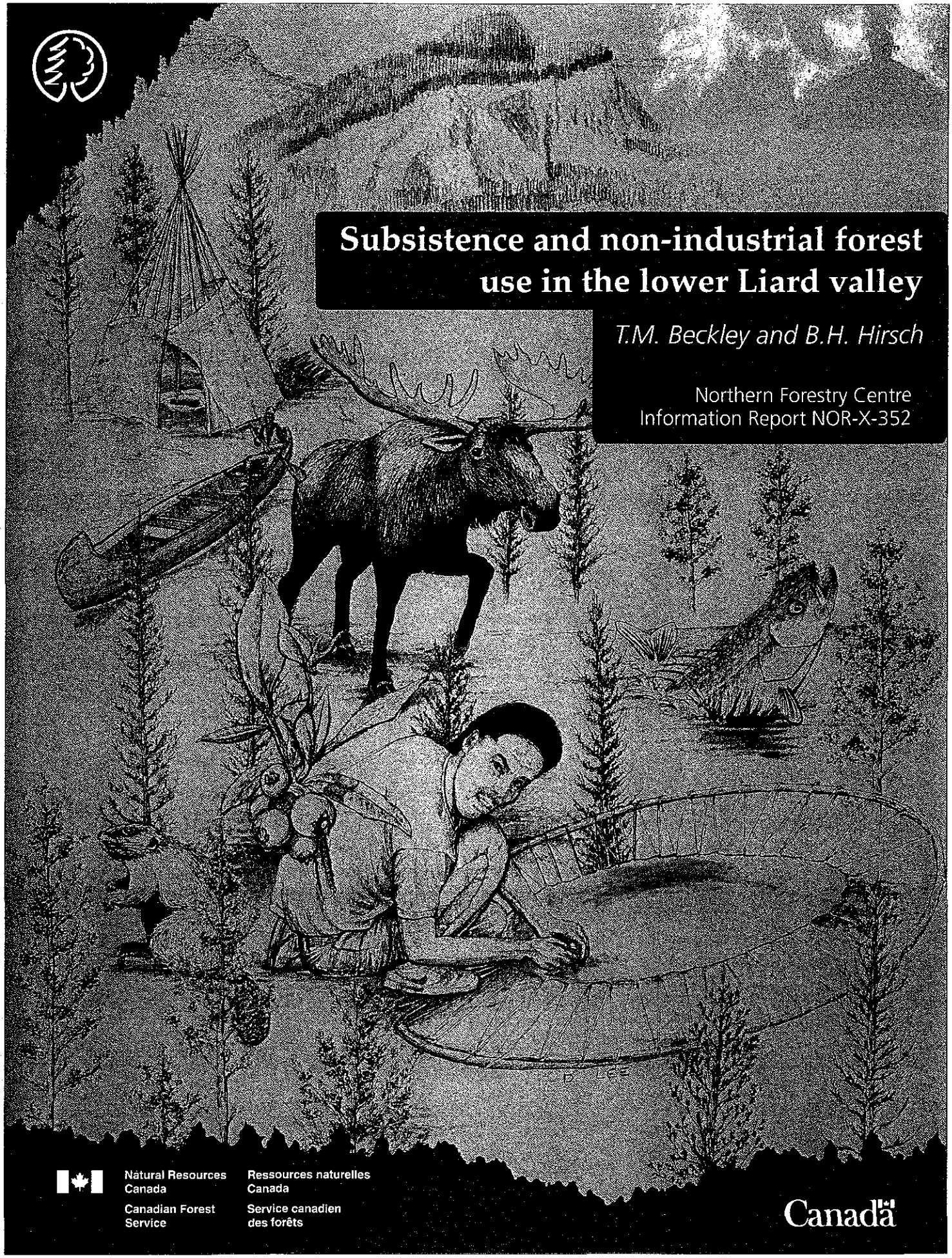


Subsistence and non-industrial forest use in the lower Liard valley

T.M. Beckley and B.H. Hirsch

Northern Forestry Centre
Information Report NOR-X-352

Natural Resources Canada
Canadian Forest Service

Ressources naturelles Canada
Service canadien des forêts

Canada

The Canadian Forest Service's Northern Forestry Centre is responsible for fulfilling the federal role in forestry research and technology transfer in Alberta, Saskatchewan, Manitoba, and the Northwest Territories. The main objectives are research in support of improved forest management for the economic, social, and environmental benefit of all Canadians.

The Northern Forestry Centre is one offive centers of the Canadian Forest Service, which has its headquarters in Ottawa, Ontario.

Le Service canadien des forêts, Centre de foresterie du Nord, représente le gouvernement fédéral en Alberta, en Saskatchewan, au Manitoba et dans les Territoires du Nord–Ouest en ce qui a trait aux recherches forestières, et au transfert de technologie. Cet organisme s'intéresse surtout à la recherche en vue d'améliorer l'aménagement forestier afin que tous les Canadiens puissent en profiter aux points de vue économique, social et environnemental.

Le Centre de foresterie du Nord correspond à l'une des cinq centres du Service canadien des forêts, dont le bureau principal est à Ottawa (Ontario).

SUBSISTENCE AND NON-INDUSTRIAL FOREST USE IN THE LOWER LIARD VALLEY

T.M. Beckley and B.H. Hirsch

INFORMATION REPORT NOR-X-352

Canadian Forest Service
Northern Forestry Centre
1997

Catalogue No. Fo46-12/352E
ISBN 0-662-26279-4
ISSN 0704-7673

This publication is available at no charge from:

Natural Resources Canada
Canadian Forest Service
Northern Forestry Centre
5320 – 122 Street
Edmonton, Alberta T6H 3S5

A microfiche edition of this publication may be purchased from:

Micromedia Ltd.
240 Catherine Street, Suite 305
Ottawa, Ontario K2P 2G8

CANADIAN CATALOGUING IN PUBLICATION DATA

Beckley, T.M. (Thomas Mark), 1961-

Subsistence and non-industrial forest use in the lower Liard valley

(Information report ; NOR-X-352)
Includes an abstract in French.
Includes bibliographical references.
ISBN 0-662-26279-4
Cat. no. Fo46-12/352E

1. Forests and forestry — Multiple use — Northwest Territories — Liard River valley. 2. Forests and forestry — Multiple use — Northwest Territories — Fort Liard Region. 3. Forests and forestry — Multiple use — Northwest Territories — Nahanni Butte. 4. Slave Indians — Northwest Territories — Liard River valley region — Economic conditions. I. Hirsch, B.H. (Brian Howard), 1964-
II. Northern Forestry Centre (Canada). III. Title. IV. Series: Information report (Northern Forestry Centre (Canada)) ; NOR-X-352.

SD387.M8B43 1997 333.75'13'097193 C97-980435-3

This report has been printed on Canadian recycled paper.

Beckley, T.M.; Hirsch, B.H. 1997. *Subsistence and non-industrial forest use in the lower Liard valley*. Nat. Resour. Can., Can. For. Serv., North. For. Cent., Edmonton, Alberta. Inf. Rep. NOR-X-352.

ABSTRACT

Subsistence and non-industrial forest uses are important in many northern communities. In some communities, these forest uses may provide more economic value than commercial forest activities. This study uses the replacement value method to estimate the value of some subsistence and non-industrial forest activities to two communities in the lower Liard valley, Fort Liard, and Nahanni Butte. Results show that these forest uses provide between $950 000 and $1 700 000 of income and in-kind income to valley residents. In addition, forest resources are widely shared throughout these communities. Over half the harvests of meat, fuel, berries, and other subsistence goods are given to persons outside the harvesters household. Comparison of contemporary harvest data to the historical data that exists suggests that subsistence and non-industrial forest activities are equal to or greater than historical harvests over the past thirty years.

RÉSUMÉ

L'utilisation de la forêt à des fins de subsistance et non industrielles est importante dans nombre de collectivités du Nord. Dans certaines d'entre elles, elle peut présenter une valeur économique supérieure à l'utilisation commerciale. L'étude a pour objet d'estimer, par la méthode de la valeur de remplacement, la valeur de certaines utilisations de la forêt à des fins de subsistance et non industrielles pour deux collectivités de la vallée du cours inférieur de la rivière Liard : Fort Liard et Nahanni Butte. Les résultats indiquent que ces utilisations procurent des revenus de 950 000 à 1 700 000 $ et des avantages non financiers aux résidants de la vallée. En outre, les ressources forestières sont largement partagées dans l'ensemble des collectivités. Plus de la moitié de la viande, du combustible, des petits fruits et des autres ressources utilisées à des fins de subsistance sont distribués à l'extérieur du foyer de la ou des personnes qui se les procurent. La comparaison des données sur l'exploitation actuelle et l'exploitation antérieure de la forêt révèle qu'on utilise celle-ci à des fins de subsistance et non industrielles au moins autant qu'on l'a fait au cours des trente années.

PREFACE

This research was undertaken at the suggestion of Steve Price of the Canadian Forest Service, and by invitation of the Lower Liard Valley Integrated Resource Management Committee (LLVIRMC). The scope and methods of the study were discussed between the lead author and LLVIRMC members. The latter felt that some detailed information was required regarding the degree of current, subsistence forest use before decisions could be made regarding future, commercial use of the valley's natural resources. Some members of the committee stressed that the people who most needed to be studied, those who still live on and actively use the land, are often overlooked by researchers due to language barriers or the time and cost involved in surveying them in the field. In addition to the support of the LLVIRMC, this research had the endorsement and received funding by Department of Renewable Resources, Government of the Northwest Territories, and the Canadian Forest Service. Discussions between these parties on how to integrate commercial and subsistence use of the valley's resources continue, and we hope that this work will contribute to those discussions.

This work took place in a cross-cultural setting; consequently, there were some major hurdles to overcome, especially with respect to language and to the general acceptance of the non-local researchers. This work would not have been possible without the assistance of some key individuals. We thank Phillip Betthale, who took a strong interest in the study and opened many doors in the community. He was instrumental in convincing many of the elders to participate in the survey, and he translated questions and answers for many respondents who wished to be surveyed in Slavey. Several students from the Fort Liard Adult Basic Education program provided assistance with editing and administering the survey. Molly Duntra, Julie Capotblanc, Adeline Marcellais, Mary Sassie and Lucy Bertrand helped to revise the survey so that respondents would understand the questions better. They also administered many of the structured surveys. Jimmy Kotchea, Molly Duntra, and Kevin Bertrand helped with the qualitative surveys.

Finally, without the cooperation of the residents of Fort Liard and Nahanni Butte, it would not have been possible to complete this study. The information contained in this report comes from the community. The work has some limitations, perhaps the greatest being that the data contained within represent a snapshot in time. It would be useful if there were periodic updates to this data so that established trends can be recorded. Just as foresters periodically do inventories of trees, communities benefit from periodic inventories of how and how much they use the land. We hope that this work is of interest and benefit to the community, and that this information is used in policy discussions. We also hope that this work will be replicated by the community in the future.

CONTENTS

INTRODUCTION 1

THE STUDY COMMUNITIES 1
- Nahanni Butte 2
- Fort Liard 2
- The Local Economy 2

METHODS 4
- Narrative Survey 4
- Quantitative Survey 5

RESULTS 6
- The Harvest Cycle 6
- Country Food 7
- Trapping 12
- Non-animal Forest Products 12
- The Value of Selected Forest Uses in the Lower Liard Valley 15
- Distribution of Forest Resources within the Lower Liard Valley 16

ANALYSIS 19
- Limitations of Replacement Value Studies 19
- Contemporary and Historical Use of Country Food 22
- Trapping 24
- Other Forest Products 25

DISCUSSION AND POLICY IMPLICATIONS 25

ACKNOWLEDGMENTS 27

REFERENCES 27

APPENDIXES

1. Forest use survey for the communities of Fort Liard and Nahanni Butte . . 29

2. Comments of survey respondents 39

FIGURES

1. Map of study area and communities 3

2. Dollar values for bush use in the Fort Liard, Nahanni Butte, and the lower Liard valley 16

3. Household income and income-in-kind from subsistence and non-industrial forest uses, Fort Liard and Nahanni Butte 17

TABLES

1. Type and quantity of species harvested in the lower Liard valley in 1993–94 8

2. Replacement value for edible animal products harvested by Fort Liard residents in 1993–94 9

3. Replacement value for edible animal products harvested by Nahanni Butte residents in 1993–94 10

4. Historical and contemporary harvest and income earned from trapping in Fort Liard 11

5. Harvest figures and income earned from trapping in 1993–94, Nahanni Butte 13

6. Harvest and replacement value for non-animal forest products, 1993–94, Fort Liard 13

7. Harvest and replacement value for non-animal forest products, 1993–94, Nahanni Butte 13

8. Total replacement value for selected forest products in 1993–94, Fort Liard 14

9. Total replacement value for selected forest products in 1993–94, Nahanni Butte 14

10. Amount of country food harvest shared in Fort Liard, 1993–94 18

11. Amount of country food harvest shared in Nahanni Butte, 1993–94 . . . 18

12. Historical and contemporary harvest of game species, Fort Liard 23

13. Historical and contemporary harvest of game species, Nahanni Butte . 23

14. Perceived change in amount of fishing, 1980–90s, Fort Liard and Nahanni Butte 24

15. Perceived abundance of marten, beaver, and moose, Fort Liard and Nahanni Butte 26

NOTE

The exclusion of certain manufactured products does not necessarily imply disapproval nor does the mention of other products necessarily imply endoresement by Natural Resources Canada.

INTRODUCTION

The lower Liard valley contains between 15 and 30% of the merchantable timber in the Northwest Territories (Bob Larson, Department of Renewable Resources, Government of the Northwest Territories, 6 January 1995, personal communication). For more than 10 years there has been interest (both locally and regionally) in exploring the market potential for this timber. There is a long history of committee meetings, funded research, draft agreements, memoranda of understanding, demonstration forests, and plan outlines; however, significant commercial development of the area's forest has yet to be undertaken.

In order for responsible resource management to take place, detailed, reliable information on subsistence and non-industrial forest use is required. Without documentation of existing forest uses, the effects of changing land use on the social, cultural, and economic fabric of the communities cannot be demonstrated. This work is intended to provide information on non-commercial timber and subsistence forest uses by the residents of Fort Liard and Nahanni Butte. Changes in land use will ultimately affect economic and non-economic variables. The Aboriginal people of the lower Liard valley are an integral part of the local environment. If the forest changes, the Native people of the valley also change. Conversely, if Native culture in the valley changes, the forest will change as well.

This study, through qualitative and quantitative methods, provides a preliminary assessment of existing forest uses in the lower Liard valley.[1] Primary activities under consideration include hunting, gathering, trapping, craft work, and the use of wood for fuel. Some discussion of other cultural dimensions of forest use is undertaken, though data on medicinal use of forest products and the spiritual importance of forests are difficult to collect and a problem to report in common currencies such as dollars (Adamowicz et al. 1994). Also excluded from this study are quantified data about guiding and tourism income related to forests; however, these other forest uses will be considered in the integrated resource management plan that is currently being drafted for the study area.

