

# SAHTÚ HARVEST STUDY METHODS REPORT, 1998–2005



Consultant's report prepared by Janet Winbourne for:

Zehdzo Got'Inę Gots'ę Nákedı (Sahtú Renewable Resources Board)

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- The Canadian Wildlife Service staff
- Department of Fisheries and Oceans staff
- Environment and Natural Resources staff.

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# EXECUTIVE SUMMARY

## *What is the Sahtú Settlement Area Harvest Study?*

The Sahtú Settlement Area Harvest Study was a survey of Sahtú Dene and Métis hunters, trappers, and fishers that took place between 1998 and 2005 in all communities of the Sahtú Settlement Area. The Study recorded the number and location of wildlife harvested in the area.

## *Why was the Study done?*

The SHS was a requirement of the Sahtú Dene and Métis Comprehensive Land Claim Agreement (SDMCLCA 1993). The objective of the Study was to estimate the total number of animals, fish, and birds harvested by Sahtú Dene and Métis for a period of five years. Based on the Sahtú Land Claim Terms of Reference (Sahtú Settlement Area Harvest Study, Schedule 1 to Chapter 13, 1993), estimates of harvested wildlife are intended for two main purposes:

- To provide information on harvesting necessary for the effective management of fish and wildlife in this region by Sahtú Renewable Resources Board and Government, and
- To determine the Minimum Needs Level of Sahtú Dene and Métis so that harvesting traditions can be protected.

## *How was the Study Done?*

The Study was coordinated by the Sahtú Renewable Resources Board (SRRB) in cooperation with Renewable Resource Councils in Tulít'a, Norman Wells, Fort Good Hope, Colville Lake, and Délı̄ne. All Sahtú Dene and Métis harvesters of at least 16 years old were asked to participate. Adult non-beneficiaries who harvested for Sahtú Dene-Métis families were also included. Harvesters were surveyed by Community Interviewers on a monthly basis between 1998 and 2003, then four times a year in 2004 and 2005.

Once the survey was complete, a statistical analysis was done on the count data (number of harvests), including measures of how reliable the results are. The proportional projection method was used to extend the Study results to the entire population of beneficiaries so that total estimated harvests and Minimum Needs Levels could be calculated. No analysis of locations or mapped data was done, nor was there any analysis of the age class and gender data that resulted from the Study.

## *What are the findings?*

The statistical analysis found that the first five years of the Study produced results suitable for use in calculating total estimated harvests and Minimum Needs Levels for each of the five communities. Due to low participation levels and changes in methods during the last two years of the survey, information recorded in 2004 and 2005 in Tulít'a, Fort Good Hope, and Délı̄ne should not be used for this purpose and has not been included with the results. There are two final reports for the Study: this Methods Report and a separate Results Report. The Methods Report includes a detailed description of the survey and data analysis methods. The Results Report includes tables of harvester response rates, recall periods, and total estimated harvests (by month, by year, and as five or seven year means) for each community. Results are also presented for the Sahtú Settlement Area as a whole (data are combined for all communities). Summaries of results from community verification sessions are also provided.

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# LIST OF ACRONYMS

CI	Confidence Interval
CV	Coefficient of Variation
ENR	Environment and Natural Resources
GIS	Geographic Information Systems
GNWT	Government of the Northwest Territories
GRRB	Gwich'in Renewable Resources Board
JS	Joint Secretariat
MNL	Minimum Needs Level
NTS	National Topographic System
NWMB	Nunavut Wildlife Management Board
RRC	Renewable Resource Council
SE	Standard Error
SDMCLCA	Sahtú Dene and Métis Comprehensive Land Claim Agreement
SMNL	Sahtú Minimum Needs Level
SRRB	Sahtú Renewable Resources Board
SSA	Sahtú Settlement Area
SHS	Settlement Area Harvest Study
TAH	Total Allowable Harvest

# INTRODUCTION

The ʔehdzo Got'Inę Gots'ę Nákedı (Sahtú Renewable Resources Board, SRRB) is the main instrument of wildlife and forest management in the Sahtú Settlement Area (SSA). As a regional co-management board, it represents beneficiaries of the Sahtú Dene and Métis Comprehensive Land Claim Agreement (SDMCLA), the federal and territorial governments, as well as non-beneficiaries and the non-Aboriginal population of the Sahtú Settlement Area. The Board works together with ʔehdzo Got'Inę in the five communities of the Sahtú Region to maintain Dene and Métis harvesting traditions, and keep the land and animals healthy for future generations.

The Sahtú Settlement Area Harvest Study (SHS) was a requirement of the SDMCLA (1993, Section 13.5). The objective of the Study was to estimate the number of animals, fish, and birds harvested by Sahtú Dene and Métis hunters, trappers, and fishers for five years. The Study was done around the time that similar studies were conducted in the Inuvialuit and Gwich'in settlement areas and in Nunavut. Data collection took place from April 1998 to December 2005, a statistical analysis of the data was completed in 2014, and representative results were later reviewed in a series of community verification sessions.

## About this Report

This is a report on the Sahtú Harvest Study data collection and analysis methods. Further study results and analyses are included in separate reports.<sup>1</sup> This report is divided into five sections:

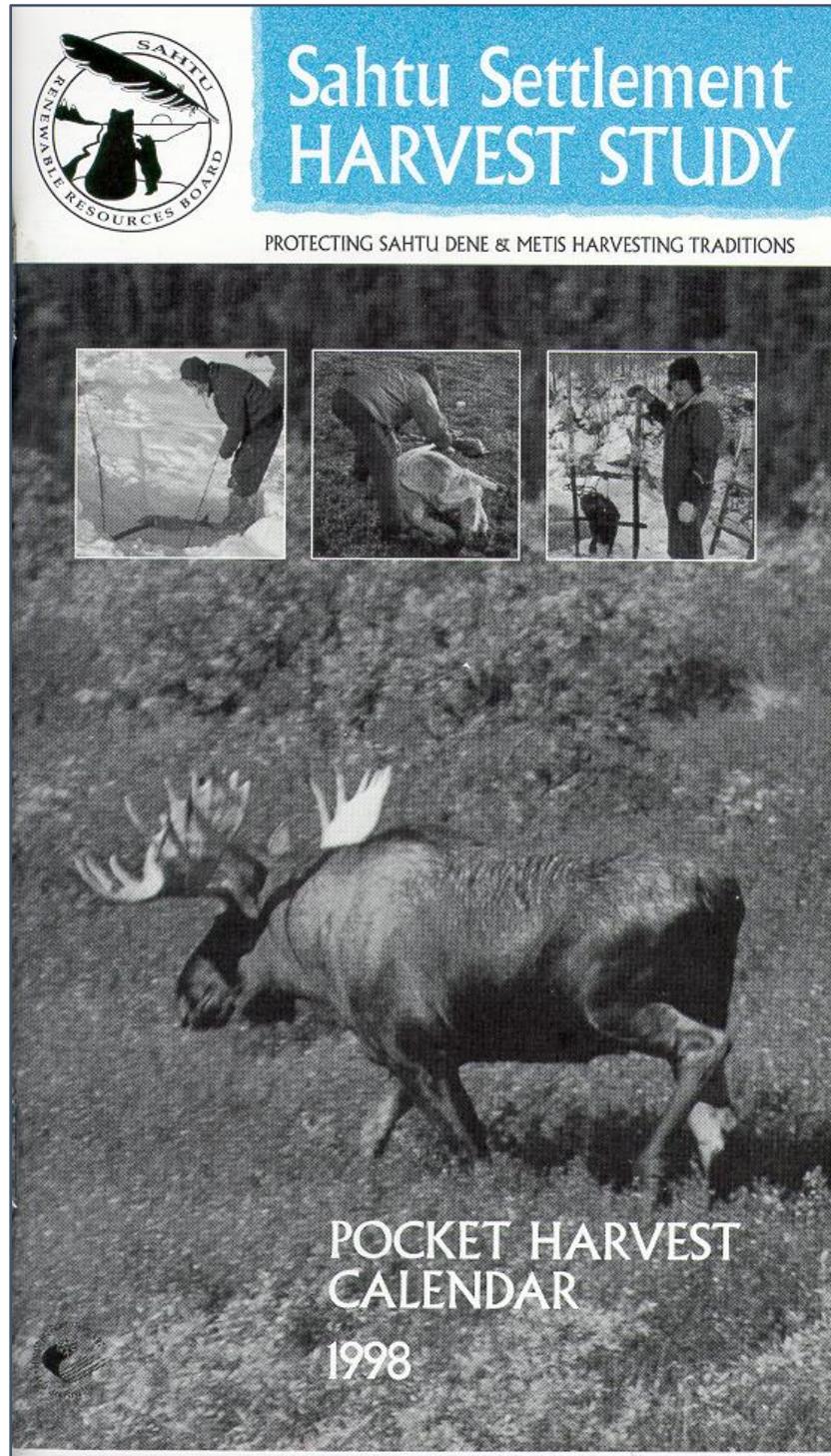
- 1. Study Background** – Contains an overview of requirements for the Harvest Study as described in the Land Claim Agreement. Details are provided about Sahtú Minimum Needs Levels (SMNL) calculations and how they may be used to help protect Sahtú Dene and Métis harvesting traditions in the event of any future harvest limitations. This section also describes how the Study was designed and coordinated.
- 2. Study Methods and Implementation** – Provides details on study area and timing, data collection methods, and how information was managed and stored.
- 3. Data Analysis** – Describes the necessary calculations and statistical analyses for estimating total harvests from harvests recorded by Community Interviewers.
- 4. Data Reliability** – Provides a discussion of how well the SHS met the assumptions of the statistical analysis, as well as any known strengths and weaknesses of the dataset.
- 5. Conclusion** – An overall assessment of Study data accuracy and reliability is provided, along with caveats for use of the information.

This report is intended to be used as a way of communicating how the Sahtú Harvest Study was conducted, with the goal of better informing researchers, managers and any others who intend to use the information resulting from the Study.

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<sup>1</sup> Sahtú Renewable Resources Board. 2016. Sahtú Harvest Study Results Report, 1998-2005. Consultant's report prepared by Janet Winbourne for the Sahtú Renewable Resources Board, Tulít'a, NT.

# 1. STUDY BACKGROUND



*Cover of the 1998 Sahtú Settlement Area Harvest Study calendar – SRRB.*

## 1.1 The Comprehensive Land Claim Agreement and Requirements for a Sahtú Harvest Study

The Sahtú Dene and Métis Comprehensive Land Claim Agreement (the Land Claim) was signed by the Sahtú Tribal Council, Canada and the Government of the Northwest Territories in 1993. The Agreement established the Sahtú Settlement Area which includes:

- Over 280,000 km<sup>2</sup> of land, of which over 41,000 km<sup>2</sup> are privately owned Dene and Métis selected lands
- The communities of Déljñę, Tulít'a, Norman Wells, Fort Good Hope, and Colville Lake.

The boundaries of the Sahtú Settlement Area are shown in Figure 1 on the following page.

Under the Land Claim Agreement, a co-management board, the ʔehdzo Got'jñę Gots'ę Nákedı (Sahtú Renewable Resources Board), was set up to act as the main instrument of wildlife and forestry management in the Sahtú Settlement Area. The SRRB has equal representation from Sahtú beneficiaries and Territorial/Federal government agencies.

The Land Claim also outlined the mandate of Renewable Resources Councils (RRCs) in each Sahtú community, “to encourage and promote local involvement in conservation, harvesting studies, research and wildlife management in the community” (Vol. 1, Section 13.9.1). RRCs are mandated to participate in the collection and provision of local harvesting data to Government and to the Board. Each community's RRC also has the responsibility and authority to:

- Allocate Sahtú Needs Levels for that community,
- Manage the local exercise of participants' harvesting rights,
- Establish or amend group trapping areas in the SSA, and
- Advise the Board with respect to participants' harvesting and/or concerns (Vol. 1, 13.9.4 – 13.9.6).

The SHS was initiated as a requirement of the Land Claim (Vol. 1, Section 13.5.6). The Sahtú Renewable Resources Board conducted the Harvest Study in close cooperation with the Renewable Resources Councils.

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*The Dene name for the Sahtú Renewable Resources Board – ʔehdzo Got'jñę Gots'ę Nákedı – means “helpers of the ʔehdzo Got'jñę, the Trap People.” The SRRB works together with ʔehdzo Got'jñę in the five communities of the Sahtú Region to maintain Dene and Métis harvesting traditions, and keep the land and animals healthy for future generations. (<http://www.srrb.nt.ca/>)*

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## 1.2 Objectives of the Sahtú Harvest Study

Based on the Sahtú Land Claim Terms of Reference (Sahtú Settlement Area Harvest Study, Schedule 1 to Chapter 13, 1993), estimates of harvested fish and wildlife are intended to be used for two main purposes:

- To provide information on harvesting necessary for the effective management of fish and wildlife in the Sahtú Settlement Area by the Sahtú Renewable Resources Board and Government, and

- To determine the Minimum Needs Level for Sahtú beneficiaries so that their harvesting traditions can be protected.



