

# A QUESTION OF SUSTAINABILITY IN CREE HARVESTING PRACTICES: THE SEASONS, TECHNOLOGICAL AND CULTURAL CHANGES IN THE WESTERN JAMES BAY REGION OF NORTHERN ONTARIO, CANADA

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## Abstract / Résumé

It is often assumed that Cree harvesting practices of the Mushkegowuk Territory are sustainable because traditionally they have been. However, a question of sustainability must be raised, based on several observations: 1. Dietary habits have changed. 2. Technological changes have occurred in firearms while refrigeration has allowed the storage of wild game. The amount of time spent in the bush per trip has decreased resulting in cultural changes. 3. Traditional harvesting practices are now falling into disuse. The dissemination of Traditional Ecological Knowledge (TEK) has been interrupted by the residential school system and changes in harvesting practices.

On prend souvent pour acquis que les pratiques de chasse crie sur le territoire Mushkegowuk satisfont les besoins nutritifs parce qu'elles l'ont été traditionnellement. Cependant, on doit soulever la question de la valeur nutritive, et ce à partir de diverses observations. 1. Les habitudes alimentaires ont changé. 2. Les armes à feu ont subi des transformations technologiques tandis que la réfrigération a permis la conservation du gibier. Le temps passé dans les fourrés par expédition a diminué, ce qui a provoqué des changements culturels. 3. Les pratiques traditionnelles de chasse tombent en désuétude. La propagation du Savoir Écologique Traditionnel, ou SET (*Traditional Ecological Knowledge, TEK*) s'est vue interrompue par le système des pensionnats et les changements de pratiques de chasse.

## Introduction

Recent studies examining land-use practices of First Nation (FN) Cree living in the Mushkegowuk region (western James Bay area of northern Ontario, Canada) have illustrated the importance of traditional harvesting practices to FNs of the region for economic as well as cultural reasons (e.g., Thompson and Hutchinson, 1989; Cummins, 1992; Berkes *et al.*, 1995; George *et al.*, 1995). Harvesting can be defined as "the total number of animals removed from a population by hunting and trapping activity" (Usher, 1976:106), while sustainable harvests refer to the number of animals that can be safely removed from the population without adversely affecting the population and the reproductive potential of the population. During the 1940s and 1950s, references were made to the sustainable harvesting practices of FN Cree living in the Mushkegowuk region:

Whereas in some other societies relative scarcity of resources might recommend harder work, among the Indians scarcity is quickly perceived as disappointing so that efforts tend to relax rather than intensify (Honigmann, 1948:89).

The present investigation has indicated that the kills of geese made by the native hunters... are within safe limits of what the nesting populations of that area can withstand (Hanson and Currie, 1957:228).

However, it cannot be assumed that sustainable harvesting practices still exist in the present day mixed-economy (a combination of traditional harvesting practices, government transfer payments, and wage work [George, 1989; George *et al.*, 1995]) of the Mushkegowuk region. As George *et al.* (1995:85) have recently noted, there have been:

transformations of cultural tradition... the shift toward efficient killing of large numbers of waterfowl, and quick, short (by snowmobile, even aircraft) sorties for large game, sustains a high percentage of bush food in the diet but changes the strategic and ethical context of hunting.

In this paper, I report on a study that identified several areas of concern that need to be explored more thoroughly with respect to the sustainability of current harvesting practices (especially geese) in the Mushkegowuk region and have suggested a program that would allow for sustainable harvesting of geese.

## Study Area

The Mushkegowuk region of northern Ontario, Canada is located on the western shores of James Bay and the southern portion of Hudson Bay. This area is populated by approximately 10,000 Cree who inhabit seven communities: New Post, Moose Factory, Moosonee, Fort Albany, Kashechewan, Attawapiskat, and Peawanuck (formerly Winisk). Some researchers have included Fort Severn (e.g., Prevett *et al.*, 1983; Berkes *et al.*, 1994), while others have included Moose River Crossing (e.g., Thompson and Hutchinson, 1989) in the Mushkegowuk region. Moose Factory and Fort Albany were chosen as the two focal communities for several reasons: readily available accommodations, important for field work in the north; and community support. Moose Factory was representative of a FN community with a less traditional lifestyle, that is, English is the primary language used, all houses have running water and sewage facilities, and a relatively large wage economy sector exists. Fort Albany is representative of remote, coastal, fly-in communities where the use of the Cree language predominates, few houses, until recently, have had running water, and there are few employment opportunities in the wage economy.

## Methodology

All participants in this study were chosen at random. In the first part of this study, 54 people from Moose Factory and 52 people from Fort Albany were interviewed. Semi-directive interviews with Cree interpreters, similar to methodology described by Tsuji (1996a) were conducted from May to August, 1995, in Moose Factory and from January to September, 1996, in Fort Albany. Data were collected with respect to the seasons, traditional harvesting rules, and technological and cultural changes with respect to harvesting practices.