THE STUDY COMMUNITIES

The people of Fort Liard and Nahanni Butte are linked in several ways. The Native residents of both communities are Slave people and share similar material culture, language, customs, and degree of acculturation. About 80% of the Fort Liard population is Native, while 100% of Nahanni Butte residents are recorded as Native in the most recent census (Statistics Canada 1993). Many families from Nahanni Butte and Fort Liard are connected through marriage. It is not uncommon for people from Nahanni Butte to live in Fort Liard for extended periods of time to take advantage of the broader range of services there.

Despite these social connections, there is both geographical and political distance between the communities. Nahanni Butte is more isolated than Fort Liard, but neither place receives many visitors from outside the communities. Travel between the two communities is difficult, particularly at certain times of the year. Nahanni Butte has only a few telephones. Although more people in Fort Liard have telephones, most do not have them.

In the past, the communities were linked politically. The Nahanni Band was formerly a subdivision of the Fort Liard Band. In 1988, Nahanni Butte became its own band and elected its own Chief. The Nahanni Band now has its own identity and pursues its own interests. Their ability to do this is sometimes compromised, because many decisions that affect the whole valley are made in Fort Liard, with little consideration given to Nahanni residents. Given these differences between the two communities, and in respect of the separate identities

[1] The study was initiated at the request of the Lower Liard Valley Integrated Resource Management Committee and the management of the Northern Forestry Centre, Canadian Forest Service, Edmonton, Alberta.

of their communities, data will be reported for each community separately.

Nahanni Butte

Nahanni Butte is located at latitude 61°03'N, longitude 123°31'W (Fig. 1). The settlement sits on the south bank of the South Nahanni River, just west of where that river meets the Liard River. Ground transport to the community is via a winter road from November to April, and by boat the remainder of the year. Nahanni Butte is accessible by air year round. According to 1991 census data, the settlement consists of 85 residents in 25 households. Eighty of the residents list single ethnic origins, 75 of which are Aboriginal (Statistics Canada 1993). The community only grew by 1.2% from the 1986 census. Higgins (1968) lists the 1967 population of Nahanni Butte as 62. There is an average of 3.7 persons per household in Nahanni Butte.

Job opportunities are extremely limited in Nahanni Butte. The 1991 census listed 20 persons employed, 10 in primary occupations, and 10 in service occupations. The unemployment rate for individuals 25 years and older is 58.3%. Of the 65 residents over the age of 15, 30 have less than Grade 9 education. Fifteen have between Grade 9 and Grade 13 but do not have a secondary certificate. Ten have some university education. The population base is relatively unstable, as 25 of 85 individuals moved during the last census year. Again, most of that migration (80%) is intra-territorial and likely entailed moving to Fort Liard or Fort Simpson for education or employment. Such moves are often temporary, and strong links to the community are maintained.

Fort Liard

The community of Fort Liard is located 80 km south of Nahanni Butte and 20 km north of the British Columbia border at latitude 60°14'N, longitude 123°28'W (Fig. 1). The hamlet sits on the east bank of the Liard River and on the north bank of the Petitot River where the two join. Fort Liard is accessible by car year round since the completion of the Highway 7 between Fort Simpson and Fort Nelson, B.C. in 1983. Fort Liard residents enjoy the most temperate climate in all of the Northwest Territories. The mean daily temperature in January is –23.6°C, and 16.0°C in July (Great White North Productions n.d.).

Fort Liard's population, according to the 1991 census, was 485, divided among 135 households (3.6 persons per household on average). Three hundred and ninety classify themselves as "single origin—Aboriginal." Another 50 are of mixed origins; many of these are Métis. Fort Liard also has a fairly unstable population. Over 23% of residents moved in the last census year. As with Nahanni Butte, the majority of movers relocated from elsewhere in the Territory. Of the 315 persons over the age of 15, 185 have less than a Grade 9 education. Thirty-five have between Grade 9 and Grade 13, without a certificate, and 10 do have a certificate. Twenty-five have a trades diploma, while 45 have some other, non-university education. Twenty have had some university; 10 of those have degrees.

Fort Liard has considerably more services, institutions and employment opportunities than Nahanni Butte. These include an RCMP detachment, a Department of Renewable Resources, Government of the Northwest Territories office, a Northern department store, a nursing station, an arena, a retail shop for crafts, an airport terminal, and a K–12 school. Many of the non-aboriginal residents hold positions within these institutions.

The Local Economy

The economy of the region is based primarily on services and natural resources. In Nahanni Butte, the band is the largest employer. Labor for the band ranges from truck driving to office work. Some others occupations there include highway road crew, retail work in the store, janitorial work, construction, teaching, and Parks Canada employment. A few individuals are employed in forestry jobs, primarily fire protection. Detailed income data for Nahanni Butte are unavailable from Statistics Canada; however, the territorial government reports some income statistics (Government of the Northwest Territories 1993). That data, combined with survey results, will demonstrate that the level of traditional subsistence activities in Nahanni Butte remains high. The subsistence economy operates on a seasonal cycle. Fall is spent hunting moose and other large game. The dominant activity in winter is trapping fur-bearing mammals. In the spring, trapping activity focuses on beaver and muskrat. Summer is slack time for bush use. Fishing occurs throughout the year but is concentrated in late fall. Craft work, tool making, small game harvesting, and other activities occur year round.

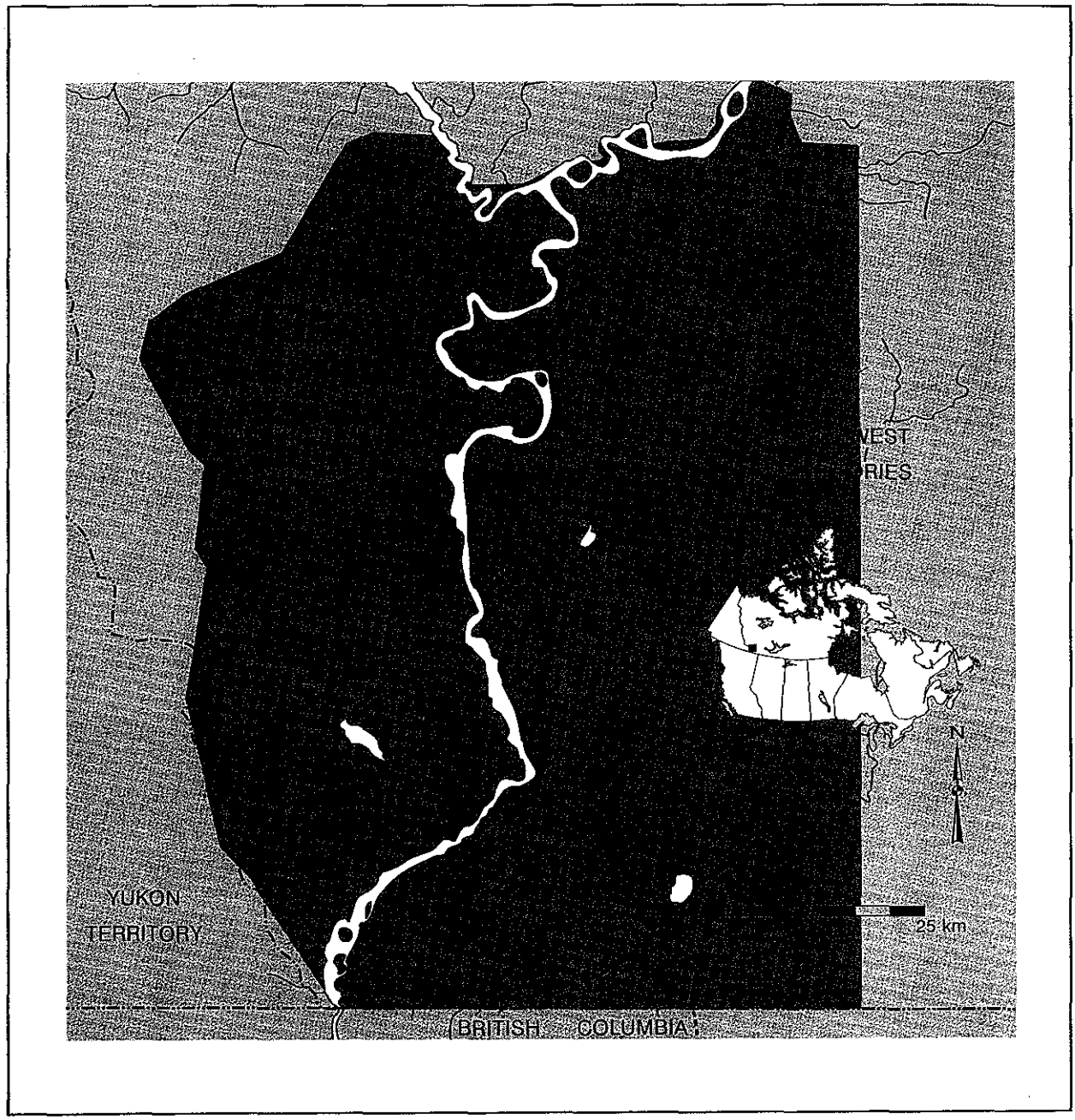


Figure 1. Map of study area and communities.

More than one-third of survey respondents in Fort Liard listed some form of forest-related employment (logging, trucking, fire protection, silviculture, trapping, guiding, millwork, or crafts). Income from trapping and crafts is reported in aggregate for the community in the results section. Other occupations reported by survey respondents include teachers, counselors, and other social-service occupations, taxi drivers, oil and gas workers, pilots, Department of Renewable Resources forest and wildlife managers, highway maintenance workers, janitors, construction workers, store clerks, airport maintenance workers, office workers for the band and the hamlet, plumbers, and others. The 1991 census lists the unemployment rate for individuals over the age of 25 as 12.5%, quite low by northern community standards. Employment opportunities are fewer for young people. Unemployment is listed as 33.3% for individuals ranging in age from 15 to 24. Despite favorable employment figures, financial returns from employment are well below Canadian averages. This may be due, in part, to the seasonal nature of many employment opportunities. Average income for males was $18 296 in 1991, and the median income was $12 832 for the same group. Average income for females was $10 421, and the median for females was $7 312. Average family income was $31 561, and the median for that category was $25 792. By contrast, average family income in all of Canada in 1991 was $53 131 (Statistics Canada 1993).

Despite high labor force participation rates and relatively low unemployment, there remains a great deal of subsistence activity in Fort Liard. The same seasonal cycle described for Nahanni Butte applies to Fort Liard. Fall is the most active time in the bush. Sixty of 70 households (85.7%) reported activity in the bush in that season. Winter was the next busiest period for bush use, with 60% of households reporting trips to bush camps in that season. In spring, 55.7% of households reported active bush use, and summer, the slowest season for bush use, saw 22.8% of households in the bush. Many of the employment opportunities in the area are seasonal in nature; therefore, many are able to actively participate in both the market and subsistence economies.

METHODS

Narrative Survey

Data were obtained through two separate surveys that were implemented in the study communities between March 1994 and February 1995. The first survey consisted of semi-structured interviews with persons from Nahanni Butte and Fort Liard identified as the most active subsistence bush users by a key informant[2] and by the local research team. These were generally older individuals (age 50 or older) who continue to live in bush camps for significant periods of the year. Some of the interviews took place in bush camps, others were conducted in town. A total of 13 interviews were completed. They ranged from 1 to 2 hours in length. Nearly all the interviews were conducted in Slavey with the assistance of two local translators from the Adult Basic Education program. A system was devised in which one assistant would orally translate questions into Slavey and responses into English. The second translator recorded the Slavey responses in English so that direct (translated) quotes were obtained. Interviews were also tape-recorded, but the quality of the recordings were poor and they were not translated and transcribed. Eleven of the 13 interviews were with men only. One was a group interview with a man and two women, and one interview was with a woman only.

Respondents were asked questions about how much time they spend on the land, and at what times of year. They were asked why they continue to use the bush and if they feel it is important to continue to live on the land. Changes in the landscape and in local land use practices were addressed (equipment for transportation, trapping, etc.). Respondents were also asked about sharing their harvests, the extent to which they continue to make their own tools, clothes, and crafts from forest resources, and whether they use traditional bush medicine. A few of the interviews also touched on the topic of logging and the ability of the land to

[2] Elizabeth Bertrand of the Nahe-Ndeh Centre, Fort Liard, N.W.T.

sustain both a subsistence economy and a commercial timber economy.

Quantitative Survey

The qualitative data obtained in these semi-structured interviews were used to create a survey instrument that was administered much more broadly throughout the study communities. Secondary sources, particularly Lamont (1977), Honigmann (1946), and Higgins (1968) were used to acquaint researchers with resources traditionally used in the region. Given their historical nature, these works also provide comparative data for how resource use has changed over time.[3]

The survey instrument ultimately administered was the product of a great deal of community input. An initial draft of the survey was taken to Fort Liard and presented to the Adult Basic Education (ABE) students[4] there. The intent was to enlist those students as interviewers. An arrangement was made with the teacher to include survey design, interview training, and survey administration as part of the social studies curriculum. Before any interviewing was done, the students reviewed the draft survey and significant changes were made. Some questions were added and others omitted. Changes were also made to the order and wording of the questions, to make them more appropriate and relevant to the local context. Input on the survey was also solicited from others throughout the community. The primary field researcher presented the idea of the survey, as well as the draft survey instrument, to the hamlet council, at coffee houses, at the children's school, and to individual band councillors.[5]

The intent of this second survey was to quantify much of the information gathered through the initial qualitative interviews. Questions were asked about the previous year's harvest (the 1993–94 trapping season). Respondents were asked what species they harvested (e.g., game, fish, fuel wood, berries), what they were used for, how much was harvested, how much was shared, with whom, and so on. There were also questions about work in the forest sector, background demographic questions, and whether resources could sustain greater harvesting pressure. The complete survey is attached as Appendix 1.

Adult Basic Education students, as well as other community residents, helped implement the survey. Students were trained in interviewing techniques and practice runs were performed. They administered 16 surveys in groups of two. Six surveys were left with respondents and picked up later. The remainder were conducted face-to-face by the primary field researcher and one of four local assistants.[6]

The survey was administered over six weeks, from mid-October to late November, 1994. After tentative figures were calculated, results were presented to the community for verification and consultation. Interviews were conducted, usually with male heads of households because they did most of the actual harvesting of wildlife. Female heads of households were nearly always present as well and contributed information on their own activities, such as berry harvesting and harvesting for craft materials. As well, the women sometimes corrected men on their initial assessments. Usually some discussion followed and a new number was agreed upon by both parties.

A full census survey of both communities was planned, but time and financial resources did not allow us to achieve that goal. For the purposes of this study, we consider both refusals and persons we were unable to contact as non-respondents. We did not have a systematic sampling process because a full census was planned. The response rate, by household, in Nahanni Butte was 72%; for Fort Liard, 52.4%.

We are aware of a few biases that may affect the overall results of our data. The 1991 census lists 25 of 135 households as containing only one person in Fort Liard. Only one resident of a single-person household was interviewed. In Nahanni Butte, there are 25 households. Five are single-person

[3] All save Lamont (1977) document the subsistence resource use of a generation now passed. Comparisons of historical and contemporary use are provided in tables 4, 5, 12, and 13.

[4] One of those students was from Nahanni Butte, but was living in Fort Liard so that she could attend the school.