Figure 1: Map of the Sahtú Settlement Area, showing the five communities that took part in the Sahtú Settlement Area Harvest Study, 1998-2005.

## 1.3 Harvest Limitations and the Sahtú Minimum Needs Level

From time to time, it may be necessary for the SRRB to limit harvesting on a temporary basis to allow an animal species or local population at risk to recover from the effects of things like disease, habitat loss, or over-harvesting. The process that must be followed when limiting any harvests in the region is outlined in Section 13.5 of the Land Claim. This limit is called the **Total Allowable Harvest** (TAH). The TAH represents the total number of a given species that can be harvested by all parties in the region or in a particular area/community. The results from the SHS will have a direct impact on determining how many animals should be allocated to Sahtú Dene and Métis in the event that a harvest has to be limited in the future.

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*The Sahtú Minimum Needs Level is to be calculated for a particular species harvested using the following formula:*

$$\frac{[H_1+H_2+H_3+H_4+H_5+ H_{max}]}{5} \times 0.5$$

*Where*

**H<sub>1</sub>**= # animals harvested in Study Year 1

**H<sub>2</sub>**= # animals harvested in Study Year 2

**H<sub>3</sub>**= # animals harvested in Study Year 3

**H<sub>4</sub>**= # animals harvested in Study Year 4

**H<sub>5</sub>**= # animals harvested in Study Year 5

And **H<sub>max</sub>**= greatest # taken in any year between Study Years 1-5.

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Until a Total Allowable Harvest has been set for an animal population or species, harvest by Sahtú Dene and Métis is not limited under the terms of the Land Claim. If a TAH ever has to be set, the Board is responsible for allocating either a portion of or all available animals to Sahtú Dene and Métis. The Dene and Métis share of the Total Allowable Harvest is called the **Sahtú Needs Level**. If the Sahtú Needs Level is equal to or less than the total number of animals available to harvest (that is, the TAH), Sahtú Dene and Métis needs are met first. If the Sahtú Needs Level is greater than the total number of animals available to harvest, Dene and Métis will get no more than the total number available for harvesting.

The SRRB, in conjunction with territorial and/or federal agencies, will set or adjust the Sahtú Needs Level only after consultation with the affected Renewable Resource Council(s). Various things are considered when setting or adjusting the Sahtú Needs Level:

- Historical use/harvesting patterns
- Personal needs of Sahtú Dene and Métis for food, clothing, culture, dog food
- Trade needs
- Availability of animals to meet these needs based on scientific studies
- The Sahtú Minimum Needs Level calculated from Harvest Study counts.

The **Sahtú Minimum Needs Level** represents the lowest level at which a Sahtú Needs Level can be set. Generally, the Sahtú Needs Level can be set above or at, but never below, the Sahtú Minimum Needs Level. The only exception to this is when the total number of animals available for harvest (*i.e.*, Total Allowable Harvest) is less than the minimum amount required by Sahtú Dene and Métis.

According to the Land Claim, the Sahtú Minimum Needs Level for a species or population of wildlife is equal to one half of the sum of the average annual harvest by participants over the first five years of the Study and the greatest amount taken in any one of those five years (SDMCLA 1993: 49).

## 1.4 Study Design

The SHS was a cooperative effort between the Sahtú Renewable Resources Board, Renewable Resource Councils, and various territorial and federal government agencies. Terms of Reference for conducting a SHS were laid out in the Land Claim (Schedule I to Chapter 13, SDMCLCA 1993:65).

### 1.4.1 PARTNERS IN THE DESIGN PROCESS

Following instructions in the Terms of Reference, the Study was designed by members of a Harvest Study Working Group. This group was made up of:

- Three Sahtú Dene and Métis members appointed by the District Land Corporations, and
- Three members appointed by various government agencies involved in fish and wildlife management in the Sahtú, including Resources, Wildlife and Economic Development (RWED; today known as Environment and Natural Resources or ENR), the Canadian Wildlife Service, and the Department of Fisheries and Oceans (Fisheries and Oceans Canada).

The Renewable Resources Councils in each community played an important role in Study design and coordination. The RRCs were also responsible for:

- Promoting the Study in their communities
- Selecting harvesters to participate in a short Pilot Study
- Building up-to-date lists of harvesters to be interviewed for the Study
- Assisting in the selection of the Community Interviewers who would collect data.

### 1.4.2 DESIGN CONSIDERATIONS

The methods used in the SHS were based on approaches used in previous or ongoing land claim-mandated harvest studies in the Inuvialuit, Gwich'in and Nunavut Settlement Areas (Joint Secretariat 2003, Gwich'in Renewable Resources Board 2009, and Nunavut Wildlife Management Board 2004 respectively). The objective of using similar methods was to collect data that would be comparable across different regions of the Northwest Territories and Nunavut. This was intended to assist the Sahtú region when negotiating for the harvest of animals shared by participants of different Land Claims (*e.g.*, barren-ground caribou).

The Study design was intended to provide only the information required to meet the two objectives of the Study. This approach was chosen to avoid burdening the harvesters with too many extra questions that try to address secondary issues (*e.g.*, human consumption, animal disease, *etc.*).

The approach used to collect harvest information was the same for each community in the Sahtú. A standardized approach was chosen so that information collected from each Sahtú community could be compared and analyzed in relation to other communities.

### 1.4.3 THE PILOT STUDY

The proposed Study approach developed by the Harvest Study Working Group in October 1997 was field-tested in late January 1998 in a Pilot Study. Eleven Dene and Métis harvesters from three Sahtú communities participated in Pilot Study interviews. The harvesters had an opportunity to comment on the questions asked and materials used in the interview.

Comments and suggestions made by harvesters participating in the Pilot Study were then used to improve the initial design proposed by the Working Group. The final Study design was approved by the Sahtú Renewable Resources Board at their quarterly meeting in February 1998.

## 1.5 Coordinating the Study

The Study was coordinated by the SRRB in close cooperation with local Renewable Resources Councils. Dedicated staff was hired by the Board; the staff then hired and trained community interviewers.

### 2.2.1 STAFF AND SUPPORT

The **Harvest Study Coordinator** was an employee of the Sahtú Renewable Resources Board whose responsibilities included:

- Assisting the Harvest Study Working Group in Study design
- Implementing the project
- Managing the day-to-day business of data collection, analysis, and reporting.

A **Community Interviewer** was hired in each community to collect harvest information for the Study. Interviewers reported to the Harvest Study Coordinator. Their responsibilities included:

- Interviewing all eligible harvesters on the official harvester list for their community
- Maintaining and updating the official harvester list for their community
- Promoting the Study
- Attending Renewable Resources Council meetings to give progress updates.

One **Harvest Study Assistant Trainee** was also hired to assist the Harvest Study Coordinator in managing the Study and to collect information for the Study in Tulít'a; responsibilities included:

- Interviewing all eligible harvesters on the Tulít'a official harvester list plus carrying out all of the other duties of a Community Interviewer
- Assisting the Harvest Study Coordinator with administrative tasks
- Assisting the Harvest Study Coordinator with compiling, entering and analyzing data
- Preparing reports and presentations.

During the Study, the Harvest Study Coordinator maintained regular contact with Community Interviewers and Renewable Resources Councils, as well as the Harvest Study Working Group.

## 2.2.2 RENEWABLE RESOURCES COUNCILS

The Renewable Resource Councils (RRC) had a very important role to play in the SHS; each RRC working with the SRRB received an annual administrative fee to do the following tasks:

- Assist with local promotion of the Study in the community
- Help build and maintain official list of eligible harvesters to be interviewed each month
- Provide some local support for the Community Interviewer
- Provide quality control (*e.g.*, Is the interviewer doing their job? Do the harvest numbers seem right?)
- Assist with hiring by providing name(s) of the best candidate(s) available for the Community Interviewer position.

## 2.2.3 HARVESTER CONFIDENTIALITY, INFORMATION SHARING AND RELEASE OF RESULTS

The Sahtú Land Claim Agreement (Terms of Reference, Schedule 1 to Chapter 13, 1993) states that the SHS must be conducted in a manner to ensure that harvester confidentiality is protected. Steps taken by the SRRB to protect harvesters' privacy and confidentiality included:

- Assigning every eligible harvester a unique personal Harvester Identification Number, and storing data in a way that kept harvesters' names and personal information separate from their harvesting information
- Restricting access to the Harvest Data Management System that contained personal information on harvesters and their harvesting activities
- Password protection for digital files and locked filing cabinets for storage of all Harvester Record forms collected and any other sensitive materials
- Requiring any persons working with Harvest Study data to sign a Data Release and Usage Agreement to assure no confidentiality breaches occurred
- Withholding information such as harvester gender, age, or community affiliation when any raw data was released
- Any requests for "raw" or unprocessed harvest data were considered on a case-by-case basis. Once the Study was complete and before statistical analyses could be done on the raw data, a data-sharing agreement was developed to guide and restrict the potential release of data that had not yet been adjusted for response rates or assessment in regards to accuracy or reliability. These agreements established further protocols for data storage, data access and data release (*e.g.*, in documents or publications).

While the Study was underway, communities received the following updates and interim reports from the Harvest Study Coordinator:

- **Monthly Community Harvest Update** – Each community received a harvest summary with a tally of harvests for their community and details on overall local harvester participation. Summaries were sent to RRCs as well as Band and Métis local offices
- **Annual Reports** – Public reports containing more detailed harvest count summaries and harvest maps were distributed on request. The contents of this public report were dictated by guidelines on public release of information established by the SRRB.

For all internal updates and interim reports produced by the Sahtú Renewable Resources Board, the harvesting activities of individual hunters, trappers, and fishers remained confidential and was never released, only combined counts for the community were shown.

## 2.2.4 HARVEST STUDY PROMOTION, COMMUNICATION AND INCENTIVES

A number of approaches were used to help launch and promote the Harvest Study, such as:

- **Brochures and Posters** – Mailed to all beneficiaries living in the Sahtú, RRCs, Band and Métis Local offices, Land Corporations, and Territorial Department offices of Resources Wildlife, and Economic Development (ENR) in the Sahtú Region. A series of posters were distributed and made for display in RRC and Band and Métis Local offices. These posters included space available to post a Monthly Community Harvest Update table
- **Meetings and Engagements** – Public information meetings were held in each community, featuring the Chair of the SRRB, the local District Working Group Representative, and the Harvest Study Coordinator. Door-to-door canvassing was done by the Community Interviewers of all harvesters on the official community list
- **Harvest Study Merchandise** – Give-aways included items such as ball caps, thermos mugs, lighters, pencils, etc. Participants also received an annual pocket calendar and harvest diary for recording harvests
- **Advertisements** – Local radio and community channel announcements were used to promote the Study, announce meetings, and the names of prize draw winners.

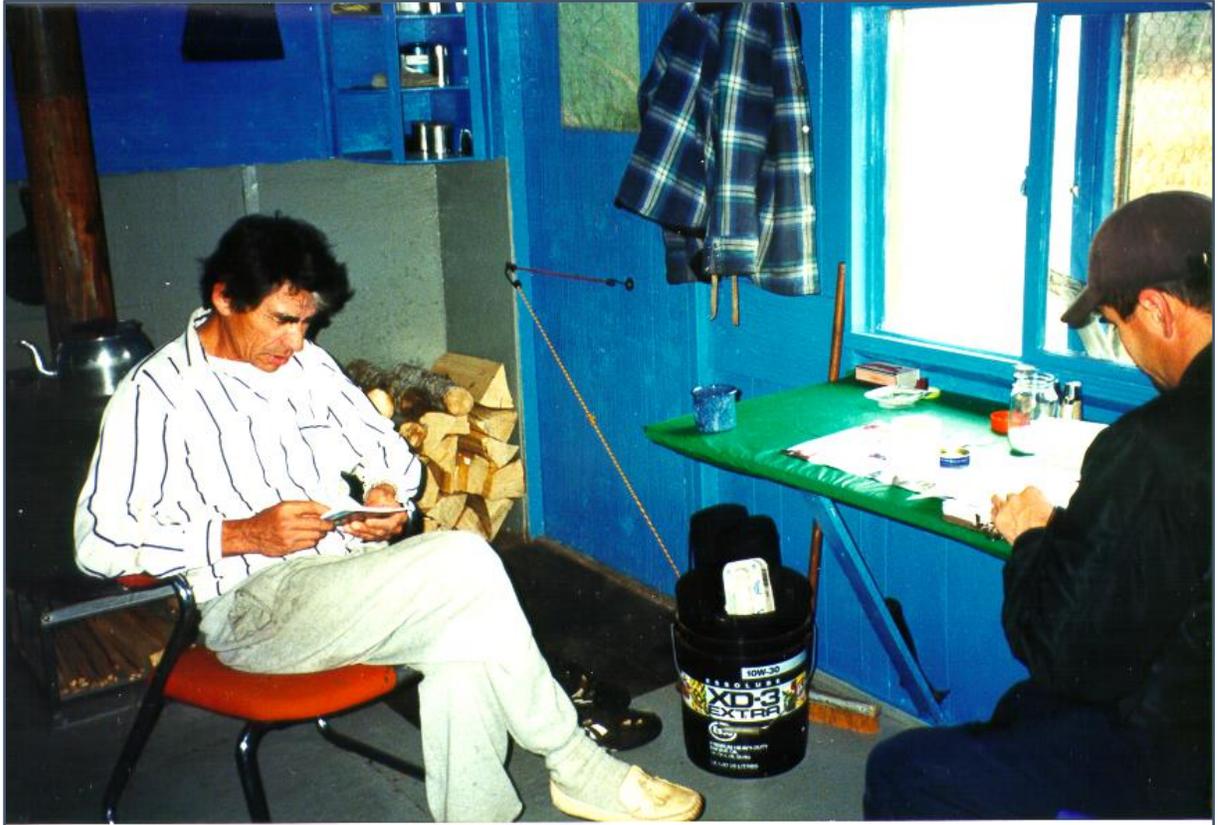
Many promotional activities began before the Study launch date in spring 1998 so that harvesters were aware of the Study and understood why it was important to participate. Communities were kept informed and educated throughout the duration of the Study. The Harvest Study Coordinator and Harvest Study Assistant Trainee visited communities regularly and gave annual community presentations of interim Study results.

