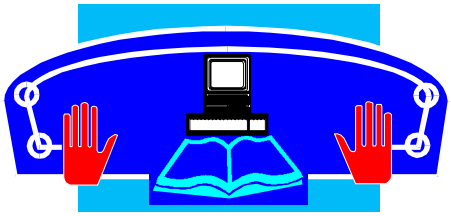

Subsistance And Non-industrial Forest Use In The Lower Liard Valley Forestry, Forestry In The Liard

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Subsistence and Non-Industrial Forest Use in the Lower Liard Valley[1]

by

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Table of Contents

List of Tables

List of Figures

I. Introduction

The Lower Liard Valley contains between 15 and 30% of the merchantable timber in the Northwest Territories (Robinson 1995, Larson 1995). For over ten years there has been interest (both locally and regionally) in exploring the market potential for this timber. Along history of committee meetings, funded research, draft agreements, memoranda of understanding, demonstration forests and plan outlines exists. However, significant commercial development of the area's forest has yet to be undertaken. This work is intended to provide information on non-commercial timber and subsistence forest uses of the residents of Ft. Liard and Nahanni Butte. 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 affects of changing land use on the social, cultural, and economic fabric of the communities cannot be demonstrated. 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.

The impetus for this study comes from two sources. In 1993, the Canadian Forest Service (CFS) funded a forestry demonstration project in the Lower Liard Valley. Shortly thereafter, CFS managers from the Northern Forestry Centre approached the principle investigator[2] of this research. The managers wanted assurances that federally sponsored forestry projects, even demonstration projects, would not compromise or jeopardize the ability of local people to continue their traditional forest subsistence activities. The principle investigator became one of two Canadian Forest Service co-representatives on the Lower Liard Valley Integrated Resource Management Committee (LLVIRMC)[3]. At a meeting in November of 1993, the LLVIRMC[4]

[2] Thomas M. Beckley, Forest Sociologist.

[3] The other CFS representative on the committee was Louis Poliquin.

[4] At that time, the LLVIRMC was comprised of local citizens of Ft. Liard and Nahanni Butte, representatives of the Government of Northwest Territories (GNWT) Renewable Resources, Indian and Northern Affairs, the Canadian Forest Service, and local elected officials (both Band and Hamlet representatives).

recommended that some form of traditional harvest survey, or traditional forest use survey be undertaken. The committee had been formulated some years earlier to explore the possibility of comprehensive planning for the Valley's forest resources. Committee members agreed that before significant changes were made in land use practices and policy, it was necessary to collect baseline data to assess the current level of subsistence and non-industrial forest dependence.

This study, through qualitative and quantitative methods, provides a preliminary assessment of existing forest uses in the Lower Liard Valley. 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 problematic to report in common currencies such as dollars (see Adamowicz et al. 1994). Also excluded from this study are quantified data concerning 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.

I. The study communities

The people of Ft. 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 twenty percent of the Ft. Liard population is not Native. No non-Native residents were recorded for Nahanni Butte in the most recent census (Statistics Canada 1993). Many families from Nahanni Butte and Ft. Liard are connected through marriage. It is not uncommon for people from Nahanni Butte to live in Ft. 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 Ft. Liard, but neither place receives many visitors from outside the communities. Travel between the two communities is problematic, particularly at certain times of the year. Nahanni Butte has only a few telephones. Although more people in Ft. Liard have telephones, most homes do not have them.

In the past, the communities were linked politically. The Nahanni Band was formerly a

sub-division of the Ft. 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 due to the fact that many decisions that affect the whole valley are made in Ft. Liard with little consideration given to Nahanni residents. Given these differences between the two communities, and in respect of the separate identities of their communities, data will be reported for each community separately.

A. Nahanni Butte

Nahanni Butte is located at latitude 61 .03N, longitude 123.31W. 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 eighty-five residents in twenty five households. Eighty of the residents list single ethnic origins, seventy-five of which are Aboriginal (Statistics Canada 1993). The community only grew by 1.2 percent 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 twenty persons employed, ten in primary occupations, and ten in service occupations. The unemployment rate for individuals twenty-five years and older is 58.3 percent. Of the sixty-five residents over the age of fifteen, thirty 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 Ft. Liard or Ft. Simpson for education or employment. Such moves are often temporary, and strong linkages to the community are maintained.

B. Ft. Liard

The community of Ft. Liard is located eighty kilometres south of Nahanni Butte and

twenty kilometres north of the British Columbia border at latitude 60.14, longitude 123.28. The hamlet sits on the east bank of the Liard River and on the north bank of the Petitot River where the two join. Ft. Liard is accessible by car year round since the completion of the Highway 7 between Ft. Simpson and Ft. Nelson, BC in 1983. Ft. Liard residents enjoy the most temperate climate in all of the Northwest Territories. The mean daily temperature in January is -23.6C, and +16.0C in July (Anonymous n.d.).

Ft. Liard's population, according to the 1991 census was four hundred eighty five, divided among one hundred thirty-five households (3.6 persons per household on average). Three hundred ninety classify themselves as "single origin - Aboriginal." Another fifty are mixed origins, many of these being Metis. Ft. Liard also has a fairl y 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 fifteen, 185 have less than grade 9. Thirty-five have between grade 9 and grade 13 without a certificate, ten do have a certificate. Twenty five have a trades diploma, while forty five have some other, non-university education. Twenty have had some university, ten of those have degrees.

Commensurate with its larger size, Ft. Liard has considerably more services, institutions and employment opportunities than Nahanni Butte. These include an RCMP detachment, a GNWT Renewable Resources 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.

C. 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. Labour 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 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 (GNWT 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 with respect to 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.

