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Natural resources and community sustainability: final report of activities 2001-2003

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The role of natural resources in community sustainability



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Natural Resources and Community Sustainability:
Final Report of Activities 2001 - 2003

by

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Introduction

The concept of sustainable use of natural resources has existed in one form or another for several decades, and has achieved its most direct expression in the Bruntland report of the World Commission on Environment and Development (Bruntland, 1987). This also marks something of a turning point, where the non-economic values of natural resources and their habitats began to be seriously considered within the context of sustainable use. Forests are arguably the most important resource to be considered in this context, because they provide so many different values to different groups of people, including recreational, spiritual, and economic values (Beckley, 1998). Forests are particularly important for many aboriginal cultures in Canada, as they have relied upon forests and forest resources for their livelihoods for countless generations. Over 80% of Canadian aboriginal communities lie within the productive forest area (Natural Resources Canada, 1998). This has led to an extremely deep and enduring relationship with the landscape and its other, non-human, inhabitants. Despite changes in modern aboriginal societies, this connection to the land, and to a large extent reliance upon its plant and animal resources, remains. Indeed, the right to continue drawing a livelihood from the land through subsistence harvesting is one of the most important treaty rights granted aboriginal peoples, a right which brings them into a very direct relationship with modern commercial forestry (Ross and Sharvit, 1998).

It is in this context that the Little Red River Cree Nation (LRRCN) and Tallcree First Nation (TCFN) have initiated a natural resource strategy that is intended to return a significant degree of control over traditional territories to the First Nations, which will better allow them to achieve a balance between commercial forestry opportunities and traditional land uses. The nations are proceeding under the stance that ecological sustainability and cultural sustainability are inseparable where aboriginal cultures are concerned, because they continue to rely on the land for foods, medicines, and cultural identity. In 1999, the LRR/TC First Nations were able to finalize a Memorandum of understanding (MOU) with the Alberta government and two forestry companies that operate in the area. The MOU designates a 30,000 km² area within their traditional lands as a Special Management Area (SMA), which is to be co-operatively managed by all the signatories in order to address the issue of First Nations subsistence harvesting *vis-a-vis*

logging activity. The First Nations also receive significant timber allocations under the agreement, which they in turn supply to the local mills. This agreement is considered to be very innovative in terms of its resource management scope and the level of integration between the parties (Ross and Smith, 2002). The MOU also recognizes the long-standing and very productive research relationship between the LRR/TC First Nation and the Sustainable Forest Management Network (SFMN); it includes a mandate to continue this relationship, and to support research efforts that will aid co-operative management efforts.

To date, many research projects have been conducted with the partners, including an institutional analysis of the co-operative management board established under the MOU (Treseder and Krogman, 2000), a study of environmental health in the First Nations communities (Crabbé, 1998), and a study of Traditional Ecological Knowledge of ungulate habitat in the area (Schramm, 2002). The project discussed here, entitled *The Role of Natural Resources in Community Sustainability*, is intended to contribute to the on-going efforts at integrated resource management of the SMA. Specifically, the goals of the project are to:

- Document the total amount of bush resources, including animals, timber and non-timber forest resources (NTFR: such as medicinal plants and berries), used by First Nation members over a one year period
- Document the social relations of subsistence harvesting and distribution of bush resources
- Document inter-generational changes in access to bush resources
- Investigate socio-economic barriers that may impede the ability of First Nations members to engage in subsistence harvesting

In order to meet these goals, the LRRCN initiated a two-step research process with Cliff Hickey and Dave Natcher, who was then a post-doctoral fellow. Mark Nelson joined the team as part of his Master's degree program. Stage One was to conduct a household harvest survey in partnership with the SFM Network during the summer of 2001. This survey was intended to provide baseline harvesting statistics on the amounts of bush resources currently used by Nation members in order to inform future land-use planning in the area, particularly in the co-operative management context. The survey also

provides a rich quantitative argument against any claims that subsistence harvesting is a dying or insignificant vocation among the Little Red River Cree. While refuting such claims, the survey at the same time acknowledges and explores the barriers to harvesting mentioned above by asking several qualitative questions on this issue. Like other harvest surveys (such as those commonly conducted by the Alaska Division of Subsistence; see Fall, 1990), this one provides baseline data to inform resource management, while also exploring the social and ecological relationships of aboriginal peoples to their resource base (Usher and Wenzel,1987:149).

Stage Two mapped the lands used by the community members in each of the three Little Red River First Nation communities in activities that furthered the economic, social and cultural well-being of the people. Often these are grouped under the term "traditional land use" but we avoid that term as it fails to acknowledge the contemporary and on-going importance of these activities, including the transmittal of values to younger generations.

As the results of the latter exercise have not yet been translated into digital information for the scrutiny and use of the First Nation, and therefore proprietary rights to the data remain in the hands of the communities, this report will emphasize the first stage survey.

Survey Design and Methods

The LRRCN harvest survey was conducted in large part by six local summer students (two in each of the three communities), with the guidance of principal investigators Cliff Hickey and Dave Natcher and graduate student Mark Nelson. The students were hired by Kayas Cultural College in John d'Or Prairie. Local researchers were employed for two reasons. First, respondents would be more likely to participate in the study and accurately respond to questions if conducted by a local Cree person rather than a white researcher from the south. Second, the mandate of the SFM Network is to have First Nations participate as active partners in research rather than as "subjects". Aboriginal participation also promotes capacity growth in their communities by allowing access to training and experience that might not otherwise be available. We are pleased to acknowledge the support of Kayas Cultural College in furthering this objective.

The goal was for the students to administer the survey to a senior member of each household in the Nation. Households were chosen as the unit of analysis because neither sufficient time nor resources were available to interview every potential adult harvester. Surveying households as a whole was the only likely means to achieve sufficient coverage to constitute a representative sample. Respondents were asked to report the total bush harvest for all members of their household for the year 2000. Animal and plant resources were broken down by category (ungulates, furbearers, waterfowl, upland birds, fish, timber and NTFR—non-timber forest resources) and further broken down into species (e.g. moose, beaver, pickerel, etc.). The comprehensiveness of the species list provided was first checked with a local Cree research consultant before proceeding. The temporal range of the survey was broken down into months, asking respondents to report the total number of each resource type harvested in each month during 2000. They were then asked several questions regarding their current harvesting practices: 1) Did you give and/or receive bush resources during 2000? With whom did sharing occur? 2) Would you spend more time in the bush if you could? 3) What barriers, if any, prevent you from harvesting as much as you would like? 4) Did the generation before you have greater or lesser access to bush resources than you? Will the next generation have greater or lesser access than you do?