Two types of prize draws were used as incentives for participation in the Study:

- **Monthly Prize Draw** – One winner was drawn in each community, using the names of eligible harvesters who were interviewed that month
- **Sahtú-wide Regional Draw** – One winner was drawn every quarter. Each eligible harvester participating in the Study got one ballot for every month they participated over the last three months.

Prize winners were announced in SRRB publications, on CBC Radio's lunchtime programming, local radio and community television channels, as well as other publications.

## 2. STUDY METHODS AND IMPLEMENTATION



*Harvest Study interview – SRRB (photographer unknown).*

## 2.1 Study Area and Timing

The Sahtú Settlement Harvest Study took place in all communities of the Sahtú Settlement Area. However, the timing of survey waves was not the same for all communities for all years of the Study. In Colville Lake, Fort Good Hope, Tulít'a, and Norman Wells the Study ran from April to March each year for the first five years of the study (1998-2003). An initial delay in Déljñę meant that surveys in that community started nine months later, in January 1999.

The survey ran on a monthly basis for five years, as mandated by the Land Claim, until 2003. Data collection paused in Tulít'a, Norman Wells, Fort Good Hope and Colville Lake between April and December 2003, to allow for completion of the survey in Déljñę. The Study then continued on a reduced harvester list and quarterly interview schedule for another two years (January 2004 to December 2005).

## 2.2 Defining Harvests, Eligible Harvesters and Survey Units

### 2.2.1 DEFINITION OF A HARVEST

The Study was designed to record the number of any species of animal, fish and bird **killed and retrieved** by an eligible harvester. Wounding losses were not captured by the survey. Harvests for any purpose were included (*e.g.*, personal use, trade, commercial, etc.), as were harvests both inside and outside the Sahtú Settlement Area.

Most of the time, identification of harvested animals was at the species level, but sometimes harvests were reported by species group (*e.g.*, goose species). This was most common for birds, but also occurred for some small mammals (*e.g.*, fox sp., hare sp., squirrel sp.).

### 2.2.2 DEFINITION OF AN ELIGIBLE HARVESTER

To be eligible to take part in the Study, harvesters had to meet the following conditions:

- Was a Sahtú Dene, Métis, or a non-participant of the Land Claim who provides for their Sahtú Dene-Métis family
- Lived in the Sahtú at the time of the Study
- Was an adult of at least 16 years-of-age
- Was an active hunter, fisher or trapper.

Participants did not have to be registered with the Sahtú Enrollment Board to be included in the Study.

### 2.2.3 HARVESTER COVERAGE AND UNIT OF SURVEY

The Study design relied on the collection of harvest information using a census approach – that is, every eligible harvester in the Sahtú was to be interviewed. One designated parent or guardian who was eligible to be interviewed for the Study (typically the head of the household) was, in addition to their own harvest, required to include the harvest(s) of their dependents or

children under 16 years old who lived in the house and who harvested. A profile of the population in the Sahtú around the time the Study was initiated is shown in Table 1.

Table 1: Population profile of Sahtú communities at the time the Harvest Study was started.

Total population <sup>2</sup> (1996)		Number of Sahtú Dene and Métis		
		# of North American Indian and Métis (1996)	# of enrolled Sahtú participants <sup>3</sup> (1997)	Estimated # of Sahtú Dene and Métis aged 15 yrs and older <sup>4</sup>
Colville Lake	90	85	53	62
Déline	616	550	562	372
Fort Good Hope	644	575	607	384
Norman Wells	798	165	100	99
Tulit'a	450	400	395	264
<b>TOTAL</b>	<b>2,598</b>	<b>1,775</b>	<b>1,717</b>	<b>1,181</b>

In 2004/5, due to decreasing participation rates, a decision was made to reduce the list of eligible harvesters in three of the five communities. This topic is covered in greater detail in section 4.1.2.

### Group hunts

Multiple reporting of harvests can sometimes occur when people harvest together (*i.e.*, it is possible that two or more harvesters from a group may each report taking the same animal). Community Interviewers were trained to be aware of this problem, to ask which reported harvests were done as a group, and to ensure that the harvest was only recorded once.

It is likely that in general, organized community hunts were not reported to the Harvest Study, but to the relevant RRCs instead. Nonetheless, we did find two records in the database noted as being community hunts – the harvests were of grayling (n= 10) in Déline, and barren-ground caribou (n=7) in Fort Good Hope. If records of community hunts were kept by the RRCs, those totals should be added to the Harvest Study results to represent a fuller picture of total needs.

## 2.3.4 BUILDING AND MAINTAINING AN OFFICIAL LIST OF ELIGIBLE HARVESTERS

The Harvest Study Coordinator built an initial list of every man, woman, and child in the five Sahtú communities using various sources, such as the current Sahtú Enrollment Board Registry list and the GNWT's General Hunting License records.

For each community, the initial list was then passed on to the Renewable Resources Councils. Each RRC used this list as a foundation to build the official list of eligible harvesters for interviews in each community based on the eligibility criteria described in the previous section.

<sup>2</sup> Total population number and number of North American Indian (excluding Inuit) and Métis, from 1996 census.

<sup>3</sup> Number of enrolled participants from the November 1997 Sahtú Enrollment Board registry.

<sup>4</sup> The estimated number of Sahtú Dene and Métis aged 15 years and older was calculated using total population data from the 1996 Census and age/ethnicity data from the 1991 Census.

Before data collection started, Community Interviewers then went door-to-door to canvas all harvesters on the official list. During this visit, interviewers checked on the accuracy and completeness of the list and collected personal information from each harvester, including:

- Date of birth
- Harvester gender
- Community affiliation (*e.g.*, Dene, Métis, Other Provider)
- Presence of children or dependents under 16 years of age in the household who harvested, as well as names and ages. The Interviewer then designated one adult head of the household to be responsible for reporting harvests of their children along with their own each month.

Once the Study was started, the official list of harvesters was maintained and updated by the Community Interviewers in the following ways:

- ***Adding any new eligible harvesters to the official list*** – This could include adults who just started harvesting or under-age harvesters who had or would be turning 16 in that Study year; people who resumed harvesting after some inactivity (*e.g.*, due to illness); or eligible harvesters who had always harvested but were initially overlooked
- ***Removal of harvesters from the official list*** – Harvesters were removed from the list if they didn't hunt/fish/trap (*e.g.*, never harvested or recently stopped harvesting); moved out of the Sahtú; or were deceased. Harvesters who refused to participate were removed from the monthly list of harvesters to be interviewed.

Lists were reviewed and updated on a monthly basis throughout the first five years of the Study. The Harvest Study Coordinator, Community Interviewers and local RRCs also reviewed the official list annually each spring. Once the interviews switched to a quarterly schedule and the number of participants interviewed was reduced (2004/5), the official list was not tracked as closely. Again, this topic is covered in greater detail in the ***Data Reliability*** chapter (4.1.2).

## 2.3 Data Collection

### 2.3.1 INTERVIEWS

Harvest information was collected during face-to-face interviews conducted by Community Interviewers in Norman Wells, Fort Good Hope, Colville Lake, Délı̄ne, and by the Harvest Study Assistant Trainee in Tulı̄t'a. Interviews mostly took place in harvesters' homes, but also occasionally took place in other locations. Interviews were conducted in either English or North Slavey, except in Norman Wells where interviews were done in English only. For five years (1998-2003), door to door interviews were done on a monthly basis. For the last two years (2004/5), interviews were done every three months.

Throughout the Study, harvesters were asked to report the numbers and general locations of animals, fish, and birds they harvested in the past month. Interviewers were provided with documentation of the animals they were asking about, including photographs and a species list with English, common, and Dene Language names. This list included a total of 80 species of birds, fish and mammals and is provided in ***Appendix A***. It was also included in SHS interim reports with reported annual harvests.

During interviews, harvesters were asked to recall what they had hunted, fished and/or trapped in recent months. Information collected was mostly based on what the harvester could remember over a one month period. However, this recall period was at times longer in cases of backlog where a harvester could not be contacted in a given month because he/she was out the on the land or out of the Sahtú Settlement Area.

All eligible harvesters participating in the Study received a Pocket Calendar and a Harvest Diary to keep track of how many animals, fish, and birds they harvested. During the interview, the harvester was asked to refer to these aids to help remember the details of their harvest.

### 2.3.2 RECORDING THE NUMBER OF FISH AND WILDLIFE HARVESTED

The Community Interviewer asked every eligible harvester who went out harvesting and was successful, questions about what they hunted, fished, or trapped that month:

- What animal, fish, and bird species did you harvest?
- How many of each species did you harvest and where did you get them?

Harvest information was recorded on the Harvester Record form, included in **Appendix B**. If a harvester had hunted, fished, or trapped in the previous month the Interviewer chose the appropriate code on their Harvester Record form to describe the harvester's reported activity last month. Similarly, if the Interviewer was unable to collect harvest information from a harvester, they marked down a code to explain why.

For certain big game species, the age class and sex of the animal(s) harvested was also recorded whenever possible (*e.g.*, adult bull). This information was collected for:

- Moose
- Caribou (barren-ground, woodland)
- Muskox
- Dall's sheep
- Mountain goats
- Black and grizzly bears
- White-tailed deer.

The age classifications that were used included adult, juvenile (including calf, lamb, yearling, cub), or unknown. Sex classifications used were male, female, or unknown. Information on

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*Activity codes used by the Community Interviewer if a harvester was interviewed:*

- 1 = Went out harvesting and was successful*
- 2 = Went out harvesting but was unsuccessful*
- 3 = Did not go harvesting*

*Activity codes used if an Interviewer was unable to collect harvest information:*

- 4 = Harvester could not be contacted – still out harvesting*
  - 5 = Harvester could not be contacted – Other reason*
  - 6 = Harvester moved*
  - 7 = Harvester deceased*
  - 8 = Harvester does not want to participate*
  - 9 = Does not harvest*
  - 10 = Other*
  - 11 = Greater than 6mos recall*
-

specific barren-ground caribou herds was not collected (*e.g.*, whether a harvested caribou was from the Bluenose-West or Bluenose-East herd).

### 2.3.3 LOCATION OF HARVEST AND GEOGRAPHIC INFORMATION SYSTEMS (GIS)

Harvest locations were recorded using two pieces of information:

- Place name – Either the common English or North Slavey name was recorded, as identified by the harvester
- A mapped location – Using grid blocks on a 1:250,000 scale National Topographic System (NTS) map. With a Lambert Conformal Conic projection mapping technique, a grid consisting of 10 x 10 km<sup>2</sup> cells was superimposed on the Sahtú Settlement Area and surrounding areas. Each cell was uniquely numbered.
  - The 10x10 km grid blocks were used to indicate locations of harvests for all animals except fish (*e.g.*, big game, furbearers, small game, waterfowl). A grid consisting of 2 x 2 km<sup>2</sup> cells was used for recording fish harvests
  - To provide more detail on specific lake and river systems, 2x2 km grid blocks were used to indicate locations of all fish harvests. To get these coordinates, the Interviewer used a map jig featuring a single 10 x 10 km grid block divided up into twenty-five smaller 2x2 km blocks. This grid was printed on a transparent acetate so that it could be overlaid on top of a 10x10 km block on the 1:250,000 NTS map.