[5] No formal band meeting was held during this preparation period.

[6] One of whom was a student in the ABE program.

households, none of which were interviewed. Given the lower consumption needs of single-person households relative to multiple-person households, those in single-person households are likely to harvest fewer natural resources. Single-household residents tend to be either elderly individuals who physically are less able to participate in bush harvests, or young people who may be less inclined to participate in bush harvests out of personal preference.

As well, over-sampling of Native respondents occurred, with the assumption that they would be more active bush users. In addition, local informants directed us to more active bush users within the Native population. The final numbers for replacement value reflect the harvests of just over half the households of Fort Liard, but considerably more than half of the total harvested forest resources for the community. As a result, final figures are presented as a range of values; the lower figure is calculated on the basis of survey respondents only, and the higher figure is based on a projection of those figures to the entire population. Nearly three-quarters of the households in Nahanni Butte were interviewed, so the projected range is narrower for that community.

The narrative surveys were conducted primarily with elders and active bush users. Their perspectives on changes in the forest resources and changes in the community may be different from the perceptions of the community as a whole. Understanding that historical perspective, however, and the links between past bush use and current and future bush use, was an explicit goal of the narrative surveys and the main reason elderly bush users were sampled.

RESULTS

The results of both surveys are interrelated. The narrative survey yielded some useful information, but difficulties in translation, and unfamiliarity with the principal investigator imposed limits on the depth of these interviews. The number of comments and the narrative data obtained from the trapper surveys were not that different from what was revealed in the quantitative survey. We provided ample space, and open-ended questions in the quantitative survey, to obtain narrative responses. Respondents were very willing to elaborate beyond a strict reporting of numbers and types of species harvested. Some of the comments from both surveys are included in Appendix 2.

The Harvest Cycle

The activities of bush users are briefly discussed in the Local Economy section. This section will review in greater detail the seasonal cycle of bush activities, and describe activities that occur all year round. The hunting season begins in the fall with the fall moose hunt. September is known in Slavey as "shoulder blade month" because hunters call moose by scraping moose shoulder blades against trees to simulate the sound of a rutting bull scraping his antlers on a tree. October is known as "bull moose eye month" because during the rut, the bulls get thin and "their eyes turn white." The traditional names for these months demonstrate the importance of the moose harvest during this season. Other large game are also hunted, but as demonstrated later in this section, moose are by far the most important species economically as well as culturally.

The latter part of the fall is spent preparing camps and traplines for winter use. This may include patching cabins, clearing "moccasin trails" of willows and downed trees for easier access during the winter trapping season, and repairing skidoos for heavy winter use. Traditionally, late fall was an important time of the year for fishing as well. November is "fish hook month," in reference to fishing on rivers. December is known simply as "fish month." Fishing is done during this time of year with nets underneath the ice.

In winter, the trappers are most active. Marten are the most commercially important species, and thus the most sought after; however, lynx, fisher, fox, otter, mink, weasel, beaver, wolf, squirrel, and wolverine are also harvested at this time of year. People tend to spend more time, and longer stretches of time, in the bush during the winter.

Of course, winter north of 60° is cold and dark. Despite Fort Liard's nickname, "Tropics of the

North," due to its mild climate relative to the rest of the Northwest Territories, it gets quite cold (mean daily temperature in January is –23.6°C). January is known as "dog tail month," because dogs crowd too close to the fire and burn their tails. February is known as "wind month." People spend the long periods indoors in winter making tools, clothes, and other crafts for both sale and use. People make their own snowshoes, axe handles, moccasins, toboggans, birch bark baskets, canoes and canoe paddles, and other items from forest resources.

Spring is the time of the beaver hunt. Muskrats are also trapped during March, "swan month", and April, "geese month", and into May, "frog month". The break up of the rivers and streams makes travel more difficult during this time of year and signals the beginning of the summer slack period for bush use.

Summer is characterized by less bush activity. Generally people congregate in town to enjoy the long summer days. Berries are picked in late summer. June is known as "eggs month", July as "ducks don't fly month". No one we interviewed could recall the traditional name for August, perhaps because it is slack time with no traditional harvest activity or seasonal change associated with it. Brody (1982) provides a more detailed description of the seasonal round of hunters in the general region.

Country Food[7]

Table 1 shows contemporary harvest figures of key game species for Fort Liard and Nahanni Butte. Given the sampling strategy (with over-sampling of Natives and active bush users) these figures represent the majority of the communities' harvests. Fifty-three percent (71 of 135) of all households in Fort Liard were surveyed, and 72% (18 of 25) of all households in Nahanni Butte were surveyed. Projections that represent the harvest of the whole community are presented only for the total value of all surveyed resources in tables 8 and 9. The data in Table 1 thus represents most, but not all, of the wild game harvested in the valley.

It is also important to note that each of these collective data points represents a single year of harvesting effort—a year that may or may not be representative of typical years for any number of reasons. Many of the respondents to the recent survey provided an unsolicited comment such as "Why are you asking about last year and not any other year?" Regardless of the answer to this question, we have no way of knowing how representative 1993 was. Historical comparisons will be drawn in the analysis section. For the purposes of integrated resource management and planning, a regular survey schedule of a random sample of the total population could provide a more accurate picture of resource harvests over a number of years. It is hoped that this report will serve as baseline data for such future research.

Tables 2 and 3 present harvest figures, pounds of meat per animal, and replacement costs of all edible animal products harvested from the forest in 1993, for Fort Liard and Nahanni Butte, respectively. Lean ground beef, priced at $7.05/kg at the Fort Liard Northern store on March 23, 1995, was used to calculate income-in-kind for moose, bear, caribou, elk, and deer harvested. Pork was used to calculate replacement value for beaver, lynx, porcupine, and muskrat harvested. The replacement value for the pork was determined by averaging pork chops at $7.99/kg, side ribs at $7.84/kg, and #1 bacon at $7.18/kg, as priced at the Northern store in Fort Liard on March 23, 1995. This average substitution price for pork was $7.67/kg.

Chicken was used to calculate the replacement value for all fowl and rabbits harvested. A whole chicken roaster at $4.45/kg, priced at the same store on the same day, provided the substitution price for these harvests. This price assumes bones in the chicken meat, and is hence lower than the price of boneless breasts ($8.15/kg) or even thighs ($6.48/kg), though edible weights of local harvests do not include bones. This results in an underestimate, perhaps a large one.

Breaded cod, the only store-bought fish available at the Fort Liard Northern store on March 23, 1995, was used to calculate the replacement value for locally harvested fish. To conservatively account for the value added and processing involved in the packaged fish, we reduced the store price of $7.09/700 g by 50%, which resulted in a replacement

[7] Country food refers to locally produced food harvested from the land.

Table 1. Type and quantity of species harvested in the lower Liard valley in 1993–94

Species	Number harvested[a] Fort Liard	Nahanni Butte
Mammals		
Moose (*Alces alces*)	159	49
Caribou (*Rangifer tarandus*)	21	0
Elk (wapiti) (*Cervus elaphus*)	5	0
Deer (*Odocoileus hemiounus*)	2	0
Bear (*Ursus americanus*)	49	2
Sheep (*Ovis canadensis*)	11	0
Goat (*Oreamos americanus*)	8	0
Rabbit (*Lepus americanus*)	2356	342
Porcupine (*Erethizon dorsatum*)	41	4
Beaver (*Castor canadensis*)	834	158
Marten (*Martes americanus*)	1021	133
Fisher (*Martes pennati*)	11	0
Mink (*Mustela vison*)	51	1
Weasel (*Mustela nivalis*)	105	0
Otter (*Lutra canadensis*)	10	0
Squirrel (*Tamiasciurus hudsonicus*)	260	0
Muskrat (*Ondatra zibethicus*)	244	62
Wolverine (*Gulo gulo*)	5	1
Fox (red) (*Vulpes vulpes*)	14	3
Wolf (gray) (*Canis lupis*)	20	0
Lynx (*Lynx canadensis*)	56	1
Fish[b]	4152	1055
Dolly varden (*Salvelinus malma*)		
Arctic grayling (*Thymallus arcticus*)		
Jackfish (pike) (*Esox lucius*)		
Lake trout (*Salvelinus namaycush*)		
Pickerel (walleye) (*Stizostedion vitreum*)		
Whitefish (*Coregonus clupeaformis*)		

Species	Number harvested[a] Fort Liard	Nahanni Butte
Birds		
Grouse[b]	1959	214
Spruce (*Canachites canadensis*)		
Ruffed (*Bonasa umbellis*)		
Sharp-tailed (*Pediocetes phasianellus*)		
Ducks[b]	363	22
Mallard (*Anas platyrhynchos*)		
American wigeon (*Anas americana*)		
Lesser scaup (*Aythya affinis*)		
Greater scaup (*Aythya marila*)		
Surf scoter (*Melanitta perspicillata*)		
Geese[b]	24	0
Canada (*Branta canadensis*)		
Snow (*Chen caerulscens*)		
Greater white fronted (*Anser albifrons*)		
Ptarmigan[b]	13	0
White-tailed (*Lapogus leucurus*)		
Willow (*Lapogus lapogus*)		
Other		
Berries (litres)		
Raspberries (*Rubus* spp.)	190	21
Blueberries (and other) (*Vaccinium* spp.)	400	39
Fuelwood (cords)[b]	693	222
White spruce (*Picea glauca*)		
White birch (*Betula papyrifera*)		

[a] In Fort Liard, 71 of 135 households were surveyed; in Nahanni Butte, 18 of 25 households were surveyed.

[b] Undifferentiated but comprising the following species.

Note: nomenclature for birds is based on Godfrey (1966); nomenclature for mammals is based on Smith (1993); nomenclature for flora is based on Moss (1983); and nomenclature for fish is based on Paetz and Nelson (1970).

value price of $5.06/kg. Lacking more precise data, we assumed all fish harvested were whitefish, for an average edible meat value of 0.76 kg/fish (Berkes et al. 1994). While most other available fish species are both larger and smaller, whitefish is by far the most popular and sought-after fish species in the communities. With the other conservative assumptions made regarding the fish harvest, we felt this was still a conservative estimate.

Lamb was used to calculate the replacement value for sheep and goats harvested, though lamb is not sold at the Fort Liard Northern store. To calculate a replacement value for this meat, we contacted the next-closest grocery store, Overwaitea in Fort Nelson, British Columbia, a two-hour drive from Fort Liard. Many Fort Liard residents, and some Nahanni Butte residents, do purchase specialty groceries in Fort Nelson; consequently, this substitution appears reasonable. On the same day, March 23, 1995, Overwaitea quoted lamb prices of $7.66/kg for shoulders and $9.88/kg for legs. We averaged these two prices, which resulted in a final replacement value of $8.77/kg. Sources used to convert animals harvested to quantities of edible meat are noted in the footnotes to tables 3 and 4.

Store prices are higher in Nahanni Butte. The Government of the Northwest Territories Bureau of Statistics calculates a food price index for all communities relative to prices in Yellowknife. With these numbers, we calculated a food price index to

Table 2. Replacement value for edible animal products harvested by Fort Liard residents in 1993–94

Animal	Number harvested	Edible kg/animal	Total kg	$/kg	Total $
Moose[a]	159	199.0	31 641.0	7.05	223 069.10
Caribou[a]	21	61.8	1 297.8	7.05	9 149.49
Elk[b]	5	140.0	700.0	7.05	4 935.00
Deer[c]	2	46.0	92.0	7.05	648.60
Bear[a]	49	95.4	4 674.6	7.05	32 955.93
Beaver[a]	834	7.9	6 596.9	7.67	50 598.53
Sheep[d]	11	68.2	750.0	8.77	6 575.25
Goat[d]	8	68.2	545.5	8.77	4 782.00
Lynx[e]	56	3.9	218.4	7.67	1 675.13
Rabbit[a]	2 356	0.9	2 026.2	4.45	9 016.41
Muskrat[a]	244	0.6	156.2	7.67	1 197.75
Fish[f]	4 152	0.8	3 155.5	5.06	15 980.45
Grouse/pheasant[a]	1 959	0.3	626.9	4.45	2 789.62
Ducks[a]	363	0.8	279.5	4.45	1 243.82
Geese[g]	24	1.6	38.2	4.45	169.81
Ptarmigan[a]	13	0.4	4.7	4.45	20.83
Porcupine[b]	41	5.0	205.0	7.67	1 572.35
Total					366 380.12

[a] Berkes et al. (1994), from James Bay and Northern Quebec Native Harvesting Research Committee (1982).

[b] Brad Stelfox, Alberta Environment Centre, 16 April 1995, personal communication.

[c] Tobias and Kay (1994), primarily from James Bay and Northern Quebec Native Harvesting Research Committee (1982), Banfield (1974), and their own calculations for Pinehouse, Saskatchewan.

[d] Bissett (1974).

[e] This number of lynx reflects only those that were eaten. All lynx harvested were used for pelt sales. The weight comes from Tobias and Kay (1994), from James Bay and Northern Quebec Native Harvesting Research Committee (1982).

[f] This assumes all fish caught are lake whitefish (as discussed in text). The weight comes from Berkes et al. (1994).

[g] This assumes all geese harvested were blue or snow geese. Canada geese provide substantially more meat per animal, so this is a conservative assumption. The weight comes from Berkes et al. (1994).

Note: 71 of 135 households were surveyed.

account for price differences between Fort Liard and Nahanni Butte. To determine replacement values for Nahanni Butte we used food prices from Fort Liard and multiplied by the food price index (which is 1.196).

Of all the subsistence and non-industrial uses of the forest that were examined, survey results demonstrate that harvesting wildlife for meat is economically the most important; however, the values reflected in tables 3 and 4 regarding harvest amounts and income-in-kind need to be understood within a broader context. According to Table 3, for example, 13 ptarmigans contributed roughly $20 of income-in-kind to all of Fort Liard. But it should not be assumed that distributing $20 to the various harvesters of ptarmigan would adequately compensate them for their effort, with no further thought or concern toward ptarmigan. According to Table 4, no ptarmigans were harvested in Nahanni Butte, and consideration of replacement value for ptarmigans that were not harvested is an impossible effort. Yet when respondents were asked what animals were in decline, ptarmigan and ducks were the most frequently mentioned species in Nahanni Butte and among the top three in Fort Liard. In general terms, the quantity of animals harvested and the dollar values associated with that harvest reflect availability at least as much as preference; the calculated replacement values should not be construed as actual dollar amounts that people would be willing to accept to forgo the harvest and consumption of that animal. In other words, residents are aware of a shortage of ptarmigans, and the ptarmigans are presumably worth much more than $20 to all residents of Fort Liard, and certainly worth more than nothing to residents of Nahanni Butte.

Table 3. Replacement value for edible animal products harvested by Nahanni Butte residents in 1993–94

Animal	Number harvested	Edible kg/animal	Total kg	$/kg	Total $
Moose[a]	49	199.0	9 751.0	7.05	82 218.48
Bear[a]	2	95.4	190.8	7.05	1 608.79
Beaver[a]	158	7.9	1 249.8	7.67	10 537.90
Lynx[b]	1	3.9	3.9	7.67	35.37
Rabbit[a]	342	0.9	294.1	4.45	1 565.36
Muskrat[a]	62	0.6	39.7	7.67	364.00
Fish[c]	1 055	0.7	801.8	5.06	4 852.30
Grouse[a]	214	0.3	68.5	4.45	364.47
Ducks[a]	22	0.8	16.9	4.45	90.15
Porcupine[d]	4	5.0	20.0	7.67	183.46
Total					101 820.68

[a] Berkes et al. (1994), originally reported in James Bay and Northern Quebec Native Harvesting Research Committee (1982).

