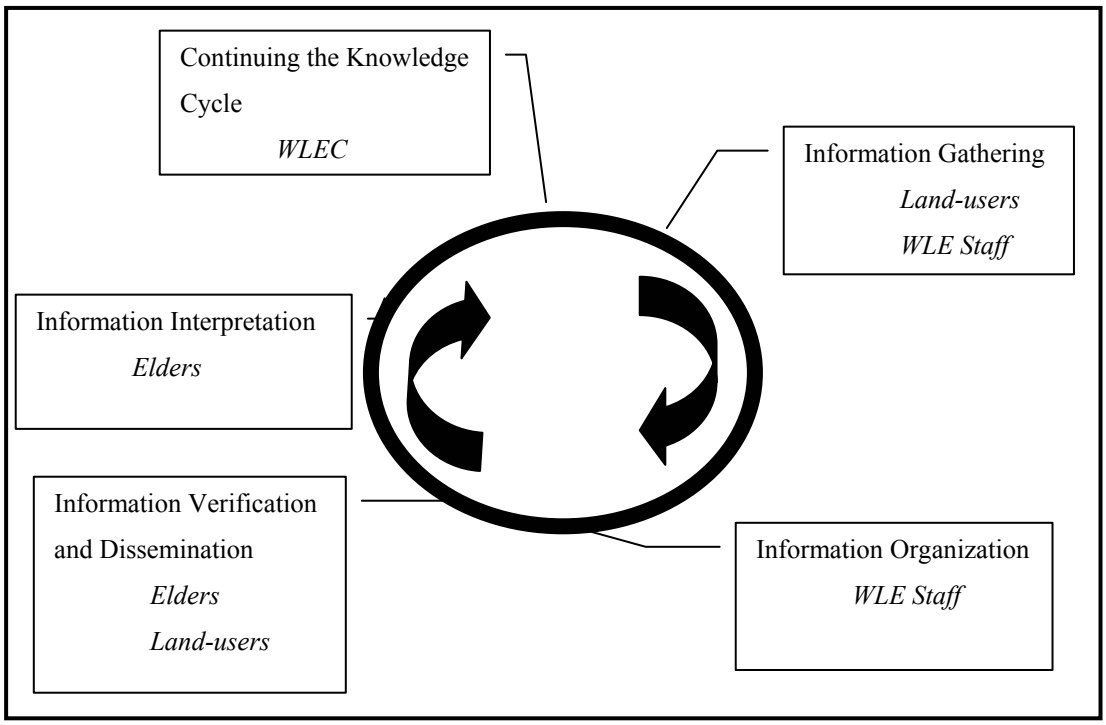

Figure 1. The Denesôåine cycle of knowledge

3.2.1 Information gathering

Dene ways of knowing are fundamentally experiential in nature. They only operate effectively when people engage in traditional activities on the land - hunting, fishing, gathering, traveling and camping. Having people in close contact with the land ensures that new information about the land is continually being generated through observation and experience. The closer to the land people are, and the longer they spend on it, the richer the information that is derived from experience. This is the fundamental "information gathering" aspect of the Dene way of knowing - people experiencing the land making empirical observations about it. This gathered information is transmitted orally to Elders who validate and interpret the new information in light of their collective experience and history. This is essential for the continual evolution of Dene knowledge - without people on the land gathering information and sharing it with the Elders, Dene knowledge can simply stagnate and eventually become outdated.

The following means of data gathering were tested:

- The gathering of information around indicators completed through the *Design of the Monitoring Plan* section of the study.
- The use of standardized question sets to gather environmental observations from community Elders and land-users. Environmental indicator questions will be asked of land-users in personal interviews (questionnaires) while they are on the land, or just after they have returned to the community after they have been on the land.
- The gathering of environmental observations from land-users participating in WLEC sponsored on-the-land activities, for example during the fall caribou hunt at Artillery Lake or the spring community hunt at Daisy Lake.
- The gathering of environmental observations from land-users after each different harvesting season. For example, information about fish could be collected after the fall fishing season, while information on fur-bearers could be collected after the winter trapping season. Different harvesting seasons corresponded with different monitoring cycles.

The methodology employed to gather information around environmental indicators will primarily feature semi-directed, informal interviews with land-users. Environmental interview questions will be based around issues of seasonal abundance, distribution, condition and context. Land-users will be asked to talk and tell stories about the abundance, distribution and condition of animals, plants and people on a seasonal basis. Such questions seek to illuminate the population health, dynamics and resilience of animals, plants and people, as well as how they interact with each other across the greater landscape. These land-user observations are important for detecting changes occurring in natural cycles and patterns, especially as a database of knowledge is built up season after season. Finally, contextual stories relating to the setting and

circumstance in which observations are made are fundamental for the interpretation of land-user observations and the derivation of implications for the larger ecosystem.

Land-users were provided with an expert consultation fee for participation in indicator questionnaires. This varied between $25-50 depending upon time required to complete an interview.

3.2.2 Information organization

Once indicator information was gathered from land-users, it was organized and stored in an accessible fashion. In this interest, researchers designed a traditional knowledge database. In addition, gathered indicator information must be put into a format that is conducive to analysis and interpretation by Elders. The following means of indicator organization were used and tested:

- The recording of interviews on audio-disc or video tape.
- The transcription of interviews into English so they could be understood by people who may not speak or read Dene Yati.
- The input and searching of interview transcripts into the traditional knowledge database.
- The mapping of spatial indicator information for comparison with subsequent years of information gathering. This was primarily done using a GIS system, effectively displaying the relationship between various spatial patterns upon the land.

Indicator information must also be organized into general themes in preparation for analysis by Elders and land-users. To accomplish this, researchers simply studied indicator information transcripts for each cycle in order to assess what the *majority* of participants are saying in response to identical questions. As well, any response that was particularly unique was also slated for Elder analysis.

If a monitoring cycle yielded only indicator information that represented natural cycles of change, this information was considered a record of baseline information ("what has always been") and was subsequently entered into the database without interpretation by the Elders. However, any monitoring cycle that yielded information perceived to represent unnatural changes to land-users were referred to a verification and monitoring workshop for discussion.

3.2.3 Information verification and dissemination

Indicator information representing potential unnatural change needs to be verified for confirmation. By comparing the information gathered with what is known to be true through the experience of the Elders, information can be determined to either fall within the natural cycles of nature or without. Information can be weighed against a collective environmental knowledge that has withstood the test of time, knowledge about the land and how it changes that has proven time and time again to be reliable. In such a fashion, observations and experiences are categorized as representing natural cycling if it fits with the Elders' understanding of the land. Experiences and observations that do not fit with Denesôåine knowledge of the land are deemed to represent unnatural change. The verification process was tested through collective Elder and land-user workshops, held at the completion of each seasonal cycle that yielded observations that potentially indicated unnatural change. In the case where all monitoring cycle participants made no indication that any unnatural change was occurring, no verification workshops took place. The information was already verified by the concurrence of monitoring interview respondents.

Information that is verified by the Elders and land-users becomes incorporated into the collective oral narrative of the Dene people. Thus the new knowledge is disseminated. This insures that Dene knowledge remains contemporary: otherwise, this knowledge could simply become a relic with only a historical relevance.

3.2.4 Interpretation of knowledge

Indicator information about unnatural change that has been organized and verified must be interpreted in order to evaluate its meaning and consequence. Elders took new information generated through the testing of the monitoring program and evaluated it against the experiential history of the people and the land. In such a way they began to explain the reasons for why things may be changing as they were. The Elders also took the new knowledge and evaluated it against the values and traditions of the Dene people. In such a way they began to determine whether the new knowledge represented a concern or a matter of little consequence to the land and its people.

The interpretation of knowledge was tested at the end of each seasonal cycle. Specific workshops were held to interpret information gathered for each monitoring cycle that yielded indicator information potentially representing unnatural change (i.e. *Fall Fishnet Cycle, Spring Freezer Hunt Cycle*).

3.2.5 Completing the knowledge cycle

Once knowledge about the land has been interpreted by the Elders, it is communicated to the WLEC for decision-making and for providing further direction to the study process. This process was facilitated by the fact that some Elders sit on the WLEC, and thus could share the new knowledge directly with the entire

committee membership. The WLEC in turn provided the study with direction for further research and monitoring activities. This was a means to insure that pertinent information about the community and land was being gathered and analyzed in the Dene way. In such a way does the whole Dene Cycle of Knowledge continue, from information gathering to evaluation and back around again.

3.3 CHRONOLOGY OF ACTIVITIES

The study objectives were met through a series of tasks and activities outlined in the following chronology:

April 2001

Formulation of 2001-2002 study objectives and work plan.

Elder workshops to discuss cultural values and their incorporation into the design of a traditional knowledge monitoring initiative.

May 2001

Design and refinement of open-ended interview questionnaires for the gathering of information around preliminary indicators as developed in Phase One of the study:

- Caribou
- Fish
- Small fur-bearing animals (mink, marten, weasel, squirrel, lynx, beaver, muskrat, otter, wolverine)
- Ducks and geese

June 2001

Development of preliminary indicators of health for the following animals and plants through Elder workshops:

- Berries
- Rabbits
- Chickens (grouse) and ptarmigan

Design and refinement of open-ended interview questionnaires for the gathering of information around preliminary indicators developed June.

July 2001

Refinement of yearly work plan.

Elder workshops to discuss the best time to administer interview questionnaires pertaining to each suite of indicators (monitoring cycles).

August 2001

Summer Hunt Caribou Cycle – MacKay Lake and Aylmer Lake Summer Hunts

- Series of interviews around caribou indicators during and after the MacKay Lake caribou hunt corresponding with the Desnedhé Che spiritual gathering.
- Gathering of stories about Denesôåine land-use in the Aylmer Lake region.
- Series of interviews around caribou indicators during a hunt at Aylmer Lake.

September 2001

Fall Hunt Caribou Cycle - Annual Fall Hunt in Artillery Lake

- Gathering of stories about the history of the fall hunt.
- Cycle of interviews around caribou indicators during and after the hunt.

Workshop to verify and interpret results from *Summer Hunt Caribou Cycle* and *Fall Hunt Caribou Cycle*

October 2001

Berry Cycle

- Cycle of interviews around berry indicators for the fall berry-picking season.

Transcription of stories and data gathered during the *Summer Hunt Caribou Cycle* and *Berry Cycle*.

Development of database for storage and analysis of traditional knowledge stories and information.

November 2001

Chicken Cycle

- Cycle of interviews around chicken indicators for the fall chicken season.

Rabbit Cycle

- Cycle of interviews around small fur-bearing animal indicators for the fall rabbit season.

Elders workshop to analyze and interpret information gathered through the *Summer Hunt Caribou Cycle*.

Continuing development of traditional knowledge database.

Fall Fishnet Cycle

- Cycle of interviews around fish indicators after the fall fishing season has been completed.

December 2001

Marten, Mink, Weasel, Lynx, Fox and Wolverine Cycle - On-the-land traditional knowledge camp at Duhamel Lake

- Gathering of stories and teaching of skills relating to the winter trapping season. Refinement of small fur-bearing animal indicators.

Transcription of stories and data from the *Fall Fishnet Cycle, Chicken Cycle* and *Rabbit Cycle*.

January 2002

Winter Caribou Cycle

Cycle of interviews around caribou indicators near the end of the deep winter hunting season.

- Transcription of stories and data from winter hunting season.
- Input into database.

Elders workshop to analyze and interpret information gathered during the *Fall Fishnet Cycle*.

Input of previously gathered indicator information into the database.

February 2002

Marten, Mink, Weasel, Lynx, Fox and Wolverine Cycle

- Cycle of interviews around fur-bearing animal indicators near the end of the trapping season.
- Transcription of stories and data from winter trapping season.
- Input into database.

Elders workshop to verify and interpret information gathered during the Rabbit Cycle and the *Marten, Mink, Weasel, Lynx, Fox and Wolverine Cycle.*

Completion of database development.

March 2002

Spring Freezer Caribou Hunt Cycle - Daisy Lake Hunt

- Cycle of interviews around caribou indicators during and after the community caribou hunt at Daisy Lake.
- Transcription and input into database.

Elders workshop to analyze and interpret information gathered during the *Winter Caribou Cycle* and the *Spring Freezer Caribou Hunt*.

4.0 THE KACHÉ TUÉ STUDY REGION

> *Not long ago I remember people stayed around here on the north shore of Mcleod Bay. Louis Drybones and his two brothers Michel and Morris Baniya – they were the last ones to stay here [year-round]. They stayed at the Waldron River along the shoreline. People used to take care of what they gained and had in the olden days. Some people starved around here because of the meat shortage. Sometimes it was hard and difficult because of the cold winter weather, the lack of food. When there was no caribou it was tough. Abele Nitah also stayed here. He had a cabin at Bedford Bay. These canoe routes and trails into the barrenlands have been here for generations. Our ancestors (Thai Dene) used these routes and trails. Now we still use them to go hunting for caribou. It has been passed on from our great ancestors to today – from Taltheilei to Fort Reliance. (ML 31 08 00)*

The north shore of Kaché Tå'azí (Mcleod Bay) in the East Arm of Great Slave Lake is the Kache Tué region, home to the Denesôåine people. The Kache Tué region is within the greater landscape of the Kakinÿne - the rich land. The Kakinÿne is described by the Elders as a region "beyond the end of the lake" – in other words, the area beyond Kaché Tå'azí, the north shore of the East Arm. The Kakinÿne extends from Nidítagh Tué (MacKay Lake) and Tåa Gai Tué (Aylmer Lake) in the north to Kaché Tå'azí in the south, from Æedacho Tué (Artillery Lake) in the east to Åu Tué (McKinlay Lake) in the west (**Figure 2**). Straddling the transition between the boreal forest and the barrenlands, the Kakinÿne is a diverse ecosystem rich in wildlife, plants, and the camps and trails of the Denesôåine people. This is Denesôåine Nÿne, or Chipewyan land.

The Kakinÿne is the heart and spirit of the Denesôåine way of life. Within this area, cultural and environmental features of value to the Denesôåine people are represented, existing today much as they were in the days gone past. It is here that the Denesôåine people have lived, laughed and loved over the centuries. The Elders describe this region as rich with resources. People would always go to this area to harvest caribou, to trap for furs, to gather berries, etc. - traveling by dog team, by canoe and on foot. People always knew they could find food in this area. This is the breadbasket of the Denesôåine people. For further information about the history and legends surrounding the Kakinÿne, refer to the report entitled Denesôåine *Land-Use in the* Æedacho Tué *and* Desnedhé Che *Region – Report #1: Traditional Practice - The Land of Legend* (Åutsÿl K'e Dene First Nation, Ellis et al.).

Initially, the Kache Tué study region was defined by Åutsÿl K'e Elders in 1997. At that time, the Elders expressed concern about the region between Kezus Tué (Cook Lake) and Kaché (Fort Reliance). On May 21, 1998, the Elders recommended that the study area be expanded to include the entire Kaché Tué region along the north shore of Kaché Tå'azí. Subsequent results from Phase One and Two of the study, however, extended even beyond Kaché Tué to encompass the entire Kakinÿne. This greater Kakinÿne region was the focus of Phase Three of *Traditional Knowledge in the* Kache Tué *Study Region*.

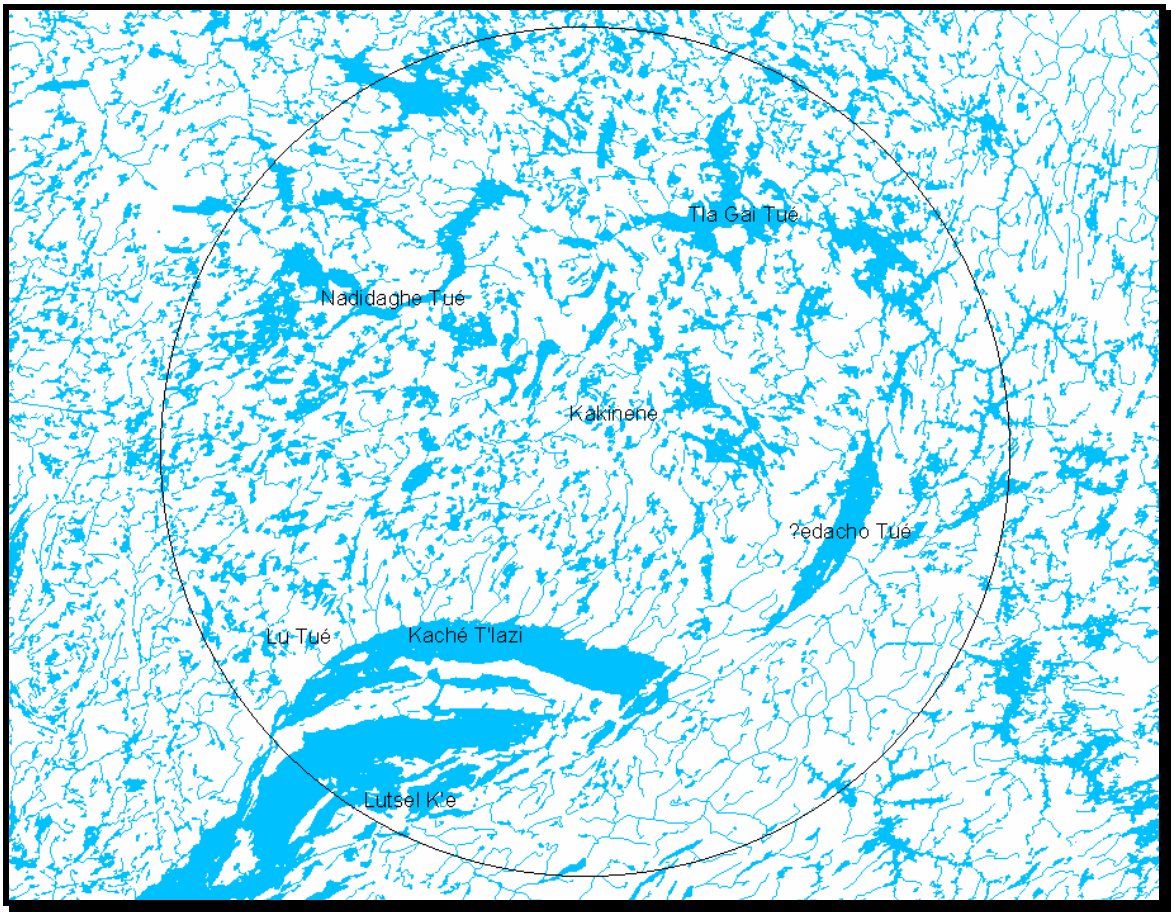

Figure 2. The Kakinÿne Region

5.0 RESULTS

> *The report that has been put together is about our culture and our way of life. The documents show how we see things. The people here know exactly what is happening. When I was young - I didn't go to the store. I survived on the land. I put my snowshoes on in the winter and this is how we survived. Today it's not like the olden days. This document here won't go away. It will be around for many years. It tells what we understand about the animals and how they behave and how we live on the land…some of the young people don't know the whole story. The documents that are made will let them know it. We can pass on stories about the rivers and how they made a dam without our consent [Talston Hydroelectric Development]. That dam in that area has damaged the area. That area used to be good for hunting - now it's ruined. We have told the government but they said it wasn't their fault. We also tell stories about the mining exploration and how they are working out there without the consent of the people. When we talk about the land, these are the things we are talking about. We are not playing around. It is not a game. What we are talking about - it is very serious. The Elders know what is happening. The stories that have been collected tell what has happened in the past. (ZC 28 06 00)*

So do the words of the late Zepp Casaway eloquently describe the importance of listening to and recording the stories of the Elders and land-users. These stories are the record of how things were and how they are changing. This is particularly true of the natural world, of which the Denesôåine have an intimate understanding and relationship. The Denesôåine live in close proximity with the land, in constant contact with the cycles of water, animals, plants and weather. Denesôåine knowledge of this land and its cycles is the foundation of understanding how the study region is changing through time.