Community Interviewers were provided with a binder containing two page-referenced general maps (1:800,000 scale) of the entire Sahtú Settlement Area and surrounding areas, plus a series of more detailed (1:250,000 scale) NTS maps of all the areas covered by the general reference maps. On the appropriate 1:250,000 NTS map, the harvester indicated the actual grid block where the harvest took place. The Interviewer then recorded the block's unique grid number on their Harvester Record form. An example of the type of map and grid overlay system used to record harvest locations is shown in Figure 2 on the following page.

For harvesting that occurred over a large area (*e.g.*, along a trapline, or when hunting muskrat, beaver or waterfowl from a boat) the harvester was not asked to give a location for each animal taken. Instead, when harvests of this type occurred over several 10x10 km grid blocks, the Interviewer evenly divided the total number of animals harvested to the closest whole number over the entire reported area. Any animals left over after this were assigned randomly by the Interviewer to one of the grid cells in the harvest area.

A Geographic Information Systems (GIS) Specialist employed by the Sahtú Renewable Resources Board was responsible for developing the maps used during the interviews, managing all SHS data entered into the Sahtú GIS Project's computer system, and for producing maps containing harvest information to be used in reports and presentations.

### 2.3.4 OTHER INFORMATION COLLECTED BY THE HARVEST STUDY

Community Interviewers were also asked to record:

- The total number of days a harvester spent out on the land harvesting
- Any observations made by a harvester during the interview (*e.g.*, animal condition, parasites, predation, numbers, *etc.*) in the Comments Section of the Harvester Record.

Comments were only recorded when harvesters mentioned things they had noticed, and these generally center on animal health – there are notes about when animals appear to be ‘fat’, ‘good’ or in ‘very good shape’. There are also numerous comments that include information about disease – most of these observations are for fish and caribou.

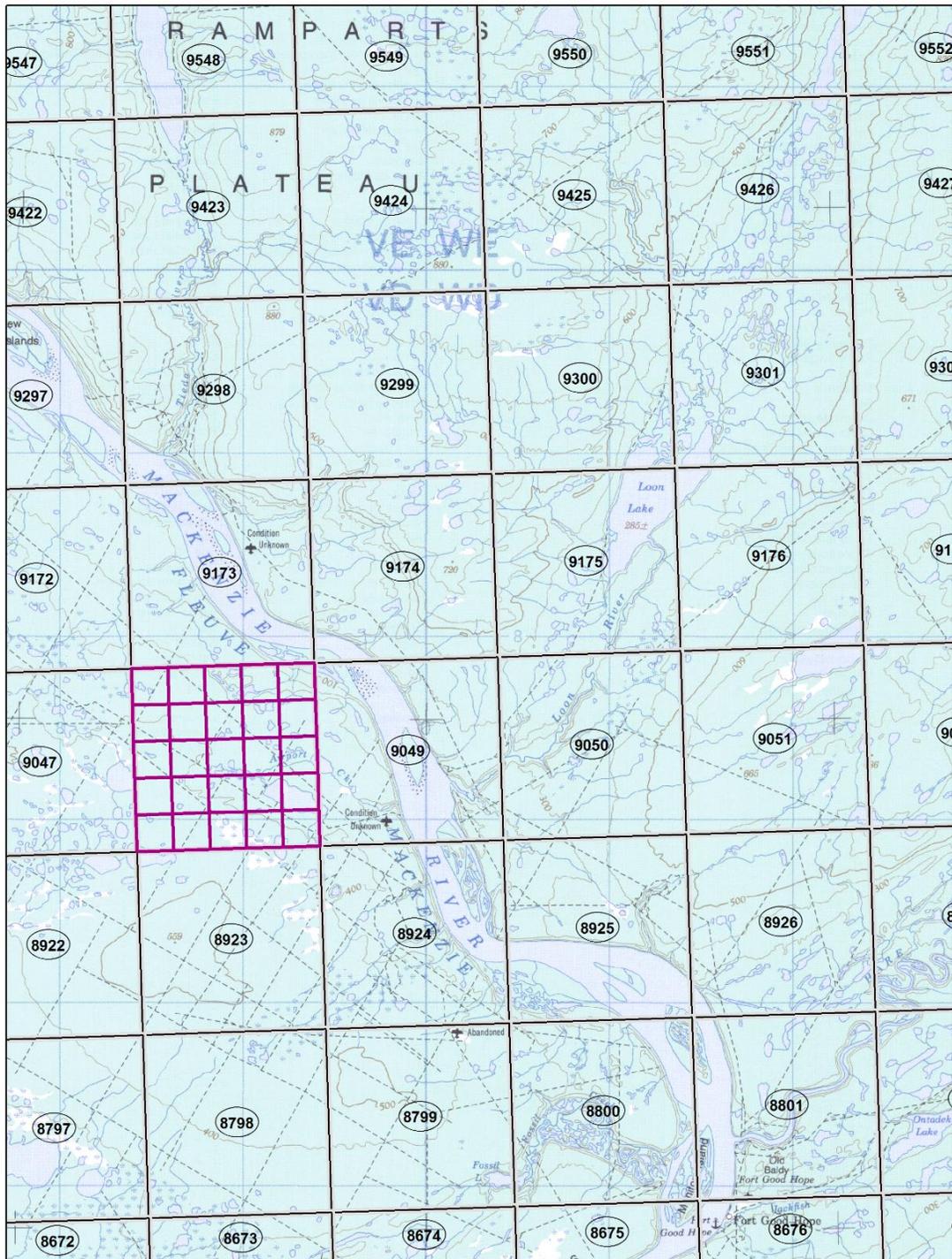


Figure 2: An example of the type of map and grid overlay system used to record locations for the Harvest Study. Bird and mammal locations were recorded on a 10x10 km<sup>2</sup> grid, and fish locations were recorded on a 2x2 km<sup>2</sup> grid (shown in pink) overlaid on NTS maps.

## 2.4 Data Management

### 2.4.1 HARVEST DATA MANAGEMENT SYSTEM AND GIS

The SHS data is stored in a free relational database management software called *Firebird*. The database is organized around a harvest trip – in other words, a single harvest trip is the node around which other types of information (who, what) is linked (**Figure 3**). The interview table records each separate harvest trip taken by each participant. The harvester's name, date of birth, and other relevant information are contained within a harvester table. Other tables hold information about what was harvested. Therefore, most queries or questions flow through the Harvest Trip records to link different pieces of information. Unsuccessful harvest trips are also recorded, as are instances when the harvester did not go out on any trips.

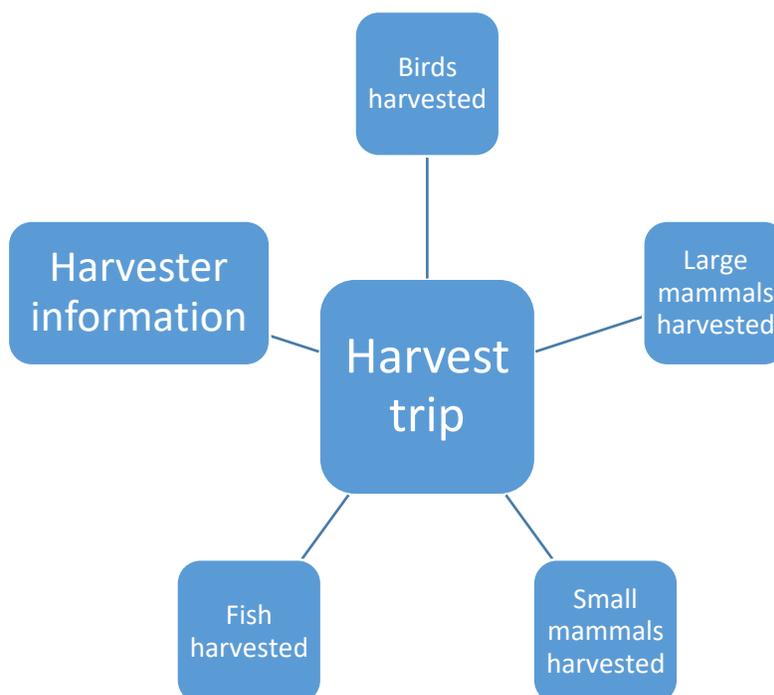


Figure 3: Generalized diagram of Sahtú Settlement Area Harvest Study Database.

Therefore, by linking tables through queries, the following types of questions can be answered:

- How many hares were harvested by young female harvesters during the winter of 2001?
- What percentage of the moose harvest during fall months was by Colville Lake hunters?
- How many successful hunting trips resulted in the harvest of large mammals and birds?
- How many hunting trips under two days were successful, compared with those over four days?
- How many caribou bulls were harvested within 25km of each community, compared to further away?

More detailed information on the data management system is included in the SHS assessment report (SRRB 2013).

## 2.4.2 INTERVIEW FOLLOW-UP AND DATA-CHECKING

All harvesters who were interviewed signed their names on the Monthly Harvester List to confirm that they participated that month. At the end of a given month, the Interviewer in each community faxed a copy of the signed Monthly Harvester List for that month, and mailed the original Harvester Record forms and signed Monthly Harvester Lists to the Harvest Study Coordinator. Upon receipt of these materials, the Harvest Study Coordinator and Harvest Study Assistant Trainee followed a series of steps to process and check the newly collected data:

### **STEP 1 - Prepare Updated *Monthly Harvester Lists* for the Current Month**

- Any additions or changes appearing on the faxed copy of last month's Monthly Harvester List (*e.g.*, harvester could not be contacted, moved, does not hunt, *etc.*), were entered in to the official harvester list in the Harvest Data Management System
- By the end of the first week of the current month, a new Monthly Harvester List (with names of those to be interviewed for the current month plus any backlogs to be collected) were faxed or mailed out to each Community Interviewer.

### **STEP 2 - Sort and Edit**

- When data arrived at the SRRB by mail, Harvester Record forms were sorted by: 1) month of harvest and 2) within a given month, by Harvester Identification Number
- Each Harvester Record form was checked against the signed Monthly Harvester List for that month to check for any missing or duplicate forms
- Harvester Record forms were checked for incomplete, missing, or inconsistent data. If there were concerns or questions, the Community Interviewer was contacted.

### **STEP 3 - Data Entry**

Either the Harvest Study Coordinator or Harvest Study Assistant Trainee entered data from Harvester Record forms into the Harvest Data Management System. A number of features were built into the system to reduce data entry error:

- Clickable "check-box" value lists that reduce or eliminate the need to type information
- "Smart data fields" that have preset value ranges and/or require data to be entered before proceeding to next data field
- Automated "sort and clean" features to maintain and update the data file by searching for duplicate/missing or outdated records and revise the master computer record when backlog months are cleared.

### **STEP 4 - Verification**

After data had been entered, all new information put into the Harvest Data Management System was checked against actual Harvester forms for any data entry errors. Both the Harvest Study Coordinator and Harvest Study Assistant Trainee did the verification. Additional checks on data included:

- The Harvest Study Coordinator and/or Assistant Trainee did random checks to confirm that interviews had been conducted as recorded and that the recorded information was correct by telephoning participating harvesters periodically

- Staff would also telephone individual harvesters and/or Interviewers as necessary for verification if they noticed any reported harvests that did not seem “correct” (*e.g.*, species hunted in an unusual number, location or season)
- Before releasing the Monthly Community Harvest Update, RRCs could review the summary table for their community overall and comment on whether or not the numbers seemed accurate.

### 2.4.3 MANAGING BACKLOGGED DATA

Backlogs occurred when eligible harvesters could not be interviewed for several months because they were out on the land or away from the Sahtú Settlement Area. When the Community Interviewer did have the opportunity to interview these harvesters, he/she would then collect harvest information for the past month plus all other backlogged months for which information was outstanding. Recall periods were also consistently longer once the interview schedule was reduced to every three months.

Part-way through the Study, Interviewers reported that harvesters were having difficulty accurately remembering some of their harvests when the recall period was six months or longer. To address concerns that long recall periods could be lowering the reliability of the data, the SRRB decided to introduce a ‘six-month rule’ in March 2001. This meant that for Years 4 and 5 of the Study, any harvests that had occurred more than six months before the interview date were not to be collected by the Interviewers. This topic is considered more in section 4.1.3.

### 2.4.4 RULES FOR MANAGING UNUSUAL DATA

In some cases unusual harvest data was collected. Rules were in place to deal with these cases in a standardized way. For example, if a harvester reported the harvest of six caribou over three months, the Community Interviewer evenly divided (to the nearest whole number) the total number of kills between the multiple months (*e.g.*, two caribou per month). A similar rule was in place for mapping harvests that occurred over multiple grid blocks (see section 2.3.3). Anything left over was assigned randomly by the Interviewer to one of the months or grid blocks.