Surveys of this kind have several limitations that should be addressed prior to drawing conclusions from their findings. First, we were not able to achieve a complete census in the allotted time. The research assistants completed a total of 195 surveys, which equals approximately 50% coverage.¹ We believe that this coverage is significant enough to generalize to the LRRCN population as a whole. The sample was not randomly selected, since the research assistants made an effort to visit both low-harvest and high-harvest households. Rather, the students attempted to achieve a complete census, and stopped when they ran out of time at the end of the summer. It is likely that those who were most likely to decline or avoid participation were those with little harvesting to report. However, several of the more intensive harvesters were not surveyed because they were in the bush rather than the community for most of the summer. This would tend to

¹ Almost total coverage was achieved in Garden River, the smallest community. About half the households in Fox Lake were covered, and slightly less than half in John D'or Prairie.

balance out the lack of participation by low harvesters, thereby avoiding an exaggerated average harvest rate in the survey results.

Several types of respondent biases may also affect the results of harvest surveys (Usher and Wenzel, 1987: 154-155). Regarding the quantitative portion of the survey, we have already addressed non-response bias above, and found that it is not likely to significantly impact the research findings. Response bias may take two forms; strategic bias or recall error. There are several reasons to discount strategic bias in this case. As with most aboriginal peoples, hunting and gathering are part of a sacred relationship with animals, and lying about this, whether to brag or to achieve secrecy, is quite frowned upon (Brody, 1982). Indeed, arrogance in any form is taboo in Cree society, but especially in relation to hunting, so reporting exaggerated harvest yields is counter-intuitive. There is evidence that Nation members in fact reported harvest numbers that were to their strategic disadvantage. For example, some households in Garden River reported harvesting several moose, despite a WBNP regulation that allows only one moose per licence holder per year. In all likelihood, their harvests exceeded this quota, yet they chose to report them anyway.

Recall bias is of course a factor in any harvest survey, but can be minimized through the use of recall aids, such as extensive species lists and small temporal units, both of which were employed in this survey. In this particular case, some might question the awareness of a senior household member about all the harvests of other family members, or their ability to recall them all. In our experience, however, any harvest would become known to a hunter's immediate family members, if not extended ones, both through word of mouth as well as the sharing process that inevitably occurs following even the smallest harvest. It is unlikely that harvests as significant or rare as a moose, bear, or lynx would go unnoticed or un-discussed. Recall ability would likely decrease where harvested numbers are too large to track accurately (e.g. waterfowl, fish, rabbits, berries). Furbearers would be an exception here, because trappers must keep accurate track of large numbers of animals in order to monitor their income (Usher and Wenzel, 1987: 156).

The harvest survey was supplemented by semi-structured interviews carried out by the second author, Mark Nelson. In total, 17 interviews were conducted over the 2001

and 2002 field seasons, which provided an opportunity to explore social relations of subsistence harvesting in greater depth. These interviews particularly addressed the social value and ideology of subsistence activities, barriers to this lifestyle, its current status among Cree youth, and distribution of country foods. Land use and allocation patterns were also discussed and documented. During the 2002 season, Nelson attempted to visit as many bush camps as possible and participate in harvesting activities in order to understand and document better the social relations involved, and returned to the Nation for two weeks in late September in order to participate in the fall moose hunt.

Harvest Survey Results and Analysis

The survey results are presented in several figures below. Rather than presenting them in a contextual vacuum, the results are interwoven with discussions of fieldwork findings in order to illustrate the significance of these findings within a Cree cultural setting. Implications for the future harvesting regime in the First Nations are also discussed along with the potential impacts of change.

Species Importance and Hunting Strategies

The harvest survey provides us with data on the relative levels of bush resource use among Nation members. Table 1 shows the total reported harvest; fish, upland birds, and furbearers are presented by category rather than by species for readability.

Table 1: Total Bush Resources Harvested, LRRCN 2000

<i>Moose</i>	<i>Bear</i>	<i>Deer</i>	<i>Furbearers*</i>	<i>Ducks</i>	<i>Geese</i>	<i>Upland Birds</i>	<i>Fish</i>	<i>Berries (kg)</i>
226	63	52	1481	3258	447	612	2076	1215

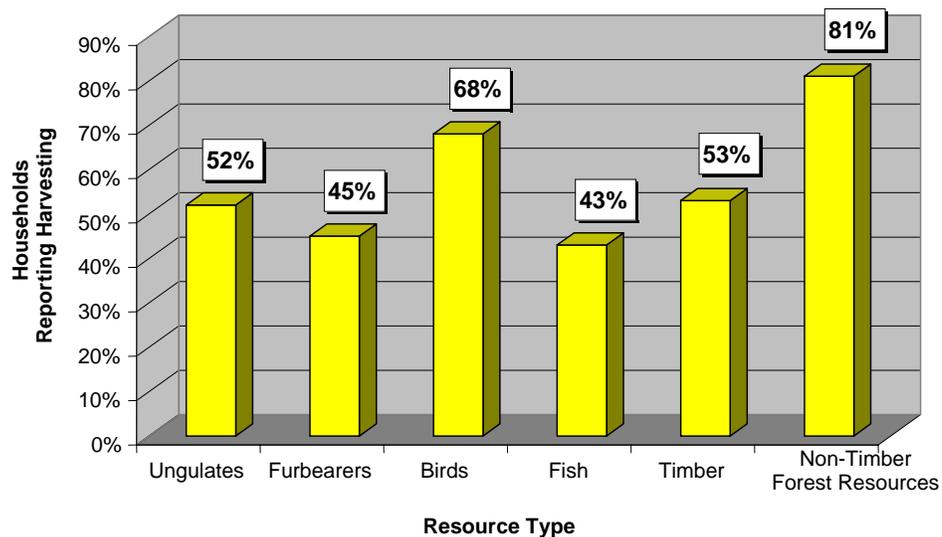
*Does not include rabbits, which numbered over 2000 by themselves.