[b] The number of lynx reflects only those that were eaten. All lynx harvested were used for pelt sales. The source for lynx weight is Tobias and Kay (1994), originally reported in James Bay and Northern Quebec Native Harvesting Research Committee (1982).

[c] This assumes all fish caught are lake whitefish. The source for fish weights is Berkes et al. (1994).

[d] Brad Stelfox, Alberta Environment Centre, 16 April 1995, personal communication.

Note: 18 of 25 households were surveyed. Food price adjustment can be calculated at 1.196. (For moose, total kilograms (9751.0) are multiplied by price per kilogram ($7.05) and then that total ($68 744.00) is multiplied by 1.196, which results in the total value of $82 218.48). The price adjustment between Fort Liard and Nahanni Butte prices was taken from Government of the Northwest Territories (1995).

Tables 3 and 4 show moose and beaver, in that order, as the two most important food sources for both communities. They are the most important both nutritionally and economically, providing for the largest amounts of meat consumed and in-kind economic contribution. For Fort Liard, the next most economically important species, in descending order, are bear, fish, caribou, and rabbit. For Nahanni Butte, the descending order of importance for remaining species is fish, bear, rabbit, and muskrat.

Several important insights can be drawn from these figures. First, in both communities, moose meat is more than four times as important in both income-in-kind contributions and total kilograms of meat to the second most important species, beaver. Second, note the discrepancies in rankings, especially for Nahanni Butte, between replacement value (in dollars) and total kilograms of meat provided by various species. Harvested wild species actually contributed more to people's diets on a per kilogram of meat basis than the dollar rankings reveal because of the low substitution price of store-bought chicken used in our calculations for replacing harvested rabbits, grouse and pheasants. In comparing total kilograms of meat instead of income-in-kind, rabbit and caribou would be fifth and sixth, respectively, for Fort Liard (the first four rankings remain unchanged), while for Nahanni Butte, rabbit would be the fourth largest contributor, followed in descending order by bear, grouse/pheasant, and muskrat. The first three rankings remain unchanged.

Furthermore, as has been documented elsewhere (Berkes 1983, as referenced in Berkes 1994), we found fairly consistent under-reporting of small game and fish harvests compared to large game. Pheasants/grouse (generically called "chickens" by most community members) and rabbits in particular appeared under-reported. In the course of our research, once the original harvest figures were compiled, we spoke with several key informants from both communities about the plausibility of our findings. All informants felt our figures were good estimates of actual harvest levels, except for "chickens" in Nahanni Butte. There was almost universal agreement that our harvest figure for this species was far below the actual amount consumed. Regarding tables 3 and 4, correcting for this dynamic would lead to a further elevation in the importance of small game and a larger overall replacement value for the traditional bush harvest.

While the importance of moose and beaver to the northern diet and culture can hardly be

Table 4. Historical and contemporary harvest and income earned from trapping in Fort Liard

Species harvested	Number of pelts										Income ($)
	1961–62[a]	1962–63	1963–64	1964–65	1965–66	1966–67	1967–68	1972–73[b]	1993–94	$/pelt[c]	
Beaver	1 243	1 138	1 112	1 489	993	825	498	525	834	32.50	27 105.00
Marten	240	202	300	188	248	283	141	244	1 021	59.10	57 977.10
Lynx	796	1 630	692	109	102	77	66	220	81	120.00	9 720.00
Fisher	7	7	6	2	4	6	2	0	11	55.00	605.00
Fox	3	9	8	1	0	2	0	10	14	23.75	332.50
Mink	178	241	183	93	131	63	78	91	51	26.00	1 586.00
Otter	10	5	5	5	6	3	3	7	10	68.50	685.00
Weasel	144	223	307	116	706	425	134	69	105	3.50	367.50
Wolverine	2	1	5	4	5	17	2	3	5	150.00	750.00
Wolf	N.D.[d]	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	2	20	300.00	6 000.00
Muskrat	1 380	516	119	484	692	978	587	94	244	3.00	732.00
Squirrel	2 419	947	472	2 566	3 207	1 871	5 731	326	260	1.05	273.00
Total											106 133.10

[a] Data from 1961–68 obtained from Higgins (1968).

[b] Data from 1972–73 obtained from Bissett(1974), quoting local fur trade statistics from the Government of the Northwest Territories.

[c] Prices are for the 1993–94 trapping season, as quoted from the Department of Renewable Resources, Government of the Northwest Territories office in Fort Liard, NWT, from Western Auction Company (1994).

[d] N.D. = no data.

overemphasized, small game assumes its own significance among active bush users. According to one respondent, "Rabbit is the most important. It helps you out." Several respondents of the narrative survey expressed that in the bush, "food is right outside your door." This too was a reference to small game. Not only are small game much more reliable and easier to harvest than unpredictable and scattered moose, but they also provide food for other animals upon which Natives depend. An experienced trapper told us, "If you want lynx, follow the rabbit. When there are no rabbit, there are no lynx."

Trapping

Tables 4 and 5 contain harvest figures and income earned from trapping fur-bearing species for Fort Liard and Nahanni Butte, respectively. For both communities, marten and beaver, in that order, are by far the two most economically important fur-bearing species, followed distantly by lynx. Compared with the older data available, both marten and beaver are currently being trapped at or near historically high levels. This is particularly noteworthy in light of our information that marten populations were significantly lower in the 1993–94 trapping year as compared to other recent years. Similar comments were made about lynx, and the historical data support this claim of previous abundance and current decline. Numerous informants had mentioned that there were far more beavers than they had bothered to trap, primarily because of the low market price for beaver pelts. In other words, beavers were trapped and/or hunted as much or more for meat than for pelts. Some, but not all, trapped species are eaten. The survey asked the uses of each animal harvested so if a given species is used for fur and food, the value of each use is incorporated in these results.

When calculating income-in-kind, contributions to village economies from country food may require some justification to resource economists and others (Usher 1976); however, the sale of fine furs is an actual market transaction with real money trading hands. In this respect, there are fewer methodological uncertainties regarding the value of trapping, compared to the reported values of traditionally harvested food. It should be noted that not all beaver pelts were sold at auction. The result is that this study underestimates the true value of locally trapped fur to the study communities. Much Native outer wear, such as moccasins, mukluks and mitts, are locally crafted from moose hide with beaver trim for both local consumption and sale through the Fort Liard craft shop. Our data only accounts for furs that were sold or incorporated into crafts that were sold. The value of fur for domestic consumption was not calculated. Another difficulty in accurately assessing the monetary value of furs is the fact that the quality of individual pelts is often variable, and prices received often reflect this variability. Such factors as time of year, coldness of the winter, relative abundance, and fashion styles influence the market price for furs. To cite an extreme example, from the auction prices used for tables 5 and 6, wolverine pelts ranged from $100 to $275, depending on quality of the fur. Most species' pelts have a price range smaller than that of wolverine, but nonetheless, a single price is, at best, an average of the range. We did not have data on every individual fur sale, so we applied average or below average prices to our harvest statistics to determine trapping income.

Non-animal Forest Products

Tables 6 and 7 provide harvest statistics from 1993 and monetary replacement values for non-animal forest products, specifically firewood, berries, and wood crafts, for Fort Liard and Nahanni Butte, respectively. The value of firewood harvested was determined by using the heat equivalent for a cord of wood as 414.1 L of heating oil (Tobias and Kay 1994), and the actual price of $0.449/L for Fort Liard and $0.59/L for Nahanni Butte as quoted on March 23, 1995 and May 7, 1995, respectively. Although these price quotes are from one year after the wood accounted for in our survey was burned, the distributor of the fuel told us the price has not changed for more than 3 years. As well, we did not factor in GST, so we consider these replacement values for fuel to be conservative.

All amounts were reported in local units chosen by the respondents. This usually amounted to truckloads for firewood, which was then converted to cords. We determined that two half-ton pick-up truckloads equalled one cord. This has been substantiated elsewhere (Tobias and Kay 1994). Berries were counted in everything from 4-L ice cream pails to 225 mL plastic cups. All berry units were converted to litres. To determine the replacement value of the berries, we received prices on fresh blueberries and raspberries from the Fort Liard Northern

Table 5. Harvest figures and income earned from trapping in 1993–94, Nahanni Butte

Species harvested	1972–73[a]	1993–94	$/pelt[b]	Income ($)
Beaver	79	158	32.50	5 135.00
Marten	53	133	59.10	7 860.00
Lynx	200	9	120.00	1 080.00
Fox	3	4	23.75	95.00
Mink	56	2	26.00	52.00
Wolverine	1	3	150.00	450.00
Muskrat	62	62	3.00	186.00
Total				14 858.00

[a] Bissett (1974), quoting local fur trade statistics from the Government of the Northwest Territories.

[b] Prices are for the 1993–94 trapping season, as quoted from the Department of Renewable Resources, Government of the Northwest Territories office in Fort Liard, NWT, originally reported by Western Auction Company (1994).

Table 6. Harvest and replacement value for non-animal forest products, 1993–94, Fort Liard

Product	Quantity	Value ($)/unit	Total replacement value ($)
Firewood	693 cords	185.93/cord[a]	128 850.10
Berries			
Raspberries	190 L	3.32/pt.	1 984.00
Blueberries and others	400 L	2.84/pt.	1 261.60
Birch bark crafts	Sales reported from craft shop		80 000.00
Wood crafts	Sales reported from craft shop		40 000.00
Total			252 095.70

[a] Based on 414.1 L per cord of wood conversion (Tobias and Kay 1994), and a heating oil price of $0.449/L (personal communication with Fort Liard Fuel Centre).

Table 7. Harvest and replacement value for non-animal forest products, 1993–94, Nahanni Butte

Product	Quantity	Value ($)/unit	Total replacement value ($)
Firewood	222 cords	244.32/cord[a]	54 238.82
Berries			
Raspberries	21 L	3.32/pt.	166.77
Blueberries and others	39 L	2.84/pt.	264.94
Birch bark crafts	Sales reported from craft shop		10 000.00
Wood crafts	Sales reported from craft shop		5 000.00
Total			69 670.53

[a] Based on 414.1 L per cord of wood conversion (Tobias and Kay 1994), and a heating oil price of $0.59/L (personal communication with Nahanni Butte Band manager, May 1995).

store for August 1994 (as quoted in seasonal price lists). There was a substantial price difference between the only two types of berries sold at the Northern store (raspberries sold at $3.32/pt. and blueberries at $2.84/pt.); consequently, we divided all berries collected by local residents into either "raspberries" or "other," with prices assigned accordingly.

The figures on crafts and moose hide require further explanation. In many studies of this sort, determining replacement values for local crafts often takes the form of imputed pricing. In Fort Liard, however, there is actually an active and successful craft shop that sells the work of local artisans, as well as those from surrounding communities, most notably Nahanni Butte and Trout Lake. Though our figures are rough, the manager of the craft shop estimated annual sales at $200 000. About 80% of the crafts are made by Fort Liard residents, with 10% each from Nahanni Butte and Trout Lake. Furthermore, about 50% of revenue is derived from birch bark baskets of all sorts, with 25% each from other wood crafts and moosehide garments. The economic value of commercially sold moosehide crafts is included in tables 8 and 9.

It is also important to state that the income considered here from the craft shop does not include income-in-kind from crafts made for local consumption or sold by other means, such as Native individuals selling directly to tourists in the summertime or to non-Native residents at any time. According to survey respondents, both kinds of sales occur quite frequently. The two study communities are very proud of their craft skills and heritage, and are world renowned for their delicate basketry, beading, and sturdy moosehide garments. We are seriously under-estimating craft-based contributions to the local economy by only including sale revenues from the craft shop, but our research did not determine numbers of birch wood toboggans, snowshoes, moccasins, mitts, etc., made annually for local use.

Traditional use of forest products such as roots, plants, and tree barks for medicine was also investigated. While we were initially hopeful that the survey would be able to identify and quantify specific uses and amounts of traditional medicines, this effort was soon abandoned. Respondents appeared generally open and honest about their use, or lack of use, of bush medicine, but often did not provide details regarding preparation, quantities used, frequency, etc. Several respondents explained that they did not reveal all the details, especially concerning contents and preparation of the medicine, for fear that such remedies would be improperly prepared without supervision. As well, for people who have grown up with these remedies, asking their frequency of use is equivalent to asking a member of non-Native society how often they take aspirin. Measurements are often imprecise and as dependent on season and time spent boiling as on absolute amounts. Hence, our data simply present use, or non-use, among our respondents.

Of those surveyed, 40% (26 of 65) of respondents in Fort Liard and 50% (9 of 18) of Nahanni Butte households reported that they prepared and used

Table 8. Total replacement value for selected forest products in 1993–94, Fort Liard

Product	Replacement value ($)
Meat (Table 2)	366 380.02
Furs (Table 4)	106 133.10
Non-animal (Table 6)	252 095.70
Moosehide crafts	40 000.00
Total	764 608.82[a]
Projection from survey data	1 470 401.77[b]

[a] Based on 53% of all households, N = 71.

[b] Based on 100% of all households, N = 135.

Table 9. Total replacement value for selected forest products in 1993–94, Nahanni Butte

Product	Replacement value ($)
Meat (Table 3)	101 820.68
Furs (Table 5)	14 858.30
Non-animal (Table 7)	69 670.53
Moosehide crafts	5 000.00
Total	191 349.51[a]
Projection from survey data	265 763.21[b]

[a] Based on 72% of all households, N = 18.

[b] Based on 100% of all households, N = 25.

bush medicines. It should also be noted that many of these preparers provided remedies to others, whose identities remain confidential. In other words, there is an unknown number of additional people who use these medicines but do not make them. Most of the medicines described were teas, inhalants, and palliatives for colds, sore muscles, stomach aches, and headaches, but other ills and medications were also included.

We did not attempt to count spruce logs harvested for local construction, which are used especially for bush cabins, but this is a very common practice and can be assumed to make a significant income-in-kind contribution to the local bush economy. It was a resource we were unable to quantify.

The Value of Selected Forest Uses in the Lower Liard Valley

Tables 8 and 9 sum the total replacement value for all forest products covered in the 1993–94 forest use survey, for Fort Liard and Nahanni Butte, respectively. The total figures do not include dollar values for contributions that the forest makes toward tourism, spiritual and religious use, medicine, construction materials, and crafts and tools for domestic use. Thus, the figures reported are a very conservative estimate of the value of subsistence and non-industrial forest use in the lower Liard valley. For a detailed discussion on difficulties associated with calculating values for these uses in Aboriginal communities see Adamowicz et al. (1994). A discussion of the limitations of replacement value studies follows in the Analysis section.