5.1 THE DESIGN OF A MONITORING PLAN

This section will detail a traditional knowledge monitoring plan as designed by the Elders, land-users and WLE (Wildlife, Lands and Environment) staff. Initially, the cultural values and historical context that informed the development of the monitoring plan will be described. Then, a comprehensive explanation of the suites of indicators used to detect changes in the plants and animals of the study region will be given, followed by a description of the means used to gather, organize and interpret indicator information. Finally,

the Denesôåine knowledge database will be described in detail, as well as the process for the interpretation and communication of monitoring knowledge.

5.1.1 Cultural values and historical context

The Denesôåine have lived in the greater Kakinÿne region since time immemorial. This is the area where people were raised in the Dene ways of knowing and doing, where they learnt about the land and its myriad gifts. It is very important to them that others understand that they were born and survived on this land. This historical presence in the region is exemplified by Elder Pierre Catholique:

> *This land here is our land as I have said before. I grew up here at* œedacho Kue *(Artillery Lake). I'm very experienced in this area and I've been every where and have seen it all. I know my way around this area very well. Some people talk and tell stories then say they have seen the area around here but they have never been here. I myself grew up here with Jonas Catholique, Joe Michel, (Dzo dzi) John Michel and some have passed away - we all grew up together at our homes here at* Æedacho T'åazi *(Timber Bay). (PC 15 09 99)*

The Elders also stress that their knowledge has not only withstood the test of time, but that it is also wide-ranging in scope. The knowledge of the Denesôåine extends to the furthest reaches of the Kakinÿne region, as exemplified in the following stories:

> *At (*œedacho*) Artillery Lake, the Dene people gather before the migration happens and harvest caribou. While still living here (Artillery Lake), the spring migration of other animals comes and this area is like a pit stop for them before they go farther north. The ducks, geese: one familiar one is the old squaw duck and also many other kinds of ducks that migrate north, one of the ways to harvest them is to set gill nets for them. After this harvesting of birds and animals, some of the people return to (*Tu Nedhe*) Great Slave Lake, though still some Dene remain at Artillery Lake. They lived there all year round and made it their home. In the summer time the Dene people fished and hunted for moose, in the wintertime they hunted caribou. That was all there was in the olden days. (04 10 99)*

> *People would mostly go to Aylmer Lake in winter by dog-team to trap. They trapped the animals that denned in the eskers. There are lots of eskers around Aylmer Lake. People would set up camps wherever there were small groups of trees* ts'u œaze di œa si*….*

> *Behind Alymer Lake –it is very rocky and there are many cliffs. Its ok traveling there in the summer but in the winter – there are very large ice ridges that hide the rivers and streams. Also sometimes if there is a hill – there is really deep snow – its dangerous. Abel Nitah was chasing caribou around there and the caribou saw the drop-off but Abel did not see it and went right over the edge with his dogs. It is dangerous in the winter. You can't tell if there is a river because the snow covers it. (JM 01 15 01)*

> *I used to go to Aylmer Lake only in the winter with my father and to Fletcher Lake. This was just for trapping. There are lots of people who used to go to Aylmer Lake from* Åútsÿl K'e. *I traveled from Aylmer Lake to the Thelon River a few years back. (NA 01 15 01)*

> *We lived this land for about 40 years growing up around Artillery Lake. We used to trap a lot around Fletcher Lake and Cook Lake, but we didn't come here [Aylmer Lake] that often because we didn't have to. But we came here to keep up the practice of living on the land. We lived all around - all the way east of the Thelon. We would carry dry wood with us and use it really wisely with small willow branches. How much wood you had determined how long you could stay out. We had some really tough days. No showers in these days! I've never seen musk ox around here just farther east. In Artillery too, only in the past 20 years musk ox have been found around there. (MD 19 08 01)*

It is important to understand that the knowledge of the Denesôåine is the product of generations and generations of experience across the wide expanse of the Kakinÿne. It is a deep and detailed knowledge, rooted in the cycles of time.

Another important aspect of Denesôåine knowledge is the concept of respect. Respecting the land for the Elders is a way of expressing thanks to the Creator for the land, water, and wildlife. Part of that respect is built upon a cultural identity that is closely connected to the land. Stories of Denesôåine history on the land are very powerful for the Elders. Elders Noel Drybones and JB Rabesca recount stories about what happens when people do not show respect for migrating geese.

> *In the past, people used to really watch things - respect. They knew not to chase the caribou too far. If they chased a caribou on one day - they knew they would have to shoot it on the next day. If people chase the caribou with the skidoo, they become stressed…it affects their lungs. They become sick - like pneumonia. We should teach the young people these things… Our main source of food is the caribou. If we lose the caribou, we will be pitiful. (ND 18 09 99)*

> *Hey! - Geese you can hear them! In the olden days when you hear them fly over, they would say "hey - come fly over me again next year." They would tell them. This is what has been told. One time when everyone was calling out like this, there was this one person who was skeptical about believing. So he said, "Hey! Next year don't fly over me again!" The next spring before the geese flew over that man died. And this is what happened. So this is why you have to talk to the geese well when they are coming from the south or the north. These are important words in the Dene language. (JBR 15 09 99)*

Respect is also based on a spiritual connection or a deep understanding of the land, water, and wildlife as alive in the same way that people are alive. Many Elders speak about how the Dene share a common language and song with the animals and the land. Elders Pierre Marlowe and Madeline Drybones explain this connection:

> *In the olden days, all the animals including the birds used to talk like people. This was at the same time in history when the fire was alive. If you wanted a fire, all you had to do was call to the trees and the wood would come running and make a fire for you. One time a piece of wood hit a man by mistake. The man got very mad and started hitting the stick. After that the wood would not longer make fires for the people. (PM 03 06 99)*

> *I know a few stories about the land being alive. There was a man –* Gahdÿle*, he used to talk to plants and animals. Everything is alive, even the rocks and sticks. Sometimes if you catch a rock in your net – its alive. Near* Åutsÿl K'e*, there is a big rock that comes out of the lake. People saw it. It made a big noise when it came out of the lake. On Dog Island, Billy's dad was visiting his nets. He was using his canoe and he noticed that the water was moving rapidly. He though that it was an animal. He went back to his camp and came back with people to see it – all the time it was a rock. You could see how it had crawled up out of the water. (MD 16 06 01)*

The way of life of the Denesôåine people is founded upon this profound respect for the land and all it contains. The Elders words echo the belief that to disrespect the land is to disrespect the Creator. The outcome of such disrespect can only be the demise of the Denesôåine as a thriving culture. On the other hand, showing proper respect for the land will insure health of the Denesôåine people and their ways for generations to come. The integrity of the land is intimately tied in with the health of the people and their lifestyle.

The concepts of respect and a physical / spiritual connection to the land are fundamental to the development of a monitoring plan that is grounded in traditional Denesôåine ways. The Elders maintain that a monitoring plan devised by the Åutsÿl K'e people must always remain rooted in this traditional context. Such measures will insure that Denesôåine knowledge continues to be gathered, communicated and interpreted in the ways of the Denesôåine people.

5.1.2 Denesôåine indicators of environmental health and change

Many preliminary, or untested, indicators of environmental change were explored in the 2000 report of *Traditional Knowledge in the* Kache Tué *Study Region*. These indicators were developed for the following values: caribou, fish, ducks and geese and small fur-bearing animals. These indicators will be outlined in this section. A complete description of how these preliminary indicators were derived can be found in the 2000-2001 Final Report of the *Traditional Knowledge in the* Kache Tué *Study Region* (Åutsÿl K'e Dene First Nation, Parlee et al. 2001).

During the 2001-2002 study year, further preliminary environmental indicators associated with chicken and ptarmigan and berries were developed in consultation with the Elders and land-users. A full exploration of these preliminary indicators will be provided in this section.

5.1.2.1 Caribou (Etthÿn) indicators

The caribou are the very lifeblood of the Kakinÿne region. They range throughout the area, from their wintering grounds to the south to their calving grounds in the very northern reaches. The caribou herds migrate through this vast region in a seasonal cycle, followed by wolves, foxes, birds and of course, people. The caribou truly have sustained Denesôåine existence in the Kakinÿne. They have been traditionally harvested to provided virtually everything of need to the people - food, clothing, shelter, tools and building materials. In contemporary times, the caribou remain of vital importance to the Denesôåine way of life. The following indicators have been and still are being used by the Denesôåine to assess the health of the caribou, both individually and as larger herds:

Respect for caribou

> *When hunting you take everything from the caribou and leave nothing but some guts. That's how they hunted back then…. People always have respect for the caribou because it is our main diet and you never hit, poke and whip caribou. Once someone [disrespects*

> *the caribou], the caribou will [migrate] further out and that is very bad for the people. (Noel M 04 10 99)*

A common theme in Denesôåine stories about caribou is the importance of respect. Properly harvesting and using all the parts of the caribou is consistently emphasized. Proper clean-up of caribou parts is important: people must not scatter bones around or walk over them. People also must not poke, hit or whip the caribou with sticks. Even the young hunters understand that if the caribou are not respected well they will not return to the same area. The following indicators can be explored in order to see how the caribou are being respected:

- Type and quantity of wastage seen at caribou kill sites.
- Type and quantity of improper disposal of caribou parts around town, cabins, camps.
- Directly or indirectly (i.e. stories) observed disrespect towards caribou.

Caribou abundance

> *In the past there were lots and lots of caribou. The caribou don't cross as much at* Æedacho *[Artillery Lake caribou crossing] as they used to be. Its not only caribou population that is decreasing. I am not sure if I will ever see large numbers of caribou again. (ML 15 09 99)*

The population of caribou in Kakinÿne is another aspect of caribou health noted by the Elders and land users. Elders have often commented that there are not as many caribou around today as in the past. This is of great concern to Elders who have related the stories and predictions of their ancestors about how a decline in the wildlife would precede a time of immense change. This belief reflects the tremendous anxiety in the community that accompanies the perceived decline in the abundance of the caribou. The following indicators can be monitored in order to better understand caribou abundance:

- Numbers of caribou harvested by local hunters in the Kakinÿne region.
- Visual sightings of caribou.

Caribou distribution (migration)

> *I was 9-10 years old that time, 1950s. After that during 50s, 60s, people used to stay around there [McKinlay Lake], there's no caribou on the south side [of the East Arm]. They go north. Used to haul meat from here [McKinley Lake] to Snowdrift. They did that a few times and then 70s, same thing there was no caribou on this side [south side of the*

> *East Arm], 70s there was lots over here, north shore, people used to go across [to the north shore]. I was trapping at McKinlay Lake, not only me, there was some people they went hunting fall-time, December, they went across by dog team, from Snowdrift to Pearson Point… (EB 31 10 01)*

The caribou have been migrating through Kakinÿne for thousands of years. Many of these migration routes naturally vary in their use from year to year, though the Elders note that there are some migration routes that caribou always use. However, in some cases the Elders feel these changes are a result of the level of respect shown to the animals in certain areas. As well, sometimes changes in migration routes are believed to be attributable to intensive industrial or tourism activity along the traditional migration routes of the caribou. The following can be monitored in order to better understand the distribution of caribou throughout their migration ranges:

- Locations of caribou harvesting activities.
- Presence of caribou at traditional lake / river crossings during peak crossing seasons.
- Visual sightings of caribou in different areas.

Caribou condition

> *Æedacho Tué (Artillery Lake) is where I lived for a long time. I have a cabin there at the mouth of Desnedhé Che (Lockhart River). The caribou are very healthy and fat around there. I look for the fat - that's the way I want the caribou. That's what I look for when I hunt. (ND 03 02 00)*

A whole host of indicators are used by hunters in assessing the condition of caribou (many of which have been explored and refined in the *Caribou Condition* research conducted by the Åutsÿl K'e Dene First Nation and Dr. Phil Lyver). This is particularly important as hunters seek to selectively harvest those caribou that are deemed most healthy. In general, caribou that are fat are selected over those that are skinny. Caribou fat is one of the most highly valued parts of the caribou, largely because of its taste, nutritional value and versatility. Caribou fat can be used as lard, for preserving berries, in pound meat (pemmican) and even for making candles.

Fatness in caribou is recognized as the primary indicator of health. A fat caribou has been feeding well, and is not overly stressed by predators, insects or sickness. A fat cow caribou is also more likely to become pregnant and successfully give birth to a healthy calf during calving season. A host of indicators can be measured to assess the fatness of caribou:

- Visual aesthetic of caribou. Generally, caribou with a big rump, short, hidden tail, wide belly, straight back, busy antlers and glossy coat are considered fat.
- Behavior of caribou. Typically, hunters identify caribou that walk with a swagger and/or with their head and tail held upright as fat and healthy. A caribou that has a limp, hanging tail is typically considered skinny.
- Amount of fat noticed while dressing caribou. Hunters assess the thickness of fat deposits in the brisket and back regions to determine the fatness of a caribou. As well, they may examine the amount of fat around the kidneys and stomach.

There are also some more general indicators used by hunters to assess the overall condition of caribou:

- Movement ability of caribou. Caribou that are limping or otherwise disabled in their movement are considered unhealthy animals.
- Color and consistency of marrow. A healthy caribou will possess a firm, creamy white marrow that is rich to the taste. A caribou in poor condition will possess marrow that is red and runny that is watery in taste.
- Presence of discolorations or parasites in muscle or internal organs. Hunters look for firm, pink lungs and a rich, red-brown liver to indicate a healthy caribou. Caribou that are sick may often have yellowish discolorations or spots on these internal organs. Hunters also inspect the livers for "pus" or cysts in the body of the organ. Caribou muscle is inspected for the presence of parasitic cysts that may indicate an unhealthy animal.
- Presence / absence of fetus in cow caribou. A mature cow that is not pregnant in the late winter / spring is generally considered to be less healthy than those with fetuses.
- Development stage of fetus in cow caribou. Some hunters have indicated that cows with fetuses that are less advanced than they should be at a given time during the spring may be unhealthy. The level of development in fetuses is typically assessed through hair and hoof development.
- Presence of milk in bags of cow caribou. A pregnant cow with no milk in her bags is considered to be unhealthy.

Relationships between caribou and predators

> *There are many caribou and some of the misfortunes that happen to them are of natural causes. Some get sick and this weakens them and they die without the help of the wolves. When the migration already happened and the injured ones are left behind maybe because of broken or injured limbs and other terminal causes. These are the ones the wolves clean up after the migration. This cycle is according to how they were created by the Creator. (SD 04 10 99)*

The relationship of caribou to wolves and white foxes is another aspect of the health of caribou noted by the Elders and land-users. Caribou are the main prey animals of both the wolves and white foxes. The wolves actively follow and hunt the caribou, whereas the white foxes follow the wolves to scavenge from their kills. This is a natural part of the life cycle of the caribou. When the caribou herd is healthy, the wolf and white fox populations are typically healthy as well. The following indicators can be monitored to help assess the abundance of the caribou populations:

- Location of wolf packs and white foxes. Where there are wolves and white foxes, there are likely to be caribou.
- The abundance of wolves and white foxes. If the wolf and white fox populations are doing well, it is likely that the caribou population is healthy.

5.1.2.2 Fish (Åu) indicators

Second only to the caribou in cultural importance, fish comprise a major portion of the Denesôåine diet. As explored through Phase One of *Traditional Knowledge in the* Kache Tué *Study Region* project and the Denesôåine *Fishing Knowledge of the East Arm of* Tu Nedhe study (Åutsÿl K'e Dene First Nation, Williams et al. 2002) these indicators are used by the Denesôåine to assess the health of fish of all species:

Fish abundance

> *It's a good big lake - Aylmer Lake. There are a few good spots for fishing where there is a channel… the fish are good there. In the past we didn't use hooks – we used caribou tongue for bait in the channel. It doesn't really freeze in the channel but if you make a hole in the ice you can see down and see all the fish swimming by… there are two gaps close together – one is good – one is not so good for fishing. (ND 01 15 01)*

Fish are incredibly abundant throughout the Kakinÿne. All the lakes and waterways are filled with lake trout, whitefish, northern pike, longnose sucker, walleye, moria (burbot) and arctic grayling. These fish are very important for Denesôåine subsistence, as they provide the primary sustenance when caribou are far away to the north in their calving grounds. Even when the caribou are near, fish provide variety to a diet founded upon caribou meat. Fish represent a constant in the diet of the Denesôåine – they have always been present in the waters in abundance. The following indicator can be explored in order to gain a better understanding of fish abundance in the waters of the Kakinÿne:

- Type (species) and number of fish harvested by local harvesters in the waters in the region.

Fish distribution

> *Talthelei Narrows is the best place to go fishing---I worked four years there, at the Plummer's Lodge. Lake trout, no moria, arctic grayling, a bit of pike, lots of pike in the Talthelei Narrows Islands, and this is where you fish for lake trout in the Narrows, hardly any Pike the farther you go into the north arm [Mcleod Bay]. I would go commercial fishing at Stoney Island, near the winter lake--- with nets in the wintertime—no pike down there, all trout, whitefish and moria – and burbot—whitefish are really big down there, and they move, they move someplace-don't stay the same place. I've been to the Rocher River-Redcliff Island is good too—right here for fishing and here too [Simpson Islands] (around the islands went commercial fishing in the wintertime around here). We even went to Fortress Island in the past, all in the wintertime. We would truck it [fish] to Hay River. They would take Bombadeers across the ice transporting the fish. 1950's –1960's. (PC 03 05 01)*

The Denesôåine have fished all throughout the Kakinÿne. The oral history of the Denesôåine contains many references to areas where the fishing is good, places where people can go and most certainly harvest fish. However, these good fishing areas tend to vary with the seasons; for example, an area that is good for fishing in the spring may not be so in the fall. The sign of a good fish harvester is a working knowledge of what areas are good for fishing and when. It is in such locations that harvesters will set their nets or drop their lines, for in these areas they are guaranteed some return for their efforts. The following indicators can be monitored in to help understand the seasonal movements of fish throughout the many water bodies of the Kakinÿne:

- Location of harvesters' gill nets.
- Angling locations.