Demographically, Moose Factory participants consisted of four Elders, seven females, and 25 males for a total of 36 participants. Data for 18 people could not be used due to a variety of problems (e.g., consents were signed with an X or unsigned, name page was lost, etc.). All 52 of the Fort Albany participants contributed data that could be utilized. This group consisted of 10 Elders, 23 females and 19 males.

In the second part of the study, a total of 55 FN Cree from Fort Albany participated. Individuals were placed into one of two groups: females (N=31); and males (N=24). The average age for females was 37 years with a range of 24 to 64 years. The average age for males was 33 with a range of 21 to 62 years. All participants were chosen at random and the type of data gathered allowed for statistical testing. Participants were questioned

about what parts of the large Canada goose (*Branta canadensis interior*, hereafter referred to as Canada goose) and lesser snow goose (*Anser caerulescens caerulescens*, also referred to as blue goose or wavie) were eaten. Individuals who consumed only breast and/or leg/wing tissue were scored as 1, those who ate more than breast and/or leg/wing tissue (e.g., heart, brain, liver, gizzard, intestine) were scored as 2, and those who did not eat geese were scored as 3. Age data were subject to Wilcoxon rank-sum tests between females categorized into group 1 and those in group 2, and between males categorized into group 1 and group 2.

## The Seasons

Traditionally in FN culture, there have been six or more annual harvesting seasons described. When asked "How many seasons are there?", the response was varied with a range of answers from one to 12 seasons. Moose Factory and Fort Albany respondents generally agreed that there were two or four seasons; however, all Fort Albany Elders (N=10 of 10 or 10/10) reported that there were at least six seasons (Table 1). These seasons were said to be related to wildlife abundance by a large majority of the participants: Moose Factory Elders (4/4), females (6/7), males (20/25); and Fort Albany Elders (10/10), females (17/23), and males (18/19). Other answers included "I don't know" and the "weather". Further, accessibility to wildlife resources was said to be of importance in the division of the seasons by many of the people (Moose Factory Elders [2/4], females [3/7], males [12/25]; and Fort Albany Elders [10/10], females [9/23], and males [12/19]). All other respondents did not know whether accessibility was important to the division of the seasons, while only eight people thought that accessibility was not important to the division of the seasons.

Traditionally, the concept of number of seasons provided the cornerstone of Cree sustainable harvesting practices in the western James Bay region. Each season corresponded to a period of time when either one particular species or group of species were abundant and/or accessible. During the designated season, just enough animals of a particular species would be harvested for subsistence and sharing. Once other species became more plentiful and/or accessible, harvesting of the first species would be discontinued and the harvesting of the next species would begin. This switching of harvesting pressures would allow animal populations to remain at sustainable levels, rather than overharvesting in one season, which may have led to a significant decrease in population numbers and eventually extinction of a species (Fort Albany Elders, personal communication).

**Table 1. The number of seasons in a year reported by First Nation Cree of the western James Bay region of northern Ontario, Canada.**

	Number of Seasons						
	1	2	3	4	5	6	>6
<i>Moose Factory</i>							
Elders (N)	-	1	-	2	-	1	-
Females (N)	-	-	-	7	-	-	-
Males (N)	-	3	1	17	-	2	2 <sup>1</sup>
<i>Fort Albany</i>							
Elders (N)	-	-	-	-	-	2	8 <sup>2</sup>
Females (N)	1	8	-	11	-	2	1 <sup>3</sup>
Males (N)	-	5	2	6	-	4	2 <sup>4</sup>

<sup>1</sup>Both participants responded 12 seasons.

<sup>2</sup>One person reported eight seasons while the others stated all year, that is, 12 seasons.

<sup>3</sup>The person reported eight seasons.

<sup>4</sup>One person reported eight seasons while the other respondent stated all year.

Examples of sustainable harvesting practices for FN Cree of the Mushkegowuk region can be found in the literature. Tsuji (1996a:74) described the harvesting of sharp-tailed grouse (*Tympanuchus phasianellus*) in the spring:

Elders stated that they typically hunted and snared... sharp-tails during the spring dancing period and only shot enough to eat. The reason they gave for not killing all the birds on the lek relates to their views on conservation and sustainability. If no birds were left, there would be no birds at the lek the next season. It has been found that older males are important during the autumn recruitment of yearlings to the lek... Elders were in agreement that when the geese and ducks arrive, they no longer hunt sharp-tails.

The harvesting of sharp-tails in the spring before break-up illustrates the use of a sustainable harvesting practice. There was no overharvesting of sharp-tails which would lead to decreased harvests in the future. Cyclic species are especially vulnerable at low points in their population cycle

when their numbers are low. Also, there was a switch-off of harvesting from one species (sharptails) to another (geese and ducks) when the latter species became more plentiful and accessible.

Although Honigmann (1948) does not discuss Cree harvesting practices in terms of sustainability, his observations and data allude to sustainable harvesting of wild game by the Cree. In the Honigmann (1948) report, a section addresses the "Annual Cycle and Seasonal Diets". In this section, the year was divided into different seasons and the wild game described for that season. The seasons and wild game diet for the corresponding seasons from Honigmann (1948) will now be presented:

*Summer.* After break-up and once the flooding of the rivers had subsided, a monotonous diet of fish began. In the early part of the summer, the diet of fish was supplemented by preserved geese harvested in late spring. By the end of June, all geese had been eaten. By the end of July and early August, fishing was more productive and there were more waterfowl in the diet.