For both communities, income-in-kind derived from country food is the single largest contributor to household income from the bush economy, followed by firewood, all crafts, and marten pelts. Only fur sales and crafts generate actual cash for community members, while the two largest contributors to the bush economy, meat and wood heat, simply lessen the need for cash to meet one's survival needs. Ignoring the seasonal and annual variability of these harvest figures, and assuming no disturbances to the productivity of the intact ecosystem, these values should be viewed as a continual stream of benefits that flow to the community on an annual basis forever into the future.[8]

Based only on the replacement value and income derived from subsistence and non-industrial forest products, Fort Liard residents derived more than $764 000 through income or income-in-kind from the surrounding forest in 1993–94. This is based on surveys of just over 50% of all households. If we project these results to the entire community[9], nearly 1.5 million dollars of value was derived from the forest for the year of the survey (Fig. 2). The lower figure represents a floor, or a very conservative estimate of the value of the forest to Fort Liard residents. The higher figure represents a ceiling, which the values of the forest that we have measured are not likely to surpass. Figure 2 illustrates that additional monetary values for goods and services from the bush exist in these communities. Unfortunately, time, money, lack of readily available data, and other factors prevented a full and total account of the value of the bush in dollars. While survey results represent the responses of the communities' more active bush users, and make the lower value more likely to represent total community harvest activity, the values of those benefits from the forest that we could not calculate theoretically place the total value of the forest for subsistence and non-industrial uses beyond the high end of the range. The value of subsistence and non-industrial forest use in Nahanni Butte was calculated to be between $191 349 and $265 763. Combined values for the communities are presented in Figure 2.

To determine the proportion of income that is derived from subsistence and non-industrial forest use in Fort Liard, we added the average income-in-kind ($7021) to Statistics Canada's (1993) calculation of median household income ($25 792). The sum, or total average adjusted income is $32 812.

---

[8] There may be more long-term decline in some species, such as marten. Appropriate questions in such cases then become: 1) Does the decline in such a species indicate an overall decline in ecosystem productivity? and 2) Are there sufficient substitutes for declining species that provide similar benefits to the communities?

[9] We attempted to classify persons as low, medium, and high bush users. Seven key informants classified all individuals on the hamlet list of Fort Liard into such groupings. This would have allowed us to make a more accurate projection, and to determine whether our assumptions about the bias of our sample toward moderate to heavy resource users is correct. Unfortunately, there was no consensus at all among the responses of the key informants with respect to other persons' levels of bush activity. Final results are thus presented as a range rather than a single, projected figure.

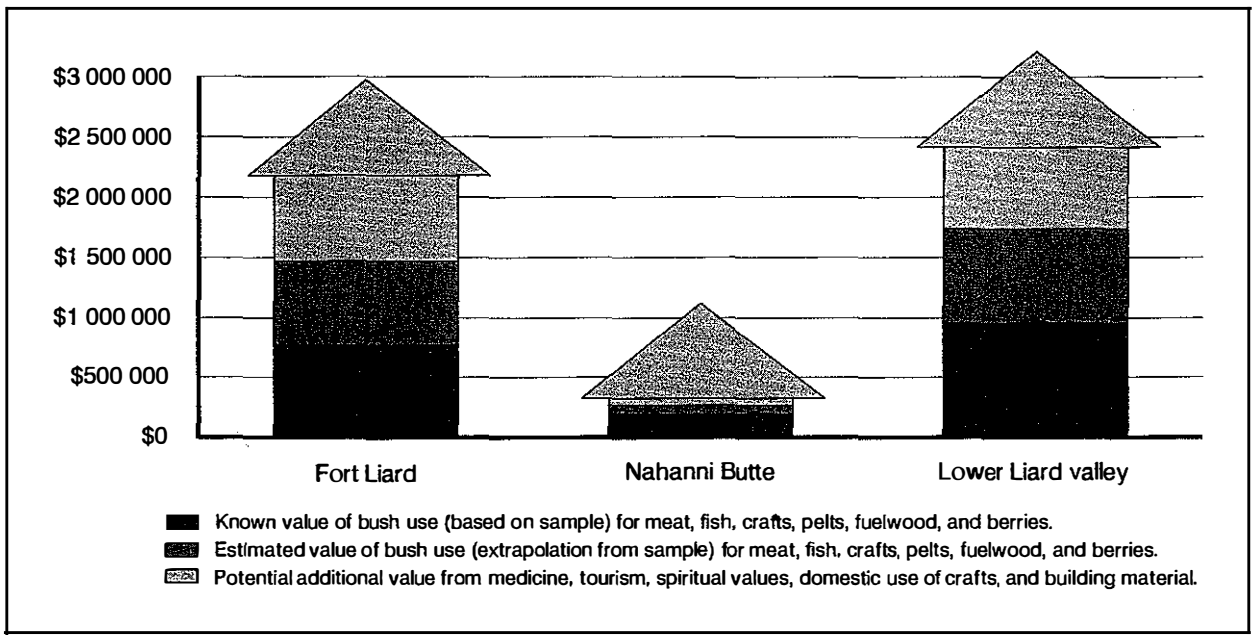


Figure 2. Dollar values for bush use in the Fort Liard, Nahanni Butte, and the lower Liard valley.

The combined average of subsistence and non-industrial income (trapping and crafts) and income-in-kind (country food, fuel) comes to $10 796.[10] Dividing this figure by total adjusted income, we find that subsistence and non-industrial forest use accounts for 33% of total income (Fig. 3). Consequently, for our sample, one-third of all income and income-in-kind is derived from subsistence and non-industrial forest use. Wages associated with industrial forestry employment are not included in these figures. Therefore, the total contribution of the forest to the local economic base is greater than one-third.

Census data on household income were not available for Nahanni Butte so a different method was used to calculate the contribution of subsistence and non-industrial forest use to total adjusted income. In Nahanni Butte, tax return data were available from 1992 returns through the Government of the Northwest Territories (1995). Average income from the 40 returns from Nahanni Butte was $15 575. Forty wage earners in 25 households translates into 1.6 wage earners per household and an average household income of $24 920. Average income-in-kind per household in Nahanni Butte is $8694. Summing the average income and income-in-kind per household in Nahanni Butte produces a total adjusted average income of $33 614. The contribution of subsistence and non-industrial forest use to that total (including income-in-kind and income from trapping and crafts) is $10 630.52 or 32% (Fig. 3).

Distribution of Forest Resources within the Lower Liard Valley

The level of active bush use varies considerably from household to household; however, regardless of actual participation in bush harvests, the entire communities of Fort Liard and Nahanni Butte benefit from the forest through the direct consumption of harvested goods. This is particularly the case for country food. There is a long-standing tradition of sharing food within these communities. Elders surveyed suggested that historically, this tradition was simply a survival strategy. One shares one's harvest with the expectation of reciprocity. Elders are often given food without the expectation of direct reciprocity. If the tradition of giving country food to elders is maintained over the years, today's resource

[10] Income-in-kind = $7021 per household. Trapping and craft income = $3775.

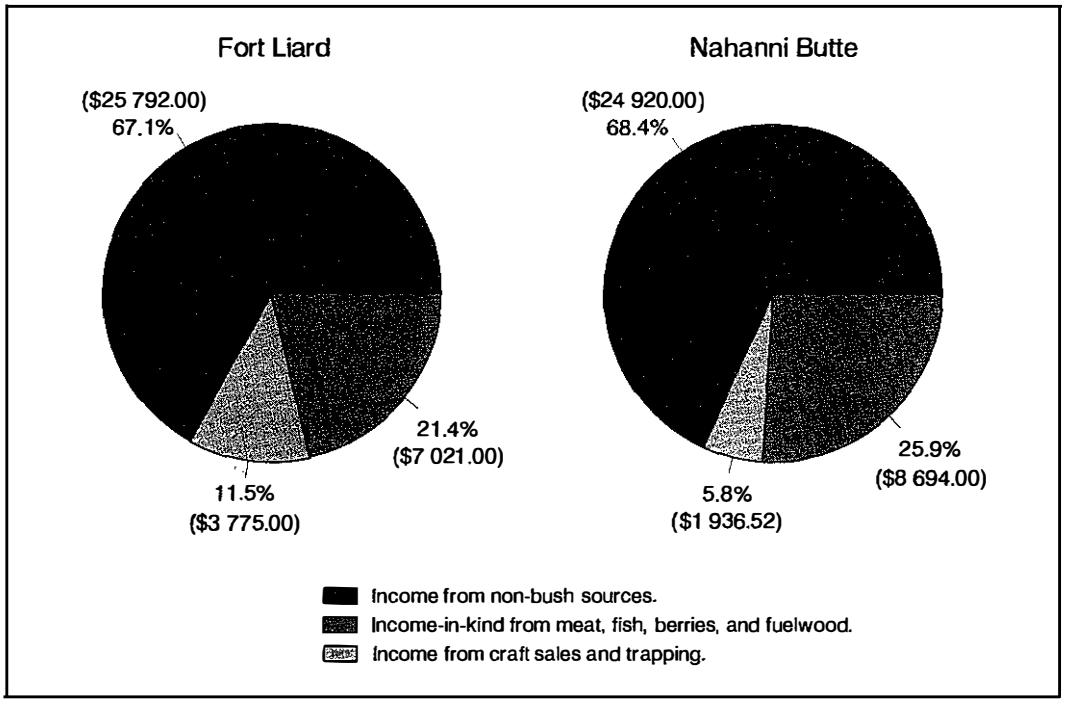


Figure 3. Household income and income-in-kind from subsistence and non-industrial forest uses, Fort Liard and Nahanni Butte

harvesters who share with elders may expect to receive food when they themselves are elders. Thus, over the long term (inter-generationally), reciprocity is maintained.

Some elders indicated that the tradition of sharing is dying off. They noted that people continue to share large game, but that small game is less often shared. In the past, it was not uncommon for one household to share even one rabbit with another household. Today it is mostly moose that is shared. The decline in sharing is likely to be due to higher standards of living, the availability of food in the store and income to buy it, although respondents of the narrative survey suggested that even people who still live in the bush do not share as much as they once did.

Despite elders' perceptions regarding past sharing practices, there is still a very active network of sharing. People share with extended family first, and then with elders, and friends, usually in that order of priority. Many said that they share with whoever asks for food. The conventions surrounding sharing are somewhat different than in non-Native society. Sometimes goods are offered by the harvester, but more often, those in need, or those that want, approach the harvester and ask for food. Food is not the only bush resource shared. Elders also described sharing furs with one another "for good luck." In addition to bringing good luck, this practice strengthens social ties through continuous mutual obligation between individuals who share.

Tables 10 and 11 display the amount of sharing of meat that occurs within the study communities. In Nahanni Butte, 55% of the in-kind income derived from fish and game is given away to members outside respondents' immediate household. In Fort Liard, 53% of the harvest documented by the survey was shared outside the household. While some may perceive the practice to be declining, sharing meat remains an active practice, with more than half the fish and game harvested being distributed throughout these communities to households other than those who harvested the game. Moose and beaver are by far the two most economically important species shared by both communities. Fish is the third most shared species in Nahanni Butte, while bear and fish, respectively, are the third and fourth most shared in Fort Liard. Our survey did not catalog which households shared with each

Table 10. Amount of country food harvest shared in Fort Liard, 1993–94

Species	Number harvested	Number shared	% shared	kg shared	Replacement value of shared meat ($)
Moose	159	92.4	58.1	18 391.6	129 660.60
Bear	49	19.7	40.3	1 883.2	13 276.53
Caribou	21	12.5	59.5	772.5	5 446.12
Deer	2	0.5	25.0	23.0	162.15
Elk	5	2.0	40.0	280.0	1 974.00
Beaver	834	369.6	44.3	2 923.4	22 422.31
Lynx	56	34.0	60.7	132.6	1 017.04
Rabbit	2 356	784.0	33.3	674.2	3 000.37
Chicken	1 959	626.9	30.8	193.1	859.38
Fish	4 152	1 809.5	43.6	1 375.2	6 964.51
Porcupine	41	21.7	52.9	108.4	831.04
Duck	363	149.5	41.2	115.1	512.26
Geese	24	12.0	50.0	19.1	84.91
Sheep	11	4.5	40.9	306.8	2 689.87
Goat	8	6.0	75.0	409.1	3 586.50
Muskrat	244	123.5	50.6	79.0	606.24
Total value shared					193 093.88
Total value of country food					366 380.02
Country food shared					52.7%

Table 11. Amount of country food harvest shared in Nahanni Butte, 1993–94

Species	Number harvested	Number shared	% shared	kg shared	Replacement value of shared meat ($)
Moose	49	30.0	61.2	5 970.0	42 088.50
Beaver	158	54.0	34.2	427.1	3 011.34
Rabbit	342	28.5	8.3	24.5	109.07
Chicken	214	17.0	8.0	5.4	24.21
Fish	1 055	308.0	29.2	234.1	1 184.45
Porcupine	4	1.5	37.5	7.5	57.53
Total value shared					46 504.00
Total value of country food					84 980.46
Country food shared					54.7%

other beyond general descriptors of relatives, neighbors, elders, friends, etc. As would be expected, the animals shared the most are the ones that have been harvested the most, such as moose and beaver. In this way, these figures closely mirror the overall harvest ratios.

The percent shared column in these two tables offers additional insight into some of the more widely distributed meats and their importance to the non-harvesters in the communities. For example, in Nahanni Butte, 61.2% of moose meat harvested was shared as compared to the next most frequently shared animal, porcupine, at 37.5%. Only 8% of chickens harvested in Nahanni Butte were shared. Many respondents spoke proudly of sharing part of a chance porcupine kill with elders, or coming back from a successful moose hunt and being asked for meat from neighbors or relatives. It would, however, also be a mistake to simply assume that chickens are second class dinners. Chickens, along with ptarmigan and ducks, as mentioned elsewhere, were some of the animals most frequently noted by locals as in decline. Part of the reason chickens are shared less is that they are harvested only one or two at a time, and there is not much to go around; also, chickens are often harvested and consumed in the bush, where distance from other households translates into fewer opportunities to share. Goat, lynx, and caribou, all relatively rarely hunted or trapped, were the three species with the highest proportion shared in Fort Liard.

ANALYSIS

Limitations of Replacement Value Studies

Most replacement value studies, including this one, start from the premise that such calculations are necessary to illustrate traditional community forest dependence in a world of market economies (Usher 1976; Berkes et al. 1994; Tobias and Kay 1994). These studies commonly attach an obligatory, though sincere, disclaimer stating that dollar values can never capture the full cultural component of forest dependence. Standard statistical techniques have "reduced" scientific investigations of this sort to fairly straightforward comparisons of saleable commodities and per capita averages. While most of this study is focused on such traditional calculations, this particular section is an attempt to discuss the limitations of such techniques and to question, if not the logic of the approach, then at least the implied and unstated economic assumptions underlying such efforts.

