

Frequency of Traditional Food Use by Three Yukon First Nations Living in Four Communities

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ABSTRACT. This study documented the frequency of use of traditional food species among 122 adults from three Yukon First Nations. The informants resided in four communities: Haines Junction, Old Crow, Teslin, and Whitehorse. Food patterns were examined in two ways: (1) estimated frequency of household use of traditional food species over a one-year period, and (2) frequency of traditional foods in four daily diet recalls of men and women, collected once per season. On average, Yukon Indian households used traditional foods over 400 times annually. Moose was consumed on average 95 times yearly, caribou 71, chinook salmon 22, Labrador tea 20, cranberries and crowberries each 14, and blueberries 11 times yearly. According to household estimates, traditional foods were consumed almost as often in Whitehorse as in Haines Junction. Teslin surpassed both these, while Old Crow had the highest frequency. Daily diets of adult individuals indicated that traditional foods were consumed on average 1.14 times per day. Traditional foods were reported twice daily in Old Crow diets, once daily in each of Teslin and Haines Junction, and 0.5 times daily in Whitehorse diets. Measured by frequency of use, traditional foods—especially moose, caribou and salmon—remain extremely important in contemporary diets of these Yukon Indian people.

Key words: traditional foods, aboriginal foods, Yukon First Nations, Yukon Indian people

RÉSUMÉ. Cette étude documente la fréquence d'utilisation des aliments traditionnels parmi 122 adultes venant de trois Premières Nations du Yukon. Les informateurs résidaient dans quatre communautés: Haines Junction, Old Crow, Teslin et Whitehorse. Le mode d'alimentation a été examiné de deux façons: (1) la fréquence d'utilisation des aliments traditionnels au foyer, estimée sur une période d'un an, et (2) la fréquence des aliments traditionnels dans quatre enquêtes par interview sur le régime quotidien d'hommes et de femmes, effectuées une fois par saison. Les foyers indiens du Yukon utilisent les aliments traditionnels plus de 400 fois par an, en moyenne. L'orignal était consommé en moyenne 95 fois par an, le caribou 71 fois, le saumon du Pacifique 22 fois, le thé du Labrador 20 fois, les airelles et les camarines noires 14 fois chacune, et les bleuets 11 fois. D'après les estimations dans les foyers, les aliments traditionnels étaient consommés presque aussi souvent à Whitehorse qu'à Haines Junction. La fréquence de consommation était supérieure à Teslin, et elle était la plus grande à Old Crow. Le régime quotidien des adultes indiquait que les aliments traditionnels étaient consommés en moyenne 1,14 fois par jour. On a relevé la présence d'aliments traditionnels deux fois par jour à Old Crow, une fois par jour à Teslin et à Haines Junction, et 0,5 fois par jour à Whitehorse. Lorsqu'on les juge par leur fréquence d'utilisation, les aliments traditionnels — en particulier l'orignal, le caribou et le saumon — demeurent extrêmement importants dans le régime contemporain des Indiens du Yukon.

Mot clés: aliments traditionnels, nourriture aborigène, Premières Nations du Yukon, Indiens du Yukon

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INTRODUCTION

As increasing numbers of non-aboriginal people settled in the Yukon during the Gold Rush, during construction of the Alaska Highway, and during development of various mining operations, competition for wildlife resources increased. Aboriginal concern over diminished fur and food resources has been well documented (Coates, 1991a,b), and indeed, access to traditional resources has been a major impetus for and issue within the land claims process. In contrast to most other areas of Canada, no treaties had been signed between the Indian people of the Yukon and the government of Canada. Twenty years ago, Yukon aboriginal people began to

make known their demands for harvesting and fishing rights, through publication of their document "Together Today for Our Children Tomorrow" (Yukon Native Brotherhood, 1973). Throughout the 20 years Yukon natives have been pressing for a settlement which would recognize their rights and ensure continuation of their culture and lifestyle, harvesting rights have remained a key issue in the land claim process. In 1991 aboriginal leaders requested a traditional food study, which would provide data to assist in negotiating the harvest allocation for each Yukon First Nation (Indian band) for food. This allocation was to be based on several factors, including estimates of personal consumption (Anonymous, 1990). Although some harvest studies were available (Quock and

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Jingfors, 1988; Jingfors, 1990; Egli et al., 1992), no contemporary dietary studies of Yukon Indian people were available.