*Fall.* Whitefish were harvested and dried in early fall. Wavies were predominantly hunted in late fall.

*Early Winter.* During this season, rabbits were snared and upland game harvested.

*Winter.* Beaver were trapped for meat and pelts along with other fur-bearing species.

*Early Spring.* Early March, rabbits were snared and upland game harvested. Large game (e.g., caribou and moose) were also harvested at this time. Beaver was now no longer part of the diet.

*Late Spring.* After break-up, the arrival of Canada geese and the emergence of muskrats provided a large quantity of fresh meat as well as furs and feathers. The geese and muskrats were dried for later consumption.

The seasons as described by Honigmann (1948), in general, correspond to the "six seasons" (or more than six seasons) of the Cree. The change-over from harvesting one species during a particular season to another species during another season is clear. Moreover, as Honigmann (1948:189) notes:

It is probably true that large scale killing of game is not necessarily followed by proportionately large scale preservation. An abundance of meat results in a heavier meat diet immediately rather than over a long future period.

Evidently, wild game was harvested during a particular season when the animals were more plentiful and/or accessible and then consumed primarily during that season. The next season would bring other game. Also, there was no overharvesting of wild game; if wild game was scarce, Cree would relax their harvesting efforts for that species rather than intensify their harvesting effort (Honigmann, 1948).

Although Cummins (1992:154) in reference to Mushkegowuk Cree asserts that past and current waterfowl "data provide clear evidence of sustained, measured resource use", other passages in his thesis suggest a different conclusion. I give an example:

Evidence from 1990 suggest that an average hunter often shoots enough geese in the spring hunt to sustain him and his family until the fall hunt. Honigmann's data... indicate that this would be unlikely in the 1940's. Typically, by June the spring kill would be exhausted. Therefore, the diet would be supplemented with further ducks and rabbits (if available) during the summer months until the arrival of geese in the fall and the return migration of whitefish (Cummins, 1992:162).

The importance of the above passage is that it illustrates how in the past FN Cree would just take enough wild game to allow subsistence into the next season and the corresponding change in wild game species. Present day harvesting of Canada geese would constitute overharvesting compared to the past because more game was harvested than required for one season. Enough geese in 1990 were harvested for two seasons putting unnecessary population pressure on the Canada geese and relaxing harvesting stress on fish species harvested after break-up and in the summer.

## **The Changing Seasons**

As explained in the previous section, the existence of six (or more) seasons provided the foundation of Cree sustainable harvesting practices in the past. Thus, a question must be asked when examining whether sustainable hunting practices still exist in the Mushkegowuk region: "How many seasons presently exist?"

Data from the present project suggest that there has been a fundamental shift in the number of harvesting seasons for many individuals. Only 27.3% (24/88) of the participants state that there were six or more seasons (Table 1). The majority of people responded that four or less seasons existed: four seasons, 48.9% (43/88); three seasons, 3.4% (3/88); two seasons, 19.3% (17/88); and one season 1.1% (1/88; Table 1). Similar trends have been reported by other researchers working in the Mushkegowuk area. Thompson and Hutchinson (1989) found varying degrees of

participation in the harvesting of several species: waterfowl, 80%; small game, 40-60%; fishing and trapping, 25-40%; and moose, caribou, and other waterbirds, <25%. Berkes *et al.* (1994) data were in general agreement: waterfowl, 80%; moose, 27%; caribou, 15%; small game, 60%; fish, 56%; and trapping 20%. Considering that most harvesting of species is season specific, these data as a whole suggest that a majority of FN Cree are not harvesting in all six seasons. The majority of harvesting activity appears to occur in the spring and fall when waterfowl are abundant during their annual migrations.

Further, Cummins (1992:297) makes an interesting observation:

While moose and caribou hunts are usually a week or so in duration, a hunter can hunt geese on a day to day basis from his house, and in this way secure a substantial amount of meat. It is not surprising, then, to find a significant number of men who have long since given up moose and caribou hunting but who nonetheless bag large numbers of geese annually.

Berkes *et al.* (1995:81) also reports that although extensive land-use for harvesting still exists for FN Cree of the western James Bay region,

contemporary harvesting involves numerous short trips of a few days' duration instead of the traditional long trips.

Numerous short harvesting trips allow recreational hunters and people employed in the wage sector to partially partake in traditional activities, in particular, waterfowl harvesting.

The religious and cultural significance of the harvesting of the spring Canada goose cannot be over-emphasized. The spring harvest of this species was a celebration of life representing the survival of the family through the harsh winter (Hanson and Currie, 1957; Thompson and Hutchinson, 1989; Cummins, 1992). The affinity of the Cree people for harvesting of waterfowl during the spring has not diminished as illustrated in several studies. Prett *et al.* (1983) and Thompson and Hutchinson (1989) found that 93% and 84% of hunters participated in the spring waterfowl hunt (cf., 84% and 74% in the fall), respectively. Berkes *et al.* (1995) give participation rates in person days with 14,000 for the spring waterfowl harvest and 10,000 for the fall harvesting period.