In some cases, harvesters were unable to recall some details of their reported harvest (*e.g.*, the species, its age and/or gender, location where harvested, *etc.*). The Community Interviewer collected whatever information was available and assigned a special code for anything else the harvester couldn’t recall.

### 2.4.5 ADDITIONAL DATA CHECKING AND EXPERT INTERVIEWS, 2013–2014

The finalization of the SHS results – including statistical analyses, calculation of total estimated harvests, and report production – was delayed due to a decision to continue the Study beyond the five-year mark originally mandated by the Land Claim. Once data collection stopped at the end of 2005, further work to complete the Study was hampered by a lack of resources for several years.

In late 2012, contractors were hired to assess the state of the Study, the existing database, and the resulting data. Some of the first findings of the assessment revealed that many of the automated functions of the SHS database were not functional, and the Study was incomplete in that there had been no statistical analyses or final reporting done (SRRB 2013).

Because there was little continuity between the different personnel that designed, conducted, and were responsible for bringing the Study to completion, the contractors decided it would be prudent to further assess the quality of the work and the results before embarking on any statistical analyses of the SHS data. The objective was to verify that the Study methods had been carried out as initially described and that adequate quality control mechanisms had been in place. Further data-checking and a series of expert interviews were conducted in 2013.

### **Data-checking**

To be confident that the records in the database were an accurate representation of the information collected by the interviewers, staff in the SRRB office were directed to review a total of 600 hard copy survey forms (approximately 1% of the existing records) and compare them to records in the SHS database. Forms were chosen randomly, but the sample size was weighted by community size.

Of the 600 harvester records initially searched, 39 hard copy forms (6.5% of the random sample) could not be found. This was concerning to the Study team and an effort was made to identify if a pattern existed in missing forms which may impact data quality. Additional time was put into searching more intensively for a sub-sample of 11 forms. Of the 11 missing forms, the search revealed that six had been filed in a way that indicated that the harvester was interviewed outside of their 'home' community. It is likely that the remaining five forms are from interviews conducted outside of the home community as well, but they are outstanding. It is unclear whether these forms are truly missing, are filed under a different community, or are simply misfiled amongst the over 62,000 sheets.

When a hard copy form could not be found, data from the immediately following sheet in the folder was checked instead until a total of 600 forms had been checked in total. The results of the data-checking are summarized in Table 2. Only four errors were discovered. Three of the errors were harvests that were recorded on the paper sheet but had not been entered in the database; the fourth was a mistake in entering caribou age class.

*Table 2: Results of additional data-checking of hard copy Harvester Records against the SHS database.*

	# records checked	# missing records	# errors found	Type of errors
Colville Lake	65	4	0	1. No entry of 20 marten harvested 2. No entry of 2 lake trout 3. No entry of 2 jackfish 4. Adult caribou harvest entered instead of juvenile.
Déline	216	13	3	
Fort Good Hope	162	14	1	
Norman Wells	70	5	0	
Tulit'a	87	3	0	
<b>TOTAL</b>	<b>600</b>	<b>39 (6.5%)</b>	<b>4 (.67%)</b>	

During data-checking, but outside of the 600 samples, a single error was noticed by chance – the community of a Fort Good Hope harvester was inputted incorrectly into the database as a Déline harvest. There is a chance that this may not be an actual error, but could instead be due to a Fort Good Hope harvester hunting or living in Déline temporarily. Nonetheless, even including the additional error that was discovered (bringing the total number of errors to five in 601 samples), the error rate in the Harvest Study records would appear to be less than 1%.

Once we were assured that the survey forms were accurately entered into the database, the Study team then did a cursory overview of the harvest records to identify any possible errors, irregularities or outstanding information (*e.g.*, unusual harvests, out of season harvests, *etc.*). Only two instances were found; both seemed unexpectedly high (a record of 30 woodland caribou harvests, and a very high fish harvest). Phone calls were made to determine if these were errors and in both cases were reported to be accurate.

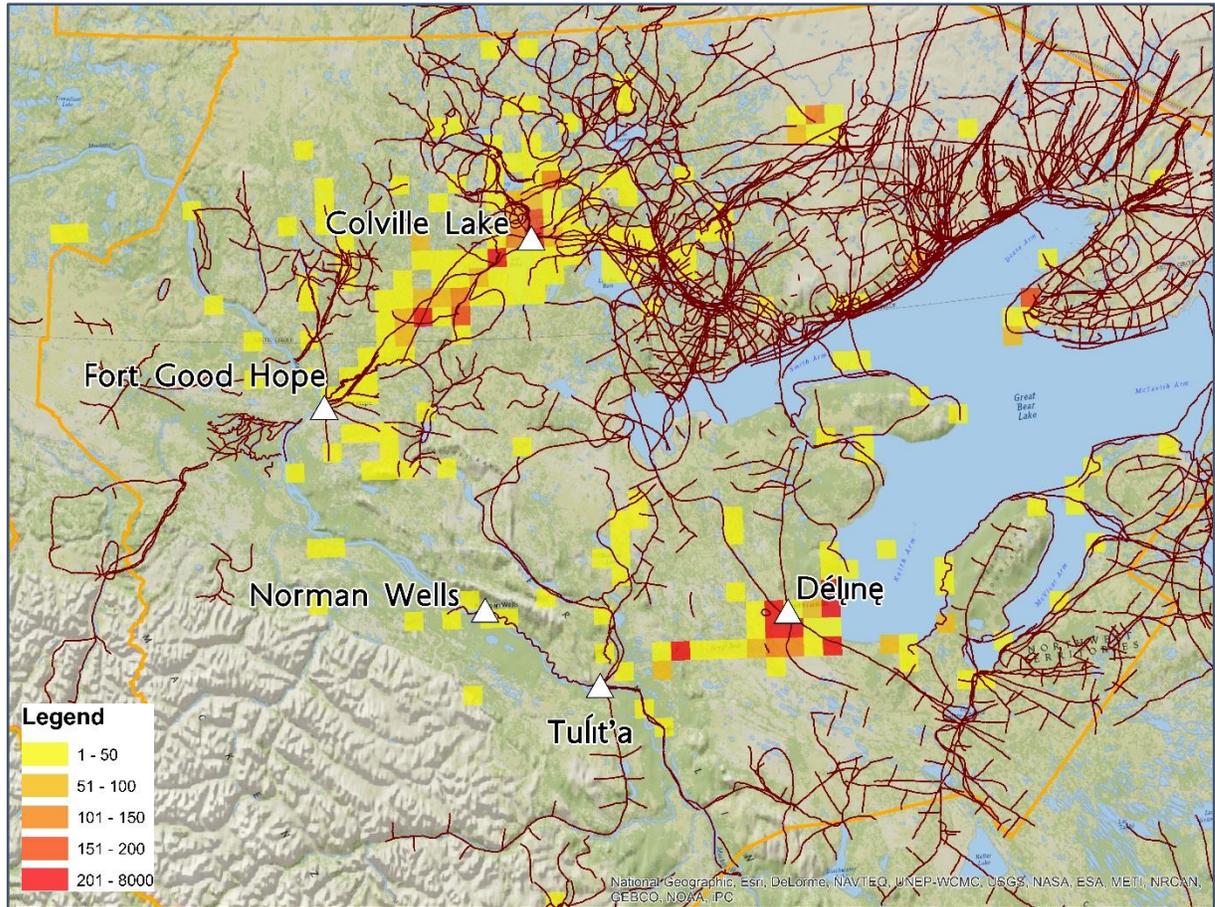
### ***Expert Interviews***

Several harvest study experts with direct experience of the SHS were also interviewed as part of the data assessment. They included the two former SHS coordinators, two former members of the Harvest Study Working Group, and the ENR Wildlife Management Supervisor for the Sahtú Region. During phone interviews each individual was asked about their personal experience with the Study, whether they were aware of any particular challenges encountered during the Study that could affect the data, and what they perceived its main strengths and weaknesses to be.

Overall, it was felt that the Study had received good support and participation in the communities, it had been carefully done, and had been successful at surveying most harvesters and capturing a reliable estimate of their harvests at that point in time. Individuals that had worked with the results felt that the spatial data were especially useful for land use planning at the community and regional levels. Further insights into the data provided by the phone interviews are included in section 4 of this report. A fuller discussion of the interview results can be found in the 2013 SRRB report.

At this point, the Study team felt confident that no real problems existed in the database and the data were sent for statistical analysis.

### 3. STATISTICAL ANALYSIS



Map of spatial data from the Sahtú Settlement Area Harvest Study, 1998-2005. Barren-ground caribou harvest information is shown with an intensity gradient, and overlaid with trail data from the Dene Mapping Project.

Surveys such as the Sahtú Settlement Area Harvest Study attempt to achieve census coverage of eligible harvesters – that is, they try to interview every eligible harvester about their harvesting activities on a regular basis. In most cases an actual census is not achieved however, and the data that are recorded capture the reported harvest of most but not all eligible harvesters. The numbers of fish and animals taken by a small number of eligible harvesters that are not interviewed remain unknown.

In order to calculate a **total estimated harvest** for all eligible harvesters, a **proportional projection** method was employed (see also GRRB 2009, JS 2003, and NWMB 2004). In this section of the report, we describe how the proportional projection method works and the types of statistical analyses that were done on the data that resulted from the SHS.

No analysis of the mapped or spatial data was done; qualitative data and data regarding the number of days harvesters spent out on the land were also excluded from the analysis. Relatively little qualitative data was recorded during the SHS – of the 62,273 records, only 2,822 (approximately 4.5% of the records) had a comment associated with them. We did not feel that comments were recorded consistently enough to be able to indicate any trends or patterns.

### 3.1 Calculation of Harvester Response Rates

The amount of actual coverage or participation in a harvest survey is represented by the **response rate** – this measures the proportion of harvesters participating in the Study in a given month out of all possible eligible harvesters in the community that month. The response rate is used in calculations that help to account for the harvests of eligible harvesters who did not take part in the Study.

Generally, response rates greater than or equal to 75% are considered adequate for use (NWMB 2004). Once rates consistently fall below 75%, the data are not considered reliable.

### 3.2 Estimating Total Harvests from Reported Harvests

To calculate total monthly harvest estimates from monthly reported harvests within a community, there is an assumption that the respondents are a simple random sample from the population of harvesters in a given community and month (see section 4.1).

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*Response rates are calculated each month using the following formula:*

$$R = \frac{a+b+c}{N}$$

*Where*

*R= harvester response rate*

*a= number of eligible harvesters interviewed who went out harvesting last month and got something*

*b= number of eligible harvesters interviewed who went out harvesting last month but didn't get anything*

*c= number of eligible harvesters who did not harvest last month*

*And N= total number of eligible harvesters in the community last month (including eligible harvesters who do not want to be interviewed or could not be contacted)*

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Therefore the total harvest for a month  $m$  in community  $c$  is estimated as:

$$\hat{Y}_{cm} = \frac{N_{cm}}{n_{cm}} \sum_i y_{cmi}$$

where,

$N_{cm}$  is the number of harvesters in month  $m$  and community  $c$ ;

$n_{cm}$  is the number of responding harvesters in month  $m$  and community  $c$ ; and

$y_{cmi}$  is the harvest reported by responding harvester  $i$  in month  $m$  and community  $c$ .

The variance of the estimated total  $\hat{Y}_{cm}$  is estimated by,

$$\hat{V}ar(\hat{Y}_{cm}) = \frac{N_{cm}^2}{n_{cm}} (1 - f_{cm}) s_{cm}^2$$

where,

$f_{cm} = \frac{n_{cm}}{N_{cm}}$  is the sampling fraction in month  $m$  and community  $c$ ; and

$s_{cm}^2 = \sum_i (y_{cmi} - \bar{y}_{cm})^2 / (n_{cm} - 1)$  is the sample variance of reported harvest by harvesters in month  $m$  and community  $c$ .

For the purpose of variance estimation, it is assumed that the survey was independent from community to community and from month to month. As each month is a separate survey within a community, it is possible to estimate the variance of the estimated annual total harvest as the sum of estimated variances of the estimated monthly total harvests. Thus

$$\hat{Y}_c = \sum_m \hat{Y}_{cm},$$

and

$$\hat{V}ar(\hat{Y}_c) = \sum_m \hat{V}ar(\hat{Y}_{cm}).$$

To obtain the estimate of total annual harvest for all communities combined and its estimated variance, a similar procedure, as described above, would be used. Thus the estimate of the annual total harvest for five communities combined would be the sum of annual total harvest estimates from each community. Similarly, the estimated variance of annual total harvest estimate for all communities combined would be the sum of estimated variances for each community. Thus,

$$\hat{Y}_T = \sum_c \hat{Y}_c = \sum_c \sum_m \hat{Y}_{cm}$$

and,

$$\hat{V}ar(\hat{Y}_T) = \sum_c \hat{V}ar(\hat{Y}_c) = \sum_c \sum_m \hat{V}ar(\hat{Y}_{cm}).$$

Variance was used to produce two indicators of the reliability of the annual harvest estimates:

- **Margin of error** – The margin of error provides a range of values within which the true harvest is likely to lie and the confidence that the true value falls within this range. Margins of error were calculated at 95% confidence and are reported with estimated total harvests. The Confidence Interval (*CI*) is used to indicate the accuracy of an estimate. A 95% *CI* for the total annual harvest estimate for community  $c$  is constructed as:

$$\left( \hat{Y}_c - 1.96 \times \sqrt{\hat{Var}(\hat{Y}_c)}, \hat{Y}_c + 1.96 \times \sqrt{\hat{Var}(\hat{Y}_c)} \right),$$

where 1.96 is the value corresponding to the level of confidence *i.e.*, 95% from a standard normal distribution table.