While bison and caribou were included on the survey, none were reported taken during 2000. Caribou are seldom hunted, as they are found only on the plateau and the north slope of the Caribou Mountains, making them difficult to reach. The proximity of moose to the communities, along with the preference for their meat, further discourages hunting caribou. Wood Bison were formerly an important food species for the Little Red River

Cree, but their dwindling numbers brought on by disease have led to a general proscription on their harvest.

Figure 1 below demonstrates that resource use is not restricted to a limited number of highly active households. Instead, we see that many households continue to rely upon bush resources. Note that the use of furbearers by 45% of households does not equate to full-time or even part-time trapping by all those respondents, which would seem abnormally high. Anybody who reported harvesting even a limited number of furbearers is included in this category. NTFR were the most widely used of resources, with berries being the most common of these.

Figure 1: Types of Bush Resources Harvested (by Household)



Each resource of course has specific seasonal times when harvesting is preferable; various berries ripen at different points of the summer and fall, for example. Regarding animals, aboriginal peoples' hunting efforts have always been most focussed during times when their behaviour and location becomes the most predictable, either during a mating or migratory season, or where weather conditions are favourable (Feit, 1987). While hunting of course occurs at other times as well, it tends to be more sporadic and opportunistic in nature. At such times, people often pursue opportunities that they encounter by chance, rather than actively seeking them out.

In contrast, hunting during intensive periods often sees people moving out to seasonal camps for extended periods of time, often with their whole families. At these times, community life is put on hold as people focus their attention on hunting and living in the bush. The fall moose hunt is by far the most important time of year for LRRCN hunters. At this time (late September to late October), moose are in the rut and are responsive to imitation mating calls by hunters. Other species are also hunted during predictable periods, but are of less importance than moose. Bears are commonly found near rivers in the late summer and early fall as they seek out food to prepare for winter. They become fat at this time and are therefore more desirable to hunters. Owing to relatively lower populations and lack of response to verbal calls, they are less actively pursued than moose. Ducks are often hunted during this period as well, when they are unable to fly prior to moulting. Often they are harvested during the moose hunt if conditions are favourable. Intensive trapping is becoming increasingly less common within the Nation (Pyc 1998: 74). Some people make short trips to traplines and cabins in order to trap part-time, but virtually nobody moves their families to the bush for extended periods for this purpose anymore. Low fur prices make trapping an inefficient and unviable vocation today, and it is largely pursued in order to maintain ties to the past and simply to spend time in the bush.

Cultural and Economic Value of Country Foods

Social scientists have often explored the importance of “country foods”, or “bush foods”, (i.e. those obtained through subsistence harvesting) in modern aboriginal societies, both in economic and cultural terms (Wein et al., 1991; Mackey and Orr, 1987; Scott, 1984). Their intention is generally to illustrate that while reduced in abundance, these foods are not marginalized nor subordinated to store-bought foods in any sense. In fact, the growing scarcity of country foods has more likely increased their value in the minds of aboriginal peoples. The majority of the Cree diet is today derived from store-bought foods for several reasons. There is simply not enough country foods coming into the community to provide a significant portion for everybody, and it is debatable whether or not the carrying capacity of the LRRCN’s traditional use area could sustain the current population. This shortage tends to create an inter-generational gap in food consumption

patterns. Young people are usually the first to exploit store-bought foods, as they have been raised in communities and are more accustomed to these foods (Condon et al., 1995; Wein et al., 1991). In Garden River, for example, only people over the age of 60 generally consume more moose meat than store-bought meat (Pyc, 1998: 85).

Despite this scarcity, country foods continue to play a substantial role in the LRRCN economy. The calculation of replacement costs for bush harvests is a common method of quantifying their economic value (e.g. Tobias and Kay, 1993; Scott, 1984). Table 2 shows the replacement costs for the portion of the LRRCN bush harvest of 2000 that was recorded by our survey.² Calculations are shown for two grocery stores, one within the Nation (Northern Store in Fox Lake) and one outside (Super A in High Level, approximately 200 km away). This comparison is provided mainly to illustrate the relatively high grocery costs within the Nation. In reality, most people do not have reliable access to High Level, and the gas costs involved would nullify any savings.

Table 2. Replacement Costs for LRRCN Bush Harvest, 2000 ³

Bush Resource	Total Edible Weight	Grocery Replacement	Replacement Costs	
			High Level	Fox Lake
<i>Ungulates</i>	59,679 kg	Beef (Sirloin steaks)	\$656,500	\$954,300
<i>Furbearers</i>	5880 kg	Beef (Sirloin steaks)	\$64,700	\$94,000
<i>Birds</i>	2684kg	Chicken (Thighs)	\$11,800	\$19,600
<i>Fish</i>	2182 kg	Fish (Fresh Fillets)	N/A	N/A
<i>Eggs</i>	5406 (450.5 dozen)	Eggs (Dozens)	\$700.00	\$1300
<i>Berries</i>	1215 kg	Blueberries (Fresh)	\$13,400.00	\$25,7000
Total Replacement Costs			\$747,100	\$1,094,900

² Average uncooked edible weights for harvested animals are taken from Tobias and Kay (1993), who employed a combination of figures derived from local research in Pinehouse, Saskatchewan, figures from Banfield (1974) and figures used in the negotiation of the James Bay Northern Quebec Agreement (JBNQA, 1976).

³ All replacement costs have been rounded to the nearest hundreds of dollars.

The figures shown apply only to the recorded harvest on the survey (sample size approx. 50%). If we extrapolate to the population as a whole, we find that bush resources provided over \$2 million worth of food to the LRRCN in 2000. This is of course a rough figure, and is intended only to provide perspective. There are multiple difficulties involved in calculating replacement costs for bush foods, including lack of comparable replacements (e.g. no fresh fish fillets at either grocery store, or the selection of replacement foods that are considered nutritionally inferior by Crees).⁴ Nevertheless, the figures provide a useful ballpark figure by which to gauge the economic contribution of country foods.