Over a third of survey respondents in Ft. Liard listed some form of forest-related employment (Logging, trucking, fire protection, silviculture, trapping, guiding, millwork or crafting). Income from trapping and crafting is reported in aggregate for the community in section IV. Other occupations reported by survey respondents include teacher, counselor, and other social service occupations, taxi-driver, oil and gas work, pilot, Renewable Resources, highway maintenance, janitor, construction, store clerk, airport maintenance, office work for the Band and the Hamlet, plumbing, and others. The 1991 census lists the unemployment rate for individuals over the age of 25 as 12.570, quite low by northern community standards. Employment opportunities are fewer for young people. Unemployment is listed as 33.3 percent for individuals ranging in age from 15-24. Despite favorable employment figures, returns to 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 labour force participation rates and relatively low unemployment, there remain a great deal of subsistence activity in Ft. Liard. The same seasonal cycle described for Nahanni Butte applies to Ft. Liard. Fall is the most active time in the bush. Sixty of seventy households (85.7%) reported activity in the bush in that season. Winter was the next busiest period for bush use, with 60% percent 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. Since many of the employment opportunities in

the area are seasonal in nature many are able to actively participate in both the market and subsistence economies.

III. Methods

A. Narrative Survey

Data was obtained through two separate surveys that were implemented in the study communities between March of 1993 and February of 1994. The first survey consisted of semi-structured interviews with persons from Nahanni Butte and Ft. Liard identified as the most active subsistence bush users by a key informant[5] and the local research team. These were generally older individuals (age fifty or higher) 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 thirteen interviews were completed. They ranged from one to two 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 whereby one assistant would orally translate questions into Slavey and responses into English. The second translator recorded the Slavey responses in English so that direct 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 thirteen 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 what times of year they spend on the land. 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 sustain both a subsistence economy and a commercial timber economy.

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[5] Elizabeth Bertrand of the Nahe-Ndeh Centre.

B. Quantitative Survey

The qualitative data obtained in the above semi-structured interviews were utilized in the construction of a survey instrument that was administered much more broadly throughout the study communities. Secondary sources, particularly Lament (1977), Honigrnann (1946) and Higgins (1968) were u tilized 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.[6]

An initial draft of the survey was taken to Ft. Liard and presented to the Adult Basic Education (ABE) students' 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 painstakingly scrutinized 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.[8] The survey instrument ultimately administered is the product of a great deal of community input. .

The intent of this second survey was to quantify much of the information gathered through the initial qualitative interviews. Respondents were inked what species they harvested (i.e. 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 regarding work in the forest sector, background demographic questions, whether resources could sustain greater harvesting pressure, and so on. The complete survey is attached as Appendix A.

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[6] All save Lament (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.

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

[8] No formal Band meeting was held during this preparation period.

Implementation of the quantitative survey was done with the assistance of Adult Basic Education students, as well as with other community residents. Students were trained in interviewing techniques and practice runs were performed. They administered sixteen 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.[9]

Survey administration occurred over a period of six weeks, from mid-October to late November, 1993. Questions were asked about the previous year's harvests (the 1993/94 trapping season). After tentative figures were calculated, results were presented to the community for verification and constipation. Interviews were conducted usually with male heads of households since 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. However, over seventy percent of Nahanni Butte households were surveyed and over fifty percent of Ft. Liard households were surveyed. In Ft. Liard, the 1991 census lists twenty five of one hundred thirty five households as containing only one person. Only one such household was interviewed. In Nahanni Butte, zero single person households were interviewed. Of the twenty five households in Nahanni Butte, five are single-person households. Given the lower consumption needs of single person households relative to multiple person households, single person households are less likely to harvest large amounts of 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

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

replacement value reflect the harvests of just over half the population of Ft. 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 with the lower figure calculated on the basis of survey respondent only, and the higher figure based on a projection of those figures to the entire population. Nearly three quarters of the population of Nahanni Butte was interviewed, so the projected range is narrower for that community.

IV. Results

The results of both surveys are inter-related. The narrative survey yielded some useful information, but difficulties in translation, and unfamiliarity with the principle investigator posed limits on the depth of these interviews. The amount of comments and 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 B.

A. The harvest cycle

The narrative surveys were conducted primarily with elders and active bush users. Their perspectives on changes in the resource and changes in the community maybe different from the perceptions of the community as a whole. However, understanding that historical perspective, 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.

The activities of bush users are briefly reviewed in Section II.C. This section will review in greater detail the seasonal round of bush activities, as well as describe activities that occur all year round. The hunting season begins in the fall with the fall moose hunt. September is know in Slavey as “shedder 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 numerically 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.

Winter is when the trapping season is in full swing. Marten are the most commercially important species, and 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 600 is cold and dark. Despite Ft. Liard's nickname, "Tropics of the North," due to its mild climate relative to the rest of the Northwest Territories, it gets quite cold. January is known as "Dog tail month," because dogs crowd too close to the fire and bum 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 with respect to bush use.

Summer is characterized by less bush activity and 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.

B. Country Food

Table 1 shows contemporary harvest figures of key game species for Ft. Liard and Nahanni Butte. Given the sampling strategy (with over-sampling of Natives and active bush users) these figures represent the lion's share of the communities' harvests. Fifty-three percent(71 of 135) of all households in Ft. Liard were surveyed, and seventy-two percent (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.

Table 1 about here

It is also important to note that each of these collective data "points" represent a single year of harvesting effort -- a year that may or may not be truly 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 inking about last year and not any other year?" Regardless of one's answer to this question, at this point in time, we have no way of truly knowing how "representative" 1993 was. Historical comparison will be drawn in the analysis section (section VI.). 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.

Table 2 about here

Table 3 about here

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 Ft. 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 #l bacon at $7.18/kg, as priced at the Fort Liard Northern Store 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 another 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 $7.09/700g by 50%, which resulted in a replacement 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&r 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. And since many Fort Liard residents, and occasionally Nahanni Butte residents, do purchase specialty groceries in Fort Nelson, this substitution appears reasonable. On the same day, March 23, 1995, Overwaitea quoted lamb prices of $3 .48/lb for shoulders and $4.49/lb 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 footnotes to Tables 3 and 4.

Store prices are higher in Nahanni Butte and 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 account for price

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

Of all the subsistence and non-industrial uses of the forest 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 lack 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.

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 well over four times greater in both income in-kind contributions and total kilograms of meat to the second most important species, beaver. Secondly, note the discrepancies in rankings, especially for Nahanni Butte, between replacement value (in dollars) and total

kilogram of meat provided by various species. Because of the low substitution price of store bought chicken used in our calculations for replacing harvested rabbits, grouse and pheasants, these wild species actually contributed more to peoples' diets on a per kilogram of meat basis than the dollar rankings reveal. 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 becomes 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 1994:353), we found fairly consistent *under*-reporting of small game and fish harvests and less so for 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 regarding 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 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 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."