The change in harvesting activity from six (or more) seasons in the past, to two major seasons (waterfowl harvesting in the spring and fall), as well as the concentrating of FN Cree in the coastal communities during the 1950s and 1960s, and regular population increases (Thompson and Hutchinson, 1989) have all contributed to an increase in the amount of waterfowl harvested. Prett *et al.* (1983) have found that the harvesting of

Canada geese and waxies has increased substantially from the 1950s to the 1970s. They report that,

the markedly higher estimates at most localities for the mid-1970s suggest that the kill has increased by a factor of about two for Snow Geese and perhaps three times for large Canada Geese (Prevett *et al.*, 1983:190).

Moreover, Thompson and Hutchinson (1989:34) have reported a

65% increase in Canada and snow goose harvests occurring between 1974-1976 and 1981-1983 study periods.

Two reasons for these larger harvests were given by Thompson and Hutchinson (1989): a change in demographics (as detailed earlier), and technological changes. Cultural changes must also be considered as an important factor.

## Technological Changes

Technological changes, especially in the 1960s, have resulted in more efficient harvesting of animals and an increase in the number of animals harvested, as well as a decrease in the amount of time spent in the bush per trip (George and Preston, 1987; Thompson and Hutchinson, 1989; George *et al.*, 1995). The most important technological changes have been in transportation, firearms, and refrigeration (Prevett *et al.*, 1983; Cummins, 1992; Berkes *et al.*, 1995).

With the introduction of the snowmachine in the early part of the 1960s, prime harvesting areas were now readily accessible to hunters due to the increased range and speed of the snowmachine (Prevett *et al.*, 1983; Cummins, 1992; Berkes *et al.*, 1995). The outboard motor and the canvas and fibreglass canoe have also made the waterways more easily traversed. Even day trips down river to and along the bay to prime waterbird areas are now commonplace. The use of helicopters currently make safe transportation during freeze-up and break-up a reality. Chartered planes are now even used to transport Cree to prime waxy harvesting areas at Cape Henrietta Maria. It is clear that technological changes have had a significant impact on who harvests (e.g., recreational hunters and people working in the wage sector can harvest during day trips), what and where harvesting occurs (e.g., easy accessibility to prime localities), and when harvesting can take place (e.g., during break-up). Modern communication devices have also alleviated the "fear" of being trapped in the bush (Cummins, 1992).

Technological changes in firearms and ammunition has also increased both the efficiency of the harvest as well as increased the amount of harvest. High-powered rifles, pump-action and semi-automatic shotguns are now

commonly used by FN Cree. Manual reloading of shotshell is now no longer required; shotshell are prepackaged in different gauges (e.g., 10 and 12 gauge), lengths (e.g., 2 3/4" c.f 3"), size of pellets (e.g., BB, 2, 4), and range (e.g., field load, magnum). In reality, less skill (compared to the past) is required in harvesting waterfowl with modern guns and shotshell.

In the past, the amount of animals harvested was dependent not only on cultural values (which will be examined in the next section) but also on the ability of the people to preserve the meat. Meats in the past were preserved by drying and smoking (Honigmann, 1948); a lengthy procedure which involved the preparation of the animal, gathering of wood, construction of a separate tipi, and the actual smoking and drying time. In the present, modern refrigeration units can store large amounts of animals with very little preparation. In the harvesting of waterfowl, it is a common practice to remove just the feet, wings, and heads. Birds are otherwise whole, often times with the feathers intact. This partial processing allows more waterfowl to be stored in the freezers and reduces preparation time in that no internal organs are removed from the body prior to freezing. People often state that waterfowl taste better when they have been frozen this way.

## Cultural Changes

Traditional Ecological Knowledge (TEK) refers to all knowledge that has been accrued over generations by Indigenous people with respect to their environment (social, spiritual, biological, and physical [Doubleday, 1993]). Since this knowledge has traditionally been transmitted solely through the oral medium (Colorado, 1988), any disruption of culture and/or language results in loss of TEK. In Canada, FN children were removed from their communities for the entire school year and were forcibly prevented from speaking their language and practising their ceremonies showing respect for Mother Earth, resulting in loss of TEK (Wavey, 1993). Loss of TEK was accelerated by the technological changes of the 20th century, as detailed earlier, by diminishing the family aspect of harvesting activities. In the past, families would traditionally spend extended periods of time together, either in transit (e.g., paddling a canoe) and/or at bush camps. During these prolonged periods of time, Elders would disseminate their knowledge orally and through hands-on experience. Today, short harvesting trips (day trips and/or weekends) by lone hunters are common (Cummins, 1992). Thus, it is not surprising that there has been significant inter-generational loss of TEK in the Mushkegowuk region (Tsuji, 1996b). The loss of TEK is of importance to sustainable harvesting practices because there are traditional "rules" or "codes of conduct" governing harvesting activities (Fast and Berkes, 1994). The strict adherence to these

codes of conduct by all community members allowed for the sustainable harvesting of wild game. At present, these codes of conduct are not strictly followed or enforced by all community members, as will be illustrated.