Fish condition

> *I have seen some deformed trout. Some I'm not sure if they were sick or what- sometimes when you drive around by boat and you see a floating trout—you see that—maybe in the river--- or something. Actually I did catch one of these onetime it was in the shape of an 'S'. You know – the actual backbone of the trout. And in Stark Lake too there's really skinny fish. You can taste the difference. Sometimes you catch a fish and there is no taste*

> *to it—that means it's really skinny. And when you get a fat one you can notice the difference—sometimes in Stark Lake I've noticed that some of the fish have big heads and small tails. Like ancient fish- it looks really weird. Fish like that sometimes you catch them with the fishing rod up the river [Stark River]. Onetime I caught a fish and it smelled really BAD. I caught it with a fishing rod. I went to my house and we were fixing it, it smelled like REALLY bad. Like yellow, or something's wrong with that I knew it- the minute I opened it up and looked inside I knew something was wrong with it. That wasn't a normal smell of a fish- so I just threw it out. Probably rotten- I smelled it as soon as I gutted it. There was something in there, a yellowish in the guts or in the guts itself. The fish with the S backbone I caught at the mouth of the river [Stark River]. It was the springtime. (James M 01 05 01)*

Denesôåine harvesters use a selection of traditional indicators to assess the condition of harvested fish (many of which have been explored and refined in the *Stark Lake Habitat Study* conducted by the Åutsÿl K'e Dene First Nation and Tracey Williams). This is to insure that they are eating fish that are of the highest nutritional value and have the best taste. The following indicators are good ways of assessing fish condition:

- Length to weight ratio. One of the most common characteristics of healthy fish described by Elders is their length to weight ratio. Most of the fish in the Kakinÿne that are considered "good" by the Elders possess round, big bodies. This is in contrast to fish that are long and skinny, which are generally considered to be less healthy fish.
- Fatness. Elders and land-users consider fish with lots of fat deposits within the body cavities as very healthy fish.
- Fish taste. Denesôåine people prefer fish with a rich flavor rather than a bland, watery flavor. As well, fish with the taste of stagnant water are considered sub-standard.
- Flesh color and texture. This indicator is typically specific to trout. The most preferred trout flesh is firm and dark red, whereas the flesh that is less desirable is soft and pinkish.
- Parasite load. Fish that have a high level of parasites on their exterior, in their gills or flesh/internal organs are considered of poor quality.
- Surface damage. Harvesters associate fish with cuts and bruises on their body as poor in quality. Such cuts and bruises may arise from being predated upon or competition among fish of the same species.

5.1.2.3 Duck and goose (Chÿth, Æinghes) indicators

A sure sign of spring is the return of ducks and geese to the Kakinÿne region. During this time the people gather around areas of open water to harvest the abundant waterfowl. Elders describe how people are happy when there are many ducks and geese around because it is an important part of the Denesôåine diet. Harvesters interpret many signs to assess the health of the duck and goose populations:

Duck and goose abundance

> *There used to be lots of migrating birds in the past. Now there are only a few here and there. I keep wondering what happened to them. I don't hear them any more. The ducks and geese that used to fly overhead gave us hope - now they are gone. (JoC)*

During the spring, the abundance of ducks and geese in the Kakinÿne is used as an indicator of the overall health of the migratory birds. Historically, these waterfowl have visited the Kakinÿne in large numbers each spring. Deviations from this pattern are considered abnormal and may indicate a decline in the waterfowl populations. The following indicators can be explored in order to gain a better understanding of duck and goose abundance in the Kakinÿne:

- Type (species) and number of waterfowl harvested by local harvesters in the region.
- Visual observations of numbers of waterfowl in the area (especially near open water areas).
- Level of noise coming from ducks and geese in open water areas and flying overhead.

Duck and goose distribution (migration)

> *We used to stay at Artillery Lake. That is the route we used to take into the barrenlands – through Aylmer Lake… that area is also very important for migratory birds, loons, swans, geese – that is what it means to us. Sometimes there are so many that the sky and lake are just white with them, you see all sorts of white. That is why that area is called* Tåa Gaí Tué *(Aylmer Lake). (MC 29 01 01)*

The migration patterns of ducks and geese through the Kakinÿne region are an important aspect of ecological health for the Denesôåine. Throughout the generations, people have depended upon the ducks and geese to use the same migration routes to reach their staging and nesting areas in the Kakinÿne. People travel to these waterfowl gathering areas in the spring to harvest the migrating birds. The Denesôåine thus can gauge the distribution of ducks and geese using the following indicator:

- Numbers of different waterfowl at traditional harvesting areas in the spring (i.e. Thubun River, Rocher River, Basile Bay, Reliance).

Duck and goose diversity

> *Surf Scoters (*ŧúzî*) are the first to come back. There are two different kinds - big ones and small ones. They come back at the same time as Oldsquaws (*hãlk'al*) and Pintails (*kél chÿth*). American wigeons (*æeågaré*), there used to be a lot of that around and there are less every year. They just like the warmer climates. They are not found around Artillery Lake, but they are found in warmer areas like* Åutsÿl K'e*. They chase each other around, you can hear them when you're out beaver hunting. The males fly around and chase the female for hours. They eat bugs, grass and snails in swampy areas. You will find the Northern Pintail (*kél chÿth*) wherever you find sandy areas. They eat gravel, bugs and weeds under water. Oldsquaws (*hãåk'al*) are back now and in the open water. Their diet is made of fish and underwater bugs. Almost the same diet as* ŧúzî*. (EB 19 05 99)*

The diversity of migratory birds in the Kakinÿne is an important aspect of the ecosystem health. Elders say that the vibrant colors of all the different waterfowl in the spring are very beautiful and are a gift from the Creator. The many voices of the birds singing together are a prayer to the Creator, a way of thanking the higher power for the rich land. The following indicator can be explored in order to evaluate the diversity of waterfowl in the region:

- Presence of different types (species) of waterfowl at traditional harvesting areas in the spring.

Duck and goose condition

> *In mid-May, most kinds of birds come back each year. They come up north in the springtime. Some birds go to the barrenlands such as ducks, geese, Oldsquaw, ptarmigan, snowbirds and loons. They stay in the barrens until fall time, until it gets cold for them. Then they go back down south. I used to live at Margaret Lake in 1957. I used to hear all kinds of birds. I saw longspurs and snowbirds. The snowbirds go there all year. (LA 17 05 99)*

Whether the ducks and geese are fat is an important indication of whether the birds are healthy. Hunters can tell when the birds are flying overhead whether they are fat or not. In preparing the ducks or geese, the hunters assess the layer of fatty skin under the feathers. If the birds are not fat, said one hunter, something

must be wrong with them. The following indicator is a good way of assessing duck and goose (and waterfowl in general) condition:

- Extent and thickness of fat deposits in harvested waterfowl.

5.1.2.4 Small fur-bearing animal (Tsa Thath) indicators

During the busy late fall and winter trapping season, the Denesôåine harvest many small fur-bearing animals such as the marten (Tha), mink (K'iåth chus), weasel (K'eå k'aile), rabbit (Gah), lynx (Chize), white fox (ts'íba), red fox (Nagíthe), wolverine (Nághai) and wolf (Nuni). The winter is the best time to trap as these animals can be tracked more easily through the snow, and their furs are in their prime. In the springtime, as the land begins to thaw, the Denesôåine begin to focus trapping activity on fur-bearing animals with an aquatic existence – the beaver (Ts'a), muskrat (Dzen) and otter (Numbî).

These fur-bearing animals have historically provided both food and income to the Denesôåine in the heyday of the fur-trade. Today, while trapping has diminished in importance, many Denesôåine still trap for profit, sustenance and recreation. It is important for the vitality of Denesôåine culture and the surrounding ecosystems that these small fur-bearing animal populations remain abundant. The following indicators have been and still are being used by the Denesôåine to assess the health of the small fur-bearing animal populations:

Fur-bearing animal abundance

> *The ice had just started to freeze-up; I knew this because I had been there two days before (*Kaché*). The ice was frozen up to Bell Island and also down to (*Hakos Tué*) Meridian Lake. I told them this so we left in the morning. They went to Snowdrift and I returned to Artillery Lake (*Æedacho Tué*) to continue to trap because there was a lot of white foxes and many Ptarmigan around. After ten or fourteen days J.B and his son came back, and being clever J.B. told me you can see the caribou from a long ways. Then he says maybe you can come with me to (*Æegeri Kilni Tué*). So I went with J.B. and his son and we all got some caribou. Then I left there and returned to my camp because I had set traps in my area there.*
>
> *After awhile J.B. and his son both came back. By that time I had trapped over two hundred white foxes. We returned to Fort Reliance (*Kaché*) shortly after that and while*

we were still there a plane landed. I chartered this plane to Uranium City, Saskatchewan. That time there were a lot of white foxes on the barrenlands. Since then I haven't seen or heard of that many around the barrenlands. Now today I often think about looking for white foxes, but the person that usually travels around with me doesn't have a skidoo anymore. And I don't know what to do; but I have set traps around Fort Reliance so I have to go back there soon.

This year there are many martens where I'm trapping, but I had an accident with my skidoo and this prevented me from trapping the way I wanted to. Raymond Griffith didn't have that many traps with him but he did good trapping this fall. He trapped about forty martens and he was able to visit his children in the south because of it.

*I haven't seen any wolves this year – nothing. But during the fall time after freeze-up we went to Artillery Lake (*Ædacho Tué*) and further north to (*Kezus Tué*) Cook Lake - about here on the map. Four wolves had passed by there - we knew by the tracks. Usually there is about ten in a pack that travel around together. Today it is not like that, maybe one or two wolves and nothing else.*

This year the wolverines are abundant where we trapped - you can see them almost everywhere. Michael Sanderson killed three of them a while ago. About here on the map - I had mentioned before that we had lived there in the past along with your late grandfather Enzoe. This area here near the new proposed mine site, this is a good place for wolverines and this here is (Kezus Dez) Cook River. (ND 07 02 00)

The abundance of fur-bearing animals throughout the Kakinÿne has long been a sign of the health, diversity and natural richness of the region. The Denesôåine describe changes in many fur-bearing animal populations that vary naturally, cycling up and down in a natural rhythm. However, some Elders suggest there has been an overall decline in the population of some species such as white fox. The Denesôåine can assess the abundance of fur-bearing animals in the region using the following indicator:

- Number and type (species) of fur-bearing animals harvested during the trapping season.

Fur-bearing animal distribution

I trapped around Mcleod Bay, Bedford Bay, and around Kennady Lake. I used four to five traplines, and sometimes along the shores of the big lake [Great Slave Lake] every once in a while. In the past, I went all over the East Arm of the Great Slave Lake. Up to the Thelon River. We trapped for wolves, wolverine, and white foxes in the barren lands.

> *I've also traveled to the Hoarfrost River, right down to Lockhart River, Snowdrift River, White fish Lake and Lynx Lake. I had trapped around those places before. I trapped up to Aylmer Lake for wolves, near the Lac de Gras area. There are more - lots of wolf activity between Aylmer Lake, MacKay Lake, Fletcher Lake and Walmsley Lake. Up to Artillery Lake - all through those places I've trapped and traveled. Then I would travel to Fort Reliance and up to* Ka'del Kué *(open area of lake). I have traveled mostly everywhere.*
>
> *The best place I know for white fox would be around Aylmer Lake. We stayed at Aylmer Lake for four days - we caught about six hundred white foxes, using two hundred leg hole traps each at that time. We checked the traps twice a day because there was too much white foxes. That was good. I remembered it was like that at Walmsley Lake too. We were using dog teams at that time. I did some hunting and trapping for wolves and wolverines in the Fletcher Lake and Walmsley Lake area, there where lots of tracks in that area. They were worth lots of money back then. I trapped for marten and mink in Bedford Bay area. The fur-bearing animal population was high in the sixties, though sometimes it was hard to catch fur-bearing animals. You'd be lucky if you caught five to ten pelts. I remember some people caught enough fur for Christmas. Now today I think there are more fur bearing animals towards the barren lands compared to the forest, there are lots of white foxes, wolves and wolverines. People have just stopped trapping or hunting them as much - around* Åutsÿl K'e *too. (AnM 27 03 00)*

Trappers travel far and wide throughout the Kakinÿne in search of prime fur-bearing animals. Often trappers run their traps along historic traplines that they have used for years and years, traplines that have been passed down from their fathers and grandfathers. These traplines have been established in areas that are rich in fur-bearing animals, areas where trappers can be successful year after year. As populations of fur-bearing animals on a trapline become more sparse, trappers simply realign their traplines to coincide with areas with larger densities of fur-bearers. As such, the following indicator can be used to explore the distribution of fur-bearing animals:

- Location and extent of traplines used by the Denesôåine.

Fur-bearing animal condition

> *My late father and I have trapped around Taltheilei Narrows for red foxes, cross foxes and grey foxes. We had our camp set up all winter long and I usually covered at least 20 miles a day on foot at the time. We trapped about 70 foxes - all types except for white fox.*

> *I've also trapped for minks around Narrow Island and had some traps set up at Bedford Bay for martens. Sometimes I see wolves but I don't shoot them or hunt them. I trapped for wolverines but they're really sly around the traps. Trapping was very promising because there was lots of fur-bearing animals. I caught between 100 and 150 martens and minks. Now it's not the same; now I don't catch much fur-bearing animals like before. Before there were lots of snow and now there's not as much. (P Lockhart 16 02 00)*

During the days of intense trapping, it was imperative that the Denesôåine harvest fur-bearing animals that were in good health. Healthy animals that were well-fed and fat typically had pelts that were thick and glossy, sure to fetch a prime price at the fur auction. The following indicators of fur-bearing animal condition are still used by trappers to assess to quality of the animals they have harvested:

- The fullness and shininess of fur-bearing animal pelts.
- The thickness of fat deposits found between a fur-bearing animals pelt and body. On rabbits, for example, fat can only be found between the shoulder blades. Harvesters look at this area to determine whether a rabbit is fat or not.

5.1.2.5 Chicken (grouse) and ptarmigan (Di, Æeåk'aith, K'asba) indicators

During the fall season the woods are filled with the distinctive mating calls of chickens (grouse). During this time Denesôåine land-users walk quietly through the bush, rifle or shotgun in hand, hoping to harvest the brown, awkward-flying birds. Chickens make a welcome addition to any Denesôåine dinner table, prized as they are for their tender meat.

Spruce Grouse are known in Dene Yati as Di. The Ruffed Grouse is called Æeåk'aith. However, both types of grouse are commonly referred to as "chickens" by the Denesôåine. Both types of chicken reside within the forested areas of the Kakinÿne. The best time to hunt them is in the fall.

The Willow Ptarmigan and Rock Ptarmigan are both called K'asba in the Chipewyan language but are differentiated by their habitat. The Rock Ptarmigan spends most of its time in the barrenlands. Conversely, the Willow Ptarmigan spends the majority of its time at the tree line. Both types of ptarmigan change the color of their plumage - from white in the winter to brown in the spring. They eat willows, berries, seeds and also ingest sand to aid digestion. There are some areas in the Kakinÿne where large numbers of K'asba can be found. Some elders describe living off K'asba for long periods of time when there was no caribou around. The best time to hunt them is in the spring.

Indicator development

The development of chicken and ptarmigan indicators was initially explored by conducting a search of previous interview / workshop transcripts for information relating to the birds. As well, during home-visit interviews, land-users and Elders were asked about ways to assess the health of chickens and ptarmigan once they have been harvested. The Elders and land-users spoke primarily about the fatness of the harvested bird:

> *All birds are the same. You can tell how good they are, how they will taste, by the amount of fat they have on their body. (EM 30 10 01)*

As well, the Elders and land-users spoke about whether the harvested bird was injured or not. They stated that chicken and ptarmigan were very rarely ever injured or sick, and that any bird that is found injured is very unhealthy indeed:

> *I have never in my life seen any injured or sick chickens. I guess this is very rare. They just aren't like that. Maybe sick birds die quickly, before we ever see them. (FR 22 10 01)*

Elders felt that chicken and ptarmigan populations have always been healthy and abundant over the generations. However, they alluded to the changes that the bird populations have been going through in the recent past:

> *When birds are singing loudly, making lots of noise, they are all praying to God, renewing the earth. They are happy. Along time ago, people used to hear birds, but nowadays you don't hear so many birds anymore. That is because so many things are changing. (PM 03 06 99)*

People also talked about the seasonal movements of chickens and ptarmigan:

> *They [ptarmigan] stay all year round on the tundra and come down to Åutsÿl K'e [in the spring]. The grouse come back [around Åutsÿl K'e] in April to October, then go south for the winter. (LA 17 05 99)*

During the home-visit interviews, Elders and land-users also revealed that lots of chirping, stomping and calling on the land is a sure sign of the abundance of chickens and ptarmigans:

> *In the olden days, Elders have told stories about chickens frightening people and animals. All animals talk about that time one man told this chicken that he's not scared of anything. One day the chicken decided to wait for the man on the side of a path, and suddenly the chicken flew off making a big noise and the man got scared. He fell into a brush of trees and the chicken laughed at him and teased him. (GM 06 11 01)*
>
> *In the springtime there is only one chicken on top of a tree, they [other chickens] make circles around it. There is also one chicken sitting on top of a log who drums with his feet and they dance in around him. (AnL 03 11 01)*

Generally, Elders and land-users pointed out that many of the same indicators of health used for ducks and geese can be used for chicken and ptarmigan. As such, the preliminary indicators of chicken and ptarmigan health are as follows:

Chicken and ptarmigan abundance

- Type (species) and number of chickens and ptarmigan harvested by local land-users.
- Visual observations of numbers of chickens and ptarmigan in different areas.
- Levels of chirping, stomping and other sounds coming from chickens and ptarmigan in the bush and on the barrenlands.

Chicken and ptarmigan distribution

- Presence and numbers of chickens and ptarmigan at traditional harvesting areas in fall (chickens) and spring (ptarmigan).

Chicken and ptarmigan condition

- Extent and thickness of fat deposits in harvested chickens and ptarmigan.

5.1.2.6 Berry (Jí) indicators

Whereas Denesôåine food consists predominantly of meat and fish, berries add a welcome sweetness and variety to the diet. Berries are gathered throughout the summer and fall months for a variety of uses like sweetening pound meat, for making jams and dyes, and even for medicinal purposes (for example, cranberries are known to be good for sugar diabetes). Berries are also enjoyed fresh from the bush.