C. Trapping income

Tables 4 and 5 contain harvest figures and income earned from trapping fur bearing

species for Ft. 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. In comparing 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 having been told 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 valuation of trapping as compared to substitution pricing for traditionally harvested food. However, in calculating the income derived from beaver pelts, it should be noted that not all pelts were sold at auction. The result is that this study underestimates of 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 (Western Auction Co., Vancouver B. C., May 1994), wolverine pelts ranged from $100-$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. Absent data on every individual fur sale, we applied average or below average prices to our harvest statistics to determine trapping income.

Table 4 about here

Table 5 about here

D. 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 Ft. 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 litres of heating oil (Tobias and Kay 1994:218), and the actual price of $ 0.449/litre for Ft. Liard and $0.59/litre for Nahanni Butte as quoted on March 23, 1995 and May 7, 1995 respectively. These price quotes are from one year after the wood accounted for in our survey was burned, however, the distributor of the fuel stated that the price has not changed for over three years. As well, we did not factor in GST, so we consider these replacement values for fuel to be conservative.

Table 6 about here

Table 7 about here

Ail 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 1994:2 10). Berries were counted in everything from one gallon ice cream buckets to eight ounce 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 Store for August 1994 (as quoted in seasonal price lists). Because of the 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.), 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 stated that annual sales are approximately $200,000. About 80% of the crafts are made by Fort Liard residents, with 10% each from Nahanni Butte and Trout Lake. Furthermore, approximately 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 are 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 via other means, such as Native individuals selling directly to tourists in the summertime or to non-Native residents at anytime. According to survey respondents, both contingencies 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, snow-shoes, 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 grownup with these remedies, asking their frequency of use is equivalent to asking a member of non-Native society how often s/he takes aspirin. Measurements are often imprecise and as dependent on season and time spent boiling as on absolute amounts. Hence, our data simply presents use, or non-use, among our respondent.

Of those surveyed, forty percent (26 of 65) of respondents in Fort Liard and fifty percent

(9 of 18) of Nahanni Butte households reported that they prepared and used 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 palliative for colds, sore muscles, stomach aches and head aches, 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. However, it was a resource we were unable to quantify.

E. 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. Bear in mind that the total figure does 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 deemed to be 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 Section V.A.

For both communities, income in-kind derived from country food is the single largest contributor to the bush economy, followed by firewood, all crafts, and marten pelts. It is noteworthy that 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.

Table 8 about here

Table 9 about here

Based only on the replacement value and income derived from subsistence and non-industrial forest products, Ft. Liard residents derived over three quarters of a million dollars through income or income in-kind from the surrounding forest in 1993-94. This is based on surveys of just fifty percent of all households. If we project these results to the entire community[10], nearly one and a half million dollars of value are derived from the forest for the year of the survey (see Figure 2). The lower figure represents a floor which we are confident is a very conservative estimate of the value of the forest to Ft. Liard residents. The higher figure represents a ceiling, beyond which the values of the forest that we *have measured are* not likely to surpass. A list of forest resources and uses that were included in the study is presented in Figure 3. While survey results represent the responses of the communities' more active bush users, and make the lower value more likley to represent total community harvest activity, the values of those benefits from the forest that we could not calculate (also presented in Figure 3) theoretically

Figure 2 about here

Figure 3 about here

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 Nti 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 subsistent and non-industrial forest use in Ft. Liard, we added the average income in-kind ($7,021.00) to Statistics Canada's (1993) calculation of median household income ($25,792.00). The sum, or total "average"

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[10] An attempt was made to classify persons as low, medium and high bush users. Seven key informants classified all individuals on the hamlet list of Ft. 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.

adjusted income is $32,812.00. The combined average of subsistent and non-industrial income (trapping and crafts) and income in-kind (country food, fuel) comes to $10,796.[11] Dividing this figure by total adjusted income, we find that subsistence and non-industrial forest use accounts for thirty-three percent of total income (Figure 4). So for our sample, a third of all income and income in-kind is derived from subsistence and non--industrial forest use. It must be noted that 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 much greater than a third.

Census data on household income was 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 Bureau of Statistics (1995). Average income from the forty returns from Nahanni Butte was $15,575. Forty wage earners in twenty-five 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 (see footnote 7) is $8,694. 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 thirty-two percent (see Figure 4).

(Figure 4 about here)

F. 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 Ft. 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. However, if the tradition of giving

[11] Income in-kind= $7,021 per household. Trapping and craft income= $3,775.

country food to elders is maintained throughout the communities, today's resource harvesters who share with elders, will in turn be given food when they themselves are elders. Thus, over the long term (inter-generationally), reciprocity is maintained.

Some elders expressed that the tradition of sharing is "dying off." They expressed 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 due to higher standards of living, the availability of food in the store and income to buy it. 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, there is still a very active network of sharing. People share with extended family first and foremost, and then with elders, and friends, usually in that order of priority. Many said that they share with whomever 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, fifty-five percent of the in-kind income derived from fish and game is given away to members outside respondents' immediate household. In Ft. Liard, fifty-three percent of the harvest documented by the survey was shared outside the household. Clearly, while some may perceive the practice to be declining, sharing meat remains an active practice, with over half of 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 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"% 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 61.270 of moose meat harvested was shared as compared to the next most frequently shared animal, porcupine 37.5%. Only 8% of chickens hsrvested 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. However, it would 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.

Table 10 about here

Table 11 about here

V. Analysis

A. 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 (see 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, though we must offer some metric for cross-cultural understanding. 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, absent 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. Though 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 such that there was no need to hunt for one's food or trap for one's cash income or cut firewood for heat -- then one would cease to perform these activities. When a Native person explains why s/he lives off the land, the most common answer is "survival": one does whatever is necessary to make it until tomorrow. Presumably, if one'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, one would have little incentive to enter the uncertain and often difficult world of living in winter bush cabins and tracking moose through four feet of snow.