One unstated assumption in most replacement value calculations, despite the cultural qualifier mentioned above, is that within a margin of error, people could theoretically—and perhaps even actually—be compensated for loss of locally harvested renewable resources. Beginning with the conceptual framework, the most common reasons for performing replacement value studies are either: 1) to counter the claim that Native people no longer substantially rely on a standing forest and its products; and/or 2) to provide a quantitative value for non-commercial uses of the forest, usually in the face of some imminent threat such as commercial development or resource extraction. Although both of these reasons are important, the final result is simply a number, a dollar value, that supposedly means the same thing to all people and that can be easily compared, traded off, or bought and sold. The logical conclusion of the original assumption is that if one were compensated adequately—i.e., paid or provided for so there was no need to hunt for food or trap for cash income or cut firewood for heat—then one would no longer do so. When a Native person explains why they live off the land, the most common answer is survival: one does whatever is necessary to make it until tomorrow. Presumably, if a person's home heating fuel and meat could be purchased with a wage and salary or transfer payment income, with some left over for discretionary expenditures, they would have little incentive to enter the uncertain and often difficult world of living in winter bush cabins and tracking moose through a metre of snow.

Yet our survey and interview data suggest that "survival" means much more than simply meeting one's daily caloric and shelter needs (Berkes et al. 1995). The activities associated with living from the land are, to a large degree, what people both in and outside the communities consider to be "traditional culture." There may not be substitutable commodities that could compensate for what would be lost

if the opportunity to hunt and trap were not available to indigenous people whose ancestors lived in the same place, and practiced the same activities for thousands of years before them. Saying the same thing from a different perspective, it is our observation that most Native people are not motivated to hunt solely for economic reasons.

This is not to say that the bush has no economic significance for people. On the contrary, the bush is viewed as an economic safety net—the food and shelter storehouse of last resort—especially for those who cannot or choose not to participate in the wage economy, such as elders, non-English speakers, traditional people, those with disabilities, etc. Many people who do live in the bush almost year round do so because of economic necessity; on the other hand, if they were given all the money they needed to live in town, they would still spend much of their time hunting and trapping, or at least living in an improved cabin in the bush. When asked why they live in the bush, many elders and active bush users said they did so because it was cheaper than living in town. Given their dim prospects for employment, living in the bush also affords them freedom from total dependence on either the state, or relatives, and thus provides a significant degree of self-respect that is impossible to quantify in dollars.

The following example illustrates some problems with translating bush use into simplistic replacement value calculations. A non-Native resident of one of the two study communities did not hunt, yet more than 70% of the meat he ate was harvested locally (and given to him). He estimated he spent about $30/month on store-bought meat for his entire household, and the household consumed meat daily. Saving money and eating what was perceived as high quality meat were the important issues for this non-Native, not actually procuring the meat himself.

A Native respondent in the same study community had hunted eight moose in the survey year, along with 10 beavers, 50 fish, 15 rabbits, 20 grouse, and three porcupines. He estimated that he gave away half of all his catch to other villagers, except for moose, of which he gave away seven of the eight he harvested (87.5%). He also estimated that about 50% of the meat he and his family ate was locally harvested, and about 50% store bought, for a monthly cost of $200. According to our replacement value calculations, this person gave away nearly $12 000 of in-kind income, though he worked for wages 30 hours per week for more than 5 months of the year. If bottom-line economics were the sole concern, this Native respondent is likely to have given away less meat, sold it instead of sharing it (although that would be culturally unacceptable), hunted more, and/or trapped more (he only trapped five martens all winter).

This person further revealed that much of the motivation behind his seasonal wage labor was to acquire cash to purchase the hunting equipment necessary to spend time in the bush. He said he bought meat from the store because he "had the money," thanks to his job. His primary concern was the act of hunting, and ensuring that the animals would be there for his children to do the same.[11] The point here is that financial concerns were not the only, or even the primary, motivations for this person's hunting and fishing. Therefore, financial compensation for reduced hunting or fishing opportunities, based on replacement values alone, would only replace a portion of the welfare lost to this individual.

Calculating replacement value does not and cannot account for these extra-market benefits of subsistence activities. Replacement values are inherently limited to comparing the price of market goods with in-kind income provided by subsistence goods. The idea is rooted in neoclassical "utility theory." The Native person's experience of tracking game and "living off the land" like their ancestors may not be quantifiable in the context of mainstream economic theory. The comparison of subsistence goods with store-bought replacements assumes that consumers are "indifferent" to whether they have market goods or subsistence goods. In fact, respondents repeatedly expressed preferences for subsistence goods over store-bought substitutes.

We did not use contingent valuation or other non-market valuation methods to measure differences in the marginal utility associated with

[11] This is not to say that Native people are indifferent to various types and qualities of meat. They certainly prefer country food and acknowledge its value, but ironically, most replacement value calculations ignore the differences between cuts of meat and the different nutritive qualities, such as protein-to-fat ratios, that distinguish, say, beef and moose.

consuming one additional unit of comparable subsistence and market goods. This would be an interesting issue to research further in the study area.

Replacement value is usually flawed in practice as well as theory. By comparing harvest statistics averaged over a whole community, it may be said that one community is more forest dependent than another, and hence, a replacement value calculation should be higher for the more dependent community. But in small, isolated communities such as those in the Canadian North, where economic opportunities and alternatives are limited, the use of averages to represent a community's harvest activities only tells part of the story. One must consider the welfare of individuals as well as the welfare of communities. Individuals' needs and forest dependencies do not always match the forest-dependent communities in which they live. It is important not to draw conclusions about individual welfare based on such aggregate data. This is an error of specification that stems from the difference between averages and margins. Once again, examples best illustrate these points and highlight the importance of considering distribution issues related to changes in resource use.

Our survey included one widowed Native woman, more than 80 years old, who snared more than 100 rabbits in the survey year. According to replacement value calculations, this amounts to 86 kg of meat and $383.70 in replacement value for meat. On a per capita basis, this woman is much less forest dependent than the "average" community member. Yet those 100 rabbits were critical for that respondent's self-reliance. Without them, she would have had to rely more heavily on welfare and the support of her extended family, or have gone without. Thus 100 rabbits were a critical component of this respondent's well-being.

Consider the Native elder who lives in the bush because he cannot get a job, has failing eyesight, is no longer able to hunt moose, but still sets fish nets under the ice. Not only are his late-winter protein needs met with his shift toward more fish, but he also has extra fish that he can barter for other goods and services, such as firewood that he has difficulty cutting and hauling himself. The per capita average of community dependence on moose does not reflect his needs nor his abilities; he is on the margins, and requires an alternative means of providing for himself. Logging or other resource developments may result in improved moose habitat; however, those same resource developments may cloud streams, or raise the temperature in lakes used for fishing, thus jeopardizing this elder's survival, or at least his ability to provide for his own needs. The net benefits to the community of resource development may still be positive, but it is important to consider the distributional effects that such development may have for individuals in the community whose circumstances are not "average."

Finally, consider the 28-year-old, able-bodied, Native male who is employed full time and spends his wages on a snowmobile and an all-terrain vehicle to get out on the land. This person harvested many animals, large and small, well above the community average. From a replacement value standpoint, he is more forest dependent than others in the community, as the monetary value of what he harvests from the forest is great. From another perspective, he doesn't need the forest for his livelihood. As a full-time wage earner, he has earned enough money to become independent of the forest. This same person gives most of his small animal pelts, such as squirrels and muskrats, to village children, and encourages them to sell the pelts to the local store, so the children will know the value and importance of furs when they grow up. Often those with the best (and most expensive) equipment harvest the most from the forest; consequently, those people appear to be the most forest dependent, according to replacement value calculations and per capita averages. Clearly, this person's behavior illustrates that what he gets from in subsistence activities transcends the simple replacement values we can calculate for the goods he harvests. This person is also on the margin, but a very different margin from the previously mentioned elder. In this case, as in many others, community averages of replacement value calculations poorly represent this individual.

Forest dependence takes many forms and exists in varying degrees, for regions, communities, households, and individuals. To measure the many types of forest dependence at the household or individual level, one would have to determine how much of household or individual income was derived from forest activities, add to that number the in-kind contribution of the forest, and derive a forest dependence index from that data for each unit of interest. We had neither the time, resources

or data to make such calculations; however, we recognize that analysis at the community level may underestimate the importance of subsistence forest dependence for some individuals.

Contemporary and Historical Use of Country Food

There is very little quantitative historical data from the lower Liard valley for subsistence and non-industrial forest dependence. It is also difficult to evaluate the accuracy of the data for studies that do exist; however, Higgins (1968) and Bissett (1974) provide some important comparison points. Moose harvests, for example, are currently as large or larger for the study communities than at almost any time in the period documented by these studies (tables 12 and 13). Some locals suggest that people don't use the bush anymore, or at least not as much as they used to. The results of this analysis suggest the opposite. Human population in the study area has increased steadily since the 1960s. Non-traditional foods have become more available and accepted. The result of these two trends is likely to have been a decrease in the per capita consumption of subsistence goods. At the community level, however, the amount of country food (especially moose) circulating at presumably sustainable harvest levels[12], has stayed much the same over the past 35 years. Other harvests, such as bear and goats, have increased significantly from the past, while elk is a recently introduced species that many expect in the near future to provide sustainable harvests much greater than caribou. In general, there is no single game species for which contemporary harvest levels are not at or near peak values from the historical study period.

Survey respondents were asked what percentage of their fish and meat come from the bush (whether harvested or received as a gift). In Fort Liard, respondents said an average of 69.7% of meat and fish comes from the bush. In Nahanni Butte, it was reported that 61.9% of fish and meat comes from the bush. While a few respondents from Fort Liard said that none, or 1% of their fish and meat came from the bush, in Nahanni, the single lowest response was 25%.

Respondents were also asked how much they spent per month on purchased meat and fish. Fort Liard residents said they spent, on average, $127.60 per month on purchased fish and meat. Nahanni Butte residents said they spent, on average, $200.83 on purchased fish and meat. The higher figure is partly explained by higher store prices in Nahanni Butte. It also relates to the lower per capita consumption of country food in the smaller community.

The one area in which bush use has appeared to decline dramatically is in the consumption of fish. Question 14 of the survey asked, "Has there been a change in the amount of fishing done by you and/or others in your community in the past five to ten (5–10) years? If yes, why do you think this has occurred?" This question was intentionally open-ended, in the hope of engaging people in conversation and observation about perceived changes. According to our data (Table 14), 72% of Nahanni Butte and 47% of Fort Liard respondents claimed there had been no change or that fishing had increased over the last decade. In both communities, "No Change" was the single largest response offered. Only 28% of Nahanni Butte respondents and 38% of Fort Liard respondents said that fishing had declined in the last decade or so, while the rest said that they didn't know or were not aware of the change.

From discussions based on the second part of this survey question (i.e., "why do you think this occurred?"), it should be noted that there was widespread agreement that fishing had declined in the last several decades, but less dramatically in the recent past. The initial drop in fishing appears to have occurred suddenly when the widespread adoption of snowmobiles reduced the use of dog teams for winter transportation. While human consumption of fish has remained relatively constant given a growing population, the demand for fish as dog food has declined dramatically. Incidently, the decline in demand for fish has been accompanied by a need for more cash to pay for and maintain snowmobiles.

We asked respondents what times of year they were more likely to be active in the bush, but not how much time people actually spent living on the

[12] We asked respondents if they felt there were enough moose, beaver, and marten to meet the needs of the community. Results are presented in Table 15. Most suggested that the species used for food, moose and beaver, are adequately stocked relative to community needs.

Table 12. Historical and contemporary harvest of game species, Fort Liard

Species	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969–70	1970–71	1971–72	1993
Moose	135	104	121	139	150	175	160	97	120	90	109	89	31	84	70	159
Caribou	21	10	15	30	25	20	15	13	22	–[a]	–	14	1	0	1	21
Elk	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	5
Deer	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2
Sheep	8	11	–	–	–	–	1	2	2	–	–	1	2	5	0	11
Goat	–	–	–	–	–	–	–	1	–	–	–	–	–	–	1	8
Bear	–	37	39	17	26	20	28	22	20	16	18	37	26	31	27	49

Sources: For 1957–68, Higgins (1968); for 1969–70 through 1971–72, Bissett (1974).

[a] Dashes indicate no data.

Table 13. Historical and contemporary harvest of game species, Nahanni Butte

Species	1964–65	1965–66	1966–67	1967–68	1968–69	1969–70	1970–71	1971–72	1993
Moose	41	38	35	30	26	17	24	46	49
Caribou	8	0	0	0	0	0	0	17	0
Elk	0	0	0	0	0	0	0	0	0
Sheep	1	1	1	0	1	3	3	0	0
Goat	–[a]	–	–	–	–	–	–	–	0
Bear	9	13	10	13	14	19	9	20	2

Sources: For 1964–65 through 1971–72, Bissett (1974).

[a] Dashes indicate no data.

Table 14. Perceived change in amount of fishing, 1980–90s, Fort Liard and Nahanni Butte

Community	Increase (%)	Decrease (%)	Same (%)	Don't know (%)
Fort Liard	8	38	39	15
Nahanni Butte	0	28	72	0

land. Regardless of how much time is physically spent living on the land, it is clear that a large proportion of the dietary needs of these communities are derived from the land. This was true in historical times, and remains true today.

Trapping

Trapping also remains an important activity in both communities. In Fort Liard, 61.9% of households trapped either beaver or marten in 1993–94. In Nahanni Butte, 44.4% of households trapped the same species during the same season. Our data also suggest that trapping is not declining in either place. Many young people continue to trap. The average age of those who trapped was 46.2 years in Fort Liard, and 46.5 years in Nahanni Butte.

The figures presented in tables 4 and 5 need to be viewed with caution because of the fluctuations in furbearer populations and pelt prices. Rabbit populations exhibit 7-year cycles, so do rabbits' predators, such as mink, marten, lynx, and others. Hence, any single year is likely to be a poor estimate of the average. Many respondents said the survey year (1993–94) was a poor year for rabbits, squirrels, muskrats, marten, mink and lynx, but that all were making a comeback in the present year (1994–95). Using data collected during several consecutive years will always be more representative of average harvest levels than data from any 1 year, given the cyclical trends in many species of harvested wildlife.

Market factors also influence human behavior with respect to harvest effort. Many respondents said that they could have trapped more beaver, but pelt prices were too low to make it worth the effort. Beavers were primarily trapped for meat and subsistence craft needs, such as moccasin and mitten trimming for local use. In the current harvest season (1994–95), however, pelt prices had increased significantly for many species, and it could be expected that the winter's harvest will increase from the figures from 1993–94 reported above. Annual trapping activity will fluctuate because most of the animals trapped, other than beaver, are for export and not for direct local consumption in the form of meat. External market forces are the most important factor in determining both the mix of species trapped in a given season and the level of harvesting effort.

Another influence on trapping activity in the study area relates to the legal realities of hunting versus trapping in the Northwest Territories. Most of the respondents were adult Native males, many of them community elders. These elders often receive old age pensions from the federal government. Any income received from trapping is deducted from their pension amount, removing virtually all financial incentives to trap. Although unlimited hunting is still allowed, these elders are perhaps the only adult male in the extended family with the time and equipment to continue trapping, as their children live in town and raise their own families, have wage labor jobs, etc. Trapping is still part of these elders' identity and occupies time that might otherwise be idled away.