When asked the question, "Can you think of any traditional rules about hunting, fishing and trapping?", there were two main responses from the Elders. All Elders from Fort Albany (10/10) and two of the four Elders from Moose Factory (the other two individuals did not understand the question with one stating that he had stopped harvesting and the other saying I don't know) stated that people should harvest only what is needed for survival. Traditionally, harvests were regulated by "okimaws" or bosses to prevent overharvesting of species (Feit, 1989; Fast and Berkes, 1994). Moreover, it was believed that animals were given as gifts from the Creator and by sharing their harvest with other people and not wasting any part of the animal, respect was shown to the Creator and the animal for giving its life so that the harvester may survive (Felt, 1989; Fast and Berkes, 1994). Honigmann (1948) substantiates the practice of not wasting any part of the animal when he found extremely little waste in Cree garbage.

The second most common answer for Fort Albany Elders (5/10) was that there should be no harvesting at night and no fires in the open because the light from the fire would disturb the wildlife. Fast and Berkes (1994) have also documented this code of conduct, and Honigmann (1948:154) suggests that,

A number of ideals regulate the hunting of waterfowl... Since deliberate violation of these norms produces resentment, they may be regarded as legal in nature... Shooting should close with sunset as hunting later... will cause the fowl to become shy and hard to kill in the future.

Two other answers given by Elders were know the tides, know the spots (Moose Factory, 1/4) and no trapping in another person's territory (Fort Albany, 1/10).

It is interesting that while Elders consider harvesting only what is needed for subsistence, sharing, and not wasting any gift that was given in one category (respect for the animals and the land), males and females from Moose Factory and Fort Albany often considered these codes of conduct as separate entities. Results from this part of the study are presented in Table 2. Although the data are limited, data do suggest that knowledge of the codes of conduct for harvesting have diminished as well as the understanding of the principles behind the rules. Lack of respect for the land and the animals has been identified as a problem by many of the FN Cree participating in this study.

**Table 2. First Nation codes of conduct for the harvesting of wild game. Respondents from Moose Factory (males, N=25; females, N=7) and Fort Albany (males, N=19; females, N=23).**

	Moose Factory <sup>1</sup>		Fort Albany <sup>2</sup>	
	males (N)	females (N)	males (N)	females (N)
Never harvest more than you need	16	3	12	7
Respect the land and the animals	5	1	4	4
Share your harvest	5	3	-	2
Do not make fires at night or in the open because it disturbs wildlife	-	-	9	2

Note: Two people from Moose Factory and 11 people from Fort Albany did not know any codes of conduct for harvesting.

<sup>1</sup>Other codes of conduct given by one or two respondents included: hunt in seasons animals are not carrying or tending their young; and do not hunt in sanctuaries.

<sup>2</sup>Other codes of conduct given by one or two respondents included: do not hunt on other territories; and do not sell your harvest.

**Table 3: Areas of concern with respect to contemporary Cree harvesting practices as identified by respondents from Moose Factory (Elders, N=4; males, N=25; females, N=7) and Fort Albany (Elders, N=10; males, N=19; females, N=23).**

	Moose Factory <sup>1</sup>			Fort Albany		
	Elders (N)	males (N)	females (N)	Elders (N)	males (N)	females (N)
Overharvesting	-	10	1	4	6	3
Killing for the sake of killing	-	4	-	-	-	1
Crippling of game birds	-	4	4	-	1	2
Hunting at night with a light	-	3	-	2	1	-
Littering at campsites	1	6	2	-	-	-
Not utilizing all parts of an animal	-	-	-	1	1	1
Use of lead pellets for harvesting	-	1	-	-	2	-

<sup>1</sup>Other concerns included harvesting animals while carrying or tending their young.

Several areas of concern with respect to contemporary Cree harvesting practices were identified in the present study (Table 3). The concern of FN people with the loss of codes of conduct and resulting changes in harvesting practices in the Mushkegowuk region is evident upon examination of these selected passages:

Rules are not followed strictly, and people tend to take more than they need in terms of food/animals. It has become more of a "sport" than a means of survival. Many years ago, our grandparents killed just enough to live on, they did not shoot everything in sight, just for the sake of a kill. People today don't know how to control their hunting, its more of a "power trip" now.

Some people hunt for fun, long ago it was a way of surviving. Hunting not taken seriously like long ago. Old days hunting was done for survival today more for sport.

People slaughter wildlife today and show no remorse but brag how many they killed. Kill anything that they have no use for (small birds, sea gulls).

Big game caught used to celebrate with feast, not done anymore.

Out of control. Old hunting practices controlled (ie fall goose hunt) there were camp bosses to let people in the camp know when to hunt usually during cloudy windy day, only allowing hunters to kill a limit.

Too much killing of wildlife which decrease the population of the animal being hunted, some people throw out frozen meat just to empty their freezers so that they can go and hunt more wildlife.