Yet our survey data and the investigators' observations suggest that "survival" means much more than simply meeting one's daily caloric and shelter needs, and that there really is not a substitutable commodity 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. Culture is simply not substitutable. Saying the same thing from a different perspective, it is our observation that most Native people are not *solely economically* motivated to hunt.

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 @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 expressed that they did so because it was cheaper than living in town. However, given their dim prospects for employment living in the bush 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. Anon-Native resident of one of the two study communities did not hunt, yet over 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 8 moose in the survey year, along with 10 beavers, 50 fish, 15 rabbits, 20 grouse, and 3 porcupines. He estimated that he gave away half of all his catch to other villagers, except for moose, of which he gave away 7 of the 8 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 twelve thousand dollars of in-kind income, though he worked 30 hours per week for over five months of the year. Clearly, if bottom-line economics were the sole concern, this Native respondent would have likely given away less meat, sold it instead of sharing it (which is 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 labour was to acquire cash to purchase the hunting equipment necessary to spend time in the bush. He said that 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 land and animals would be there for his children to do the same.[12] The point here is that financial concerns were not the only, or likely 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 can not take this into account. Replacement values are inherently limited to monetary compensation for loss and the assumption that a person *can* be compensated with money. The idea is rooted in the neoclassical "substitutability of inputs," i.e., a kilogram of moose is as good as a five dollar food stamp, but the Native person's experience of tracking game and "living off the land" like his/her ancestors is neither substitutable nor compensable. How does one pay for connecting the past, present and future?

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 as 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 to not 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, an example illustrates best.

Our survey included one widowed Native woman, over 80 years old, who snared over 100 rabbits in the survey year. According to replacement value calculations, this amounts to 86 kilograms of meat and $383.70 in replacement value for meat. On a per capita basis, this woman

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[12] 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.

is much less forest dependent than the "average" community member. Yet those 100 rabbits were critical for that respondents self-reliance. Without them, she would have had to rely more heavily on welfare, support of her extended family, or gone without. Thus 100 rabbits were a critical component of this respondent well-being.

Consider the Dene 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. His late winter protein needs are not only now met with his shift toward more fish, but he also has extra fish which he can barter for other goods and services (such as extra 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.

Finally, consider the 28 year old, able-bodied, full time employed Native male who 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, according to economics; as a full time wage earner, he has done exactly what replacement value logic assumes he should do: earn 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. Since often those with the best (and most expensive) equipment harvest the most from the forest, these people appear to be the most forest dependent, according to replacement value calculations and per capita averages. This person is also on the margin, but a very different margin from the elder above. 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 obtain measures for the many types of forest-dependence that exist 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.

B. Contemporary and historical use of country food.

Very little quantitative historical data exists for the Lower Liard Valley regarding subsistence and non-industrial forest dependence. It is also difficult to evaluate the accuracy of the data for studies that do exist. With that caution being made, 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 (see tables 12 and 13). While some locals suggest that "people don't use the bush anymore, or at least not as much as they used to," our data challenges that assertion. It is true that human populations have steadily increased from the 1960's, decreasing per capita dependence upon country food. During the same time, other non-traditional foods have become more available and accepted. However, the amount of country food (especially moose) circulating in the communities, at a presumably sustainable harvest level[13], has stayed much the same from thirty five years ago. 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) as opposed to being purchased. In Ft. Liard, an

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[13] We inked 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.

average of 69.7% of meat and fish comes from the bush. In Nahanni Butte, 61.9'% of fish and meat comes from the bush. While a few respondents from Ft. Liard expressed that zero or one percent of their fish and meat came from the bush, in Nahanni, the single lowest response was twenty-five percent.

Respondents were also asked how much they spent per month on purchased meat and fish. Ft. Liard residents spent, on average, $127.60 per month on purchased fish and meat. Nahanni Butte residents 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 (see Table 14 below), 72% of Nahanni Butte and 47% of Fort Liard respondents claimed there had been no change or fishing had increased over the last decade. In both communities, "No Change" was the single largest response offered. Only 28% of Nahanni Butte respondent and 38% of Fort Liard respondents stated that fishing had declined in the last decade or so, while the rest claimed 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 during a brief period when the widespread adoption of snowmobiles reduced the use of dog teams for winter transposition. 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 this subsistence good has been accompanied by a concomitant need for more cash to pay for and maintain snow mobiles.

We asked respondents what times of year they were more likely to be active in the bush, but did not receive useful data on how much time people actually spend living on the land.

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

C. Trapping

Trapping also remains an important activity in both communities. In Ft. 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 fading away in either plain. Many young people continue to trap. The average age of those who trapped were 46.2 years in Ft. Liard, and 46.5 years in Nahanni Butte.

Because of the fluctuations in fur bearer populations and pelt prices, the figures presented in tables 4 and 5 need to be viewed with caution. Rabbit populations exhibit seven 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 stated that 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 one year given the cyclical trends in many species of harvested wildlife.

Economic factors also influence human behaviour with respect to harvest effort. Many respondent 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. Since most of the animals trapped are for export and not for direct local consumption in the form of meat or fuel, annual trapping activity will fluctuate. 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 Dene

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 labour jobs, etc. Trapping is still part of these elders' identity and occupies time that might otherwise be idled away. Some of these individuals continue to trap, but chose to give the hides to their sons to sell in town so as to avoid reductions to their pensions. These harvests are unreported in this survey, unless the son of the elder was also surveyed and he included these animals.

Despite all of these caveats, the trapping data collected in the forest use survey is 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 indicating 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-tern monitoring of harvest levels with periodic analysis to determine representative averages and baseline carrying capacity. If serious and prolonged disturbances to the natural system do occur, such as commercial logging and/or oil and gas activity, this data will be crucial in assessing ecosystem health and recovery. .

D. 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 Ft. Liard. The craft shop has a new building, and sales of traditional crafts will likely 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 centres 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 not insignificant. Again, since we are not able to incorporate the value provided by bush medicine into our total valuation of subsistence and non-industrial forest products, the estimate that we do make is likely to err on the conservative side.

VI. 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 development were to reduce the availability of 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 maybe some complementarities. Moose tend to frequent "edge" habitat, a point raised often by proponents of clear cutting. 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. However, before commercial development of the Valley occurs, some important questions need to be answered. First, would Valley residents consume more moose if it were available, or are they currently at or near the satiation point for that commodity? Secondly, there are some distributional issues related to potential changes in wildlife habitat that might result from increased resource development. 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 immunities should be given the opportunity to choose the mix of market and subsistent economies with which they are most comfortable.