Despite all of these caveats, the trapping data collected in the forest use survey are at least representative of the most active trappers' harvests for what may or may not be a representative year. Taken with the historical data, there is reliable evidence that trapping remains a significant and important component of local culture and economy, though diminished from years ago. To best account for the inherent population swings and the market forces that have an impact on annual harvests, we recommend long-term monitoring of harvest levels with periodic analysis to determine representative averages and baseline carrying capacity. Significant changes in harvest levels over time would warrant further studies. Declines could be caused by behavioral changes, policy changes, declining productive capacity of the ecosystem or interactions between these causal variables.

Other Forest Products

Next to country food, fuel wood is the second largest economic in-kind contributor of the forest uses considered in this study. Both communities expressed a strong preference for spruce over other types of wood, though birch and aspen are also used. Given the commercial potential for spruce, and the strong preference of the communities for the same species for domestic fuel, detailed forest management planning must be undertaken to ensure that commercial forest ventures do not compromise the communities' access to fuel wood in perpetuity.

Sales from the crafts shop are nearly equivalent to the income-in-kind derived from firewood in Fort Liard. The craft shop has a new building, and sales of traditional crafts are likely to continue to increase in the future. Craft sales are currently less important to Nahanni Butte residents.

We did not attempt to attach a dollar value to the use of traditional remedies and medicine, but certainly these activities fall into the "income-in-kind" category that replacement value calculations hope to measure. To the degree that these home-made medicines replace over-the-counter purchases, the home remedies represent direct income-in-kind from forest products. To the extent that these bush medicines replace visits to the nursing centers and hospitals, the traditional medicines represent savings to the public health care delivery system. While the practice of traditional medicine is probably not increasing, the percentage of people using these medicines, as noted above, is significant. Again, we are not able to incorporate the value provided by bush medicine into our total valuation of subsistence and non-industrial forest products; consequently, the estimate that we do make is likely to err on the conservative side.

DISCUSSION AND POLICY IMPLICATIONS

Financial compensation based on replacement values would never adequately replace what subsistence and non-industrial forest users of the lower Liard valley would lose if commercial, market-oriented, resource developments were to reduce the opportunity to participate in traditional harvests. That is not to say that any increase in logging or oil and gas exploration or development would lead to a decreased bush harvest. On the contrary, there may be some complementarities. Moose tend to frequent "edge" habitat (between mature sites and sites disturbed by fire, disease, or harvest). Proponents of clear cutting often claim the practice increases moose habitat. Given the major role that moose plays in the diet of valley residents, some clear cutting may increase access to moose and thus increase social welfare. Commercial forestry may increase access to firewood and provide significant amounts of firewood through harvest residues. Before commercial development of the valley occurs, however, an important question needs to be answered. Would valley residents consume more moose if it were available, or are they currently at or near the satiation point for that commodity? Elders who live in the bush rely more on fish and small game than moose. Water quality may be compromised by logging with negative impacts on fish populations, and clear cuts do not enhance habitat for rabbits or squirrels. Therefore, logging may decrease numbers of small game available for food, as well as decrease lynx and marten populations. The communities should be given the opportunity to choose the mix of market and subsistence economies with which they are most comfortable.

While young and middle-aged people in Nahanni Butte and Fort Liard are likely to be hired in the event of increased forestry jobs, elders who depend on the bush for food and income from crafts and fur may bear a disproportionate amount of the social cost associated with resource development. Some may be willing to make such a sacrifice in order to keep their children and grandchildren employed in these communities; however, such issues should be addressed explicitly in resource management planning (e.g., surveys could be done to determine if this is indeed an opinion held by a majority of elders). As has been demonstrated with several examples, the bush represents a critical social safety net for those unable to find work, or find work consistently. For some, the bush economy is a choice, for others it is a necessity. For the latter group, individuals and households at the margins of society, the importance of forest resources in providing sustenance and self-respect should not be underestimated.

In addition to elders, women may be vulnerable in the event of a major change in forest resource use. Women are rarely hired in commercial forestry occupations, yet they are active participants in the bush economy. Commercial forest development could change not only the stream of benefits derived from the forest (from subsistence goods to wages and profits), but it could also result in a change in the distribution of benefits. With in-kind benefits from the forest, men and women both contribute labor toward creating usable products from forest resources. In other words, men and women depend on each other in the traditional, bush economy; however, if the local economic system becomes more market oriented, and the employment opportunities are geared more toward men (e.g., forestry and/or oil and gas jobs), then women will almost certainly become more economically dependent on men.

Some groups may be better able than others to reap benefits from changes in resource use. Attention must be paid to how benefits are distributed under different resource-use scenarios. An important finding of this study is the widespread distribution of subsistence and non-industrial benefits from the forest, through direct participation or sharing. Today, everyone benefits from the forest. Under different resource management scenarios, would benefits to the community be as evenly distributed? If commercial developments in forestry mimic those in the south, where owners collect profits, resource workers receive wages, and service workers receive even lower wages, the benefits of commercial forest development are likely to be less evenly distributed than benefits currently derived from subsistence and non-industrial forest harvests. Alternatively, if community ownership and management of commercial forestry operations existed, and profits were distributed widely throughout the community, or used to provide services to the whole community, then a wide distribution of benefits could be achieved. Currently, sharing networks are extensive in the traditional, bush economy; however, no one reported sharing cash income with members outside their household. As the local economy becomes more market oriented, the practice of sharing that has traditionally dispersed the benefits of the forest widely will almost certainly decline.

Population trends should also be considered in future forest management planning. The population of Nahanni Butte has grown by 40% since 1967. Fort Liard has grown by over 112% during the same time (Higgins 1968; Statistics Canada 1993). Given the high levels of subsistence and non-industrial use of forest products, questions of sustainability arise--even in the absence of removals of land for traditional activities through logging, oil and gas exploration, or preservation. Locals perceive key resources to be in fairly good supply. We asked respondents if there were enough marten, beaver, and moose to meet the current needs of the community. Results from that question are summarized in Table 15. Marten is the only species widely agreed upon to be in flux, or in recent decline. As previously mentioned, marten was in the low part of a natural cycle, but regardless of that, many said that

Table 15. Perceived abundance of marten, beaver, and moose, Fort Liard and Nahanni Butte

Species	Inadequate supply (%)	Adequate supply (%)	Don't know (%)
Fort Liard			
Marten	40.8	33.8	25.3
Beaver	1.5	77.5	21.0
Moose	14.1	78.8	7.1
Nahanni Butte			
Marten	55.5	16.6	27.8
Beaver	0.0	83.3	16.7
Moose	11.1	77.8	11.1

Note: 71 of 135 households were surveyed for Fort Liard residents, and 18 of 25 households were surveyed for Nahanni Butte residents.

contemporary marten populations in general are significantly smaller than they were a generation ago. Moose and especially beaver appear to be quite abundant given current use levels and population; however, increased use and/or increased human population growth could change those perceptions and the reality.

Commodity production for exchange (forestry, mining, oil and gas development) does not always produce negative effects in bush economies. The relationship between industrial and non-industrial resource use is complex. Subgroups within the communities may benefit disproportionately, and such factors need to be addressed when considering significant changes in land use. Many respondents expressed concern over an increase in forestry operations in both the narrative and quantitative surveys (*see* Appendix 2); however, many also said that some commercial development of local timber would be acceptable if the benefits accrue locally, if subsistence users and trappers are always kept well-informed about logging operations, and if there is substantial ongoing local input into forest management and planning.

Population trends, the needs of distinct groups within the community such as women and elders, and distribution of potential benefits of alternative resource uses all need to be considered before major resource developments are undertaken. Changes in the land will undoubtedly, and perhaps irrevocably, change life in Fort Liard and Nahanni Butte. The people who live in these communities are directly tied to the land in a way that is increasingly unusual in North America. If the present culture and lifestyle in the lower Liard valley are valued by local people, then those people must work in partnership with territorial and federal governments to ensure that there is truly integrated, comprehensive planning of natural resources in the valley.

ACKNOWLEDGMENTS

The authors thank Elizabeth Bertrand and Margie Lomen of the Nahe-Ndeh Centre, Mike Labine, Craig Robinson, and the other staff at the Department of Renewable Resources, Government of the Northwest Territories, Eva Hope for providing data on crafts, Louis Poliquin of the Canadian Forest Service, Karen Wiley of Arctic College, and Rick Hagen, Steve Melesku, Harry Deneron, and other members of the Lower Liard Valley Integrated Resource Management Committee for their support. The assistance of Phillip Betthale, Molly Duntra, Mary Sassie, Adeline Marcellais, Julie Capot Blanc, Jimmy Kotchea, Kevin Bertrand, Anna Sassie, and Lucy Bertrand is greatly appreciated. Tim Williamson of the Canadian Forest Service and Cliff Hickey of the University of Alberta provided useful reviews of the manuscript. The project would not have been possible without the cooperation of the residents of Fort Liard and Nahanni Butte. Funds for the project were provided by the Canada–Northwest Territories Cooperation Agreement in Forestry.

REFERENCES

Adamowicz, V.; Beckley, T.; Hatton MacDonald, D.; Just, L.; Luckert, M.; Murray, E.; Phillips, W. 1994. In search of forest resource values of Aboriginal Peoples: the applicability of non-market valuation techniques. Univ. Alberta, Dep. Rural Econ., Edmonton, Alberta. Staff Pap. 94-08.

Banfield, A. 1974. The mammals of Canada. University of Toronto Press, Toronto, Ontario.

Berkes, F. 1983. Quantifying the harvest of native subsistence fisheries *in* R.W. Wein, R.R. Riewe, and L.R. Methven, eds. Resources and dynamics of the boreal zone. Assoc. Can. Univ. North. Stud., Ottawa, Ontario.

Berkes, F.; George, P.J.; Preston, R.J.; Hughes, A.; Turner, J.; Cummins, B.D. 1994. Wildlife harvesting and sustainable regional Native economy in the Hudson and James Bay Lowland, Ontario. Arctic 47(4):350–360.

Berkes, F.; Hughes, A.; George, P.J.; Preston, R.J.; Cummins, B.D.; Turner, J. 1995. The persistence of Aboriginal land use: fish and wildlife harvest areas in the Hudson and James Bay Lowland, Ontario. Arctic 48(1):81–93.

Bissett, D. 1974. Resource harvests: hunter-trappers in the Mackenzie Valley. Environ.-Soc. Comm., North. Pipelines, Task Force North. Oil Develop. Rep. 74-42.

Brody, H. 1982. Maps and dreams. Douglas and McIntyre, Vancouver, British Columbia.

Godfrey, W.E. 1966. The birds of Canada. Natl. Mus. Can., Ottawa, Ontario. Bull.203, Biol. Ser. 73.

Government of the Northwest Territories. 1995. Bureau of Statistics, Statistics Quarterly 15(3).

Great White North Productions. n.d. Come north to the tropics. Great White North Prod. Brochure.

Higgins, G. 1968. The lower Liard region: an area economic survey. Dep. Indian Aff. North. Dev.,Ottawa, Ontario. AESR 68/3.

Honigmann, J.J. 1946. Ethnography and acculturation of the Fort Nelson Slave. Yale Univ. Press, New Haven, Connecticut.

James Bay and Northern Quebec Native Harvesting Research Committee. 1982. The wealth of the land: wildlife harvests by the James Bay Cree, 1972–73 to 1978–79. Quebec City, Quebec.

Lamont, S.M. 1977. The Fisherman Lake Slave and their environment: a story of floral and faunal resources. Masters thesis, Univ. Saskatchewan, Saskatoon, Saskatchewan.

Moss, E.H. 1983. Flora of Alberta. 2nd ed. Revised by J.G. Packer, Univ. Toronto Press, Toronto, Ontario.

Paetz, M.J.; Nelson, J.S. 1970. The fishes of Alberta. Queen's Printer, Edmonton, Alberta.

Smith, H.C. 1993. Alberta mammals: an atlas and guide. Prov. Mus. Alberta, Edmonton, Alberta.

Statistics Canada. 1993. Selected characteristics for census divisions and subdivisions, 1991 Census—20% sample. Minist. Ind. Sci. Tech., Ottawa, Ontario.

Tobias, T.N.; Kay, J.J. 1994. The bush harvest in Pinehouse, Saskatchewan, Canada. Arctic 47(3):207–221.

Usher, P.J. 1976. Evaluating country food in the Northern Native economy. Arctic 29(2):105–120.

Western Auction Company. 1994. Price list for May 1994. Vancouver, British Columbia.

APPENDIX 1
FOREST USE SURVEY FOR THE COMMUNITIES OF FORT LIARD AND NAHANNI BUTTE

Forest Use Survey

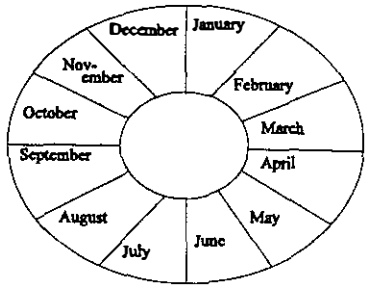
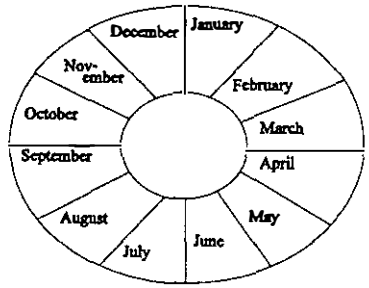
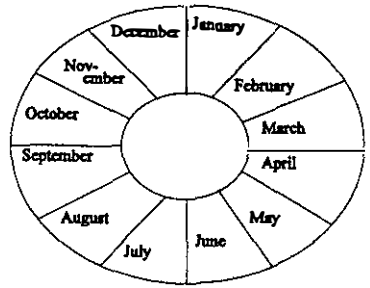
For the Communities of

Fort Liard and Nahanni Butte

The following survey will help us to understand how you use the forest. Your responses are confidential, and will only be reported at a community level. A trained surveyor will ask you a series of questions and s/he will record your answers in this survey. S/he will also provide whatever other assistance they can, such as explaining or interpreting questions. We hope the results of this survey will be of use to you and your community. Thank you very much. Your time and effort are appreciated.

	Head of Household	Person 2	Person 3
Survey#:			
1. Gender			
2. Relationship to head of household			
3. Ethnic Status	1. Dene 2. Metis 3. Caucasian 4. Other (specify) _____	1. Dene 2. Metis 3. Caucasian 4. Other (specify) _____	1. Dene 2. Metis 3. Caucasian 4. Other (specify) _____
4. Years lived in Ft. Liard // Nahanni Butte			
5. Age			
6. Highest level of schooling			
7. Did you harvest anything from the forest last year (1993), including wild game, birds, fur bearers, fish, firewood, berries, or other trees or plants for food, crafts, medicines, or other usses? **> If No: Skip to Q 27.**	Yes _____ No _____	Yes _____ No _____	Yes _____ No _____
8. What animals did you harvest last year? (ask about small game, birds, fish, etc).			
Note: For each type of animal harvested last year, please answer the questions on the separate Species Page. **Please write the type of animal at the top of the page.**			

9. Do you think there are enough **Martens** to meet your needs and the needs of the local community? > **If No:** Why not? > **If Yes:** If your needs and the needs of your community increased, could more Martens safely be harvested from the forest?			
10. Do you think there are enough **Beavers** to meet your needs and the needs of the local community? > **If No:** Why not? > **If Yes:** If your needs and the needs of your community increased, could more Beavers safely be harvested from the forest?			
11. Do you think there are enough **Moose** to meet your needs and the needs of the local community? > **If No:** Why not? > **If Yes:** If your needs and the needs of your community increased, could more Moose safely be harvested from the forest?			
12. Are there any wild game, bird, or fish species that are becoming harder to find? > **If Yes:** what are the species and why do you think they are becoming harder to find?			