These foods can be especially important to impoverished households, many of which exist in the LRRCN. Even those who receive government assistance may have difficulty meeting their nutritional requirements through store-bought foods. A study conducted by the Alberta Treaty 8 Health Authority (2001) found that 99.9 % of a Fox Lake family's social assistance payments would be required in order to provide a healthy family diet based on local grocery prices. Several interviewees reported that many poorer families rely upon bush foods to put meat on the table, and many people are concerned about potential malnourishment of children should country foods become more scarce (Pyc, 1998: 85). With 70% of LRRCN collecting some form of social assistance (Webb, 2001), the value of country foods for alleviating poverty cannot be overstated.

Although it is easier to calculate the economic value of country foods than their cultural value, we should by no means allow the latter to be eclipsed by figures and calculations (Freeman, 1988). The act of going to the bush to hunt or gather is only the beginning of the process that defines Cree relationships to the land and animals; consumption is the culmination. Eating bush foods is a means of enacting the relationship of humans to animals, and is in effect an important expression of Cree identity. This expression may be especially significant for those who are unable to spend as much time as they would like in the bush, such as elders or students (Condon et. al., 1995). During a videotaped interview, Clifford Ribbonleg of Fox Lake talked about giving food to elders: "When you go home, and you give it to them, and the smile you get, that's all you

⁴ We were unable to quantify the use of medicinal plants on the harvest survey because of the sensitive nature of this subject. Had we been able to do so, and to align them with comparable commercial

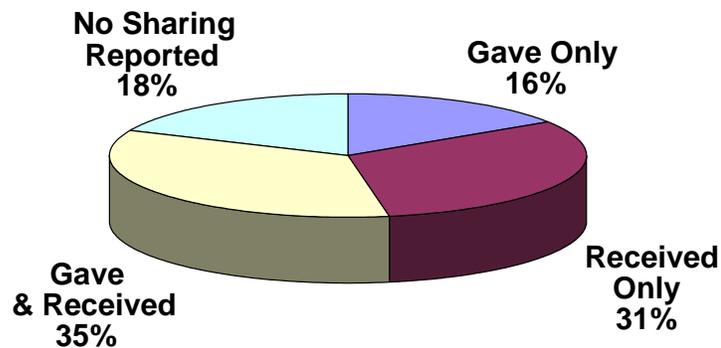
need...Especially when you tell them where you got it, the memory comes back [for them]”. The food becomes a focal point for the person’s ties to the lands and animals which have sustained them and their ancestors. The association of Cree identity with bush food is further illustrated by the way that they associate store-bought foods with outsiders. The dichotomy is most often expressed as “Indian food” vs. “white-man food”, rather than bush food vs. store bought food.

The sharing of country foods is also one of the defining elements of aboriginal subsistence harvesting. While any hunter technically has the right to retain an entire kill for himself, to do so would be socially unthinkable. For nomadic hunter-gatherer peoples, this social norm of open sharing has served as a form of insurance against periods of scarcity or bad luck (Orchard, 2001). Yet, even now that starvation is no longer a threat, the sharing ideal is as strong as ever. Practical issues aside, to share is to maintain a respectful relationship with animals; “You treat it like a gift,” as one interviewee stated. To give to others is to acknowledge that the food has been given to the hunter, rather than taken (Nuttall, 1992: 142). The ideology of giving bush food is every bit as important, and we would argue more so, than the gift itself. As Wenzel (1991: 102) notes, and as several Crees told us, the size of the gift does not matter, only that it is given.

Quantifying the distribution of bush foods is particularly difficult, partly because sharing often takes on less than obvious forms. For example, when dry meat is sitting on a rack at a camp, everyone is expected to help themselves without invitation, including visitors. Working with Inuit, Condon et al. (1995) found that this open invitation applied to people’s freezers at home as well, at least for their closer kin. Family members often helped themselves to a hunter’s meat without discussion, making it impossible for that hunter to accurately estimate how much he gives and how often. Owing to such difficulties, our own harvest survey simply asked people to report whether or not they had given or received bush foods in 2000. 82 % of respondents reported being engaged in sharing, either by giving, receiving or both (Figure 2). This may actually be a low figure, as the 18% listed under “No Sharing Reported” in fact failed to answer the question at all. Further, many who stated that they “gave only” or “received only” may have failed to account for the kind of indirect sharing discussed above.

medicines, the replacement value of the bush harvest would have increased substantially.

Figure 2. Distribution of Bush Resources in the LRRCN, 2000 (By Household).



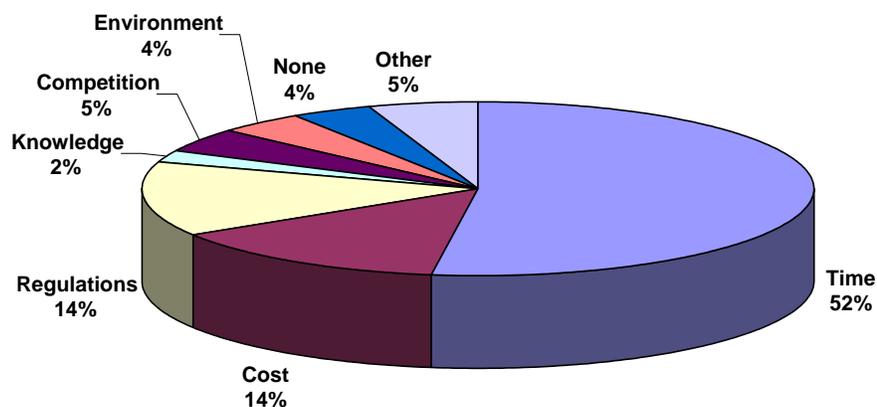
When asked with whom they typically shared country food, most respondents gave rather broad answers, such as “everyone, all the time” and “friends and family, whenever”. These responses reflect the ideal that sharing is simply a given, and is not ideally subject to boundaries. In closer conversations, however, interviewees often stated that it is becoming increasingly difficult to share with everyone who wants bush foods. There are simply more people than ever, and fewer of them are hunting. Thus, sharing is becoming somewhat more restricted to the extended family than in the past,⁵ though some people continue to make a conscious effort to maintain extra-familial sharing, especially with elders. Sharing on this scale often requires that hunters retain little or no food for themselves. Mark Nelson participated in several hunts where people gave away their entire share of the harvest. They spread this share between large numbers of people, even where it was possible for them to give away a substantial portion while still retaining some for themselves. One man stated that when he kills a moose, which yields around 200 kg of edible meat, he often retains only enough for one meal for his family. “Sometimes I wish there was more,” he said, “so that we could have more for ourselves”. This shortfall of country foods is likely to grow as Cree populations increase and more people must seek full-time employment, thus limiting their harvesting time.