Picking berries is a popular social event throughout the summer and fall months. Women congregate in the rich berry patches of the Kakinÿne to gather the necessary supply of berries for the winter months. There are many berries that are actively sought by the Denesôåine. Blueberries (ts'âåchogh) are prized for their fresh sweetness to make jams. Elders say that blueberries from the barrenlands taste better than those from below the treeline. They identify two types of blueberry – one that is purplish-black and the other that is really blue. Blacker ones are found on high bushes but there aren't so many of them.

Cranberries (nitå'ÿr) are used in a variety of fashions including making jams or medicine. These berries can be picked and preserved all year round. They won't fall from their bushes after their first season, so in the following spring you can still pick them. However, at this point they are darker, watery and very sour. The following summer the berries from the previous season dry up and fall off to make room for the new berries.

Blackberries or crowberries (ts'ât'eth dhé) are tremendously abundant, and are often mixed with cranberries or blueberries to as they have a relatively bland taste. They are tasty to eat but can cause constipation, and if they are not picked they won't fall from the bush. After over-wintering, this berry will lose its taste and be a different color.

Cloudberries (nadláré) are found predominantly in swampy areas on the barrenlands, but they can be discovered in areas of muskeg below treeline. These berries cannot be preserved. One cannot eat too many of these berries because they are sour in taste and will upset your stomach.

Bearberries (denie) can be mixed with fish eggs. They are often mixed with fish or caribou to make pemmican with more flavor. In the fall, these berries are ripe and sweeter – they should only be picked at this time. If picked when unripe these berries are very sour. These berries are often mixed with bone grease for flavor, or even crushed and whipped with sugar for a tasty treat.

Whiskey Jack Eye (ejízé naghé) can be eaten fresh but this doesn't happen often – usually it is preserved in a jam. These berries taste better in the barrenlands as they get more sun – here they are a clear red. Those from below treeline are black, seedless and bland. Whiskey Jack Eye berries that grow below the tree line sometimes have worms and bugs in them (Åutsÿl K'e Dene First Nation, Parlee et al. 1998)

Indicator development

The development of indicators for measuring the health of berry populations was initially explored by conducting a search of previous reports and interview / workshop transcripts for information relating to the

berries. As well, during home-visit interviews and a small focus workshop, land-users and Elders were asked about ways to assess the health of berries once they have been harvested. The Elders and land-users spoke primarily about the abundance of berries in traditional harvesting areas:

> *Last year there weren't many berries because it was too warm. But this summer was the best season to pick berries. It goes like that each year - sometimes there is less or more. (LE 10 01)*

> *There were a lot of berries this year compared to other years. A couple of years ago there weren't too many. The places where berries usually were had none. Sometimes the berries grow big and sometimes none at all. I am not sure why this happens. It is like this with everything on the land. (MRE 10 01)*

They also spoke about how the levels of rain during the spring and summer months greatly affect the abundance of berries:

> *There is a lot of berries this year compared to other years, there was not many in the past because there wasn't much rain. This year there was a lot of rain so there were many berries growing. (Berna C 10 01)*

> *I noticed there were more berries this year than other years because it rained a lot this year and it was not as hot as other years. (Bertha C 10 01)*

Elders and land-users discussed how berry patches arise or disappear when habitat areas undergo disturbance:

> *This year I found there was much more berries than the years before. In the past there was too much forest fires and it was also the weather was too hot. (YD 10 01)*

> *Pin cherries never used to grow here until they made a road and pushed the dirt around. It grows on the exposed dirt. It grows by the big hill around town. I've never seen pin cherries around here until they fixed the road. Then the berries started growing on the new dirt. The cherries started growing about two years after the road got pushed through. They don't last long though, only a week to ten days. (MD 12 01)*

Based on these discussions, the preliminary indicators of berry health are as follows:

Berry abundance

- Type (species) and abundance of berries in traditional berry patches.

Berry distribution

- Location of berry-harvesting activities.

Berry condition

- Levels of rain during the spring and summer months.
- Temperature during the spring and summer months.
- Forest fire activity in the region

5.1.3 Techniques for measuring indicators of environmental health and change

Traditional ways of knowing and doing are fundamental in the design of techniques for monitoring indicators. Monitoring activities involve practicing traditional means of knowing about the land - simply by being on the land and experiencing it. The principles of participatory learning (learning while doing) and informal consultation (story-telling) are foundations of the design of the monitoring plan.

Elders and land-users decided that environmental monitoring information would best be collected based upon the seasonal cycles of the harvesting seasons. Indicator information would be best collected during on-the-land activities or directly following such activity. This way land-user observations and experiences could be gathered while memories were still fresh and full of detail. An overall yearly cycle of environmental information gathering (based around the indicators outlined in the previous section) was devised by the Elders and land-users as follows:

Spring

Spring Freezer Caribou Hunt Cycle (caribou indicators)
Ducks and Geese Cycle (duck and goose indicators)
Ptarmigan Cycle (chicken and ptarmigan indicators)
Beaver, Muskrat and Otter Cycle (small fur-bearing animal indicators)

Summer

Summer Hunt Caribou Cycle (caribou indicators)

Summer Angling Cycle (fish indicators)

Fall

Fall Hunt Caribou Cycle (caribou indicators)

Berry Cycle (berry indicators)

Fall Fishnet Cycle (fish indicators)

Chicken Cycle (chicken and ptarmigan indicators)

Rabbit Cycle (small fur-bearing animal indicators)

Winter

Winter Caribou Cycle (caribou indicators)

Marten, Mink, Weasel, Lynx, Fox and Wolverine Cycle (small fur-bearing animal indicators)

It is important that indicator information can be compared from year to year. In this interest, it was decided that standardized indicator questionnaires would be used to guide monitoring interviews. In such a way, the same questions would be asked of land-users every year during each seasonal monitoring cycle. Researchers devised a series of standardized draft questionnaires for each seasonal monitoring cycle. Questionnaires with open-ended questions encourage people to tell stories around observations and experiences relating to pertinent indicators.

Many of the indicators to be monitored are spatial in nature, requiring land-users to share information about harvesting locations, travel routes, etc. As such, monitoring questionnaires all featured a map encompassing the harvesting region of interest. Land-users could use the map to record spatial indicator information. For example, while participating in an interview about trapping, a land-user could outline on the map where his traplines were, his trap and camp locations, etc. Questionnaires and associated maps can be found in **Appendix A**.

Researchers struggled with the question of which land-users to interview during each monitoring cycle. This question was resolved in a couple of ways. For specific on-the-land events it was determined that it was best to interview *all* participating land-users. This meant that approximately 15-30 people were to be interviewed for each monitoring cycle associated with specific harvesting events. Specific harvesting events included the fall caribou hunt (Artillery Lake), summer caribou hunts (MacKay Lake and Aylmer Lake), and the spring community caribou hunt (Daisy Lake). However, many harvesting activities are not focused around a specific seasonal event. For example, hunting for caribou during the winter occurs constantly, with many hunters traveling back and forth to good hunting areas many times during the period between late fall and early spring. The same is true for many other harvesting activities such as berry-picking, trapping, fishing and ptarmigan/chicken hunting. In such cases, researchers were to rely on

reputable land-users who spend a good proportion of their time on the land. Elders designated a number of land-users with plenty of on-the-land experience as a sort of "experts pool" that could be drawn upon for indicator information. Researchers were to interview a significant proportion (i.e. 25%-50%) of these active land-users for each monitoring cycle.

Following each environmental monitoring cycle, it is imperative to organize and compile the gathered information so that it is in a form that is easy to interpret. For this reason the researchers spent a good chunk of time developing a database to store indicator information.

5.1.4 Database development: techniques for organizing indicator information

The Åutsÿl K'e traditional knowledge database was constructed using the following software packages: Access 2002, AutoCAD 2000, ArcView 3.1 and AskSAM 4.0. A digital Access 2002 database, creatively entitled "Document Organization", was created to store transcribed information from questionnaires, workshops and meetings. This database allows for the easy input of information about a document (meta-data), information that can be easily accessed through simple queries.

All documents are given a numerical signature as a unique identifier upon input into the database (the "Number Code" field). Documents entered into the digital database are then stored in a digital and a hard-copy filing system, organized by Number Code. Thus, it is easy to find documents by entering criteria into a query of "Document Organization". "Document Organization" lists the Number Codes of all the documents that match the criteria, and then it is a simple process of accessing those documents through the numerical filing system.

Completed indicator questionnaires were to be transcribed into a digital document and input into "Document Organization".

A means of representing the spatial indicator information contained in the questionnaire transcripts (i.e. traplines, net sites, etc.) was designed using *AutoCAD 2000* and *ArcView 3.1*. Quite simply, spatial indicator information is to be represented using digital maps. Transcript information with spatial components is to be digitized using *AutoCAD 2000* and organized into map format in *ArcView 3.1*. Thematic layers are to be stored in digital folders entitled "Traplines", "Cabins", "Net Fishing Sites" and so forth. For an example of a map made from spatial indicator information, see **Figure 3**.

Linkage between the digital maps and the rich textual information contained within the transcribed information is to be linked using *AskSAM 4.0*. Stories of relevance to mapped features will be organized in

a series of *AskSAM* database documents. Each *AskSAM* document will contain stories related to a particular cycle of monitoring. For example, *AskSAM* database documents may contain stories about the *Fall Hunt Caribou Cycle* or the *Berry Cycle*. These documents can be linked to *ArcView* themes so that when a mapped feature is clicked using a mouse pointer, a small menu will pop up giving the user the option to view the variety of stories related to the mapped feature. This linkage will be greatly simplified by programming queries into "Document Organization" and importing search results into the relevant *AskSAM* database documents. The development of this aspect of the database is ongoing.

5.1.5 Techniques for verifying and interpreting indicator information

Indicator information representing potential unnatural change must be verified and interpreted in the way of the Denesôåine. Elders specified that the best way to do this was to present the relevant indicator information to them in "verification and interpretation workshops". In such workshops, indicator information could be evaluated against the long experiential history of the people on the land. Elders could also develop explanations for the observed trends associated with the indicator information - why things are as they are, or why they are changing in an unnatural manner. During these workshops, it was hoped that Elders could also take indicator information and evaluate it against the values and traditions of the Denesôåine people. In such a way they could determine whether the new knowledge represented a concern or a matter of little consequence to the land and its people.

Specific verification and interpretation workshops were to be held for each monitoring cycle that revealed potential unnatural change. For example, after *Fall Fishnet Cycle* questionnaires were completed and organized, a workshop would be held to deal specifically with that new indicator information.

5.2 THE TESTING OF A MONITORING PROGRAM

This section will detail the testing of the traditional knowledge monitoring program, the design of which is outlined in the previous section. Firstly, information gathered through monitoring questionnaires for the pertinent animal and plant indicators will be presented. Then, the verification, contextualization and interpretation of this information in light of Denesôåine traditional knowledge will be detailed. Finally, implications of this new monitoring knowledge for the land and people of the Kakinÿne will be presented.

5.2.1 2001-2002 trial indicator information

A selection of the preliminary indicators of environmental health and change outlined in section 4.1.2 were tested during the 2001-2002 trial of the monitoring program. Whereas all the indicator suites for caribou, fish, small fur-bearing animals, chickens / ptarmigan and berries were tested (duck and goose indicators remain to be tested in the spring of 2002), not all of the indicators contained within each suite were put to trial. This was largely due to a lack of resources and personnel to completely test some of the indicators, some which require fairly time-consuming and resource-intensive procedures to monitor completely and correctly. However, the researchers believed that the indicators that were tested provide a good indication of how the overall monitoring program would work, and thus are adequate for testing purposes.

This section will outline which indicators were tested during each monitoring cycle, as well as representative samples of participant responses to the questionnaires (**see Appendix A**).

5.2.1.1 Caribou (Etthÿn) indicator information

The indicators tested during the caribou monitoring cycles were the following (see section 4.1.2.1 for a complete description of these indicators):

- Numbers of caribou harvested by local hunters in the Kakinÿne region.
- Locations of caribou harvesting activities.
- Presence of caribou at traditional lake / river crossings during peak crossing seasons.
- Visual aesthetic of caribou.
- Behavior of caribou.
- Movement ability of caribou.
- Presence of discolorations or parasites in muscle or internal organs.
- Presence / absence of fetus in cow caribou.
- Development stage of fetus in cow caribou.

The questionnaires used to monitor these indicators are in **Appendix A**. Caribou indicator information was gathered during four distinct cycles during the 2001-2002 trial period. These four cycles were as follows:

- The *Summer Hunt Caribou Cycle* was completed during the summer hunts around MacKay Lake (August 1-4, 2001) and Aylmer Lake (August 18-23, 2001). The MacKay Lake hunt was scheduled to coincide with and provide meat for the Desnedhé Che (Lockhart River) spiritual gathering at old Fort Reliance. Six hunters traveled to the area for the harvesting event and hunted for three days. All the hunters participated in a caribou indicator questionnaire immediately following the hunt. The Aylmer Lake hunt took place in parallel with land-use research being

conducted in the area by Elders and land-users. Eight hunters were present for this hunt, and all participated in caribou indicator questionnaires during the hunt itself.

- The *Fall Hunt Caribou Cycle* was completed during and after the fall hunt at the great caribou crossing at Æedacho Tué (Artillery Lake), which took place between September 19th and October 27th, 2001. Approximately fifteen hunters and their families participated in this hunt. It was attempted to interview all the hunters regarding the caribou in the area, but due to time and personnel constraints only about ten hunters were in the end interviewed.

- The largest caribou monitoring cycle, the *Winter Caribou Cycle,* occurred between the months of December 2001 and February 2002. At this time winter was in full swing and the East Arm of Great Slave Lake was completely frozen. Caribou had returned to their wintering grounds around Great Slave Lake. During this time many hunters traveled about the Kakinÿne in search of the caribou to feed their families. This hunting period was not defined by any large, organized hunting event. Rather, land-users went hunting consistently throughout this time. Twenty-one prominent hunters in the community were interviewed near the end of this "deep winter" hunting period. They discussed in retrospect their observations and experiences while caribou hunting during this three month period.

- The *Spring Freezer Caribou Hunt* took place at Daisy Lake during March 28-30, 2002. This hunt occurs every spring in order to stock the community freezer for the summer months when the caribou will be far to the north in their calving grounds. This hunt takes place wherever there is a large concentration of caribou in the early spring months. Whereas in years previous this hunt took place in the Artillery Lake region, this spring the caribou were concentrated in the Daisy Lake area. Ten skilled community hunters participated in this organized community hunt. They told stories around caribou indicators upon their return from this hunt.

Summer Hunt Caribou Cycle

Hunters that participated in the MacKay Lake portion of the *Summer Hunt Caribou Cycle* were asked to respond to questions concerning the abundance and condition of caribou in the area. These are some of their stories:

> *When we first got to MacKay Lake the caribou herd didn't look to healthy and [the caribou were] very skinny. When we harvested some caribou, started cutting up the caribou - it was every skinny. Usually you see fat around the kidney there wasn't any, the*

> *fur condition wasn't what I expected - they were different and in poor shape, male, female, and calf. (GA 08 08 01)*

> *We saw lots of caribou - it was just like big hills moving. The caribou were skinny and they were moving too fast for this time of the year. It reminds me of when I worked at Misery camp, witnessing the movement of the caribou, about twenty thousand - even the gravel trucks stop because of the caribou movement. Before, when we go out hunting for caribou to Artillery Lake, the caribou were in better shape. I'm not sure if the caribou will be skinny or not there [at Artillery Lake] - it is hard to say. When I cut and skinned the caribou at MacKay Lake, for me the fur were shedding like feathers. But caribou fur changes every year naturally, which could be the problem. The caribou that I harvested were in poor condition - every one skinny. (FA 07 08 01)*

During the Aylmer Lake portion of the cycle, land-users echoed many of the same observations as noted by hunters at MacKay Lake about the condition of caribou. This included one comment noted during the fixing of a recently harvested caribou:

> *Morris Lockhart predicted this caribou would be skinny. He is right - bulls are supposed to be fat this time of the year. The caribou is really skinny you can even see the ribs. The front knee has a bruise on it. The inside looks fine. The liver is good. The marrow is good and white and firm - the caribou is not sick, just very skinny. (AB 19 08 01)*

Another comment was made around caribou condition indicators while fixing two caribou a couple of days later:

> *These two caribou, they are skinny but not injured. (Tastes the marrow) The marrow just tastes like water and there is blood in it. Good marrow should taste rich. (JBR 22 08 01)*

During indicator interviews held to wrap up the Aylmer Lake hunt, land-users shared the following stories:

> *I've shot three caribou and three were skinny and had pus in the meat - we couldn't even take much meat. When I went after these two caribou today, they didn't run away at all so I knew right away something was wrong. Not only did they have broken hooves full of pus, but long scars on their legs like they had fallen in a hole and scraped the sides of their legs. (AB 21 08 01)*

The caribou are supposed to be fat this time of the year because the food is really good in the barrenlands at this time. (MD 21 08 01)

In all our [the Elders] lives we have never seen injuries like that [swollen and infected knees and joints on the caribou]. Even when the caribou are running away from all the flies on the barrenlands, we've never seen that. Even before I was hunting I went out with my dad and never saw a [caribou] foot with pus like that. I've been hunting for 80 years and I have never seen a caribou foot like that until today. Around this time the caribou are supposed to be really fat. They aren't supposed to be skinny like this. There will be a lot of talk about this among all aboriginal people. Caribou is our main diet. (ML 21 08 01)

Fall Hunt Caribou Cycle

After the fall caribou hunt at Artillery Lake, the following representative stories were gathered while interviewing hunters about their experiences and observations:

I harvested two caribou this year. I'm not sure why but last year there were many caribou around the Crystal Island area [middle of Artillery Lake]. This year I've seen fewer caribou - I've counted that only fifteen caribou have been harvested all together. I think it's because of the mining industry slowing down the movement of the caribou through their migration routes. I'm not sure why the caribou move more away from the Artillery Lake area these days. This is my second year out hunting caribou out in barrenlands at Artillery Lake. I've heard many stories about caribou being gone or having come back [to Artillery Lake] late, but I haven't experienced it myself until now. I haven't noticed any sick or injured caribou because I haven't seen many caribou this season. I think there are less caribou each year around here, maybe there will be none around Artillery Lake area in the future. (MB 22 10 01)

I harvested ten caribou this season [at Artillery Lake]. I think there wasn't much caribou around Artillery Lake this year. It is probably because the migration route is more to the north from Artillery Lake - that is why there's more caribou on the north end of Artillery Lake. The caribou have many migration routes - they even have routes on the outskirts of Artillery Lake - that is why there weren't many caribou around the Artillery Lake area this year. The groups of caribou we've harvested here were healthy and fat. (James L 24 10 01)