While young people in Nahanni Butte and Ft. Liard would likely 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 costs 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, activity in the bush economy is a choice, for others it is a necessity. However, the importance of forest resources in providing sustenance and self-respect to individuals and households at the margins should not be underestimated.

In addition to elders, women maybe 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 labour toward creating usable products from forest resources. In other words, men and women depend upon 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 dependent upon men.

Some groups may be situated more favorably than others to reap benefits from changes in resource use. Attention must be paid to probable benefit distributions 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 would likely be less evenly distributed as 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 forty percent since 1967. Ft. Liard has grown by over one hundred twelve percent during the same time period (Higgins 1968 and 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 expressed that contemporary marten populations in general are significantly less than 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.

Commercial forestry and other resource development and subsistence and non-industrial bush harvests are not competing in a zero-sum game, but the relationship between these activities 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 B). However, many also expressed 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 substantial local input is an ongoing feature of 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 Ft. Liard and Nahanni Butte. The people who live in these communities are directly tied to the land in a way that is increasingly unique 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 truly integrated, comprehensive planning of natural resources in the valley occurs.

VII. References

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Table 1. Type and quantity of species harvested in the Lower Liard Valley, 1993-94.

Species (common name)	Scienctific name	Number of individuals harversted	
		Ft. 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*		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*		

* undifferentiated but comprised of the following.

Table 1 (continued)

Species (common name)	Scienctific name	Number of individuals harversted Ft. Liard	Nahanni Butte
Birds			
Grouse*		1959	214
Spruce	*Canachites canadensis*		
Ruffed	*Bonasa umbellis*		
Sharp-tailed	*Pediocetes phasianellus*		
Ducks*		363	22
Mallard	*Anas platyrhynchos*		
American wigeon	*Anas americana*		
Lesser Scaup	*Aythya affinis*		
Greater Scaup	*Aythya marila*		
Surf Scoter	*Melanitta perspicillata*		
Geese*		24	
Canada Goose	*Branta canadensis*		
Snow	*Chen caerulscens*		
Greater White Fronted Goose	*Anser albifrons*		
Ptarmigan*		13	
white-tailed	*Lapogus leucurus*		
willow	*Lapogus lapogus*		
Other			
Berries (in litres)			
Raspberries	*Rubus spp.*	190	21
Blueberries (and other)	*Vaccinium spp.*	400	39
Fuelwood (cords)*		693	222
White spruce	*Picea glauca*		
White birch	*Batula papyrifera*		

* undifferentiated but comprised of the following.

Ft. Liard n =71 (of 135 households)
Nahanni Butte n = 18 (of 25 households)

Source: Beckley and Hirsch forest use survey.

Table 2 Replacement Value For Edible Animal Products Harvest

Animal	# Harvested	Edible kg./animal	Tota
Moose[1]	159	199	3164
Caribou*	21	61.8	129
Elk[7]	5	140	700
Deer[2]	2	46	92
Bear[1]	49	95.4	4674
Beaver[1]	834	7,91	6596
Sheep[3]	11	68,18	750
Goat[3]	8	68.18	545.
Lynx[4]	56	3.9	218.
Rabbit[1]	2356	0.86	2026
Muskrat[1]	244	0.64	156,
Fish[5]	4152	0.76	3155
Grouse/Pheas[1]	1959	0.32	626.
Ducks[1]	363	0.77	279.
Geese[6]	24	1.59	38.1
Ptarmigan[1]	13	0.36	4.68
Porcupine[7]	41	5	205
TOTAL			

N =71 households (of 135)

Source notes:

1. Berkes et al. (1994:355), from NHR (1982, Appendix 8).
2. Tobias and Kay (1994:21 1), primarily from JBNQ (1982), Banf
3. Bissett (1974: 176).
4. This number of lynx reflects only those that were eaten. All ly and Kay (1994:21 1), from JBNQ (1982).
5. This assumes all fish caught are lake whitefish (as discussed in
6. This assumes all geese harvested were blue or snow geese. Ca conservative assumption, The weight comes from Berkes et al. (
7. Brad Stelfox.(personal communication, 16 April 1995)

Table 3 Replacement Value For Edible Animal Products Harvested By Nahanni Butte Residents, 1993

Animal	# Harvested	Edible kg./animal	Total kg	$/kg	Food price adjustment	Total $
Moose[2]	49	199	9751	$7.05	x 1.196	$ 82,218.48
Bear[2]	2	95.4	190.8	$7.05	"	$ 1,608.79
Beaver[2]	158	7.91	1249.78	$7.67	"	$ 10,537.90
Lynx[3]	1	3.9	3.9	$7.67	"	$ 35.37
Rabbit[2]	342	0.86	294.12	$4.45	"	$ 1,565.36
Muskrat[2]	62	0.64	39.68	$7.67	"	$ 364.00
Fish[4]	1055	0.75	801.8	$5.06	"	$ 4,852.30
Grouse[2]	214	0.32	68.48	$4.45	"	$ 364.47
Ducks[2]	22	0.77	16.94	$4.45	"	$ 90.15
Porcupine[5]	4	5	20	$7.67	"	$ 183.46
TOTAL:						**$101,820.68**

(N = 8 of 25 households)

Source notes:

1. Price adjustment between Ft. Liard and Nahanni Butte prices taken from Bureau of Statistics, Government of the Northwest Territorties. 995.
2. Berkes et al. (1994:355), from NHR (1982, Appendix 8).
3. 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 (1994:211), from JBNQ (1982).
4. This assumes all fish caught are lake whitefish. This assumption is discussed above. The weight comes from Berkes et al. (1994:355).
5. Brad Stelfox.(personal communication, 16 April 1995)

Table 4. Historical and Contemporary Harvest, and Income Earned from Trapping, Ft. Liard

Year	61-62[1]	62-63[1]	63-64[1]	64-65[1]	65-66[1]	66-67[1]	67-68[1]	72-73[2]	93-94	$/pelt[3]	Income
Species Harvested											
Beaver	1243	1138	1112	1489	993	825	498	525	834	32.50	$27,105.00
Marten	240	202	300	188	248	283	141	244	102	59.10	$57,977.10
Lynx	796	1630	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 (all kinds)	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								2	20	300.00	$6,000
Muskrat	1380	516	119	484	692	978	587	94	244	3.00	$732.00
Squirrel	2419	947	472	2566	3207	1871	5731	326	260	1.05	$273.00
											TOTAL: $106,133.10

Source Notes:

1. Higgins (1968:135).
2. Bissett(1974:57) quoting "Local Fur Trade Statistics" from the Territorial Government.
3. Prices are for the 1993-94 trapping season, as quoted from the GNWT Renewable Resources Office in Fort Liard, NWT, from Western Auction Co., Vancouver, B.C., May 1994.