- **Coefficient of Variation (CV)** – A large margin of error does not necessarily indicate an unreliable estimate. The margin of error is in the units of the reported species, so what is large for one may be small for another. The *Coefficient of Variation (CV)*, expressed as a percent, is unitless and provides a better indicator of the reliability of the annual total harvest across species. CV is a measure of relative variability of an estimate. It is the ratio of standard error (*SE*) of an estimate to the estimate, expressed as a percentage. The CV for total annual harvest estimate for community *c* is calculated as,

$$CV(\hat{Y}_c) = \frac{SE(\hat{Y}_c)}{\hat{Y}_c} \times 100\% = \frac{\sqrt{Var(\hat{Y}_c)}}{\hat{Y}_c} \times 100\%.$$

The smaller the CV, the more reliable the estimate is. The guidelines shown in Table 3 can be used in judging the quality of estimates.<sup>5</sup>

*Table 3: Guidelines for using Coefficients of Variation as indication of data quality.*

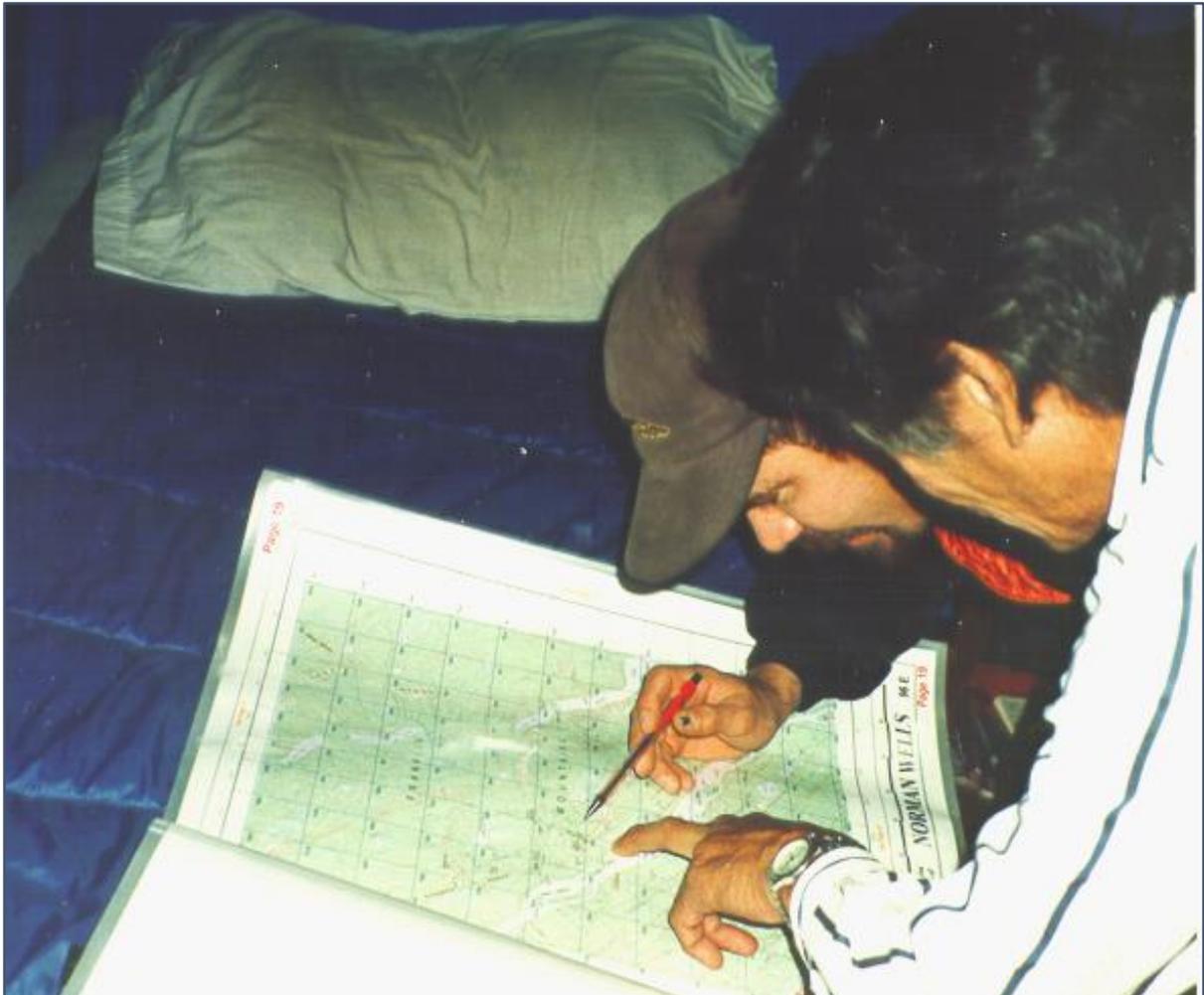
If the Coefficient of Variation is:	Then the data quality is considered:	Associated warnings include:
Less than or equal to 16.5%	Sufficient accuracy for all purposes	None
Greater than 16.5% and less than or equal to 33.3%	Potentially useful for some purposes	Use with caution
Greater than 33.3%	Not recommended for release	Data contain a level of error that makes them so potentially misleading that they should not be released in most circumstances

Tables of the SHS results indicate any cases where the Coefficient of Variation of a total estimated harvest exceeds 33.3%.

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<sup>5</sup> These guidelines are based on the *Guide to the Labour Force Survey* (catalogue number 71-543-G) [http://www23.statcan.gc.ca/imdb-bmdi/document/3701\\_D2\\_T2\\_V3-eng.pdf](http://www23.statcan.gc.ca/imdb-bmdi/document/3701_D2_T2_V3-eng.pdf).

## 4. DATA RELIABILITY



*Harvest Study interview – SRRB (photographer unknown).*

As mentioned in the preceding section, using the proportional projection method to calculate reliable total estimated harvests from harvests reported to the Study relies on meeting several assumptions. In this section of the report we examine how well the SHS met these assumptions. We also discuss any findings regarding the specific strengths and weaknesses of the SHS dataset, and how they may influence calculations of total estimated harvests and Minimum Needs Levels.

This discussion of data reliability does not rely on applying any numerical or quantifiable criteria, but is limited to a subjective consideration by those that coordinated the Study and those who reviewed the data. This chapter does not consider potential errors or other issues arising from the spatial data (mapped harvest locations).

## 4.1 Assumptions for Statistical Estimation

The reliability of harvest estimates and estimates of their sampling errors based on the reported harvests in the SHS depend upon the following assumptions:

1. **Survey Coverage**– That the list of eligible harvesters in a given community and month accurately reflects the harvester population, that is, there is no undercoverage (missing eligible harvesters) or overcoverage (including ineligible harvesters on the list)
2. **Non-response Bias or Representativity** – That the responding harvesters form a representative sample of the population of harvesters (*e.g.*, there is no systematic bias where harvesters with a lot of harvest are not responding or vice versa)
3. **Measurement Issues and Response Error** – That the harvest numbers are accurately reported and recorded, that is, there is no response bias on the part of respondents, no recording error on the part of interviewers, and no coding error on the part of data entry.

Where possible, we consider each of these three topics in regards to how the survey was designed and executed, what the potential sources of error could be and their magnitude. The information presented here results from a review of the Sahtú harvest data and methods, as well as an assessment of the Study and expert interviews conducted in 2013.

### 4.1.1 SURVEY COVERAGE

#### ***How well did the survey frame represent the harvester population?***

As outlined in section 2.2.3, the Harvest Study Working Group and SRRB staff worked closely with Renewable Resource Councils to build an official list of eligible harvesters based on sources such as the Sahtú Enrollment Board Registry list and the GNWT's General Hunting License records. Community Interviewers then canvassed all households to identify and confirm eligible harvesters. Once the Study was underway, monthly checks were in place to ensure that the list remained as current as possible.

Past Harvest Study Coordinators reported that the survey achieved a good cross-section of the harvester population in the first five years, and that family representation was thought to be good. For the last two years of the Study, the harvester list was not as carefully managed and it is likely that the survey coverage was not as good in 2004/5 (see section 4.1.2). It was acknowledged that there were several harvesters that consistently declined to take part in the Study throughout its duration.

Overall, women were not very well-represented in the harvester list. This is in part due to the fact that there was no emphasis on foods traditionally harvested by women in the species list (e.g., berry and plant harvesting was not recorded). Also, most often, men reporting a household's total harvest included harvesting done by women. The number of women harvesting in the five Sahtú communities at the time of the Study is not known.

Refusal to participate and exclusion of women could result in some under-enumeration, which in turn would result in an unquantified underestimate of total harvests, especially if these individuals were active or intensive harvesters.

A past Harvest Study Coordinator and Community Interviewer reported that some community members felt there were some individuals on the list who didn't hunt and shouldn't have been included. This also could have influenced the study results, and their inclusion would result in a bias in response rate calculations.

#### 4.1.2 NON-RESPONSE BIAS OR REPRESENTATIVITY

##### *What were participation levels like in the SHS?*

Documentation found on the Harvest Study server and interviews with past Harvest Study Coordinators provided some details on the process of engaging communities and harvesters in the Study. One interviewee suggested that support for the Study was not good in Colville Lake, and harvesters had some reluctance to participate. Others stated that once Déljñę began participating in 1999, harvester participation was good in each community after that point (see Table 4).

Response rates were calculated for each community and for every month that the SHS took place between 1998 and 2005. An annual response rate was also calculated as an average of the community rates from 12 separate consecutive months.

For the first five years of the Study, participation rates were consistently high in all communities and adequate to do the necessary statistical analyses for estimating total harvests. Average annual response rates for 1998-2003 are shown in Table 4. Generally, response rates exceeding 80% are considered to be very good.

*Table 4: Average numbers of eligible harvesters, respondents, and response rates for the first five years of the SHS.*

Community	Number of Survey Occurrences	Average Number of Eligible Harvesters	Average Number of Respondents	Average Response Rate (%)
Colville Lake	60	39	33	85.46
Déljñę	51	175	164	93.43
Fort Good Hope	60	149	135	90.86
Norman Wells	60	108	103	95.00
Tulit'a	60	141	128	90.88

By 2003, Harvest Study Coordinators were starting to see signs of participant fatigue or response burden. Community Interviewers reported that harvesters were increasingly not wanting to participate or saying that they had not harvested in the preceding months. Participants were said to be quitting towards the end of the first five years, and prize incentives were no longer as effective in encouraging people to participate.

Because there was interest in continuing the survey beyond the claim-mandated five years, it was decided that the Study would resume in 2004 with a reduced number of participating harvesters. The process followed was if a harvester hadn't reported harvesting for a year, the Study Coordinator consulted with the RRC as to whether the individual should still be on the list or not, and the list was adjusted accordingly. The number of harvesters on interview lists were reduced in Fort Good Hope, Délı̄ne, Norman Wells and Tulı́t'a. This apparently was not the case in Colville Lake, where the number of harvesters on the interview list increased slightly.

Knowing the total number of eligible harvesters in a community for each month the survey is conducted is a critical piece of information for harvest estimation. Because eligibility lists do not appear to have been kept for the last two years of the Study, and it is not possible to re-create those lists after the fact, accurate response rates for 2004 and 2005 could not be calculated from the existing data. Using the information available would have resulted in artificially inflated response rates. This in turn would result in total estimated harvests that are lower than actual.

In order to present as accurate a picture of harvesting as possible, we used the preceding four years of data (January 1999 – December 2002) to determine an average number of eligible harvesters in the Study area, then used this average to calculate the necessary response rates for the remaining two years of the Study (2004/5). This decision was based on assumptions that the majority of the harvesters that were taken off the interview list remained in the study area and were still eligible, but were no longer interested in taking part in the study. While there would be some additions to the eligibility list over this period of time (*e.g.*, people turning 16 or moving into the Study area) as well as some deletions (*e.g.*, people passing away or moving away) it is our assumption that these changes would be minimal and not account for a significant change in harvester numbers. Average annual response rates estimated for the last two years of the Study are shown in Table 5. Years in which the response rates are considered too low to calculate reliable harvest estimates are bolded and shaded.