Some of the hunters offered their thoughts about the lower abundance of the caribou at Artillery Lake during this hunt. The following stories are representative of their comments:

> *This season there wasn't many caribou, but last year there were lots. It is probably because we went there later in the season than before – the caribou were late this year. It seems like the healthier caribou travel faster than the injured or the sick caribou. The healthier caribou migrate further south to the Saskatchewan border and come back this way towards the* Åutsÿl K'e *area. They stay around the* Åutsÿl K'e *area until late spring, then they migrate back to the barrenlands. It is a cycle that the caribou use yearly. (AC 24 10 01)*

> *The caribou weren't much this year, probably because of the weather or the lateness of the migration. The only way caribou change their migration route is when something is in the migration route. Like the mine built roads - that's the main factor. This year there weren't much caribou compared to other years. I can tell by looking at their tracks. (TL 24 09 01)*

Winter Caribou Cycle

Hunters had much to say about their caribou hunting activities and associated caribou observations during the months in the heart of winter (December – February). They spoke mostly about areas where they went hunting, the condition of the caribou they harvested, as well as their perceptions of the caribou migrations. Here is a characteristic selection of their stories:

> *I have gone hunting two times this winter. I shot one fat caribou at the end of* Etthen *Island and one skinny caribou on the north shore [of the East Arm] past* Besti ghie *(Utsingi Point). I haven't seen any sick or injured caribou. The caribou are moving pretty slow this year. It is unusual that the caribou are going a different direction [westwards] and did not come this way yet [towards* Åutsÿl K'e*]. The caribou that I harvested were healthy and good size. (AA 23 01 02)*

> *I went caribou hunting about five times this season so far. I went to the Portage Inlet, Maclean Bay, Meridian Lake, Charlton Bay, and Francois Bay. I shot a couple of cows and three bulls. The caribou I harvested were both fat and skinny. The bulls were much skinnier than the cows, which were fat. I had seen some caribou that had injured legs. The caribou are moving very slow this year. The caribou we are getting [on the north*

shore of the East Arm] are a whole different herd than what we usually get, the Beverly herd. The caribou are healthy but seem to be skinny. (EB 23 01 02)

I harvested a lot of caribou this season and I go hunting every week. The caribou I mostly shot were skinny bulls. The cows are fat and the bulls are skinnier. I did not see any sick or injured caribou. The caribou are moving very slow this season. It is unusual for the caribou migration routes, because they are moving in all kinds of different directions this season. The caribou that we are shooting is not our caribou. I know because these caribou are smaller and skinnier. Our herd, the caribou usually to the south of Åutsÿl K'e*, is opposite to that. (Justin C 25 01 02)*

I went caribou hunting four times this winter. I went to the Big Narrows where I harvested seven caribou and also five at Float Lake (Tochatwi Lake). This winter I harvested twelve caribou. The caribou I harvested - some were fat and some skinny. The bull caribou were much skinnier than the cows, which were fatter. I have witnessed some injured caribou that had yellow spots on the arms. It was on cows only though. I have seen this at Float Lake. (MS 07 03 01)

The map in **Figure 3** shows caribou hunting locations (and associated numbers of caribou harvested) used by questionnaire respondents during the deep winter hunting season. Different colored dots represent different hunters. Some of the hunting locations have a "0" associated with them. These represent areas where the caribou were seen or tracked but none were successfully harvested.

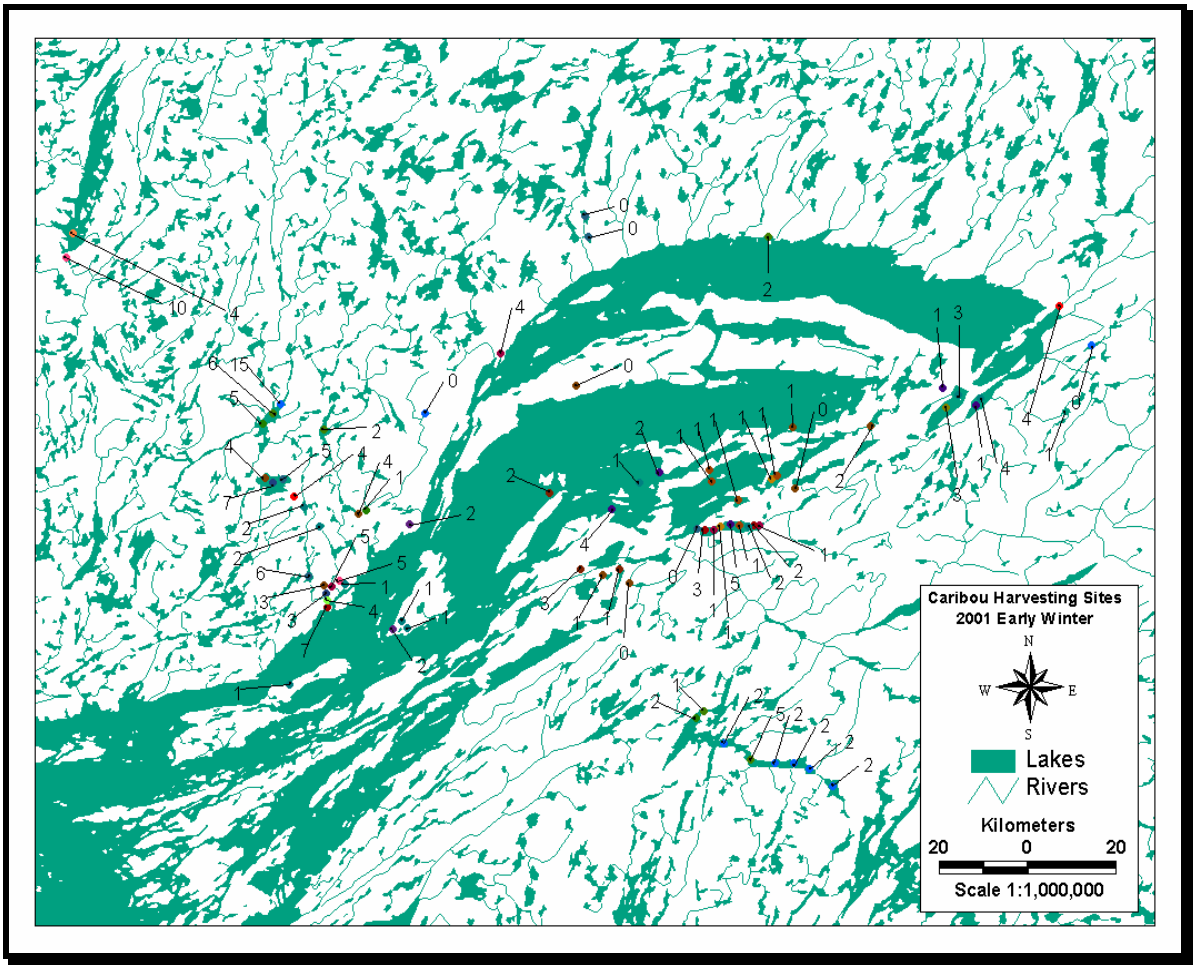

Figure 3. Deep winter caribou harvesting locations

Spring Freezer Caribou Hunt

After the spring freezer caribou hunt at Daisy Lake, the following representative stories were gathered while interviewing hunters about their experiences and observations:

> *We killed sixty caribou [at Daisy Lake], it was all mixed, cows, calves, and not too much bulls. We did not shoot too many bulls because they were too skinny. This was the first time that the caribou stayed around Daisy Lake at this time of year. There were more caribou there, but they will be there for only a couple of weeks at most. Most of the caribou were healthy but lots were skinny. I did not see any injured or unhealthy caribou. They all seemed fine. The caribou that we harvested were skinny. The stage the baby caribou were at was medium sized, no hair. But some were different such as some were smaller and some were medium sized. Every year I look at it and last year it was the*

same. It depends on how they eat when they travel. I did see some cows with no babies. I do not know why this happens. I shot a few of them. Well it has been quite a while since caribou have been hanging around the Daisy Lake area so the caribou to me is different. These caribou are going straight east. About this time of the year they do not travel towards the barrenlands. The caribou moves around so fast, and they travel towards Nanula Tué *(Nonacho Lake) where it is burned because of fire, so all the caribou are moving east because of this. (EB 08 04 02)*

Only now there is caribou at Daisy Lake, so there were more caribou this year at that area. There was none last year at Daisy Lake. Some of the caribou were healthy, and some were skinny. The caribou I harvested were both fat and skinny and they were mixed cows and bulls. The stage where the babies were at was medium-sized. I did see some cows that had no babies and the reason for this is because the cows were older and they cannot have any more babies. The movement with the caribou in this area, seems that they are circling in the area because of the fires that took place in some areas around there. The caribou were all heading east. (RE 10 04 02)

I think these caribou were there [Daisy Lake] all year long and people did not know about that. It is kind of hard to protect caribou because Daisy Lake connects to Dion Lake and the Dion Lake area is all burnt. So the only way to protect the caribou is to harvest them. It seemed like they were just going in circles because in one area it [the tracks] was in circles. And in some places it looked like ski-doo tracks. The land it looked just like ski doo tracks. I think they were going around and around in that one area. (RF 17 04 02)

There were more caribou in other years. It looked like the caribou were hanging around there [Daisy Lake] for the whole year and they stayed there. I can tell by the tracks. Some of the caribou were healthy and some weren't. But for me it was pretty good. Some of the cows we shot did not have any babies inside them. They were young cows. It was very strange for me. I called it "lost caribou". The caribou we harvested were both fat and skinny. The caribou were moving in the north-east direction. That area at Daisy Lake is a trapping place. In the olden days people used to trap there. They would travel right from this community of Åutsÿl K'e *right before ice freeze up. The caribou started migrating south early in the fall because the feeding area around there is no good. It is too deep in the snow. Well, I have seen better herds before. (JC 17 04 02)*

5.2.1.2 Fish (Åu) indicator information

The indicators tested during the fish monitoring cycle were the following (see section 4.1.2.2 for a complete description of these indicators):

- Type (species) and number of fish harvested by local harvesters in the waters in the region.
- Location of harvesters' gill nets.
- Fatness.
- Parasite load.

The questionnaire used to monitor these fish indicators is in **Appendix A**. Fish indicator information was tested during one distinct cycle, the *Fall Fishnet Cycle* administered during the fall of the 2001-2002 test period. The *Summer Angling Cycle* was not tested due to logistical and personnel limitations during the summer months. Harvesters from Åutsÿl K'e have fishnets set during all the seasons of the year, from the open water of the summer months to under-the-ice sets in the wintertime. As people's seasonal fishing locations remain relatively constant throughout the year, it was found that harvesters could talk about some of the indicators, such as gill net locations, for the whole previous year of fishing. Other indicators, such as those associated with fish condition (such as fatness and parasite load), could however only be discussed very generally or for the most recent past.

The Denesôåine all fish at some point or another during the year. As such, a representative sample of thirty prominent fisherman and fisherwomen answered questionnaires around fish indicators.

Fall Fishnet Cycle

During the *Fall Fishnet Cycle*, stories gathered and recorded from harvesters about gill net locations, fish abundance and general fish condition include the following representative selection:

> *In the springtime I fish at the point across (Pearson Point). In the summer I use my fishing rod and fish all over, the place. In the fall I set nets at* Nu Cho *and in the winter I have nets across from town [between Dog Island and the mainland]. The best place I set nets is across from town. I have seen some unusual fish this summer, which had pus inside of the fish and some white spots on the meat, and it was very small. The best time to fish is in the summer and fall. There were more fish this year than other years. In the fall the fish are skinny and in the summer it gets fatter. I eat fish twice a week, mostly I catch trout and whitefish. (Baptiste C 20 11 01)*

In the springtime I fish at the Åutsÿl K'e *Gap. In the summertime I fish anywhere on the East arm of Great Slave Lake. In the fall I fish at the river [mouth of Stark River]. I set nets at Nu Cho, Moose Bay, across from* Åutsÿl K'e *and at the Gap. The best place I fished was at Nu Cho and Moose Bay. I have seen unhealthy fish at Stark Lake that had a lot of worms on it. It is best to fish in the fall time and summer. There were more fish this year than other years. I have noticed the fish were fatter this year. (Frederick R 26 11 01)*

In the spring and winter I fish at the Gap. In the summer I fish at the Gap and in the fall I go up the River [Stark River]. The best places I set my nets in the spring was at the Gap, Dog Island and across from town. I have seen a couple of deformed fish that looked crooked. The best time of year to fish is in the summer because you can go anywhere. The amount of fish I caught was normal. Most of the fish I caught were all normal. I eat fish twice a week. I mostly catch trout and whitefish. (RF 20 11 01)

I go and I set nets at Portage Inlet, Fortress Island, Fish Fin Island, Nu Cho, Big Island and Seagull Island. I have seen some unhealthy fish around Stark Lake that had a hump back. Some had skinny tails, big heads and small bodies. I've even seen fish with no fins. Some have worms or blood suckers on the fish, and even something that looks like an octopus on the fish. It is best to fish in early June. There were more fish this year. They were skinnier this year because there are too many fish. (SB 21 11 01)

I fish all over the Great Slave Lake. I set nets at Åutsÿl K'e *rapids [Stark River], and Fish Fin Island. The best places I fished were at* Æeghai Nu, Nu Cho, *and the Stark Lake area. I have seen fish that were skinny with a big head and some white fish as well. It is best to fish anytime of the year. There were more fish this year. I caught fat and some skinny fish. (JM 18 11 01)*

The map in **Figure 4** shows fish net locations used by the local harvesters interviewed during all four seasons of 2001.

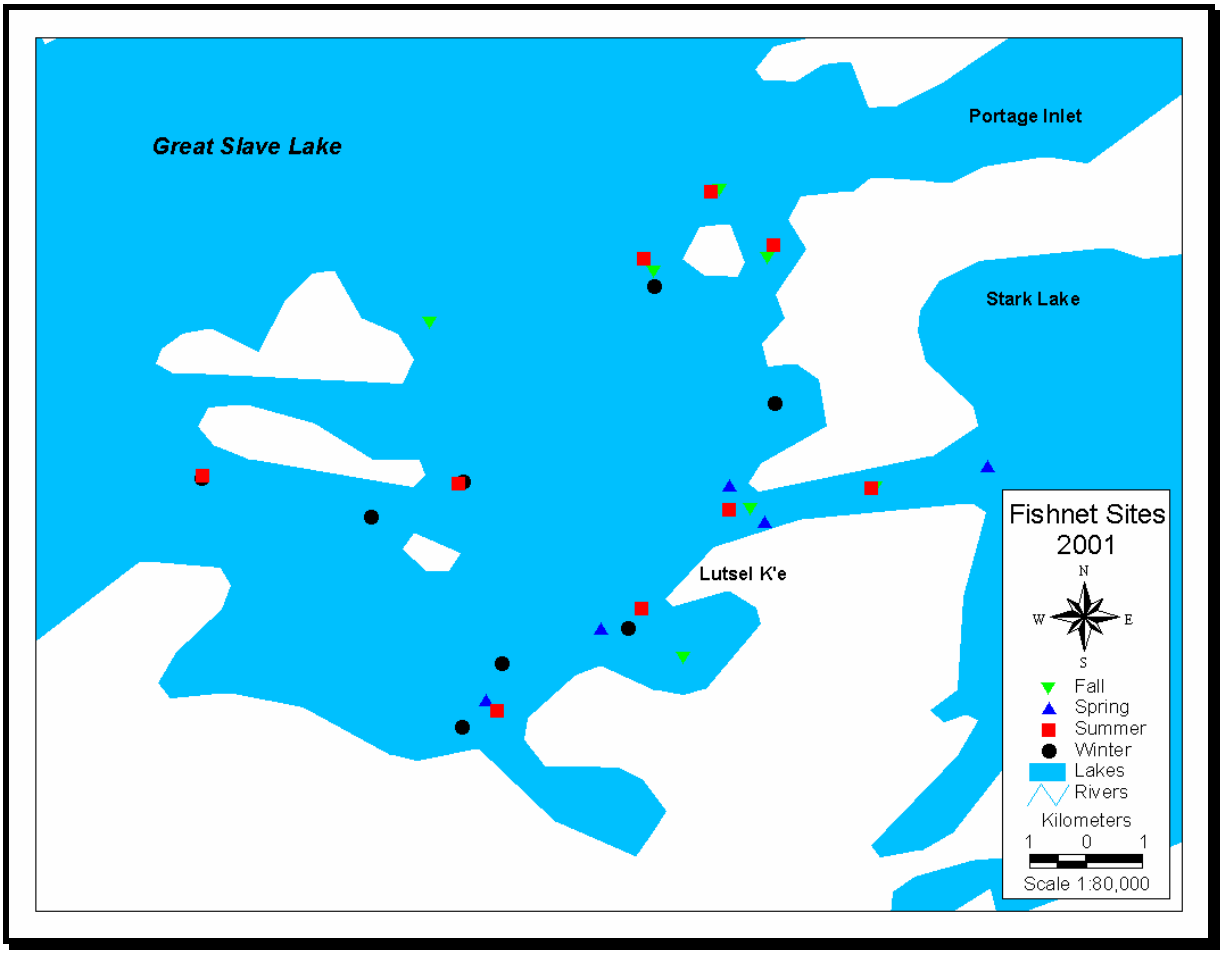

Figure 4. Fishnet locations for 2001

5.2.1.3 Small fur-bearing animal (Tsa Thath) indicator information

Small fur-bearing animal indicators were tested during the *Rabbit Cycle* in the fall and the *Marten, Mink, Weasel, Lynx, Fox and Wolverine Cycle* in the winter of 2001-2002. The *Beaver, Muskrat and Otter Cycle* remains to be tested in the spring of 2002 when the Denesôåine actively trap these aquatic animals. The indicators tested were the following (see section 4.1.2.4 for a complete description of these indicators):

- Number and type (species) of fur-bearing animals harvested during the trapping season.
- Location and extent of traplines used by the Denesôåine.
- The fullness and shininess of fur-bearing animal pelts.
- The thickness of fat deposits found between a fur-bearing animals pelt and body.

The questionnaires used to monitor these small fur-bearing animal indicators are in **Appendix A**. The *Rabbit Cycle* was administered in November 2001, during the period when rabbits are actively snared during the first snowfalls of the winter. At this time rabbit snares can easily be set along the fresh tracks. As snaring rabbits is not a huge investment of time or money, most people in Åutsÿl K'e set snares at one time or another during the fall. Sixteen of these people participated in small fur-bearing animal questionnaires near the end of the rabbit season.