Several of these topics have been partially addressed in articles appearing in local/regional publications. In the *Omushkego Arrow* (1996:3) and *Wawatay News* (1997:24), Billy Goodwin and Chief Oliver Wesley of Kashechewan, respectively, talk of respect:

My own interpretation of respect means to show respect to Mother Earth...whenever they [Elders] killed a moose they utilized everything from that animal, because it was a way of showing respect and gratitude to the Great Spirit for providing them with food. We should also show respect every day to the animals, the fish, and birds. In return we should keep the environment clean and preserve it so that the animals in it are not harmed.

As an Aboriginal person, I believe in traditional values and that everyone should respect the land and water... today our traditional traits are diminishing because not enough education and promotion is being done within the Mushkegowuk region to keep our land clean and free from destruction.

Littering appears to be a major concern and has been reported on by the Ontario Ministry of Natural Resources (OMNR) in Moosonee (OMNR, 1995). The OMNR and the Nishnawbe-Aski Police (regional FN police force) are also concerned about the wastage of wild meats (OMNR, 1996a, 1996b). Reports of large quantities of wild meats being deposited at the dump are reported each year (OMNR, 1996a, 1996b). Sharing of the wild game has been encouraged rather than wastage of the meat which is a criminal offence (OMNR, 1996a, 1996b).

It should be stressed that traditionally, wastage of wild meat meant not utilizing all the parts of animals that were edible or could be used otherwise (e.g., feathers, furs). In the present study surveying dietary habits of 55 FN Cree with respect to goose consumption, it was found that 22 of the 55 participants (males, 13/24; females, 9/31) consume more than just breast/leg/wing tissue (14/55 respondents consume everything [e.g., heart, gizzard, brain]; 8/55 respondents consume more than just breast/leg/wing tissue but less than five internal organs). Thirty-one individuals (males, 10/24; females, 21/31) eat just skeletal muscle in the breast, legs, and wings. Two people, one male and one female, stated that they no longer consumed goose.

No differences in age were found for: Group 1 versus Group 2 males, and Group 1 versus Group 2 females (Table 4). The consumption of different parts of the waterfowl does not appear to be age related. However, there has been a major shift of eating habits from consuming everything that is edible (Honigmann, 1948), to a clear preference for only certain parts of the bird (i.e., breast/leg/wing tissue). As mentioned previously, traditionally, it was respectful to utilize all parts of an animal. However, this practice cannot be taken out of context of the time period when the threat of starvation was real (Honigmann, 1948; Cummins, 1992).

Adding further, individual consumption patterns must be considered when calculating net weight of edible tissue obtained from game birds because even though two harvesters harvest the same number of birds, the amount of edible tissue obtained by each harvester may differ depending on consumption preference. I give an example using wavier data gathered by Ankney (1977) and Wypkema and Ankney (1979) from the western James Bay region. Wypkema and Ankney (1979) calculated the average Protein Reserve Index ( $PRI^1=212.3$  g dry weight) for male wavier

**Table 4: Age data and Wilcoxon rank-sum tests between Group 1 and Group 2 males, and Group 1 and Group 2 females. First Nation Cree of the western James Bay region of northern Ontario, Canada, who consumed only breast/leg/wing tissue of harvested geese were placed in Group 1, while those who ate more than just breast/leg/wing tissue (e. g., brain, gizzard, liver) were scored as Group 2. Those who did not eat geese were scored as 3<sup>1</sup>.**

	N	Age	
		$\bar{x} \pm SD$	Z <sup>a</sup>
<i>Males</i>			
Group 1	10	34 ± 12	-0.1244 <sup>NS</sup>
Group 2	13	34 ± 8	
<i>Females</i>			
Group 1	21	35 ± 12	0.9979 <sup>NS</sup>
Group 2	9	41 ± 16	

<sup>a</sup>Significance of Z: <sup>NS</sup>,  $P \geq 0.3183$

<sup>1</sup>Two people, one male and one female stated they no longer consumed geese.

arriving in the James Bay area as the total, average, dry weight (dw) of sternal muscles (pectoralis, supracoracoideus, coracobrachialis—breast and wing tissue), leg muscle (all muscle attached to femur or tibiotarsus), and gizzard (minus contents). Ankney (1977) gives average weights of arriving wavier males for liver (11.0 g dw) and gizzard (34.1 g dw). A simple calculation adding the dry weight of liver to the PRI<sup>1</sup> (11.0 + 212.3) gives the sum of 223.3 g dw (PRI<sup>2</sup>). Adding liver and gizzard weight (11.0 + 34.1 = 45.1 g dw) and then subtracting the sum from PRI<sup>2</sup>, gives the value PRI<sup>3</sup> (178.2 g dw). Therefore, if liver and gizzard tissue were not consumed, there would be a 20% decrease in the amount of edible tissue procured from a wavier (i.e., PRI<sup>3</sup>, 178.2 g dw cf. PRI<sup>2</sup>, 223.3 g dw). This decrease of edible tissue salvaged from a bird has been underestimated in the above calculation because other edible tissues (e. g., brain, heart, intestines) were not included in the calculation. The main point is that a significantly larger harvest of waterfowl would have to be procured today to equal a relatively smaller harvest from the past due to changing dietary habits. The contem-

porary harvesting of increased numbers of waterfowl has implications for waterfowl management and sustainable harvesting practices.