Table 5. Harvest Figures and Income Earned From Trapping, 1993, Nahanni Butte

Year	*1977.-73'*	*1993-94*	$/pelt[2]	Income
Species Harvested				
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:
				$14,858.30

Source Notes:

1. Bissett (1974:58), quoting "Local Fur Trade" statistics from the Territorial Government.
2. Prices are for the 1993-94 trapping season, as quoted from the GNWT Renewable Resources Office in Fort Liard, NWT, from Western Auction Co., Vancouver, B. C., May 1994.

Table 6. Harvest and Replacement Value for Non-animal Forest Products, 1993-94, Fort Liard

Product	Amount(unit)	Value/unit	Total Replacement Value ($)
Firewood	693 cords	$ 185.93/cord'	$128,850.10
Berries	190 litres raspberries	$ 3.32/pt.	$ 1,984.00
	400 litres all others	$2.84/pt. (blueberries)	$ 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**

source: Beckley et al. forest use survey

Table 7. Harvest and Replacement Value for Non-animal Forest Products, 1993-94, Nahanni Butte

Product	Amount(unit)	Value/unit	Total Replacement Value ($)
Firewood	222 cords	$ 244.32/cord[2]	$54,238.82
Berries	21 litres raspberries	$ 3.32/pt. (x 1.196)	$ 166.77
	39 litres all others	$2.84/pt. (blueberries) (x 1.196)	$ 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**

source: Beckley et al. forest use survey

Source notes:

1. Based on 414.1 litres per cord of wood conversion (Tobias and Kay 1994), and a heating oil price of $0.449 per litre (personal communication with Ft. Liard Fuel Centre).

2. Based on 414.1 litres per cord of wood conversion (Tobias and Kay 1994), and a heating oil price of $.059 per litre (personal communication with Nahanni Butte band manager).

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Table 8. Total Replacement Value for Selected Forest Products, 1993, Fort Liard

Product	Replacement Value ($)
Meat (Table 3)	$366,380.02
Furs (Table 5)	$106,133.10
Non-animal (Table 7)	$252,095.70
Moosehide Crafts	$40,000.00
TOTAL:	$764,608.82 (based on 53% of all households,N=71)
Projection from survey data	$1,470401.77 (based on 100% of all households, N = 135)

$764,608.82 <Value of forest use in Ft. Liard <$1,470,401.77

Table 9. Total Replacement Value for Selected Forest Products, 1993, Nahanni Butte

Product	Replacement Value ($)
Meat (Table 4)	$101.820.68
Furs (Table 6)	$ 14,858.30
Non-animal (Table 8)	$69,670.53
Moosehide crafts	$ 5,000.00
TOTAL	$191,349.51 (based on 72% of all households, N = 18)
Projection from survey data	$265,763.21 (based on 100% of all households, N = 25)

$191,349.51< Value of forest use in Nahanni Butte <$265,763.21

Table 10. Amount of Country Food Harvest Shared, 1993, Fort Liard

Species	#l Harvested	# Shared	%Shared	Kg. Shared	Rep. Val. of Shared
Moose	159	92.42	58.1%	18391.58	$129,660.60
Bear	49	19.74	40.3%	1883.2	$13,276.53
Caribou	21	12.5	59.5%	772.5	$5,446.12
Deer	2	0.5	25%	23	$162.15
Elk	5	2	40%	280	$1,974.00
Beaver	834	369.6	44.3%	2923.4	$22,422.31
Lynx	56	34	60.7%	132.6	$1,017.04
Rabbit	2356	784	33.3%	674.2	$3>000.37
Chicken	1959	626.88	30.8%	193.12	$859.38
Fish	4152	1809.5	43.6%	1375.22	$6,964.51
Porcupine	41	21.67	52.9%	108.35	$831.04
Duck	363	149.5	41.2%	115.1	$512.26
Geese	24	12	50%	19.08	$84.91
Sheep	11	4.5	40.9%	306.82	$2,689.87
Goat	8	6	75%	409.09	$3,586.50
Muskrat	244	123.5	50.6%	79.04	$606.24

TOTAL VALUE SHARED: $193,093.88

TOTAL VALUE OF COUNTRY FOOD: $366,380.02

PERCENT OF COUNTRY FOOD SHARED: 52.7

source: Beckley et al. forest use survey

Table 11. Amount of Country Food Harvest Shared, 1993, Nahanni Butte

Species	# Harvested	# Shared	%Shared	Kg. Shared	Rep. Val. of Shared
Moose	49	30	61.2%	5970	$42,088.50
Beaver	158	54	34.2%	427.1	$3,011.34
Rabbit	342	28.5	8.3%	24.5	$109.07
Chicken	214	17	8.0%	5.4	$24.21
Fish	1055	308	29.2%	234.08	$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
				PERCENT OF COUNTRY FOOD SHARED:	54.7

source: Beckley et al. forest use survey

Table 12. Historical and Contemporary Harvest of Game Species

Year / Species	1957	58	59	60	61	62	63	64
Moose	135	104	121	139	150	175	160	97
Caribou	21	10	15	30	25	20	15	13
Elk	---- No Historical Data ----							
Deer	---- No Historical Data ----							
Sheep	8	11					1	2
Goat								1
Bear	37	39	17	26	20	28		22

Sources: For 1957-1968, Higgins (1968); for 1969-70 through 197

Table 13. Historical and Contemporary Harvest of Game Species, Nahanni Butte

Year / Species	1964-65	65-66	66-67	67-68	68-69	69-70	70-71	71-72	1993
Moose	41	38	35	30	26	17	24	46	49
Caribou	8	0	0	0	0	0	1	7	0
Elk	o	0	0	0	0	0	0	0	
Sheep	1	1	1	0	1	3	3	0	0
Goat	-								0
Bear	9	13	10	13	14	19	9	20	2

Sources: For 1964-65 through 1971-72, Bissett (1974); for 1993, Beckley et al. forst use survey.