The *Marten, Mink, Weasel, Lynx, Fox and Wolverine Cycle* of indicator information gathering was completed in late January and early February, during the tail end of the trapping season that begins with the first snowfall. Trappers from Åutsÿl K'e typically establish traplines soon after the first snow of winter, and continue trapping during the prime fur months between November to February. While not many Åutsÿl K'e trappers continue to live the trapping lifestyle exclusively, many still trap to supplement their income or simply for recreation. Fifteen of these individuals participated in small fur-bearing animal questionnaires in relation to marten, mink, weasel, etc.

Rabbit Cycle

Questionnaire participants were asked about the location of their snares, how many rabbits they harvested in each area, as well as the overall condition of the rabbits they harvested:

> *This fall I harvested eight rabbits. I set snares at the Snowdrift River beside my camp and this is where I go every year. There were fewer rabbits this year compared to other years. I am not sure why, but it gets less each year. All the rabbits I snared were all fat. It is best to set snares in the fall time. The best place I snared rabbits was beside my cabin (Snowdrift River) and on the side of the cemetery [mouth of the Snowdrift River]. (AE 15 11 01)*

> *I harvested ten rabbits this year. I usually go to the Gap and the Snowdrift River to snare rabbits. I go to these places every year. There were not many rabbits this year compared to other years, when there were more. All the rabbits I snare are fat. The best time to snare rabbits is in the fall time (Aug-Sept). The best place I went to snare rabbits was at the Gap. (BM 05 11 01)*

> *I snared ten rabbits this season and wolves and martens were eating some, so I lost a few. I went to a place called Rock River. Nobody knows where it is. There weren't too much rabbits this year because there are too many wolves and foxes. The rabbits I snared were not too fat or skinny – they were just right. The best time to snare rabbits is in the*

fall and after snowfall when you can see tracks in the snow. The best place I go for snares is anywhere in the bush [around Åutsÿl K'e]. (BS 05 11 01)

I harvested five rabbits this year. I went to Fish Fin Island and Snowdrift River to set rabbit snares. There weren't too many rabbits this year compared to other years. At Fish Fin Island the rabbits were fat and at Snowdrift River they were skinny. The best time to snare rabbits is in the springtime and in the fall time. The best place I snared rabbits was at Snowdrift River area. (SB 15 11 01)

Figure 5 shows a map of the areas used for snaring rabbits as outlined by all the land-users that participated in the small fur-bearing animal questionnaires.

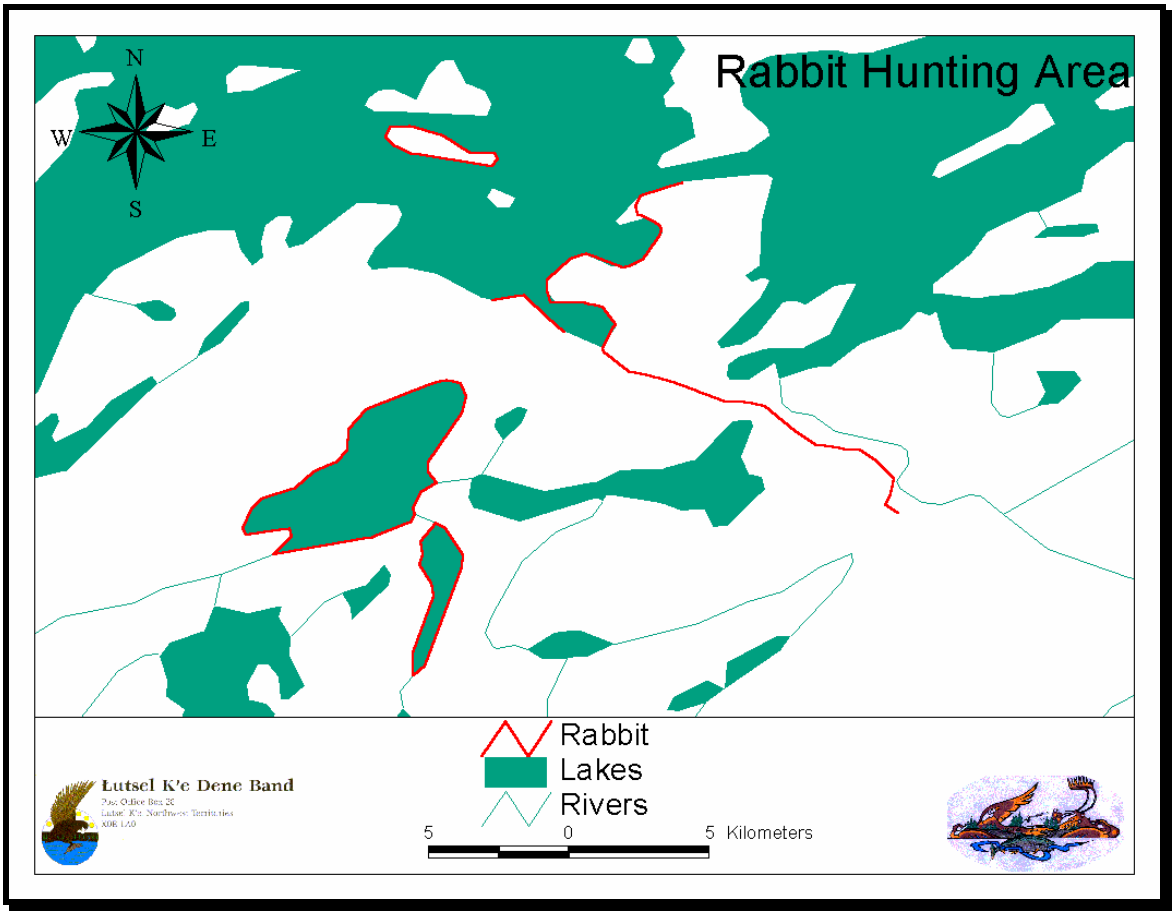

Figure 5. Areas of rabbit harvesting 2001-2002

Marten, Mink, Weasel, Lynx, Fox and Wolverine Cycle

Trappers were asked about the numbers of different types of fur-bearing animals that they harvested on their traplines. The trappers also talked about the quality of the furs they trapped. Here are some of their stories:

> *I harvested about thirty martens [this year]. I really slowed down because of the mining [employment at the mine] going on. But it is a hobby for me to show my son about his culture. I just built a cabin at Murky Lake. I usually sell the fur I catch. I used to use leg hold traps before but now I use conibear traps. It takes about twelve hours to set traps on the line. I harvested martens, minks, wolverines, and foxes [in the past]. Before each day I used to visit 50-60 traps but now it went down to 20-30. I do not really profit anything because I have to buy gas, food, ski-doo parts, and equipment supplies so it costs a lot to check your traps. The best time to trap is in October through mid February. I usually trap all over and it really depends on how far you go. The amount of animals this year was pretty low this year for me. There were no signs of tracks I am not sure why of this. The fur quality this year was the same as before. (FA 16 01 02)*

> *I went trapping on the north shore [of the East Arm] across the lake and also at McLeod Bay. I harvested about thirteen marten so far. The fur I catch I usually give to my dad. The traps I use are conibear traps. I don't like using it because it is too dangerous. It takes me three minutes to set up one trap. The animals I caught this season were martens, wolverines, and wolves. I visited eight traps a day this season. I have profited from trapping each season. The best time I usually trap is in February. The best place I trapped was on the north shore on the small side lakes. I did not notice if there were more or less fur caught this season. The quality of the fur was good. (NM 14 02 02)*

> *I have been trapping since the fall time. I went to Macdonald Lake this year. I did not harvest too much fur this year because it was too cold. I did catch about four all together. The outpost camp I usually stay at is located at Narrow Lake (Larry Catholique's cabin). It takes about three to four hours to set up traps on the trapline. The kind of fur I caught were mink and martens. I visited about fifteen traps a day. The best time to trap is before Christmas. There were less fur-bearing animals caught this year than other years. But its like that from year to year – its how it is. Sometimes there's really lots of fur-bearing animals, at other times there aren't too many. The quality of the fur this year was good. (MS 07 03 02)*

I did not catch too much fur this trapping season, though I did catch about four martens. It takes one whole day to set traps on the line. I caught martens, fox, lynx, and mink. I visited about twenty traps a day. I do profit from trapping. The best time to go trapping is in December. The best place I trapped was anywhere around Åutsÿl K'e. There was less fur bearing animals this year. The quality of the fur this year was not too bad. I check my traps every three days. (TM 01 02)

Figure 6 shows a composite map of the 2001-2002 traplines outlined by all the trappers that participated in the small fur-bearing animal questionnaire. This map provides a good indication of where trappers focused their efforts, and thus where the small fur-bearing animals were distributed across the landscape.

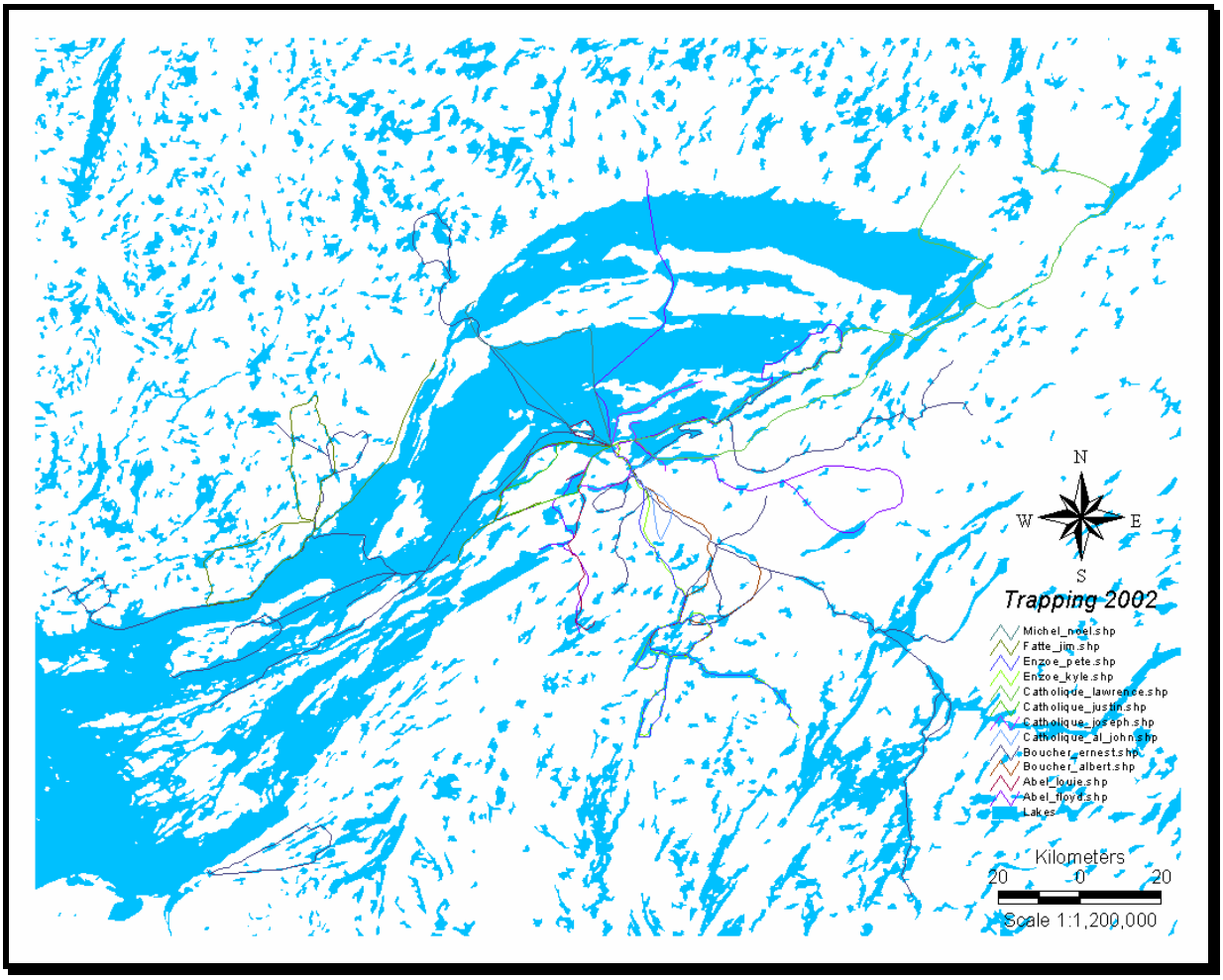

Figure 6. Winter small fur-bearing mammal traplines

5.2.1.4 Chicken and ptarmigan (Di, Æeåk'aith, K'asba) indicator information

Chicken and ptarmigan indicators were tested during the *Chicken Cycle* in the fall months of 2001. Questionnaires were administered in October and early November, prior to the first snowfall. At this time, chickens are active in the woods with their mating rituals. Harvesters actively pursue them at this time, stalking the birds through the woods with shotguns or .22 rifles. Ten harvesters were interviewed about their chicken hunting experiences during this cycle. The *Ptarmigan Cycle* remains to be tested in the spring, during the time when the ptarmigan begin moving towards the barrenlands. The indicators tested during the *Chicken Cycle* were the following (see section 4.1.2.5 for a complete description of these indicators):

- Type (species) and number of chickens and ptarmigan harvested by local land-users.
- Presence and numbers of chickens and ptarmigan at traditional harvesting areas in fall (chickens) and spring (ptarmigan).
- Extent and thickness of fat deposits in harvested chickens and ptarmigan.

The questionnaire used to monitor chicken and ptarmigan indicators is in **Appendix A**. The answers to these questionnaires are exemplified in stories told by land-users about chicken abundance, harvesting locations and condition:

> *I harvested about 30 chickens this year. I sometimes go to Snowdrift River and anywhere on land there's lots of chickens. This year there wasn't much chickens but two years ago there were many chickens. The chickens are nice and fat, the ones I got. Fall is the best time to hunt chickens - you could see their footprints on the snow. The best place to hunt chickens is where there is usually lots of sandy ground like at the Snowdrift River and where there's willows. I haven't seen any chickens that re sick or injured. (JD 02 11 01)*

> *In the fall and spring times are the best times to hunt chickens. I've harvested about 10 chickens this season. I went hunting near the Snowdrift River, Duhamel Lake, the top of the big hill [south of* Åutsÿl K'e*], and generally all around the* Åutsÿl K'e *area. These are the places I usually go. The Snowdrift River is the best place to hunt them. There was more chickens last year compared to this year. The chickens I got were nice and fat. I didn't notice anything unusual about the chickens. None were sick or injured. (FB 29 10 01)*

I harvested about ten chickens this season. I just traveled along the road [from Åutsÿl K'e to Duhamel Lake] - if I see a chicken I usually shoot it. I'd say this year was lot of chickens. I've never really noticed them go up or down. The chickens I shot weren't really fat or really skinny. I'm not sure about this but every time I shoot chickens they are always the same, always in the same condition. The best time to hunt the chickens is in the spring and fall months, and the best place is at the Snowdrift River in that area. Not this year or any other year have I ever noticed anything unusual chickens, any that were sick and injured. (DD 30 10 01)

Figure 7 shows areas where Lutsel K'e harvesters went to hunt chickens in the fall of 2001.

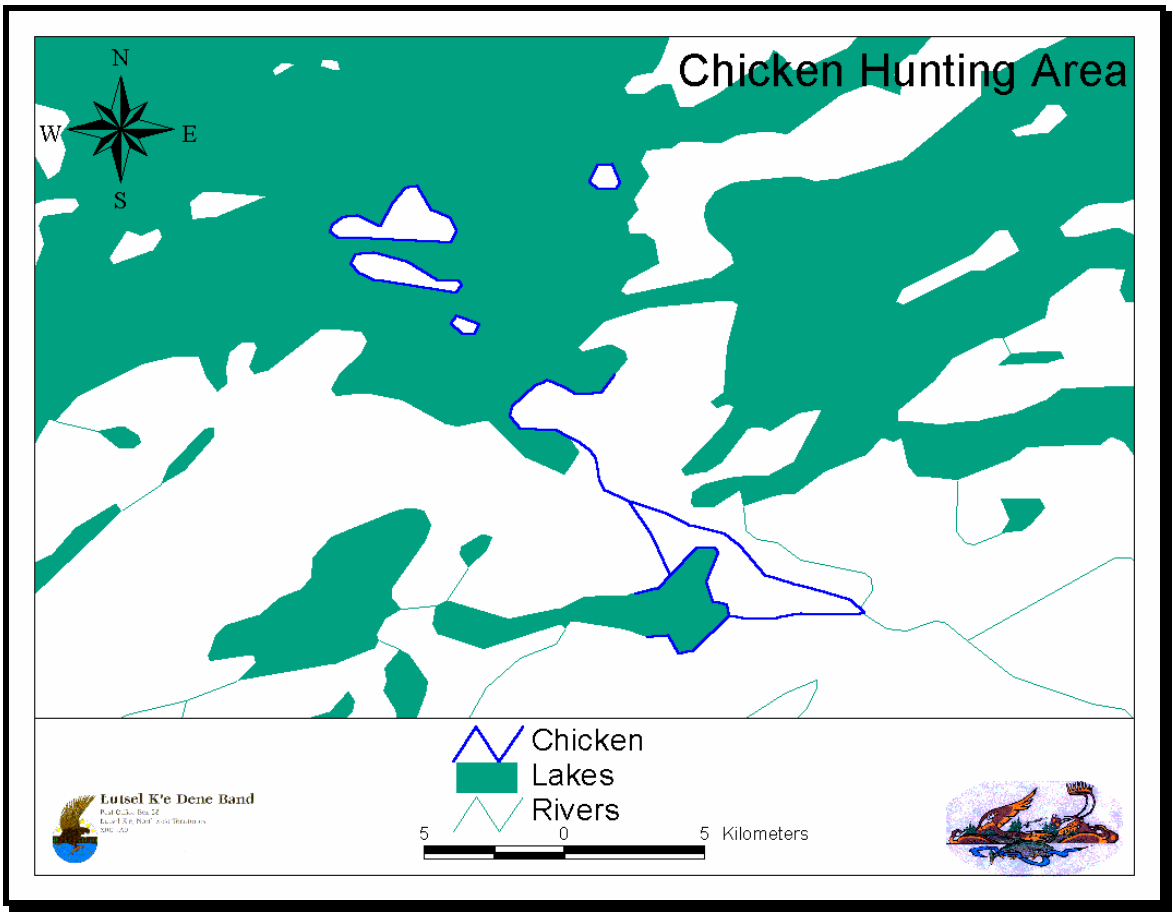

Figure 7. Chicken hunting areas 2001-2002

5.2.1.5 Berry (Jí) indicator information

The *Berry Cycle* was completed in September and early October 2001. This is the tail end of the berry-picking season which begins in mid-summer with the raspberries and ends in early fall with the cranberries and crowberries. During the berry-picking season, many Denesôåine women gather in the berry patches to harvest berries and socialize. The women gravitate towards those traditional berry patches that are known have many large, juicy berries. While picking berries, the women make many observations around berry indicators as described in section 4.1.2.6. During the testing of the *Berry Cycle*, twelve harvesters were interviewed about all of the berry indicators. These indicators were:

- Type (species) and abundance of berries in traditional berry patches.
- Location of berry-harvesting activities.
- Levels of rain during the spring and summer months.
- Temperature during the spring and summer months.
- Forest fire activity in the region

The questionnaire used to monitor berry indicators is in **Appendix A**. Responses to these questionnaires are detailed in these sample transcripts:

> *The best time of the year to pick raspberries is the first week of August. They were very ripe. The blueberries are usually ripe in August also. Cranberries are usually ripe at the end of August and in September. It is best to pick the berries at these times because they get ripe and juicy. It is best to store them at that time. The best place I found for raspberries is up towards the [Åutsÿl K'e] airport where there is a long stretch full of berries. The other place I found raspberries is towards the garbage dump on the side of the road [south of Åutsÿl K'e]. Another place is by the gravel pit at the firebreak. I picked up cranberries past the airport - on the road going up there are a lot of cranberries on both sides. I picked up about ten pounds of cranberries there. This year the berries were excellent, there was a lot, same as about three years ago. (AJ 09 01)*

> *The only place I did not pick berries this year was Artillery Lake. This year the berries were really good. They grew big and abundant. I went to Barren Island, Caribou Island and at the Snowdrift River where there was plenty. Mary Rose, Cathy and I went to the Boucher junction (Duhamel Lake) where there were a lot of cranberries. We drove in a boat. We picked up until we could not see the berries anymore. There were a lot of wolf and bear sightings that we were aware of but we got into the berry picking and forgot to watch out. I remember Caribou Island when I was younger there was a lot of berries and it tasted sweet not like today it is quite sour. Blueberries are everywhere and also for the cranberries. (Angie L 09 01)*

The best time to pick up blueberries and raspberries was at the end of July and in August. The best time for cranberries was best to pick at the end of August and in September. This year I went to pick berries by the airport and further towards Stark Lake, also on the side of the hill and behind my dad's camp [Æeghai Nu]. The best place to pick blueberries that I know of is going towards by the dump. There are a lot of cranberries behind my dad's camp. I did not pick any raspberries this year. I think there were more berries this year compared to last year and the year before. (Lucy A 09 01)

The best time of year to pick up raspberries is in July, same as strawberries. They are the first berries to ripen up. It is best to pick up blueberries in August. Cranberries are best to pick about this time of year (fall). It turns out really good now. The other day I went berry picking with the nurses and there was too much snow. I usually go up by the river to pick up berries. It is good to go this time of year because they freeze and it is easier to pick when it is like that. I pick up raspberries right by the airport on the side of the road. They grow mostly near where there is gravel and sand are. At the island at Stark Lake they said that it was just red because of all the berries. But hardly anyone went there because of the shallow water at the [Stark] river. There were a lot of berries this year and last year near the community and in Fort Reliance. In Fort Reliance where we set our tent there was a lot of berries close by and we did not have to go very far. It was still white [the berries] but it is still good to pick up. And by the time we went home it was all ripe. (MF 10 01)

The best time to pick up strawberries is the end of July. In the beginning of August is the best time to pick up raspberries and also blueberries. For cranberries it is best to pick up in the beginning of September. It is best to pick the berries up at this certain time because they are big and ripe. The place I went berry picking was beside Nu Cho on an island where there were plenty of raspberries, and blueberries. Raspberries are usually found along the shores. Cranberries are found all over and same for blueberries. There were a lot of berries last year, which were very ripe and bigger, compared to a couple of years ago where the berries were small and there was hardly any to be found. I am not sure why this happens. (VS 09 01)

The best time to pick up raspberries is at the end of July that is when it is ripe. It is best to pick up blueberries in the first week of August. Cranberries are the latest berries to pick up because it gets reddish and it is nice and ripe. This year I went to pick up berries at my camp at the island. I picked up cranberries. For raspberries, strawberries and

blueberries I went to the gap where our ancestors used to live at the point. People usually pick up blueberries around here towards the airport on the right hand side and you go along the path. Two weeks ago I went berry picking with the nurse right behind the hill past the firebreak and we picked up a lot of cranberries all along the fire break. I picked about a bag and a half of the zip lock bag. Behind my camp there are a lot of cranberries. Wherever I looked there were lots. Last year I went to pick up blueberries on the big island and there was absolutely nothing. This year there were lots all over. (AA 09 01)

Figure 8 shows a sample of a map that was used to locate berry-picking locations for 2001 in the vicinity of Åutsÿl K'e (as identified by questionnaire participants).

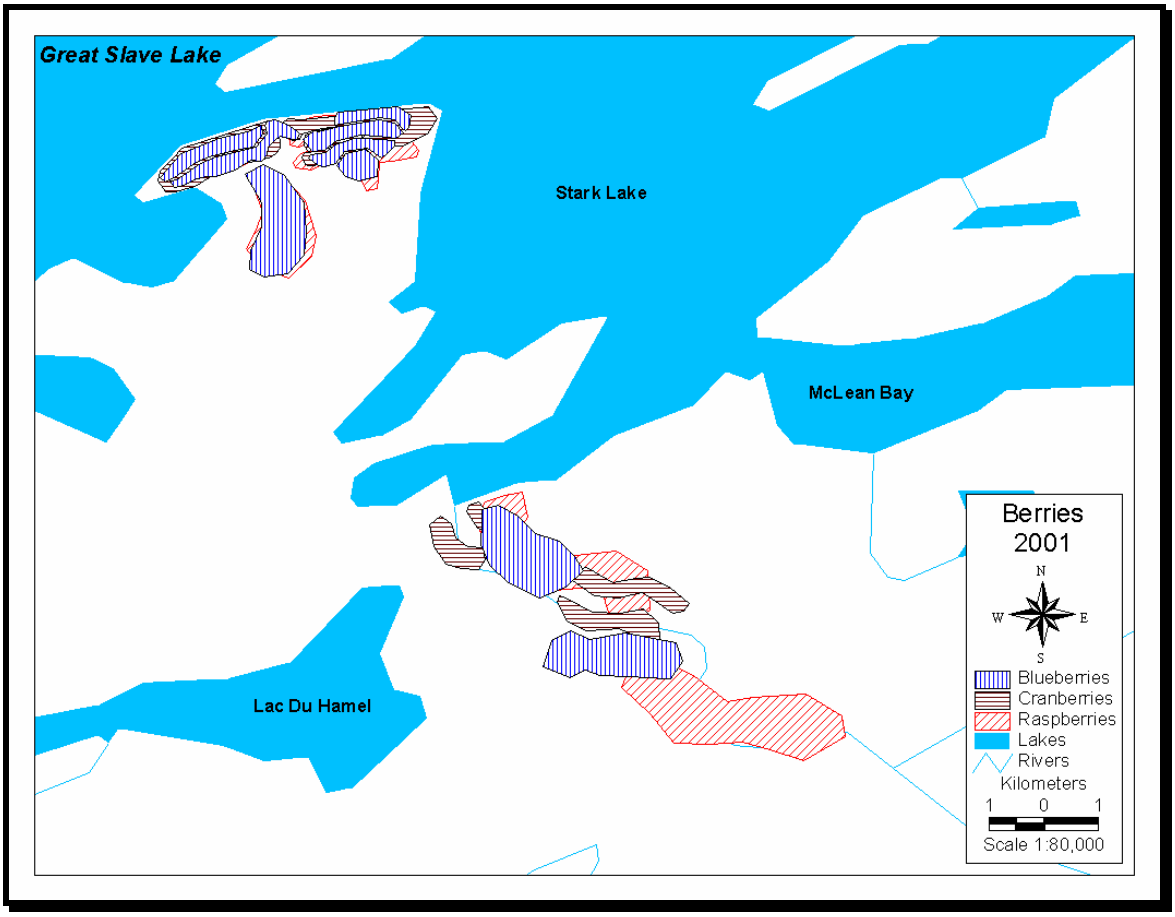

Figure 8. 2001 berry-picking locations around Åutsÿl K'e

5.2.2 Verification and interpretation of 2001-2002 indicator information

Verification and interpretation workshops were scheduled to correspond with the conclusion of each specific monitoring cycle. In preparation for these workshops, researchers studied the transcripts of monitoring questionnaires to tease out overall themes and unique responses represented in participant answers. In some cases, specific monitoring cycles only revealed information and themes considered baseline, or "how it has always been". Such baseline information represents that which varies within limits recognized by the Denesôåine as natural. In cases where only baseline information is revealed, indicator information was simply input into the database for comparison with information gathered during future cycles of monitoring. No interpretation workshop was needed for monitoring cycles that yielded only baseline information.

In the instances where researchers discovered environmental information representing changes to baseline, or unnatural change, a verification and interpretation workshop was deemed necessary. Themes relating to new indicator information (i.e. not baseline) were presented to Elders in order to for them to (1) verify the information in light of their current and historical environmental knowledge and (2) interpret the information using their vast traditional environmental knowledge and Denesôåine values. Elders deemed experts by their peers in the relevant subject matter were selected by the researchers for each trial workshop.

During the test of the monitoring program, some of the monitoring cycles revealed information that did not represent changes from how it has always been. These were:

Chicken and Ptarmigan Indicators
Chicken Cycle

Small Fur-bearing Animal Indicators
Rabbit Cycle
Marten, Mink, Weasel, Lynx, Fox and Wolverine Cycle

Berry Indicators
Berry Cycle

However, the following monitoring cycles were deemed to reveal information that deviated from baseline, and were thus scheduled for verification and interpretation workshops. These were as follows:

Caribou Indicators
Summer Hunt Caribou Cycle and Fall Hunt Caribou Cycle
Winter Caribou Cycle and Spring Freezer Hunt Cycle

Fish Indicators

Fall Fishnet Cycle

The thematic material gleaned from collected indicator information is presented below. In the case of information that deviated from baseline, the proceedings of verification and interpretation workshops were also presented.

5.2.2.1 Caribou (Etthÿn) monitoring themes and workshops

As unnatural changes were alluded to in caribou indicator questionnaire responses, two workshops were held to discuss indicator information about caribou. The first workshop dealt exclusively with information generated during the *Summer Hunt Caribou Cycle* and *Fall Hunt Caribou Cycle.* Themes garnered from participant questionnaires during these two cycles were:

Summer Hunt Caribou Cycle

- Caribou (bulls and cows) observed at both MacKay Lake and Aylmer Lake were skinny for this time of year. Caribou had very little brisket, back or kidney fat. The marrow of some caribou was watery.
- Many caribou were observed in the MacKay Lake and Aylmer Lake region. They were in many small groups (not a big herd), and a high proportion of caribou were limping.
- Caribou that were limping were observed to have, upon closer inspection, swollen ankles/knees, broken and infected hooves and a few had long cuts on their lower legs.
- Caribou were moving very quickly for this time of the year (late summer).
- Hides were in poor condition – hair fell out of the hides very easily.

Fall Hunt Caribou Cycle

- Compared with previous years, there were not too many caribou around the Crystal Island region of Artillery Lake (south shore) this fall.
- More caribou were seen towards the northwest side of Artillery Lake.
- The caribou were late in coming to the Artillery Lake region this year.
- The caribou harvested were generally fat and in good condition.
- No caribou were seen that were sick or injured.

A two-part workshop was held to discuss these observations and experiences. Elder interpretations of the information are summarized by the following workshop quotes:

I believe it's [caribou skinniness] because of lack of food. From my point of view, when we have gone out caribou hunting in August, just like this trip [MacKay Lake hunt], we had better caribou condition. I think this winter the caribou are going to have hard time surviving the winter. Some of them might die off this winter because of their weak condition this summer. (GA 16 10 01)

From my point of view it's [poor condition of caribou] because of the mining industry disturbing the caribou migration route, disturbing the caribou. Twenty-four hours a day there's noise and the smog of dust in the air for miles. Of course caribou eat this smog that lands on the ground. (FA 16 10 01)

Old timers once told me that skinny caribou like this could be traveling caribou. They just travel all the time and don't stop much. This is why things are changing because they don't have much food. This could be a different kind of herd than the ones we get around to the south of Åutsÿl K'e. *The Elders think these caribou are not from the herd that* Åutsÿl K'e *usually gets, they think these ones come from straight north, not the east like the Beverly that come around in the winter. Hunters to the east, around Artillery Lake, have been saying that the caribou around there were fat in the fall, not like these ones we're talking about. (JBR 16 10 01)*

The Elders know about the caribou, how they travel, their actions. I've never heard of caribou with injuries like the ones seen at Aylmer Lake and MacKay Lake. The government tells us the caribou are hurt because of running away from bugs and a wet year. When there is a lot of rain, the caribou are fat and healthy because their food is good. In really wet years, the bugs are actually less, but he is not sure why. He says when Elders talk about things, they have to repeat themselves many times to get the point across. Maybe those 5 caribou (deceased at BHP this summer) died because of licking bad mud. He has seen caribou lick mud all their lives and he has never seen them die. Also with the caribou falling into the pit, we never hear about this – we should get these reports so we can talk about it. (PM 11 12 01)

When the caribou have sores it is very unusual. When it is a wet year, the caribou should be very fat and healthy because there is lots of grass and food. (LE 11 12 01)

The reason why the caribou migrate further out from Artillery Lake is due to the fact of the mining developments and it is disturbing the migration. That is what the Elders

predicted. This summer when people went out to the Spiritual Gathering some hunters went out hunting towards MacKay Lake. The caribou they harvested were very skinny. It is because of the mining developments. The caribou we harvested at Artillery Lake in the fall were healthy and fat. (JM 11 12 01)

These caribou with broken legs and swollen feet – it's got to be because of the mining roads up there. Like the Misery road, that road has steep sides with big, sharp boulders along the sides. Maybe they get scared because of traffic and run real quick off the road. Their legs get stuck in the rocks. They could even be running away from bugs. Caribou run real fast when the bugs are bad. (AB 11 12 01)

I have been hunting since 1917, I have seen a few rainy days. But I have never seen caribou hurt like they have been this year. I respect the land - these Elders are the caribou eaters – we know what is going on. (ML 11 12 01)

A second workshop dealt with information gathered from hunters that participated in the *Winter Caribou Cycle* and *Spring Freezer Hunt Cycle.* These two cycles revealed the following themes:

Winter Caribou Cycle

- Caribou were sparse in the Åutsÿl K'e area during the winter. They were concentrated on the northwest shore of the East Arm around Narrow Lake and Francois Lake. Caribou became more numerous around the Reliance area in late winter.
- The caribou were moving very slowly, generally in a westwards direction in the fall and early winter. The caribou seemed to change their movement directions quite a bit, however.
- The caribou on the north shore were generally considered to be skinny, though none were seen that were sick or injured. Cows seemed to be fatter than bulls. Caribou towards the east of Åutsÿl K'e were considered not too bad with regards to fatness. Two incidences of injured or sick caribou were reported

Spring Freezer Hunt Cycle

- There were more caribou in the Daisy Lake area than in previous years.
- The group of caribou in this area were predominantly bulls with a few cows. The bulls were very skinny.
- No injured or sick caribou were noted.
- Caribou fetuses were at the mid-stage of development (no hair yet). Some cows were not pregnant.
- The caribou were moving east towards the barrenlands.
- The caribou around Daisy Lake seemed to have stayed in the area all winter long.

A workshop was held to analyze these themes. The conclusions of this workshop are exemplified below:

> *Those caribou on the north shore are Bathurst. They're the same ones people saw last year at MacKay Lake in the summer. They are the same skinny caribou, though the young boys going hunting said they didn't see injured caribou. This is because the injured ones already died by the time they got to that area [north shore]. Wolves got them. But I bet if you really looked closely you could still find a few that were hurt. (PM 15 03 02)*
>
> *Those caribou don't know where they are going. First they go towards Yellowknife, then they come back this way, then back again. From the collars [radio collars], its like most of the caribou are up north around Snare Lake. These caribou on the north shore are the southern part of that herd. They act like they are confused, moving different directions all the time. (AE 15 03 02)*
>
> *Some years it's just like that. Last year there was lots around Åutsÿl K'e, this year not so many. The caribou do whatever they want to do. You can't know ahead of time what they are going to do. (AM 15 03 02)*
>
> *Overall these caribou this year were OK. There was not too many of them though, and they were really skinny. It is hard to tell if this will affect the caribou herd. Maybe some years down the road we will know. (AE 15 03 02)*

5.2.2.2 Fish (Åu) monitoring themes and workshop

A workshop was held to discuss the information gathered during the *Fall Fishnet Cycle*. Elders discussed the following themes (as taken from questionnaire responses) in the workshop:

- There were more fish this year than in the recent past.
- Harvester's focused their gill netting activities around Åutsÿl K'e.
- Some fish that were caught in the Stark Lake region had high parasite loads and big head / small bodies (very skinny fish)[1]. Some fish caught in the main body of Great Slave Lake had parasites, but generally were parasite-free.

[1] Concerns over the fish in Stark Lake have been voiced by the Åutsÿl K'e people for many years. In response, the Åutsÿl K'e Dene First Nation is conducting the three-year *Stark Lake Habitat Study* to assess the habitat and fish in Stark Lake. The report from the first year of the study will be available in June 2002.

- The fatness of fish was normal.