## Goose Management

In the Mushkegowuk Territory in 1990, Berkes *et al.* (1994:358) state that

there was no evidence that the rate of harvesting exceeded the rate of biological productivity... and no major wildlife populations are presently in danger (OMNR, 1985). Some wildlife subpopulations, such as Canada geese nesting on Akimiski Island have declined (OMNR, Moosonee Region, personal communication, 1991, 1992). But other populations, such as lesser snow geese nesting in the area of Cape Henrietta Maria, have increased in recent decades (Prevett *et al.*, 1983) despite continuing Cree harvests.

Although Berkes *et al.* (1994) briefly discuss harvesting practices of geese in the Mushkegowuk region and believe that no wildlife populations are harvested beyond their reproductive capacity to recover, the information and beliefs they base their conclusions on are not current. A review of current scientific literature indicate a radical change in harvesting practices must be made to save both the Southern James Bay Population (SJBP) of the Canada goose, and waxies of the midcontinent population who breed in southern Hudson Bay (Cape Henrietta Maria, Ontario) and La Perouse Bay, Manitoba (Bortner *et al.* 1991; Ankney, 1996; Rockwell *et al.*, 1996; Batt, 1997).

In the Bortner *et al.* (1991) report, a decrease in the population of the Canada goose was reported for the SJBP (formerly Tennessee Valley Population) due to years of poor productivity. Although Leafloor of the OMNR,

pointed out that they are expecting a recovery in 1997 because 1993 was a good year for eggs and the birds begin to reproduce at about 3 years of age (Robinson, 1996:20),

competition for food on brood rearing grounds with moult migrant giant Canada geese (*B. c. maxima*) might negate this recovery (Ankney, 1996). The giant Canada goose was once extinct in the Ontario region until they were reintroduced in 1965 (Ankney, 1996). Since this time, a population explosion of giant goose numbers has occurred with a population doubling time of five years (Ankney, 1996). These giant geese not only compete for food with the large Canada goose, giants also cause agricultural losses and become a nuisance because of feces (Ankney, 1996).

Overpopulation of wavies is an even greater problem as explained by several leading researchers:

The evidence now is overwhelming that these geese have been or are "eating themselves out of house and home" at certain breeding colonies...along west Hudson and James Bays...studies have found that mean body size and mass of goslings of banding age, have declined markedly, as have gosling survival and mean clutch size...Adult survival rates, however, have increased over the course of these studies (Ankney, 1996:219).

With up to one thousand nests now packed into a square mile of tundra, the geese are ripping out the slow-growing grasses and sedges faster than they can grow back...This foraging destabilizes the thin arctic soil, allowing melting snow and spring rains to erode the earth...Stripped of vegetation, the soil loses more and more moisture to evaporation. Inorganic salts move from underlying sediments to the bare surface, raising soil salinity...As the process intensifies, plants die, ponds dry up, and the parched earth cracks (Rockwell *et al.*, 1996:21).

The major causes of these wavier population increases are anthropogenic in nature. Changes in the agricultural landscape and refuge provision during wintering and staging periods have led to high winter survival and recruitment; over-wintering carrying capacity restraints have been removed (see Batt, 1997, for a detailed account). It is clear that the time has come to manage the overpopulation of giants and wavies before bird numbers lead to a population crash due to starvation and/or disease (Ankney, 1996; Rockwell *et al.*, 1996).

Recently, under the guidance of the Canadian and United States governments, a group of scientists, wildlife managers, and naturalists have formed the Goose Habitat Working Group, with the goal of drastically reducing the snow goose population (Rockwell *et al.*, 1996). This organization has suggested that reduction of the wavier population could be accomplished by,

lengthening the hunting seasons, liberalizing hunting regulations, recruiting new hunters, and increasing egg collecting by northern native peoples (Rockwell *et al.*, 1996:21).

In addition, Ankney (1996:221) suggests to,

legalize commercial sale of waterfowl in Canada and the United States (commercialization is not prohibited under the current Treaty)...sale of down, feathers, and meat could add millions to local economies.

In the Mushkegowuk region, there is a relatively large tourist industry in Moosonee and Moose Factory during the summer months. Although bannock cooked over an open fire in a tipi has been available to tourists, other traditional foods are not available. Goose dishes (e.g., smoked, roasted, wings, liver pate) would provide a much needed Native flavour to the basically western cuisine currently available in these communities and could become a tourist attraction. Further, goose meat could be used for special occasions (e.g., weddings, feasts) and provide traditional food for locally-run social organizations (e.g., old age home in Moosonee). Even the establishment of a local manufacturing sector should be contemplated with the construction of down products (e.g., coats, sleeping bags, pillows). As Berkes *et al.* (1994:359) point out with respect to the Mushkegowuk region:

An emphasis on small-scale enterprises, compatible with living resources use and subsistence activities will be one important component of the development strategy.