*Table 5: Average numbers of eligible harvesters, respondents and response rates for the SHS, January 2004 – December 2005.*

Community	Number of Survey Occurrences	Average Number of Eligible Harvesters <sup>6</sup>	Average Number of Respondents	Average Response Rate (%)
Colville Lake	24	41	32	78.29
<b>Délı̄ne</b>	<b>24</b>	<b>175</b>	<b>99</b>	<b>56.34</b>
<b>Fort Good Hope</b>	<b>24</b>	<b>149</b>	<b>106</b>	<b>70.86</b>
Norman Wells	24	108	83	76.43
<b>Tulı́t'a</b>	<b>24</b>	<b>141</b>	<b>101</b>	<b>71.76</b>

Our calculations indicated that estimated response rates for 2004 and 2005 are adequate for total estimated harvests to be calculated in Colville Lake and Norman Wells. In Fort Good Hope, Délı̄ne and Tulı́t'a however, response rates were consistently under 75% for most months of 2004 and 2005, sometimes even dropping below 50%. Generally, response rates less than 75% are considered to produce unreliable data for use in calculating total estimated harvests.

<sup>6</sup> Actual eligibility lists were not available for 2004/5. Response rates were estimated using average numbers of eligible harvesters based on previous years of the study for all communities except Colville Lake where the number of participating harvesters increased.

This means that for the last two years of the Study, it was not possible to calculate reliable total estimated harvests for three out of the five Sahtú communities. The implications of these findings for the results presented here are discussed in greater detail in section 4.2.

### ***Are there significant differences in harvesting between participants and non-participants?***

As mentioned above, past Study Coordinators said that in each community, some harvesters refused to take part in the survey. Some of these individuals were described as ‘intense or ‘super-harvesters’ that never registered with or reported to the Study, fearing prosecution or simply not supporting the Study objectives. It was estimated that one or two of these very productive harvesters was missed in each community.

The omission of these harvesters would likely result in an underestimation of actual harvest levels, but it is difficult to know the magnitude of the resulting influence on the data set. Generally, low rates of intentional non-response ( $\leq 5\%$ ) will not have a strong influence on a survey’s results (NWMB 2004). Past Study Coordinators felt that it was very likely that some of the other participants were reporting some of the super-harvesters’ harvests. Overall, they summarized that there were so few people that were *not* participating, that most family’s harvests were being reported to the Study (SRRB 2013).

It was also pointed out during the expert interviews that people who harvest part-time tend to be the easiest to contact for the monthly interviews. The full-time harvesters – who are harder to contact as they are out of town a lot – are necessarily more difficult to interview, but do tend to harvest significantly more than others. This means that within the sample of participating harvesters, it is possible that there could be a slight bias towards information from people that harvest less than others. It is possible that this effect has also influenced the SHS dataset, again leading to a possible unquantifiable underestimation of total harvests.

## **4.1.3 MEASUREMENT ISSUES AND RESPONSE ERROR**

### ***Are the survey responses valid? Do they measure the true harvests of responding individuals?***

During the expert interviews conducted for the Study assessment in 2013, no reasons for harvesters to strategically bias their answers could be identified by former Study Coordinators; there were no known species-specific or other resource management issues that were likely to have created biases in reporting or the Study results. For the most part, harvesters were said to have had good recall of both their harvest numbers as well as locations. No major issues were reported in regards to harvester reporting, Community Interviewer reliability, data management, or any aspect of how the survey was conducted (SRRB 2013).

There were however differing levels of acceptance in the different communities. One resource manager felt that because there was not as good a trust established with harvesters in Colville Lake, the data for that area may be less reliable than for the other communities. However, it was also stated that overall, the harvesters and elders in the Sahtú communities (Colville Lake included) are very supportive and committed to the conservation of wildlife.

There were two instances where reported harvests were falsified. This was the result of an action either on the part of the harvester or the Interviewer. However, due to a rigorous data-

checking procedure, as well as the Coordinator’s local knowledge of seasonal harvesting activities, the inaccuracies were found, and it was felt that these were isolated incidents and unlikely to significantly influence the data.

Throughout the Study, Coordinators worked closely with the RRCs in each community. There was also good communication between staff and harvesters – for example, if a harvester had missed an interviewer, he would often call the office for follow-up. In addition, Study Coordinators did data checks by calling harvesters to confirm their activities and harvests. Good communication and tight quality control should have helped to ensure data reliability.

### ***Recall failure and backlogged data***

One weakness identified in the SHS was recall failure when data backlogs occurred – this happened when a harvester couldn’t be contacted for several consecutive months, and became even more prevalent when the Study switched to a quarterly interview schedule. Community Interviewers felt that when harvesters were out on the land, and an interviewer was unsuccessful at interview attempts for two or three months at a time, harvesters were more likely to give inaccurate numbers or ‘guesstimates’ of their actual harvests. This tended to occur seasonally – for example, when harvesters were out for extended periods hunting caribou or ducks and geese, as well as during fish runs.

As mentioned in section 2.4.3, the Board decided to introduce a ‘six-month rule’ in order to address this problem. Table 6 shows the number of records coded as 11 (*i.e.*, having a recall period greater than six months) during the first five years of the Study.

*Table 6: Records with greater than six month recall periods during first five years of the Study.*

Community	Number of records >6 months recall period				
	1998	1999	2000	2001	2002
Colville Lake	53	17	0	1	7
Déline	N/A	967	175	19	48
Fort Good Hope	85	147	214	31	20
Norman Wells	31	9	7	8	2
Tulit’a	0	39	0	0	0
<b>Total</b>	<b>169</b>	<b>1,179</b>	<b>396</b>	<b>59</b>	<b>77</b>

After the six-month rule was introduced in March 2001, there is a significant drop in the number of records in the database with a long recall period, however, some harvests with a long recall period were still recorded after the introduction of the rule. At this point, so long after data collection ceased, it is not possible to know whether these records were kept for a particular reason (*e.g.*, could be attributed to harvesters using a calendar or diary). Nonetheless, any harvests that were *not* recorded or entered as a result of the six-month rule should have been accounted for by the statistical analysis (*i.e.*, harvesters would have been counted as eligible but not interviewed).

In 2004 and 2005, when the survey changed to quarterly interviews, the Study Coordinator felt that harvester recall failure began to be a bigger and more consistent problem, as harvesters had a harder time remembering their activities over the three month period. Long recall periods can increase the potential for measurement error, resulting in an underestimation of true harvest levels.

## 4.2 Survey Timing and Resulting Data

As mentioned in section 2.1, the timing of the Sahtú Settlement Area Harvest Study survey was not consistent between all communities for all years of the survey. The SHS started in April 1998, but Déljine did not start participating until January 1999. In order to balance out the number of months surveyed across communities due to Déljine's missed nine months of survey, the SHS was suspended in Colville Lake, Fort Good Hope, Norman Wells and Tulít'a from April 2003 to December 2003. These two facts resulted in nine months of data missing for each community.

It is necessary to have five years of SHS data to meet the requirements in the Land Claim – if calculated on an individual basis, each community in the Sahtú has a complete five year dataset that could be used for total estimated harvests. However, to compare annual totals or Minimum Needs Levels across communities or for the Sahtú as a whole, it is desirable to have **comparable** years of data (*i.e.*, to compare the same years and/or months for each community). Because Déljine did not join the Study for the first nine months of data collection, we do not have any comparable data for 1998 for that community. In addition, because response rates were low in three communities during the last two years of the Study, these data cannot be used in the necessary area-wide or comparative calculations.

Based on our understandings of the Study methods and resulting reliability of the data, and in order to have five years of comparable data for all communities, we chose to do the following:

- For the nine months of 1998 data that are lacking in Déljine, harvests were imputed from the other five years of data that were collected in that community. Imputed values were calculated as averages of harvest estimates from the corresponding months for January 1999 – December 2003, and are only used in area-wide and comparative calculations
- Monthly and annual data is presented in tables summarizing information for each community according to the actual survey waves – that is, for Colville Lake, Fort Good Hope, Tulít'a and Norman Wells, data is displayed seasonally, from April 1998 to March 2003; for Déljine, data is displayed on the calendar year from January 1999 to December 2003
- Data for Years 6 and 7 in Fort Good Hope, Déljine and Tulít'a (where response rates are below 75%) are not published in the report as are considered unreliable
- Data for Years 6 and 7 in Colville Lake and Norman Wells (where response rates remained above 75%) are published in the report as are considered reliable.

### RATIONALE

Presenting the results in this way allows us to use the maximum amount of data that was collected during the Study, as well as to compare data between communities on a monthly basis for most years of the survey. Again, using imputed data for Déljine for the nine months of 1998 is restricted to tables of annual comparisons and five year means –imputed data constitutes 15% of the first five years of data for Déljine, and 3% of the first five years of data for the SSA as a whole.

This information is summarized in Table 7. The actual survey waves for the full seven years of the Harvest Study are shown in the first two columns of the table; data are presented at the community level according to these actual survey waves. The last column of the table indicates how data are compiled across communities and presented in annual comparisons for the entire

Sahtú Settlement Area. Shaded rows indicate the years/data used in calculating means. Imputed data for Year 1 in Délı̨ne is indicated in blue.

Table 7: Harvest Study survey timing in the five communities of the Sahtú.

	Surveys done in Colville Lake, Fort Good Hope, Tulít'a, and Norman Wells	Surveys done in Délı̨ne	Data used in annual comparisons and mean calculations
<b>Year 1</b>	Apr 1998 – Mar 1999	Jan 1999 – Dec 1999 <sup>7</sup>	Apr 1998 – Mar 1999 <sup>8</sup>
<b>Year 2</b>	Apr 1999 – Mar 2000	Jan 2000 – Dec 2000	Apr 1999 – Mar 2000
<b>Year 3</b>	Apr 2000 – Mar 2001	Jan 2001 – Dec 2001	Apr 2000 – Mar 2001
<b>Year 4</b>	Apr 2001 – Mar 2002	Jan 2002 – Dec 2002	Apr 2001 – Mar 2002
<b>Year 5</b>	Apr 2002 – Mar 2003 <sup>9</sup>	Jan 2003 – Dec 2003	Apr 2002 – Mar 2003
Year 6	Jan 2004 – Dec 2004 <sup>10</sup>	Jan 2004 – Dec 2004	LOW RESPONSE RATES – FGH / DEL / TUL
Year 7	Jan 2005 – Dec 2005	Jan 2005 – Dec 2005	LOW RESPONSE RATES – FGH / DEL / TUL

## CONSIDERATIONS FOR CALCULATING THE MINIMUM NEEDS LEVEL (MNL)

We would recommend that the five shaded rows of data in Table 7 are those used if it is necessary to calculate Sahtú Needs Levels at a regional or Settlement Area-wide level. Otherwise, the data that are presented in the monthly tables that summarize information for communities individually would be preferable should MNLs be calculated by community. In any case, the “maximum harvest year” used in Minimum Needs Level calculations should not be the year with imputed data.

### 4.3 Community Review and Interpretation of the Data

The statistical review and analyses that were done as part of this project cannot provide insights into any influences on the dataset that may result from specific socio-economic, regulatory, or ecological conditions during the time of the Study. To provide some of this context, the final step planned in the finalization of the Sahtú Harvest Study is to present representative summarized data – both spatial and count data – to knowledgeable community members for review and interpretation during a series of workshops.

Focus group sessions to review the Harvest Study results will be held in each of the five Sahtú communities. Participants will included former Harvest Study participants, RRC members and past Community Interviewers as much as possible. The sessions will be a way of further assessing the following topics:

- *How comprehensive was the study coverage?*

<sup>7</sup> No data were collected in Délı̨ne for nine months of Year 1 of the Study (April – December 1998).

<sup>8</sup> In order to calculate annual totals and five year means, as well as make annual comparisons between communities, nine months of data (shown in blue) were imputed for Délı̨ne.

<sup>9</sup> No data collected for Colville Lake, Fort Good Hope, Norman Wells and Tulít'a March to December 2003.

<sup>10</sup> Of the 2004/5 data only that collected for Colville Lake and Norman Wells is included in this report, as the response rates were too low to produce reliable harvest estimates for the other communities.