Some of the interpretations of the various themes include:

> *There are all kinds of fish and they are changing or different now. The fish from Stark Lake are coming down river, and they are deformed and have worms on them. Twenty-five years ago it wasn't like that. Trout didn't go up river [Stark River], only suckers and whitefish did. (JD 21 01 02)*

> *The reason why the fish had in Stark Lake are bad is because it is overpopulated. There are too many fish in there so they don't get enough food. And I think it could also be because there was a uranium mine there. The tailings from that mine could just be washing into the water from that little stream there. May be that's why some of those fish are deformed, like that one fish I caught that had a backbone curved like an "S". It was really weird. I threw it back in the water. (AB 21 01 02)*

> *When I go out to set nets, I will go where I know is a good spot to catch fish, and I will set nets there. I will go and collect the fish out of the nets there. The fish are always good. Not many are bad. Us Dene don't just set nets any old place in the water. We know where to catch fish with nets. You don't even have to go very far from town to find a good place for your nets. Even me, the farthest I've gone from town to set a net is maybe 1 or 2 miles. You don't need to go further, because there are good fish close by. (AE 21 01 02)*

As the Åutsÿl K'e Dene First Nation conducted a study of traditional fishing knowledge of the East Arm during 2001 (Åutsÿl K'e Dene First Nation, Williams et al. 2002), transcripts of interviews and workshops from this study were reviewed to see if they contained any insight into the trends recorded during the *Fall Fishnet Cycle*. The following relevant comments were discovered:

> *Before there used to be not as much trout - these days there is much more. When I was fishing in Moraine Bay there was no trout at all, only whitefish. When I used to go fishing, there used to be tons of people [commercial] fishing this lake—and a lot of fish were taken from this lake—fish nets all the way around those islands--- Narrow Island, Etthen Island, Union Island, Keith Island, Utsingi Point, Blanchet Islands, Seton Islands, the nets where everywhere. There was one fishing camp at Simpson Island and one at Pekanatui Point. And we would also go way over to the North Arm past*

Yellowknife too. There used to be so much fishing going on in those days and now there is hardly any going on at all, except for in Wool Bay (very near Yellowknife). In wintertime too I was still going fishing and at that time we would use Bombardeers to haul all of our fish to Hay River. There has got to be lots of fish in the lake now, compared to the other days… nowadays there are guides that are out there and whatever they want they take, what they don't they will just throw back into the lake. Nowadays you are allowed only two trouts to bring back to the camp with you [lodges]. And some days you could catch ten fish, and if those fish are too small they can just throw them back into the water. Too me, it just seems like the trout are suffering too much. (JBR 24 05 01)

Mostly the fish they move around. And then sometimes they go one place, (Great Slave Lake- East Arm) and stay there just to feed, I mean they feed some places and then quit and then go someplace else. If you find one spot where they are feeding, then you just go back and forth – and catch. (PE 31 05 01)

5.2.2.3 Small fur-bearing animal (Tsa Thath) monitoring themes

A few themes arose out of the *Rabbit Cycle* series of interviews:

- There were fewer rabbits this year then previous years.
- There were lots of rabbit predators (wolves, foxes) this year.
- Harvesters set snares in areas of close proximity to Åutsÿl K'e. Snares were generally set in areas where harvesters always set snares.
- The rabbits were generally in good condition (fat).

As questionnaire respondents did not observe anything about the rabbit population that was outside their perception of natural patterns of variation, no verification and interpretation workshop was held to analyze indicator information.

In the case of the *Marten, Mink, Weasel, Lynx, Fox and Wolverine Cycle*, the following themes were extracted from interview material:

- Some trappers noticed a decline in small fur-bearing animals during the 2001-2002 trapping season compared to previous seasons. These trappers typically operated on the south shore of the East Arm, whereas those that trapped on the north shore did not notice a decline in populations.
- Most trappers operated to the south and east of Åutsÿl K'e during the 2001-2002 trapping season.

- The quality of small fur-bearing animal pelts was generally good (normal).

Much like the information gathered during the *Rabbit Cycle*, questionnaire participants did not experience anything outside the realm of natural variation with respect to these small fur-bearing animals. No workshop was held, and indicator information was input into the database for comparison with subsequent years of monitoring.

5.2.2.4 Chicken and ptarmigan (Di, Æeåk'aith, K'asba) monitoring themes

Themes that arose out of the *Chicken Cycle* of monitoring were:

- Chickens were numerous around Åutsÿl K'e, but less were seen than in years previous.
- Most chicken hunting took place along the road south of Åutsÿl K'e and towards the Snowdrift River.
- Chickens were in normal condition, generally fairly fat.
- No chickens were seen that were sick or injured.

Questionnaire respondents did not notice or experience anything about the rabbit population that was out of the ordinary or outside the normal cycles of natural variation. Thus, no verification and interpretation workshop was needed to analyze indicator information.

5.2.2.5 Berry (Jí) monitoring themes

A review of the Berry Cycle questionnaire responses revealed the following themes:

- Berries were very numerous in 2001 in the traditional berry patches around Åutsÿl K'e.
- The berries were numerous and large in 2001 due to a lot of rain in the summer.
- Berries were plentiful throughout the region this year. People could gather ample berries wherever they happened to be.

No verification and interpretation workshop was held to examine this information. Indicator information does not point to any unnatural variation.

5.2.3 Implications of 2001-2002 monitoring knowledge for the Kakinÿne *region*

During Phase Three of *Traditional Knowledge in the* Kache Tué *Study Region,* the trial run of the traditional knowledge monitoring program, much knowledge was generated about the state of the environment in the Kakinÿne region. From this knowledge we can learn many lessons about the cycles of change in the Kakinÿne region.

For many of the animals and plants that were monitored, nature seems to be taking its normal course. Small fur-bearing animal, chicken and berry populations all seem to be relatively abundant and well-distributed in harvesting areas across the Kakinÿne. The condition of these animals and plants, though in some cases not as good as in some previous years, is varying according to natural rhythms as recognized by the Denesôåine Elders and land-users. All in all, the first trial year of the monitoring program seemed to demonstrate a healthy status for many animals and plants in the Kakinÿne. There are, however, two glaring exceptions to this statement – the Bathurst caribou herd and the fish of Stark Lake.

Of utmost concern to the Denesôåine is the state of the Bathurst caribou herd. All community Elders and land-users echo the same message - never in their lives have they seen or heard of the caribou herd having such a high proportion of injured and skinny caribou. Such consistent observations have grave implications for the state of the environment in the Kakinÿne. The caribou are not only the backbone of Denesôåine culture and subsistence, but they are an overall indicator of the general health of the ecosystems in the region. If the caribou populations become significantly reduced in numbers and/or health, many other aspects of the environment in the region will be effected. For example, the predators (i.e. wolves and foxes) that depend upon the caribou as their primary source of food will suffer as their prey diminish. This 2001-2002 test of the monitoring program has revealed that something unprecedented has been happening with the Bathurst caribou. Only further efforts to monitor these caribou and investigate the observed changes will result in the necessary wise decision-making to insure this herd remains a healthy component of the vast Kakinÿne region.

The fish in Stark Lake have been observed to be of poor quality for many years prior to this trial of the monitoring program. The results of the *Fall Fishnet Cycle* in this test only confirm the observations made by harvesters in the recent past. The health of this fishery is of importance to the Denesôåine, particularly due to the proximity of Stark Lake to Åutsÿl K'e and the history of this lake as a heavily-used fishery. Fortunately, the trends experienced in Stark Lake fish do not seem to have been observed in other waters of the Kakinÿne. Hopefully, the *Stark Lake Habitat Study* will provide some answers as to the reasons why these fish are so unhealthy.

5.2.4 Lessons learned and refinements suggested by the test of monitoring program

The 2001-2002 test of the traditional knowledge monitoring program revealed many of the strengths of weaknesses in the overall design of the plan as outlined in section 4.1. Many gaps were revealed, and many refinements were suggested for the monitoring plan design:

- The selection of animals and plants monitored remains an incomplete representation of the important species within the Kakinÿne. To become more comprehensive, indicators, questionnaires and monitoring cycles need to be developed for moose, musk-ox, and bears. This should not prove to be to hard a task, as Elders have indicated that moose and musk-ox indicators are very similar to those for caribou, whereas bear indicators would be similar to those for small fur-bearing animals.

- Wolves were somewhat overlooked in the test monitoring program as they were simply lumped in with the small-fur-bearing animals. Wolves are harvested in a different manner than the small fur-bearing animals. They are largely hunted rather than trapped. As well, wolves occupy a singular role in Denesôåine culture, much different than the primarily economic value of the small fu-bearing animals such as marten and mink. In the future, a monitoring cycle for wolves, distinct from the small fur-bearing animals, should be created.

- Indicators, questionnaires and monitoring cycles need to be developed for some natural aspects of the Kakinÿne that are not plants or animals. The most glaring omission in the initial design of the monitoring plan was the specific monitoring of water (levels, quality) and weather (seasonal changes). The incorporation of monitoring techniques for these remain to be explored in the future.

- There was no way to insure that what one harvester deemed a fat caribou was the same as another. There was therefore a potential problem in the standardization of land-user answers to indicator questions. In order to further standardize harvester responses to indicator questionnaires, it was thought that "criteria codes" could be developed for indicators. In other words, harvesters would be given a set of criteria that defined the answers they may give for any given indicator question. This approach was used quite successfully during the *Stark Lake Harvest Study*. Land-users were shown pictures that exemplified fish that were "highly parasitized", had a "a few parasites" or were "free of parasites". Land-users could simply point to the picture that best represented the fish they had seen. This approach could conceivably be adapted for a host of the monitoring program indicators. For example, land-users could be shown pictures that demonstrated the criteria associated with "fat", "normal" and "skinny" caribou. They could then simply point to the

pictures that best represented the ones they had harvested. This approach would require a series of Elder workshops to define criteria codes.

- Spatial indicator information maps (i.e. **Figure 3**) need to be refined to show more detail. This could be done by having seasonal harvesting times or harvesters be distinguishable on the maps (maybe through color differentiation).

- Much information relating to caribou and fish indicators was simply not gathered. This was largely due to resource and personnel constraints – we simply could not interview all the harvesters of the caribou and fish with the necessary frequency. Because people are hunting and fishing all the time, it is really quite necessary to ask them questions around indicators with far more frequency than was done during the 2001-2002 test. To garner a relatively complete picture of the caribou and fish, it would really require a researcher to concentrate entirely upon these two important resources, administering questionnaires with more frequency during each cycle. During the busy hunting and fishing seasons, asking harvesters to do quick indicator questionnaires on a weekly basis would greatly enrichen the depth, detail and accuracy of the information collected.

- With proper personnel and resources, it would be ideal to have two types of indicator questionnaires for fish and caribou. One type of questionnaire would remain similar to that tested in 2001-2002, a questionnaire of general harvester impressions administered near the end of each harvesting season. This questionnaire would focus on abundances and distributions of animal and plant populations. Another more specific, quantitatively-oriented questionnaire could be used to gather harvester observations on the condition of specific animals and plants *while in the act of harvesting*. For example, a harvester could answer condition questions specific to one animal while or immediately after successfully harvesting a caribou. This approach was proven to be quite successful in the *Caribou Condition* research undertaken by the Åutsÿl K'e Dene First Nation and Dr. Phil Lyver. Such an approach does however require a full-time land-user / researcher to travel with harvesters.

- During the test, indicator information was entered into the database prior to being verified (in the instances when verification was needed). This could potentially create problems when information failed verification during the Elder workshops, as the unverified information in the database would have to be removed. However, no indicator information failed verification during the test. That is, no information was ever deemed to be downright untrue. Elders were willing to, at the very least, consider any observation made by a harvester, no matter how outrageous it seemed. Indeed, the verification process was more the classification of observations and experiences into those representing natural change and those representing unnatural change.

- Elders and older land-users were concerned that there was not enough youth participation in the test monitoring program. Denesôåine ways incorporate the participation of many generations in on-the-land activities. It is in this way that cultural values, knowledge and skills are passed on. Further yearly cycles of the monitoring program should allow for seasonal on-the-land camps with youth. Such on-the-land would allow for Elders and land-users to pass on traditional knowledge and skills, tools that will be essential if the youth are to watch their land like their parents and grandparents are through this monitoring program.

- Land-users were provided with an expert consultation fee for their participation in interviews during the test of the monitoring program. Some alternatives to this method of renumeration for services were considered during the test. One alternative is to help harvesters out with gas and oil costs for harvesting activities in return for an interview upon return to Åutsÿl K'e. Another alternative is to hire harvesters to self-administer questionnaires. Questionnaires would have to be modified for this purpose. Another alternative is to set up a "lottery" for harvesters that answer indicator questionnaires. Every time a questionnaire is completed, the land-user would have their name put into a box for a random draw. The more a harvester filled out forms, the more chance they would have of winning the raffle prize (i.e. camping equipment).

6.0 DISCUSSION / CONCLUSIONS

6.1 IMPLICATIONS FOR MONITORING IN THE SLAVE GEOLOGICAL PROVINCE

That there is a definitive need for a cumulative effects monitoring program in the Slave Geological Province is a matter of little debate. Industrial development is progressing in the region at an unprecedented rate, what with the advent of diamond mining and exploration, increased traffic on winter roads, a potential all-weather road and ever-increasing tourism. Aboriginal peoples, industry and government must act wisely to insure that the pristine natural environment, fundamental to the identity and culture of aboriginal people, remains as it has always been. Establishing a monitoring program to assess and inform management is a critical step in realizing this goal.

The traditional knowledge of aboriginal peoples can contribute tremendously to the design and implementation of a regional cumulative effects monitoring program. Traditional knowledge represents generations and generations of direct experience with regards to *how the land works*. When combined with the ongoing observations and experiences of current land-users, traditional knowledge serves as a powerful means of interpreting change in the environment.

Various proponents of a regional cumulative effects monitoring initiative in the Slave Geological Province have repeatedly asked the question: *How do we incorporate traditional knowledge into cumulative effects monitoring*? The results of Phase Three of *Traditional Knowledge in the* Kaché Tué *Study Region* provide one way of answering this question. This study outlines an effective and tested model for how the skills and knowledge of aboriginal people can be employed to monitor environmental change. It is hoped that this model can serve to inform the design of similar monitoring initiatives in other areas of the Slave Geological Province.

7.0 LINKS WITH PARALLEL STUDIES

The current study is linked to the following projects being undertaken or already completed by the Wildlife, Lands and Environment Department of the Lutsel K'e Dene First Nation:

- Community-Based Monitoring Pilot Project (1997)
- Traditional Knowledge Study on Community Health (1998)
- Traditional Ecological Knowledge Project in the Kache Kue Study Region (2001)
- Stark Lake Fish Habitat Study (2001-2002)
- Traditional Fishing Knowledge of the East Arm of Great Slave Lake (2001)
- GIS Database Project (2000-2002)
- Denesoline Land-Use in the Æedacho and Desnedhé Che region (2001-2002)
- Traditional Knowledge in the Nâ Yaghe Kué region (2001-2002)
- Ni hat'ni – Watching the Land: Cumulative Effects Assessment and Management in Lutsel K'e (2001)
- Caribou Condition (in partnership with the University of Manitoba and Dr. Phil Lyver) (2000-2001)
- Caribou Movements (in partnership with the University of Manitoba and Anne Kendrick) (2000-2002)

8.0 TRAINING ACTIVITIES AND RESULTS

For a complete description of training activities and their results, please refer to Section 2.1.

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APPENDIX A: INDICATOR QUESTIONNAIRES

SUMMER HUNT CARIBOU CYCLE

Where did you go hunting this summer? (show on map)

How many caribou did you harvest this summer hunt? Where? (show on map)

Were there more or less caribou this year compared to other years in this area?

Where the caribou healthy? Were any sick or injured?

What condition were the caribou hides in?

Were the caribou you harvested fat or skinny? Were they cows or bulls?

What are your thoughts about this year's caribou movement around the summer hunt area?

Which way were the caribou moving? Did you notice anything about their movements?

Do you have any good stories from the hunting trip?

FALL HUNT CARIBOU CYCLE

Where did you go hunting for this fall hunt? (show on map)

How many caribou did you harvest this fall hunt? Where? (show on map)

Were there more or less caribou this year compared to other years in this area?

Where the caribou healthy? Were any sick or injured?

Were the caribou you harvested fat or skinny? Were they cows or bulls?

What are your thoughts about this year's caribou movement around the fall hunt area?

Which way were the caribou moving? Did you notice anything about their movements?

Do you have any good stories from the hunting trip?

WINTER CARIBOU CYCLE

How many times have you gone hunting this winter?

Where did you go hunting this winter? (draw on the map)

How many caribou did you harvest in each place that you harvested caribou? (write on the map)

Were the caribou you harvested fat or skinny? How could you tell?

Was there a difference in fatness between bulls and cows?

Were any of the caribou sick or injured? If yes, tell me about them.

Do you think the caribou are moving slow or fast this year? Was their migration route normal or unusual?

If unusual, why?

Did you think the caribou were generally healthy this year?

Any stories from the hunting trips you have taken this year?

SPRING FREEZER CARIBOU CYCLE

Where did you for the spring hunt? (show on map)

How was it traveling to that area?

How many caribou did you harvest this spring hunt? Where? (show on map)

Were there more or less caribou this year compared to other years in this area?

Where the caribou healthy? Were any sick or injured?

Were the caribou you harvested fat or skinny? Were they cows or bulls?

What stage were the babies at? Did you see cows with no babies?

What are your thoughts about this year's caribou movement around the spring hunt area?

What steps should be taken to protect the caribou movement around the spring hunt area?

Which way were the caribou moving?

Do you have any good stories from the hunting trip?

FALL FISHNET CYCLE

How long have you been fishing?

Where did you go this year for fishnets in the spring? Summer? Fall? Winter? Why? (show on map)

Where is the best place to set fishnets in the spring? Summer? Fall? Winter? Why? (show on map)

Did you see any fish that looked unhealthy or deformed?

When is the best time of the year to fish?

Were there more or less fish this year than other years?

Were the fish fat or skinny this year compared to other years?

How often do you eat fish in a week?

What kind of fish do you eat mostly?

Do you know any stories or legends about fish?

RABBIT CYCLE

How many rabbits did you harvest this year?

Where did you go to snare rabbits this year? Is this where you went in the past?

Were there a lot of rabbits this year compared to other years before?

Were the rabbits you snared fat or skinny?

When is the best time to snare rabbits?

Where is the best place to snare rabbits?

What do rabbits eat?

Where do they have their babies?

Did you notice anything unusual about the rabbits this year?

How do you usually cook rabbit?

Do you have any stories or legends about rabbits?

MARTEN, MINK, WEASEL, LYNX, FOX AND WOLVERINE CYCLE

How long have you been trapping?

where did you go trapping this year? Can you draw you traplines on the map?

What type of fur-bearing animals did you harvest?

How much fur did you harvest this trapping season? How many marten, mink or other fur-bearing animals did you catch?

Do you have an outpost camp or cabin out on the land? Can you show it on the map?

What did you do with your fur-bearing animals?

What kind of traps did you use?

How long does it take to set a trap on the line?

How many traps did you visit each day?

Do you profit from trapping during one season?

When is the best time to harvest fur-bearing animals?

Where is the best place you trapped?

Were there more fur-bearing animals caught this year than other years that you know of?

How was the fur quality this year compared to other years?

CHICKEN CYCLE

How many chickens have you harvest this year?

Where did you go to hunt chickens this year? (show on map) Is this were you went in other years?

Was there lot chicken this year or less compared to other years?

Were the chickens you shot fat or skinny?

When is the best time of the year to hunt chickens?

Where was the best place to hunt chickens?

What do chickens eat?

Where do they have there nesting areas?

Did you notice anything unusual about any of the chicken? Were any sick or injured?

How do you usually cook your chicken?

Do you know any stories or legends about chickens?

BERRY CYCLE

When is the best time of year to pick up raspberries, blueberries and cranberries (and any other berries)? Why?

Where did you go pick berries this year?

Where was the best place to pick blueberries, cranberries and raspberries (or other berries)?

How were the berries this year compared to other years? Why?

What do use berries for?

Do you have any other stories about berries that you would like to share?