Table 14. Perceived Change in Amount of Fishing, 1980's - 1990s, By Community

Community	More Now	Less Now	Same	Don't Know
Nahanni Butte	o%	28%	72%	o%
Fort Liard	8%	38%	39%	15%

source: Beckley et al. forest use survey.

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

Community	Inadequate Supply	Adequate Supply	Don't Know	Total
Marten				
Nahanni Butte	55.5%	16.6%	27.8%	100.1%
Fort Liard	40.8%	33.8%	25.3%	100.1
Beaver				
Nahanni Butte	o%	83.3%	16.7%	100%
Fort Liard	1.5%	77.5%	21.0%	100%
Moose				
Nahanni Butte	11,1%	77.8%	11.1%	100%
Fort Liard	14.1%	78.8%	7.1%	100%

Nahanni Butte (n = 18)
Ft. Liard (n = 71)

source: Beckley et al. forest use survey.

Figure 1: Map of study area and communities.

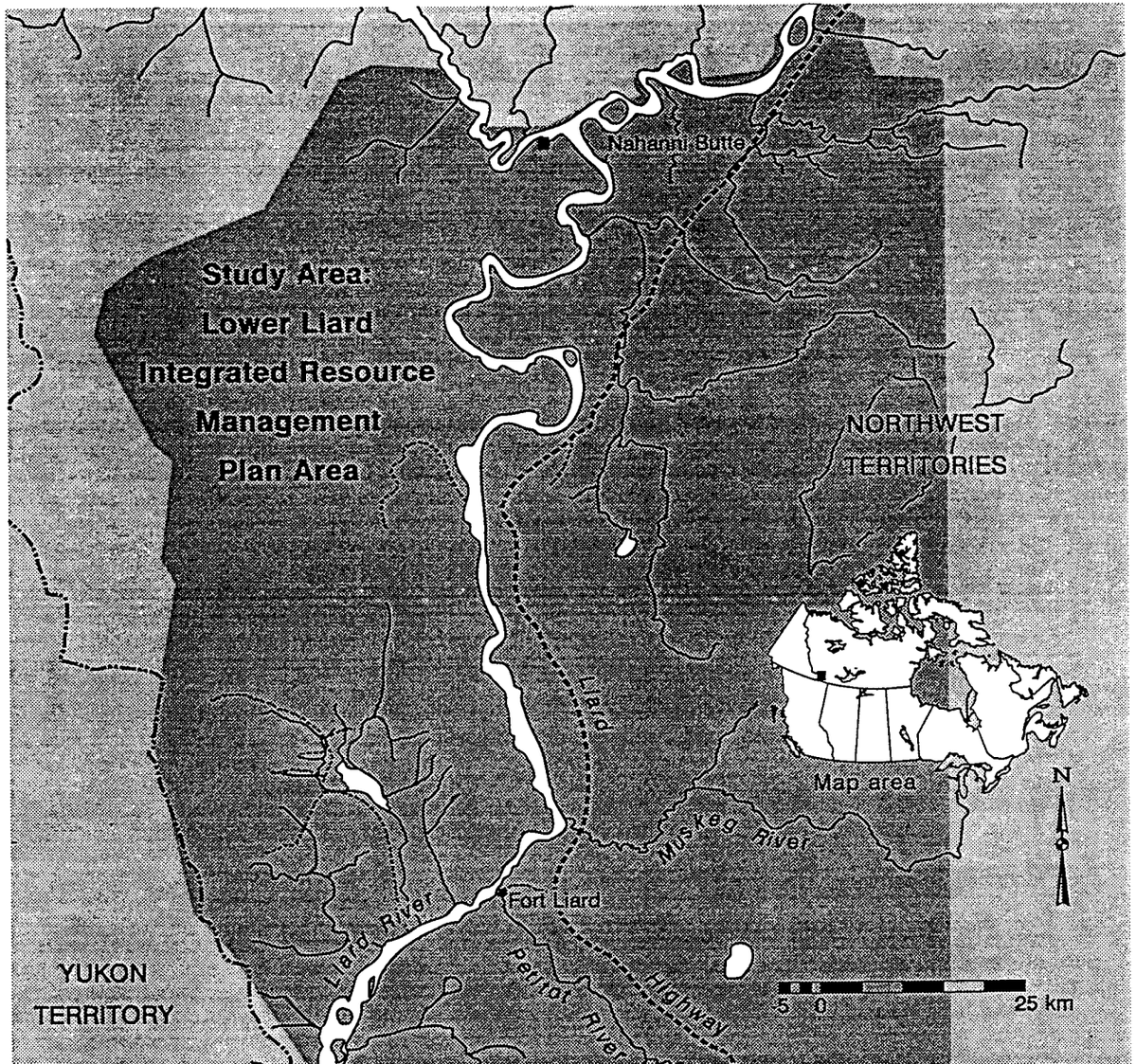


Figure 2. Range of subsistence and non-industrial forest use values for Ft. Liard, Nahanni Butte, and the Lower Liard Valley, 1993-94.