- *How representative are the results?*
- *How accurate are the data?*

Participants will be asked to review four categories of species data (large mammals, furbearers, fish, and birds), with a more in-depth look at one or two representative species within each category. Data will be presented in tables, graphs and on maps. Harvesters will be asked to comment on the following:

- *Do the results look reasonable to you for that species at that time?*
- *If not, in what way do they not seem right?*
- *What factors could have influenced harvesting or harvest data collection at that point in time?*

Community Interviewers will also be able to provide information on topics such as:

- *What biases or errors might be in the data based on your knowledge?*
- *Were there any main or 'super' harvesters that did not take part in the study?*
- *Did you encounter any problems conducting the monthly survey that could influence the results?*

Focus group participants will be able to provide thoughtful feedback and ideas about how well the total estimated harvests represent their knowledge of actual harvesting in the communities between 1998 and 2005, and what other factors may have been going on at that time that could have influenced the Study results. Once the focus group sessions are complete, the results will help inform a final analysis of the Sahtú Harvest Study results to be provided in an updated version of this report. Fuller account of harvesters' perspectives on the Harvest Study data, including qualitative descriptions of reliability and accuracy by species or species group, will be included in focus group reports provided to each of the RRCs.

## 5. CONCLUSION



*Shore of Great Bear Lake, Délı̄ne, NT – Janet Winbourne.*

The Sahtú Harvest Study (1998-2005) was done as a requirement of the Sahtú Dene and Métis Comprehensive Land Claim Agreement (1993, Section 13.5). The objective of the Study was to estimate the number of animals, fish, and birds harvested by Sahtú Dene and Métis hunters, trappers, and fishers for five years. In this report we have identified when and how data resulting from the Harvest Study may be influenced by the types of errors or biases that commonly challenge harvest surveys of this type, and have quantified the magnitude of this influence when possible.

The statistical analysis determined that the first five years of the Sahtú Harvest Study produced results suitable for use in calculating total estimated harvests and Minimum Needs Levels for each of the five Sahtú communities. Despite statistical confidence in the 1998-2003 results, the estimated total harvests and estimated variances presented in the data tables should be used with caution keeping in mind the assumptions made in their computations, as the bias due to assumptions not being met could be sizeable. We encourage any readers or users of the results to refer to the response rates and confidence intervals when using the harvest estimates shown in the data tables.

Due to low participation levels and changes in methods during the last two years of the survey, information recorded in 2004 and 2005 in Tulít'a, Fort Good Hope, and Délı̄nę did not meet the tests for survey reliability and should not be used for similar calculations.

A series of community focus group sessions with knowledgeable harvesters and interviewers will provide further qualitative assessment of the data that has been determined to be statistically reliable. Participants will be asked to identify any instances in the data that appear unusual or inaccurate based on their knowledge of harvesting in the area, as well as any overall patterns or trends. This will provide local interpretation of the Study results' accuracy, reliability, and representativeness.

Results of the community review and assessment of the data will be provided to RRCs and used to inform a final analysis and recommendations regarding use of the Harvest Study results.

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# APPENDIX A – LIST OF SPECIES

Standard Names	Common/Local Names	Scientific Names	Dene Language Names (Dél̨ne, Tulít'a and K'asho Got'ine Districts)
<b>LARGE MAMMALS</b>			
Black Bear		<i>Ursus americanus</i>	saht'ea/sah dén̨jt̨lé/bəd̨zi
Grizzly Bear	Brown Bear	<i>Ursus arctos</i>	sahcho/SHSho
Barren-Ground Caribou		<i>Rangifer tarandus groenlandicus</i>	ekw̨wá/ʔekw̨ wá gow'í z̨d̨d̨
Woodland Caribou	Mountain Caribou	<i>Rangifer tarandus caribou</i>	t̨d̨z̨í
Dall's Sheep		<i>Ovis dalli</i>	do/doge
Mountain Goat		<i>Oreamnos americanus</i>	shúhta do
Moose		<i>Alces alces</i>	íts'é/ʔíts'é
Muskox		<i>Ovibos moschatus</i>	gokw'í əjiré/gokw'í z̨jire z̨jire y̨né
White-tailed Deer	Deer	<i>Odocoileus virginianus</i>	
<b>SMALL MAMMALS</b>			
Beaver		<i>Castor canadensis</i>	tsá / sá
Muskrat	Rat	<i>Ondatra zibethicus</i>	tehk'áe/dz̨
Mink		<i>Mustela vison</i>	tehwá
Weasel	Ermine	<i>Mustela erminea</i>	n̨ba
Northern River Otter	Otter	<i>Lontra Canadensis</i>	náb̨ə/ráb̨ə
Marten	Sable	<i>Martes Americana</i>	n̨wh̨ə/zo
Fisher		<i>Martes pennanti</i>	n̨wh̨əcho/zosho
Wolverine		<i>Gulo gulo</i>	n̨gha
Marmot	Gopher	<i>Marmota flaviventris</i>	tsele
Arctic Ground Squirrel	Gopher	<i>Spermophilus parryii</i>	dléa/sele
Red Squirrel	Gopher	<i>Tamiasciurus hudsonicus</i>	dléa
Red Fox	Cross, Silver, Black Fox	<i>Vulpes vulpes</i>	n̨gére dekwo/depoi yehfe defo
Arctic Fox	White, Blue Fox	<i>Alopex lagopus</i>	n̨gére dek'ale
Coyote		<i>Canis latrans</i>	dígatse/bel̨ lį́
Wolf		<i>Canis lupus</i>	díga/bele
Cougar	Mountain Lion	<i>Felis concolor</i>	shúhta z̨ewódzi
Lynx	Cat	<i>Lynx lynx</i>	n̨da
Porcupine		<i>Erethizon dorsatum</i>	ch'ʔə/ch'ʔ
Snowshoe Hare	Rabbit	<i>Lepus americanus</i>	gah
Arctic Hare	Rabbit	<i>Lepus arcticus</i>	gahcho/gahsho
<b>BIRDS</b>			
Ruffed Grouse	Chicken	<i>Bonasa umbellus</i>	dih/zehseré
Sharp-tailed Grouse	Chicken	<i>Tympanuchus phasianellus</i>	ʔehtale/etsele
Spruce Grouse	Chicken	<i>Dendragapus Canadensis</i>	dih/zehaté
Rock Ptarmigan	Chicken	<i>Lagopus mutus</i>	k'áhba'cho
Willow Ptarmigan	Chicken	<i>Lagopus lagopus</i>	k'ahba
American Widgeon	Whistling Duck	<i>Anas americana</i>	zashishi
Bufflehead		<i>Bucephala albeola</i>	tutsele
Canvasback		<i>Aythya valisineria</i>	dahgare cho
Barrows Goldeneye		<i>Bucephala islandica</i>	

Common Goldeneye		<i>Bucephala clangula</i>	
Ring-Necked Duck		<i>Aythya collaris</i>	nóhta
Harlequin		<i>Histrionicus histrionicus</i>	
Mallard		<i>Anas platyrhynchos</i>	chuhu/túriw'élé
Common Merganser	Fish Duck, Pie Duck	<i>Mergus merganser</i>	kw'ole/fole
Red Breasted Merganser	Fish Duck	<i>Mergus serrator</i>	kw'ole
Northern Pintail	Long Tailed Duck	<i>Anas acuta</i>	nagorak'ale/chíhdúwe/yéhxai
Northern Shoveler	Spoon Bill	<i>Anas clypeata</i>	dayéchare
Oldsquaw		<i>Clangula hyemalis</i>	ajléa
Greater Scaup		<i>Aythya marila</i>	dajhgare
Lesser Scaup		<i>Aythya affinis</i>	dajhgare tsele
Black Scoter	Black Duck	<i>Melanitta nigra</i>	tənaeko
Surf Scoter	Black Duck	<i>Melanitta perspicillata</i>	chuk'ó
White-Winged Scoter	Black Duck	<i>Melanitta fusca</i>	tənaeko/yawileho dé
Blue-Winged Teal		<i>Anas disors</i>	chutsele
Green-Winged Teal		<i>Anas crecca</i>	chutsele/fik'one
Brant Goose		<i>Branta bernicla</i>	dat'é/gogaht'ó
Canada Goose		<i>Branta canadensis</i>	xah
Greater White-Fronted Goose	Yellow legs, Speckle Belly	<i>Anser albifrons</i>	dahk'é
Snow Goose	Wavy, Blue, Grey Goose	<i>Chen caerulescens</i>	gogarek'ale/gogah
Trumpeter Swan		<i>Cygnus buccinator</i>	
Tundra Swan		<i>Cygnus columbianus</i>	degao
Arctic Loon		<i>Gavia arctica</i>	bedárega/w'ihbé
Common Loon		<i>Gavia immer</i>	tútsi/túsi
Pacific Loon		<i>Gavia pacifica</i>	p'ibe
Red-Throated Loon		<i>Gavia stellata</i>	yanóhza
Yellow-Billed Loon		<i>Gavia adamsii</i>	tútsio/túsi
Sandhill Crane		<i>Grus canadensis</i>	deleho/dəleho
Snowy Owl		<i>Nyctea scandiaca</i>	báhdziga/báhdzi dek'ale
<b>FISH</b>			
Arctic Char	Red Fish, Silver Trout	<i>Salvelinus alpinus</i>	luededele/luge dedélé
Sucker	Longnose, White Sucker	<i>Catostomus catostomus</i> <i>Catostomus commersoni</i>	dehdele
Arctic Grayling	Grayling, Blue Fish	<i>Thymallus arcticus</i>	t'áe/t'áa
Broad Whitefish		<i>Coregonus nasus</i>	lúé wá
Lake Whitefish	Crookedback, Humpback	<i>Coregonus clupeaformis</i>	lu
Burbot	Loche, Lingcod	<i>Lota lota</i>	nóhk'wá/nóh'fə
Walleye	Pickerel, Dore, Perch	<i>Stizostedion vitreum</i> <i>Perca flavescens</i>	ʔéhch'ja/t'á
Chum Salmon	Dog Salmon	<i>Onchorhynchus keta</i>	geo sahba
Bull Trout/Dolly Varden Char		<i>Salvelinus malma</i> <i>Salvelinus confluentus</i>	dehgá sahba
Cisco	Herring, Least Cisco, Arctic Cisco	<i>Coregonus autumnalis</i> <i>Coregonus sardinella</i>	luehya/lugeya
Inconnu	Coney	<i>Stenodus leucichthys</i>	Siho/sih
Northern Pike	Jackfish	<i>Esox lucius</i>	ʔóhda
Lake Trout	Trout	<i>Salvelinus namaycush</i>	sahba

# APPENDIX B – HARVESTER RECORD FORM



## SAHTU SETTLEMENT HARVEST STUDY

### Harvester Registration Form

Community :  1 Deline  2 Nerman Wells  3 Colville Lake  
 4 Tulita  5 Ft. Good Hope

Interviewer Name:

Interview Date:     
Day Month Year

Harvester's Last Name:

Harvester's ID #:

Harvester's First Name:

Harvester's Sex  Male  Female

**PART 1- ASK ALL**  
 First, I just want to ask you a few questions to make sure this Study is right for you. Please answer "Yes" or "No" to each of the following questions ...

Do you do <i>any</i> hunting, fishing, or trapping at <i>any</i> time of the year?	<input type="checkbox"/> NO	<input type="checkbox"/> YES
Are you 16 years of age and over?	<input type="checkbox"/> NO	<input type="checkbox"/> YES
Do you currently live in the Shtu region?	<input type="checkbox"/> NO	<input type="checkbox"/> YES
Are you a Shtu Dene, Shtu Metis, or a Non-beneficiary of the Land Claim who provides fish and game for your Shtu Dene-Metis family (e.g., non-aboriginal)?	<input type="checkbox"/> NO	<input type="checkbox"/> YES

**Year of Birth-**  
 If answered "YES" to 16 years of age and over, ASK →  
 What year were you born?

**Dene/Metis or Other-**  
 If answered "YES" to Dene, Metis, or Other, ASK →  
 Are you   Shtu Dene or Metis  
 Non-aboriginal providing for your Dene-Metis family

IF YOU ANSWERED "NO" TO ANY QUESTION IN PART 1, THIS STUDY IS NOT FOR YOU → [Code as "B" on your harvester list, get signature, & then remove name from list] **INTERVIEW FINISHED**

IF YOU ANSWERED "YES" TO ALL THESE QUESTIONS IN PART 1, YOU ARE **ELIGIBLE** TO TAKE PART IN THE HARVEST STUDY → [Code as "A" on your harvester list and get the harvester's signature] **CONTINUE**

**PART 2- ASK ELIGIBLE HARVESTERS-**

Who is the one person in your house that does most of the harvesting?  (ONLY ONE PERSON PER HOUSE)

Person being interviewed (CONTINUE)

Someone else (WRITE IN NAME BELOW & THEN FINISH. ADD ANY NEW NAME TO YOUR OFFICIAL LIST)

Are there any other adult harvesters aged 16 years plus living in your house? (ADD ANY NEW NAMES TO YOUR OFFICIAL LIST. CONTACT THESE NEW PEOPLE FOR REGISTRATION)

Are there any children under 16 living in your house who harvest? (WRITE IN NAME & YEAR OF BIRTH FOR EACH UNDER-AGE HARVESTER & THEN FINISH)

Child Harvester's Full Name (first & last)	Year of Birth
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>