Barriers to Subsistence Harvesting

⁵ Collings et al. (1998) note the same reduction in extra-familial sharing among the Inuit of Holman Island.

In order to establish a baseline by which to measure the scope of the barriers in question, respondents to the harvest survey were asked if they would spend more time in the bush if they could. The vast majority (92%) answered positively. They were next asked their perceptions of inter-generational access to bush resources. Again, 92% of respondents perceive that the previous generation had greater access than they do, and 78% believe that the next generation will have even less access. Finally, the survey asked people to report any factors that they feel prevent them from engaging in subsistence harvesting as much as they would like. The results are shown in Figure 3, and the major barriers are summarized below along with potential solutions that may mitigate the impact of these barriers.⁶

Figure 3. Perceived Barriers to Harvesting.⁷



Time (52%): For clarity, we have grouped several different responses under this heading, as they all reflect the essence of this barrier. Responses such as “kids in school”, “kids play sports”, “my job”, and “husband works” are all basically about lack of time, though they of course all require individual solutions. If grouped this way, time barriers are by far the most common factor reported for inhibiting subsistence harvesting.

Addressing this barrier will most likely require some re-formulation of social institutions. Most of the jobs that are available in the communities are administered by

⁶ These barriers and their solutions are addressed at greater length in Nelson’s M.A. thesis, *Forestry and Cultural Sustainability in the Little Red River Cree Nation*

⁷ The responses labelled as “Other” in Figure 5 include disease in animals, poor health, and lack of a hunting partner.

the Nation. It is therefore quite possible to structure job schedules so as to ensure that those who wish to hunt have the time to do so, particularly during favourable hunting periods. Education is also administered by the Nation, which allows for some degree of freedom in allocating time towards bush activities for school children. This possibility is further discussed below under the heading “Knowledge”.

Cost (14%): This barrier is frequently discussed by social scientists who study changes to hunting and gathering cultures (e.g. Fienup-Riordan, 1986; Condon et al. 1995, Feit, 1982). In particular, transportation costs involved in harvesting have risen dramatically since the move onto reserves and since the introduction of ATV’s and snowmobiles. Quads, for example, only became available in Fox Lake in the early 1990’s (prior to which horses were used to reach bush camps), but today are very pervasive in the community (John Laboucan, Personal Communication to Mark Nelson, Aug. 2002).

The most effective way to address this barrier would be the establishment of a guaranteed income program for subsistence hunters. Several such programs have already been established under various bodies, including two under the James Bay and Northern Quebec Agreement (JBNQA, 1976: one administered to the Cree by the Quebec government, the other administered to the Inuit by the Kativik regional government in northern Quebec), and most recently a program run by Nunavut Tunngavik Inc (Royal Commission on Aboriginal Peoples [RCAP], 1996). The Crees’ Income Security Program (ISP) under the JBNQA has received the most analysis because it is the oldest and most complex of the guaranteed income programs (Feit, 1982; Scott, 1984; Scott and Feit, 1983). This program has been very successful in allowing families to return to the bush together and to spend longer periods of time there. Within the first few years of the ISP, the average number of days per year spent on the land by practicing harvesters increased by 26% (from 170 to 214), and over 300 families used ISP funding to begin intensive harvesting (Feit, 1982: 69).

Regulations (14%): Regulations are a particular issue for residents of Garden River, which lies within Wood Buffalo National Park (WBNP) and is therefore subject to federal harvesting regulations that are enforced by Parks Canada. These include bag

limits and transportation restrictions. Regulations are beginning to arise as an issue in other LRRCN communities as well. In the spring of 2002 (the year following the harvest survey), provincial authorities attempted to enforce what they claimed was a long-standing ban on pickerel fishing during their spawning run. Several people were threatened with prosecution if they failed to comply with this directive, which had never been locally heard of nor enforced previously. It is quite likely that “regulations” would be cited as a barrier more frequently if the harvest survey were conducted today.

Efforts have been underway for several years to establish a co-operative management relationship between Parks Canada and the LRRCN regarding WBNP (Pyc, 1998; Honda-McNeil, 2000), but have been largely unsuccessful to date. Regarding the fishing dispute discussed above, some attempts at dialogue with provincial wildlife managers were made, though no consensus was achieved and no long-term relationship was established.

Competition (5%): This barrier was reported quite infrequently. Competition amongst Nation members for hunting grounds is rare at this point, and there is a limited degree of competition with non-aboriginal hunters and outfitters. Even a sparse number of encounters, however, can have a disruptive effect on Cree harvesting practices. Several families who formerly hunted along the western boundary of WBNP have left the area because of a bear outfitter operating there. Another family reported encountering a Calgary-based moose outfitter on their hunting grounds for the past two years. Those facing such competition are unlikely either to share a hunting area with outsiders or to overtly challenge their presence; they are more likely to move elsewhere. This is partly a reflection of Cree attitudes concerning confrontation, and partly a mistrust of outsiders. Cree hunters often report finding empty alcohol bottles at abandoned campsites, and doubt the judgement of what they consider to be inexperienced and careless trophy hunters (and disrespectful to the animals, as well).

Limiting competition from outside hunters for the finite resources within the LRRCN traditional use area will most likely require co-ordination between the Nation and provincial wildlife managers. Efforts could be directed towards limiting the number of game tags awarded to recreational hunters and outfitters, and towards defining their

geographic range such that it interferes with LRRCN harvesters as little as possible. This might be best accomplished through the co-management arrangement discussed above; however, the co-operative management board does not yet include representation from the relevant government departments that could address wildlife issues.

Environment (4%): While many Crees are concerned with the impacts of industrial activities upon the ecosystem, these impacts do not yet appear to inhibit harvesting based on the survey results. Pollution and ecosystem alteration in the area are at this point minimal enough that the current situation might be described as preventative. However, while these factors do not yet limit harvesting *activity*, they may affect harvesting *success*. Several older interviewees commented that hunting was easier in the past because animals were more abundant. They also commented on the changes in the seasonal behaviour of the Peace River and its tributaries, which are corroborated by the findings of the Northern River Basins Study (Alberta Environmental Protection, 1997). Since the W.C. Bennett Dam began operating on the Peace in northern B.C., water levels have generally declined and seasonal floods have ceased. This has affected the small creeks and marshes that previously served as travel routes and as good wildlife habitat. Many have dried up while others have become stagnant and contaminated. One elder man reported recently contracting “beaver fever” by drinking from a creek that he has used all his life.