At present, the goose harvesting practices of FN Cree of the western James Bay region (in conjunction with other factors) exacerbates the situation and will eventually lead to a destabilization of the large Canada and snow goose populations of the region. I make this assertion based on data collected in several studies. It is an established fact that in the Mushkegowuk region the majority of the annual, Cree, large Canada goose harvest occurs in the spring, with the majority of the wavier harvest being taken in the fall (Berkes *et al.*, 1994; Table 5). Moreover, the SJB of the Canada goose is in a decline, while the giant Canada goose population (which is not generally harvested because these birds arrive on the coast after the spring harvest and leave before the fall harvest) is rapidly increasing (Bortner *et al.*, 1991; Ankney, 1996). The midcontinent population of wawies is also increasing at an astonishing rate (Ankney, 1996; Rockwell *et al.*, 1996). Thus, Cree harvesting practices are only accelerating the processes previously described. That is, the Cree harvest of large Canadas during the spring (annual harvest for spring and fall seasons of this species has been estimated at 56,536 [Berkes *et al.*, 1994]) is taken from a *breeding* population that is already stressed by habitat degradation (molt migrant giant Canadas), as well as poor productivity rates (Bortner *et al.*, 1991; Ankney, 1996). Cree harvesting of wawies in the fall, although substantial (annual harvest for both seasons recently estimated at 55,076 [Berkes *et al.*, 1994]), does not effectively decrease the overpopulation of wawies, since harvests occur after the wawies have reproduced. The most effective management plan for these two populations would be a reverse of harvesting practices that have been historically documented for the region (Table 5). The majority of harvesting activity for the large Canada goose and wawie

**Table 5: Percent of the annual harvest (per season) for First Nation Cree of the Mushkegowuk region for two goose species.**

	Percent of Harvest		Source
	Spring	Fall	
Canada Goose			
	82 %	18%	1
	80-85%	15-20%	2
	80%	20%	3
	80%	20%	4
	75%	25%	5
Snow Goose			
	8%	92%	1
	31%	69%	2
	24%	76%	3
	25%	75%	4
	20%	80%	5

1. Attawapiskat data from 1947-48. Average number consumed per family (Honigmann, 1948).
2. Data from 1954-56 (Hanson and Currie, 1957).
3. Data from 1974-76 (Prevett *et al.*, 1983).
4. Data from 1981-83 (Thompson and Hutchinson, 1989).
5. Attawapiskat data from 1990 (Cummins, 1992).

should in the future occur in the fall and spring, respectively. Harvesting in this time frame would allow the SBJP of large Canadas to increase, due to decreased harvesting pressure in the spring, allowing for greater reproductive output from the population as a whole. Major harvesting of moult migrant giants would also allow the habitat to recover and increase brood survival. Harvesting of waxies primarily in the spring would remove a substantial number of reproductive adults from the population (as well as the young who would have subsequently been produced). Current harvesting practices of waxies does little to decrease the overpopulation because birds are harvested mainly after they have reproduced, when young and adults alike are harvested. Commercial harvesting of waxies in the spring with firearms and/or rocket nets would have the greatest impact in reducing population numbers (Ankney, 1996).

## Discussion

In this paper, I have argued that technological and cultural changes in the western James Bay region have resulted in a fundamental change in Cree harvesting practices, such that present-day harvesting practices may not be sustainable into the near future. Some harvesters harvest more wildgame than required, waste wild meat, and show little respect towards wildlife. What is needed are new social "norms" and/or social control mechanisms, or better yet, revival of the old codes of conduct. Several educational initiatives in the Mushkegowuk Territory (e.g., Shabotawon [Tsuji, 1996b; Naywayeg Itaykay Centre] Anonymous, 1996) have the reintroduction of TEK into the "classroom" as their goal.

In the Mushkegowuk Territory, a question of sustainability is most evident when examining the harvesting of waterfowl. In order to preserve the SJBP of the large Canada goose and the midcontinent population of waxies, increased season-specific harvests of giant Canadas and waxies must be realized. Increasing the harvest of one species to preserve that species (and other species) is in conflict with modern wildlife management practices, as well as contrary to traditional (sustainable) Cree harvesting practices. Further, the scheduling of harvests as I have detailed (the majority of the Canada goose harvest in the fall and the majority of the waxie harvest in the spring) is also counter to traditional Cree harvesting practices. However, this harvesting schedule or a similar one may be the only way to sustain the goose populations of the region. As Fast and Berkes (1994:7) point out: "Cultural *change* is not the same thing as cultural *loss*". Sometimes a culture must change in order to survive. This type of thinking has been expressed in one of the regional FN newspapers, *Wawatay News*:

Shoot a snow goose save a Canada goose. What's more, in the long run by blasting that sucker you might save the snow goose population too. That's a simple answer to what might help what ails the declining wild Canada geese populations that nest around the James Bay coast (Robinson, 1996:1). Clearly, more work must be done in the Mushkegowuk region by FNs and other interested parties to generate a viable waterfowl management plan. As Rockwell *et al.* (1996:21) suggest: "Success will depend on timely action and the cooperation of diverse interest groups."

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