13. Are there any wild game, bird, or fish species that could safely be harvested more by the community? **> If Yes:** what are the species and why do you think there are so many?			
14. Has there been a change in the amount of fishing done by you and/or others in your community in the past five to ten (5 - 10) years? **> If Yes:** why do you think this has occurred?			
15. Are there certain times of year when you are out in the bush the most? If yes, when?			
16. Did you harvest firewood last year? **> If No:** skip to Q 20.			
17. How much did you harvest? (truckloads, toboggan loads, etc)			

18. How much of your firewood harvest was used for the following?	Household use _____ Commercial Sale _____ Sharing _____ Other (specify) _____	Household use _____ Commercial Sale _____ Sharing _____ Other (specify) _____	Household use _____ Commercial Sale _____ Sharing _____ Other (specify) _____
19. What kinds of trees do you prefer for firewood? (spruce, birch, etc) Why?			
20. Did you harvest wood or other tree parts for crafts or other reasons (**NOT** for firewood) last year? **> If No:** Skip to Q 22.			
21. What tree parts did you harvest and what did you use them for? (Example: birch bark or spruce roots for baskets, logs for houses) **Use back of sheet if necessary.**			
22. Did you harvest any berries in the past year? **> If No:** Skip to Q 24.			
23. What kinds of berries did you harvest, and how much of each (in pails or buckets)? **Use back of sheet if necessary**	Type of Berry Amount	Type of Berry Amount	Type of Berry Amount

24. Did you harvest other things from the forest, like plants or vines, for food, medicines, or other reasons (This does NOT include wood, other tree parts, or berries.) For each material harvested, specify the amount and use. **Use back of sheet if necessary.**	**Material** **Amount** **Use**	**Material** **Amount** **Use**	**Material** **Amount** **Use**
25. Are there **any** plants or trees that are becoming harder to find? > **If Yes:** Why do you think they are harder to find?			
26. Are there **any** plants or trees that the community could safely harvest more of? > **If Yes:** What kind(s) of plants or trees, and why do you think it could be harvested more?			
27. About how much of the total meat and fish that you eat is obtained by local hunting and fishing? **(By Household)**			
28. About how much do you spend on store bought meat each month? **(By Household)**			
29. Were you employed in the last year? > **If No:** Survey is FINISHED! Thank you for your time. Is there anything you would like to add?			
30. Were you employed in a forestry job such as logging, fire protection, crafting or guiding last year? > **If No:** Skip to Q 32.			

31. What kind of job(s) and how much time did you spend at this job(s) in the last year? (specify hours, weeks, months, etc)	Logging/harvesting _____ Fire control _____ Reforestation/silviculture _____ Trucking _____ Mill work _____ Crafting _____ Guiding _____ Trapping _____ Other (specify) _____	Logging/harvesting _____ Fire control _____ Reforestation/silviculture _____ Trucking _____ Mill work _____ Crafting _____ Guiding _____ Trapping _____ Other (specify) _____	Logging/harvesting _____ Fire control _____ Reforestation/silviculture _____ Trucking _____ Mill work _____ Crafting _____ Guiding _____ Trapping _____ Other (specify) _____
32. Were you employed in an industry other than forest products last year? (Example: construction, office work, etc) > **If No:** Survey is FINISHED! Thank you for your time. Is there anything you would like to add?			
33. What kind of job(s) and how much time did you spend at this job(s) in the last year? (specify hours, weeks, months, etc)			
Survey is FINISHED! Thank you for your time. Is there anything you would like to add?			

SPECIES PAGE **Survey #**_____ Initials _____			
TYPE OF ANIMAL:_____			
A. How many of this animal did you harvest last year?			
B. Why did you harvest this animal? **Circle all that apply.**	Food Fur/Hide/Skin Other Body Parts Religious Culture/Traditional Medicine Recreation Other (list)	Food Fur/Hide/Skin Other Body Parts Religious Culture/Tradition Medicine Recreation Other (list)	Food Fur/Hide/Skin Other Body Parts Religious Culture/Tradition Medicine Recreation Other (list)
C. What parts of the animal did you use, and for what? **Use the back of this sheet if necessary.**	Part Use	Part Use	Part Use
D. How much of your harvest did you share with others NOT in your household?			
E. Who are the people you shared with?			
F. Did you trade some of your harvest? **>If Yes:** What did you receive in return?			

APPENDIX 2
COMMENTS OF SURVEY RESPONDENTS

(surveyors initials in parentheses)

During the narrative, trappers' surveys, respondents were asked some questions about how logging affects trapping, and their perceptions or experiences regarding commercial timber development. During the community survey, respondents often asked why we were doing the survey, and when we explained that it was to provide information for the Integrated Resource Management Plan, people often volunteered opinions about logging or forest management. Also included below are statements about sharing bush harvests, the importance of the bush economy to elders as a safety net, the importance of the bush economy to the culture, and other selected comments.

1. **Selected comments from trappers survey (March 1994)**

It would be good if they slowed the cutting. (tb/md)

I really like it out in the bush. Living on the land is very important and very good. You don't have to ask for water or firewood. You don't have to suffer. You can do things for yourself. (tb/kb).

It is good to share meat. Whoever shoots a moose always shares with the people. That is good. (tb/md/jk)

Why go in town? We like the bush better. (tb/md/jk)

With all the trees, one can't walk or hunt through the thick forest. Cut lines are good. (tb/jk/md)

Logging is only good if it is done in small areas, small blocks. If logging is done, it will be cleared all over, which is no good for the moose. Small patches are better than large clear cuts. (tb/jk/md)

If logging is to be done on traplines, it will be no good. People make a living on trapping fur and all the animals will move away. (tb/jk/md)

Trees are very important. They keep the temperature normal. In the open spaces it is really cold. People use the wood. The trees should be managed. It is very important to manage the forest. Animals travel in the bush only. They need to move around in the forest. Around cut lines there are less animals. Animals cut across cut lines. The furbearers go in the dense forest, so narrow trails like moccasin trails are better. The elders like the bush where they grew up. Without the elders, the younger generations probably will not go on the land. I don't know how long the people here will continue to live on the land. I can't predict the future. (tb/jk/md)

I like it in the bush. when I am in town there is nothing to do. I like the bush because there is wood to get, snow for water. Logging will ruin everything for trappers. If a trapper is on an island he will be OK. Logging is no good in a trapping area because the forest will be clear cut. If it is clear cut, trapping will be ruined. Logging will be OK only if it is only done in small blocks. You need to leave some trees for animals. (tb/jk/md)

There are some burial sites around Sandy Lake that should not be logged. (tb/jk/md)

Where you hunt is very important. It isn't just that you hunt. Continuing the tradition means hunting on the land that your father hunted. I worked hard to build and maintain the cabins and to maintain the trails. The cabin is still there, but the forest was cut right down to the edge of the river. There is only a small patch left around my cabin. (tb/jk/md)

How can I afford to live in town? I have no job, no money. Living in the bush is good. I get rabbit and small game. (tb/jk/md)

In the fall we get meat for the winter. We give meat to people who ask. I give meat even to people who don't ask me. (tb/jk/md)

2. **Selected narrative comments from community survey (October–November 1994).**

Surveys about our environment and habits are important. We need to show how we use the land. Logging is coming whether we like it or not—we should prepare for it, not fight it, but figure out how to take advantage instead of losing out. (1bh)

You should try to get videotape of the logging already done, not just questions and numbers. We don't want the land bare for our kids. (3bh)

If done properly, there are lots of spruce logs for logging. We need to maximize jobs, not revenue. Logging will also need lots of community input and oversight. (7bh)

Be careful about selective cutting—it needs to be done right. Don't do what was done in B.C. Cut away from the highway. (11bh)

My people have never seen the government before doing something to help us. Good to see people from government to come here again with the paper and camera. If they want something from our land, need to come here face to face—we don't believe only paper from the government. Our leaders scare the people with the government and lots of people are now scared, they don't want to say too much to the government. It would be good for the government to help our elders in the bush. If they want trees or gas from our land, good to trade something like tools to survive in the bush, power saw, plywood, ski-doo. Money is not good. We don't like them taking trees across the border. We used to stay in log houses and use dog teams; we didn't pay much money. Today, we pay for water, power, sewer, gas and food and our kids go to school; we're stuck in town. We should use the trees here for log houses and doors and floors and roof. We need help to do things like this; now the government says not enough money to build houses in town, but log houses could be here for generations. There should be log houses here again. We know how much money you get for one tree, but it takes long time for one tree to grow back. We have lost lots of elders and now we will be losing lots from our land. We need to talk aboutthis. There are lots of government houses in town. Thanks for the house. We need to work together if you want something from our land. Whoever sees this paper, thank you for reading this. (15bh)

I feel very strongly that we should exist in harmony with our environment. We are lucky to live in such a natural, undisturbed area, when so much of the rest of the planet has been destroyed. We should guard it jealously against industrial development, and fight those who would trade it off for the trappings of modern society, robbing future generations of something we tend to take for granted. We can live healthy, prosperous lives without destroying everything around us. We live in a unique area, the "Rainforest of the NWT." More and more people from around the world are travelling here to see it. Ecotourism is the most environmentally friendly industry—we should be doing more to promote and develop this forest use. (17 bh)

I can live on the land with nothing but matches. Come back in a few years and re-survey to see what's changed. The bush is our food and our job. We'll tell you about our land again. This is the truth. (20 bh)

If you do logging, need to do it right. Trapping is fading out. (21bh)

Logging with contractors doesn't help community people. Contractors leave garbage and take logs. Logging needs to help community, by being labour intensive; use chain saws, not machines. Logging could be bad for hunting and trapping. We need more surveys like this, more often. Surveys should be done before any activity occurs, to let people know what's coming. Workshops should happen before tree cruising. IRM should be complete before any more cutting. Surveys should be done after spring hunting, or in general, right after hunting seasons. (23bh)

I support logging with proper controls, including buffer zones around highway and rivers. Designated land use areas for tourism, hunting, logging. Logging and tourism can work together, such as logging a mountainside and then downhill skiing. I have aesthetic concerns about logging activities. Need to consider people who live here and will stay here. Need to log properly. I'm concerned about the IRM committee and outreach to the community because not everybody is being asked their opinion on

logging. Is there full representation on the Committee? What is the consultant doing to ensure that? (25bh)

The survey needs to account better for how people live. Not everybody lives traditionally. Survey is too rigid. There is space here for every kind of industry if it's not polluting and is in tune with nature. Logging (small scale, responsible) can happen if it's done properly. Careful use of nature. Space for small sawmill to produce finished product, like fine furniture. Good quality wood, use it well. Size of demo project is too big. Trees are for more than money. This valley is too small to sustain large scale logging. We need a bigger bang for the buck for responsible money making. Let's grow food here and create jobs. There's too much waste of animal parts. We need to have a workshop with young and old to learn to not waste animal parts and other things from the land. Nobody should be allowed to hunt from the highway, only ½mile away. The NWT government should stop allowing people to hunt from the highway. (1bh/md)

Every year going down; harder and harder to trap for a living. Government needs to help. To do this kind of survey is good. Government needs to trade with the people. Cut lines all over the land; harder to live for Indian people on land, because of cut road, drilling. Should help our people with something, like power saw—something to build with. Cut roads are for money and drilling, not people who live on the land. I hope something is done with this survey; if not, I won't answer again. Never did this kind of survey before. (2pb)

Use to trap upriver, but now too many seismic lines, too hard to trap. Government needs to help us preserve the land, not tear it up. Should help with trade, like tools for in the bush, not money. Companies should pay if they make cut line and take out trap from land. (3pb)

In 1987 they logged on my trapline (in B.C.). Lost over 100 traps. 1986 was a good year—over 100 marten. Clearing my trapline is like robbing my bank. I got kicked out of my trapline—had cabin and everything; Game Warden pushed my trap out. Government doesn't help me at all. I try to trap again this winter, but they are cutting more on my line this winter. Used to be my grandfather's trapline, then my father's, now mine. I was to take care of it, but they cut it down. I still pay for trapper's license in B.C., so it's still my line. If traplines get logged, government should help people with tractor for a garden. (5pb)

Clear cutting is bad. Not good for Native people. Cutting logs scares moose. More elk now because of cutting in Yukon and B.C., they are coming here. Getting tougher every year. (7pb)

All the logging on the highway, taking trees. Who is doing this? Why? Something wrong with this. Oil drilling is same as logging—bad. Before they drill, they should tell us. Then we will know what is going on. Not telling us the truth is like stealing from the people. (20 pb)

Good to know before they cut trees. People living in tent, staying in bush, don't have good tools. Need to help us with tools, plywood, roof, floor. They take our trees away, so they should give us something in return. (21pb)

Government should pay for skidoos and bush tools. They did it once, 6 or 7 years ago, why not now? I can't see in my left eye, so I need help building a bush cabin. (22pb)

When school kids grow up, they will need the trees and the bush. Leave them for now, or do something good with the trees, not just sell them. We like log house, and they sell them down south for lots of money. We know what's good, and log house is good. Why no more log houses built in town? We have big family, our house is too small. (25pb)

We need help to build log house in town. We stay in bush for long time, and Band ignores us. (26pb)

Don't live in town. Live in bush. Can't find rabbit in town. Good that government does this kind of work with the paper. Need to work with the people, listen to them, say things in Slavey, trade with the people. (27pb)

Old age pension from government is good for elders; we use it for everything. They may be drilling for oil on my trapline—I don't know what's going to happen—they drill close to here already. If they do drill here, they should help

me with skidoo. Need plywood for my bush cabin. (31pb)

When they cut trees down, they need to tell the people. Not just with public meeting, but door to door. They should only cut trees 30 miles from town. If they cut close to town, need to get approval from community. (40pb)

Good when government helps people. We need help with power saw, skidoo, kicker engine, things so we can help ourselves. Fur prices too low, everything in town too expensive. People in tough times need help. Band doesn't help us. Can't stop logging, but need to do it in good way. (42pb)

Need help testing for hanta virus and water pollution. I don't like what's going on. We need more information. All I see are trucks and cutting. Clear cuts in B.C. are ugly. (4ms)

Cutting trees is not good for animals. No logging around Bovie Lake! Leave it for kids. (8ms)

Some elders don't share meat because the people don't get rid of the bones in a good way. Some believe that we need to dispose of the animal in the right way or the animal won't come back. (1md)

Hope this survey is put to good use, not put on a shelf. (2jcb)

Wish logging would quiet down so we could trap. Wish there were more permanent jobs. (4jcb)

Lots of elders still use the forest to hunt and still live off the land. I would hate to see our forest disappear to white man. (6jcb)

Come back in 5 years to see what happened from logging. (1am)

There are trees to cut, but stay away from traplines. (14am)