Knowledge (2%): It is interesting that knowledge (or lack thereof) was not more frequently cited as a harvesting barrier, given the frequency with which it is discussed by community members both in public and in the semi-directed interviews conducted by Mark Nelson. Pyc also encountered repeated concerns that younger hunters are not learning the same skills as their elders, to the point that older hunters fear that the younger ones are “losing their culture” (1998: 72). The senior household members that participated in the survey may have felt that their bush knowledge was sufficient, or perhaps did not want to admit any lack of knowledge.

It is clear that Cree children’s life training and accumulation of knowledge must be woven in with the new institutions that characterize modern life, especially schooling.

Living in the bush full-time is simply not an option for most people. However, it must be recognized that children can only receive *information* through their schooling, and knowledge is only derived through experience and practice. It is therefore imperative that children are provided with the opportunity to spend a significant amount of time in the bush, and that this time is facilitated through the schools which have come to dominate their time. In Fox Lake, for example, several youth workers take students out to the bush each fall to teach them traditional skills and knowledge. However, there is both limited funding and insufficient time for this program. As yet, there is no institutional support for such projects because it lies outside the Alberta curriculum. It is essential that this situation is amended so as to consider the specific needs of First Nation's children by providing security for fieldtrip programs. Being in the bush should be considered a core program for Cree students, not an extra-curricular activity.

Summary of Survey Findings and Future Directions

The survey results give us a good starting point for understanding the subsistence harvesting regime in the LRRCN. Clearly, a substantial amount of resources continue to be taken from the bush each year, which possess considerable economic and social value. Use of these bush resources is not restricted to a few intensive harvesting households, but is spread quite evenly throughout the Nation. Further, the social network of distribution that has traditionally governed bush resources continues to function today and retains its ideological significance in addition to its practical function. However, it is clear both from the survey results and from semi-directed interviews that LRRCN members today face a variety of barriers that inhibit their ability to hunt and gather with the frequency and intensity of the past. Although these barriers cannot be altogether eliminated, efforts must be made to mitigate them in order to ensure the future viability of subsistence harvesting.

The most apparent next step in this research would be to employ the survey data in a resource management context, namely the co-operative management board, in order to address the future subsistence needs of the LRRCN. To illustrate the urgent need for such work, we can perform a rough calculation of the future demand for moose in the LRRCN, as shown in Table 3. Given that the Nation's population is expected to double

by 2026 (Woodrow and Campa, 2001), we can also expect the number of moose required to double (assuming that demand for moose remains constant). Since it is doubtful whether the area could support this harvest rate, it is imperative that this issue be addressed today so as to mitigate the severity of any future shortfall.

Table 3. Current and Projected Requirements for Moose

Year	LRRCN Population (Approx.)	Number of Moose Required
2000	5000	ca. 450
2026	10,000	ca. 900

To employ harvest data in resource management, the information presented here would need to be partnered with geographic and ecological data about the region and Cree harvesting practices. Other SFMN projects have begun to collect such information. For example, Schramm (2002) worked with LRRCN hunters to gather information on critical ungulate habitat in Caribou-Lower Peace area. In addition, a second phase of the project discussed above was initiated in 2002, which included land-use mapping with local harvesters. This process is on-going, and the data obtained thus far have yet to be digitized. Once this is complete, we will have a much better picture of the current harvesting regime in the area and its relationship to the ecosystem.

Ultimately, the future viability of harvesting will require the preservation and restoration of important habitat and species. Efforts in this vein are already underway. The LRRCN is taking the initial steps towards a bison re-introduction program, which would see a critical food species returned to harvestable levels (LRRCN, 2000). Also, about 6000 km² of the Caribou Mountain plateau has been designated as a protected area for woodland caribou habitat, again in an effort to ensure future hunting opportunities. Other possible avenues might include restoration of moose habitat that has been affected by changes to the Peace River watershed.

Criteria and Indicators for community sustainability: multiple community perspectives towards forest values

During the spring and summer of 2001 we were engaged in discussions with the leadership, and their technical representatives, of the Little Red River Cree Nation on the subject of community values and their inclusion in land use planning. While this was not an explicit component of the research proposal addressed here, it is an example of the sort of communication we have used in the Sustainable Aboriginal Research Area to keep Partners and Researchers engaged in order to promote common interests. We think this has been successful enough that, along with concerns expressed by both government and industry partners about the lack of such exchange, this was a reason the Knowledge Exchange and Technology Extension Program of the Network was formed. In this specific case, for example, the dialogue we undertook developed a deeper understanding of the needs of the Partner for both the Partner and the Researchers, and this led to the Researchers doing a bit of introspection on what they could offer the Partner. This eventually led to a proposal by the Researchers to develop a form of “criteria and indicators project” which may ultimately be highly beneficial to all of the various stakeholders in north-central Alberta (including government and private enterprise).

Readers should consult the SFM Network’s website (www.ualberta.ca/sfm/) Publications series, Working Papers (No. 2002-2) for the full text of this contribution. Here we include the matrices that illustrate the values that community members provided to us. The matrices each show a single, general, Criterion of great general importance to community members, illustrated by specific, principled, examples given by them as shown in Column A: Critical Element. Illustrating these, of special and specific local importance, is what is shown in B, the Local Value. What we asked for and what was usually easily given was what we show in Column D of the matrix, an Indicator that prescribes either a safeguarding or promotion of that Local Value/(or, sub-Criterion).

What is of most importance to note in these criteria and indicators is the breadth of interests portrayed. From the First to the Sixth, we see a broad range of values stemming from both traditional community interests and those recognized as of increasing value to younger members of the community. We expect that these values will change as the

demographics of the First Nation change. We have little doubt, given our methods and acceptance by the community, that we have captured an accurate “snap shot” of the LRR community values toward their forests as of 2001. We would like to see the Nation’s leadership examine these values in the context of alternative forestry strategies, that is, to look at trade-offs of these values against commercial forest/AAC values. We hope to do this in the coming research year. In the meantime, we present the criteria and indicators we have developed from community members’ statements.