$764,608.82< Value of subsistence and non-industrial forest use in Ft. Liard <$1,470,401.77

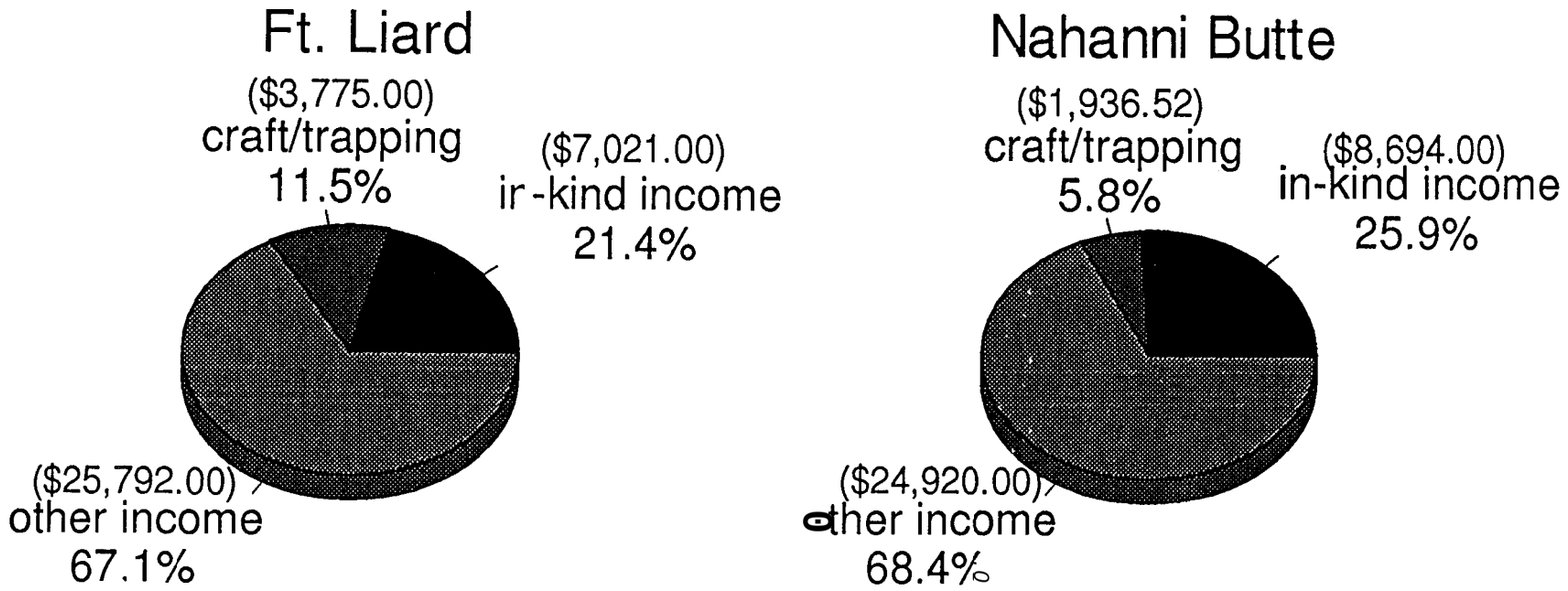
$191,349.51 < Value of subsistence and non-industrial forest use in Nahanni Butte <$265,763.21

$955,958.33< Value of subsistence and non-industrial forest use in the Lower Liard Valley <$1,736,164.98

Figure 3: Subsistence and non-industrial forest resource included and excluded in the Lower Liard Valley Forest Use Survey

Forest resources included:	Forest resources not included:
Hunting, fishing	Medicine
Berries	Tourism
Moose hide (sales only)	Spiritual/Religious
Firewood	Construction materials
Trapping	Crafts/tools for domestic use
Crafts (sales only)	

Figure 4: Household income and in-kind income contributions from subsistence and non-industrial forest uses, Ft. Liard and Nahanni Butte



in-kind income = meat, berries, fuel from firewood
craft/trapping = income from pelts and wood and moosehide crafts that are sold
other income = median household income (Ft. Liard), average household income (Nahanni Butte)

Forest

For the

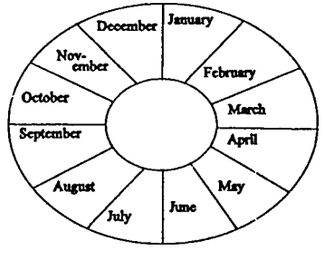
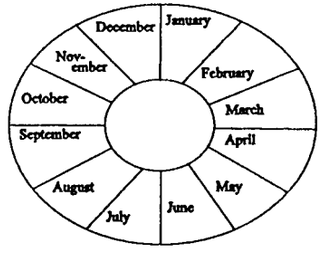
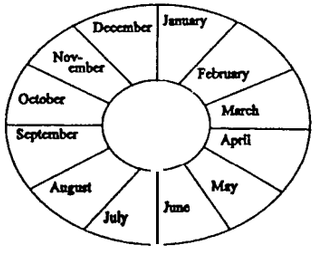
Fort Liard

The following survey will help us to understand how you use the forest. Your responses
you a series of questions and s/he will record your answers in this survey. S/he will als
hope the results of this survey will be of use to you and your community. Thank you

	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.**			

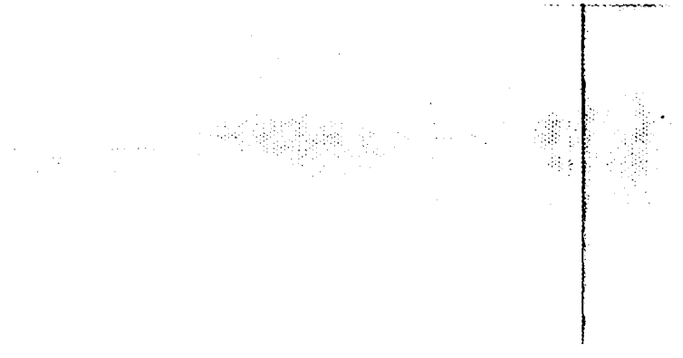
SPECIES PAGE Survey #_____ Initials _____			
TYPE OF ANIMAL:_____			
A. How many of this animal did you harvest last year?			
B. **Why did you harvest this animal? Circle all that apply.**	Food **Fur/Hide/Skin** Other Body Parts Religious **Culture/Traditional** Medicine Recreation Other (list)	Food **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 [his 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?**			

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 then-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 O 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 mom?									
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 stem 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) _____	bgging/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. [s there anything you would like to add?			

Appendix B: 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. Curing 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

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 si 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. (1 lbh)

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 about this. 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 modem 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 traveling 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 small 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 ½ mile away. The NWT government should stop allowing people to hunt from the highway. (1bhmd)

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 meat 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 BC, 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 -- 1 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. (3 lpb)

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