Matrix 1

Criterion I. Modify Forest Management Operations to Reduce Negative Impacts to Wildlife Species.				
A) Critical Element	B) Local Value	C) Goal	D) Indicator	E) Action
1. Species Diversity and Availability.	1. Healthy population of bison in the Caribou Mt. lowlands and drainages.	1. Limit clear-cut activity along the Caribou Mt. slope to ensure turbidity of drainage is not adversely affected by erosion and sedimentation.	1. Reduce timber harvesting along the Caribou Mts. slope to maintain lowland bison habitat.	1. Reduce harvesting along the Caribou Mt. slope and increase streamside buffers to no less than 300 meters in order to offset increased runoff caused by clear-cuts.
2. Species Diversity and Availability	2. Healthy population of woodland caribou.	2. Enhance critical habitat for woodland caribou.	2. Protection of critical habitat blocks of old growth conifer along the Caribou Mt. slope.	2. Long-term harvest rotation of critical conifer habitat along the Caribou Mt. slope, specifically in elevations between 1500-2000 feet.
3. Species Diversity and Availability	3. Availability of bison throughout the management area.	3. Protect and enhance bison range throughout the management area.	3. Protect bison migration routes.	3. Placement of protective zones along bison migration routes that run north-south between Fox Lake and Tall Cree.
4. Species Diversity and Availability	4. Healthy population of fox, coyote, mink, fisher, and lynx.	4. Maintain critical habitat for primary prey species (squirrels).	4. Protection of critical habitat of blocks of spruce (availability of cones) necessary for squirrel habitat.	4. Long-term harvesting rotation and staggering of cut-blocks to ensure the continued availability of spruce cones for squirrels – and thus predator species.

Matrix 2

Criterion II. Modify Forestry Operations to Ensure Community Access to Lands and Resources.				
A) Critical Element	B) Local Value	C) Goal	D) Indicator	E) Action
1. Continued access to lands and resources.	1.Ensure travel is not impeded by forestry operations.	1.Modify silviculture methods to ensure continued access to lands and resources.	1.Discontinue the practice of scarification following harvesting as it impedes human and non-human travel.	1.* Utilize alternative silviculture methods: - Controlled Burns. - Hand scalping followed by hand seeding and planting.
2. Continued access to lands and resources.	2.Ensure travel is not impeded by forestry operations.	2.Maintain travel corridors throughout the management area for local hunters and trappers.	2.Expand buffers along creeks and streams to limit windfall across waterways.	2.Expand buffers on creeks, streams and rivers to no less than 300 meters from each shoreline.
3. Continued access to lands and resources.	3.Continued availability of balsam poplar throughout the management area.	3.Modify forest operations so as to ensure the availability of balsam poplar near trapline cabins and camps as balsam polar burns well when green with little sparking.	3.Continued availability of balsam poplar near trapline cabins and camps.	3.Protective buffer of no less than 200 meters around trapline cabins and camps to ensure the continued availability of balsam poplar.
4. Continued access to lands and resources.	4.Limit blow-down (wind velocity) of protective buffers in order to protect critical habitat and travel corridors.	4.Modify harvesting sequence and cutblock layout in order to limit blow-down.	4.Maintain stand integrity of buffers along critical habitat areas and travel corridors	4.Stagger cutblocks and expand buffers to no less than 300 m. from each shoreline along eastern end of cutblock.
5. Continued access to lands and resources.	5.Forestry operations should in no way obstruct hunting, trapping and camping trails.	5.Ensure that forestry operations do not obstruct community access trails.	5 Buffers along all known hunting, trapping and camping trails used by LRRCN band members.	5.Buffers no less than 200 meters should be placed along all known hunting, trapping and camping trails used by LRRCN band members.

Matrix 3

Criterion III. Provide Protection to all Areas Identified by Community Members as Having Biological, Cultural, and Historical Significance.				
A) Critical Element	B) Local Value	C) Goal	D) Indicator	E) Action
1. Areas of cultural significance are protected from forestry operations.	1. Protection of areas of natural and/or environmental sensitivity.	1. Modify forestry operations to ensure areas of natural and/or environmental sensitivity are not adversely affected by forestry operations.	1. Harper Creek caves are protected from resource development activities.	1. Protective buffer of no less than 300 meters around caves located along Harper Creek south of Fox Lake.
2. Areas of cultural significance are protected from forestry operations.	2. Protection of historical cabins and traditional settlements.	2. Cabins and settlements of historical and cultural significance are protected from forestry operations.	2. Protective buffers are placed around all cabins and settlements of historical and cultural significance.	2. Protective buffers of no less than 500 meters should be placed around settlement sites located at the confluence of the Mikkwa and Peace Rivers.
3. Protection of sites of biological significance	3. Protection of mineral licks throughout the management area.	3. Modify forestry operations to ensure mineral licks are protected from harvesting activities.	3. Protective buffers placed around mineral licks that are located throughout the management area	3. Protective buffers of no less than 300 meters should be placed around mineral licks.
4. Areas of cultural significance are protected from forestry operations.	3. Protection of all burial sites located through the management area.	4. All burial sites located throughout the management area are protected from forestry operations.	4. Protective buffers are placed around all burial sites located throughout the management area.	4. Protective buffers of no less than 200 meters should be placed around burial sites known to be located within the management area.
5. Areas of cultural significance are protected from forestry operations.	5. Protection of rare, endangered and medicinal plants.	5. Plants known to be rare, endangered, or used for medicinal purposes by LRR/TC band members should be protected from forestry operations.	5. Protective buffers placed around areas known to support rare, endangered and medicinal plants.	5. Protective buffers of no less than 100 meters should be placed around upland areas known to support rare, endangered and medicinal plants and no less than 300 meters for riparian zones.

Matrix 4

Criterion IV. Recognize and Protect Aboriginal and Treaty Rights to Hunting, Fishing, Trapping and Gathering Activities.				
A) Critical Element	B) Local Value	C) Goal	D) Indicator	E) Action
1. Continued ability to participate in subsistence activities.	1.Ensure forestry operations do not infringe upon Aboriginal or treaty rights.	1.Maintain or enhance opportunities to participate in subsistence activities.	1.Modify existing annual allowable cut to ensure subsistence activities are not limited by forestry operations.	1.Implement a selective logging program for the management area.
2. Continued ability to participate in subsistence activities.	2.Trapline areas remain productive and readily accessible to community trappers.	2. Maintain existing age structure and species diversity found within trapline areas	2.Long-term harvesting rotation in registered trapline areas.	2.Long-term sequencing and cutblock rotation within trapline areas. Implemented through a consultative framework between community trappers and Board representatives.
3. Continued ability to participate in subsistence activities.	3.Rights of trappers are recognized in the planning process.	3.Compensation for lost or reduced access.	3.Implementation of a trappers compensation program.	3.Implement a trappers compensation program for trappers affected adversely by forestry operations.
4. Continued availability of subsistence resource.	4.Priority use of large ungulates for subsistence use.	4.Limit poaching by non-local hunters of large ungulates.	4.Limit access to areas representing critical ungulate habitat.	4.Reclaim access roads leading to the Caribou Mt. slope.
5. Continued availability of subsistence resource.	5.Wild foods are utilized to their fullest extent.	5.Limit the illegal wastage of wild foods by non-local hunters and outfitters.	5.Community elders receive the meat harvested from trophy hunts.	5.Implement wild meat sharing program with commercial guides and outfitters.

Matrix 5

Criterion V. Increase Forest-Based Economic Opportunities for Community Members.				
A) Critical Element	B) Local Value	C) Goal	D) Indicator	E) Action
1. Community self-sufficiency.	1. Empowerment through education.	1. Provide community members with the education and training necessary to assume responsibility for forest management operations.	1. - Forestry educational program delivered at K through 12. - Delivery of a post-secondary training program.	1. - Implement a forestry education program in each of the LRRCN schools. - Deliver a post-secondary forest worker training program through Kayas College.
2. Community self-sufficiency.	2. Empowerment through employment and training opportunities.	2. Provide community members with on the job training opportunities in the forestry industry.	2. Training and employment program with industry partners.	2. In partnership with Footner Forest Products implement an employment and training program in forestry operations.
3. Community self-sufficiency.	3. Empowerment through capacity-building and marketable skill development.	3. Developing technical skills needed for forest management and planning.	3. Community members receive training in the technical and managerial aspects of forest planning and management.	3. Implement a GIS training program for community members. To be delivered on-site and at regional training centers.
4. Community self-sufficiency.	4. Empowerment through economic development.	4. Expand and diversify economic opportunities for community members.	4. Increase in the number of individually owned primary, secondary or value-added community services.	4. Promote value-added resource-based business opportunities with industry partners.
5. Community self-sufficiency.	5. Empowerment through employment and training opportunities.	5. Provide community members with on the job training opportunities in the forestry industry.	5. Training and employment program with industry partners – planning to production.	5. Implement an internship and job-shadowing program with forest industry partners.

Matrix 6

Criterion VI. Increase the Involvement of Community Members in Decision-Making.				
A) Critical Element	B) Local Value	C) Goal	D) Indicator	E) Action
1. Intra/Intra Community Information Exchange.	1. Equitable participation of community members in policy and decision-making.	1. Direct communication between industry and community members.	1. Recognized point of contact is established between industry and each of the three LRR communities.	1. Community-industry information liaison representing each of the three LRR communities should be appointed.
2. Intra/Intra Community Information Exchange.	2. Equitable participation of community members in policy and decision-making.	2. Industry goals and management plans are communicated to each of the three LRR communities.	2. Information is disseminated in a format accessible to community members.	2. Posters and newsletters for information dissemination.
3. Intra/Intra Community Information Exchange.	3. Equitable participation of community members in policy and decision-making.	3. Pluralistic participation on Management Board.	3. Community representation on the SMA Management Board is diversified.	3. Youth (3), Women (3), and Elder (3) involvement on SMA Management Board. (Rotated involvement)
4. Intra/Intra Community Information Exchange.	4. Equitable participation of community members in policy and decision-making.	4. SMA management objective are made more accessible to community members.	4. Forums to facilitate community participation in the management of the SMA are created.	4. Community Steering Committees should be created and comprised of family representatives.
5. Intra/Intra Community Information Exchange.	5. Equitable participation of community members in policy and decision-making.	5. Local ecological knowledge is given an equitable role in management and planning decisions.	5. Traditional ecological knowledge is used to inform management and planning objectives.	5. Implement a consultation program with community trapline holders.

Land Use Mapping: Summer of 2002

The mapping exercise was conducted with methods similar to that of the harvest survey and for the same reasons. One student from each community was hired through Kayas Cultural College and trained in the interview and survey methods developed and found to be successful in 2001. In this case the students were issued the relevant 1:250,000 maps that covered the traditional Little Red River territory. The maps were laminated and the students were also issued sheets of transparent plastic on which they were to mark the locations of activities and specific areas where animals were hunted or trapped or berries were gathered, coded by colour. Species lists were identical to those used in 2001, and in addition the students were provided with activity lists that went beyond the resources of interest in the previous year. That is, they looked to determine locations of cabins, seasonal camps, burials, trails, firewood, and so on.

Forty-six households were surveyed: seven in Garden River, twenty-two in Fox Lake, and seventeen in John d’Or Prairie. Since we had only half of the students available to help in 2002 as we did in 2001, the results (the sample was about 8.7% of all

households in the three communities) are not as useful as indicating the total extent of land being used in various activities that furthered the economic, social and cultural well-being of the people. Again, we avoid the term “traditional land use” as it fails to acknowledge the contemporary and on-going importance of these activities, including the transmittal of values to younger generations.

We are currently in discussions with the Little Red River Department of Environment and Sustainability regarding the use of this information and an extension of the study. It seems likely that the First Nation will enter into an agreement with the Provincial Government to conduct a Land Use Study funded jointly by the Nation and the Province. If this occurs, we shall link our study with the new project to achieve maximum efficiency. However, we will probably focus more on issues such as trade-offs and alternative management strategies given the knowledge we now have about resource harvesting and land use, rather than focussing on current use. The future integration of the First Nation’s values in forest management, building on the present research and on the criteria and indicators collected by Natcher and Hickey (2002), as well as the suite of projects approved for the last granting cycle, should serve as an effective beginning to an alternative and sustainable forest management system.

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