The purpose of this study was to examine differences in frequency of use of traditional foods in contemporary diets of Yukon Indian adults in four locations. Two approaches were used, namely (1) household estimates of frequency of use over a one-year period, and (2) examination of frequency of traditional foods in daily diet recalls of adults, collected once in each of four seasons.

Study participants were members of the three First Nations which had requested the study. Haines Junction participants were members of the Champagne-Aishihik First Nation; Old Crow participants were members of the Vuntut Gwich'in First Nation; Teslin participants were members of the Teslin Tlingit First Nation; Whitehorse participants included members of all three First Nations who lived in Whitehorse rather than in their band's traditional village.

The Study Communities

Haines Junction (60°N, 137°W, population 616, Yukon Government, 1992) (Fig. 1) is a centre for tourism and headquarters for Kluane National Park. This village is located within the traditional territory of the Champagne-Aishihik First Nation and serves as administrative headquarters for this group of Southern Tutchone people. Moose and fish,

especially salmon, were dietary staples in traditional times (McClellan, 1975, 1987; O'Leary, 1985).

Old Crow (67°N, 139°W, population 267, Yukon Government, 1992), is located on the Porcupine River in the northern Yukon. This remote community is accessible only by air, since the river is too shallow to transport supplies by barge. Old Crow is located within the traditional territory of the Vuntut Gwich'in people and serves as their headquarters. Many aspects of traditional lifestyle are still practised, and the Gwich'in people continue to depend heavily upon the Porcupine Caribou Herd which migrates through their land.

Teslin (60°N, 132°W, population 466, Yukon Government, 1992) is located on Teslin Lake in the south central Yukon. It is within the traditional territory of the Teslin Tlingit First Nation and serves as headquarters for these Inland Tlingit people. Moose and fish, especially salmon, whitefish and lake trout, are dietary staples of these people (McClellan, 1987).

Whitehorse, the territorial capital, (population 21 671, Yukon Government, 1992) is located at 60°N, 135°W on the Alaska Highway, halfway between Teslin and Haines Junction. Whitehorse represents the most urban lifestyle of the Yukon. More than half the Champagne-Aishihik members, many Teslin Tlingit members, and some Vuntut Gwich'in members live in Whitehorse. Furthermore, residents of Haines Junction and Teslin frequently travel to Whitehorse.

METHODS

The Sample

Within each First Nation's band list, all households were first stratified by residence location, as Haines Junction, Old Crow, Teslin, or Whitehorse. Then 40 households in each of Haines Junction, Old Crow, Teslin, and Whitehorse were randomly selected to participate. Because it was expected that food patterns would be similar within Whitehorse and different from each of the other locations, and to avoid oversampling in Whitehorse, equal numbers were drawn from each of the four locations.

Dietary Study Methods

Food Frequency Questionnaire: A traditional food frequency questionnaire specific to Yukon Indian foods was developed for this study. Based on discussions with eight elders and other leaders, the questionnaire listed over 70 species of animals, birds, fish, berries and other plants. Within each category, use of any other species not listed was also queried. The questionnaire asked, for each season of the past year (fall 1991–summer 1992), how often each species had been consumed in the household. Six choices of frequency were offered to assist the respondent, namely, once per day or more, 4–6 times per week, 1–3 times per week, twice per month, once per month or less, and never. Respondents could also reply in other quantitative terms. Colour photographs of most fish and plant species were available to

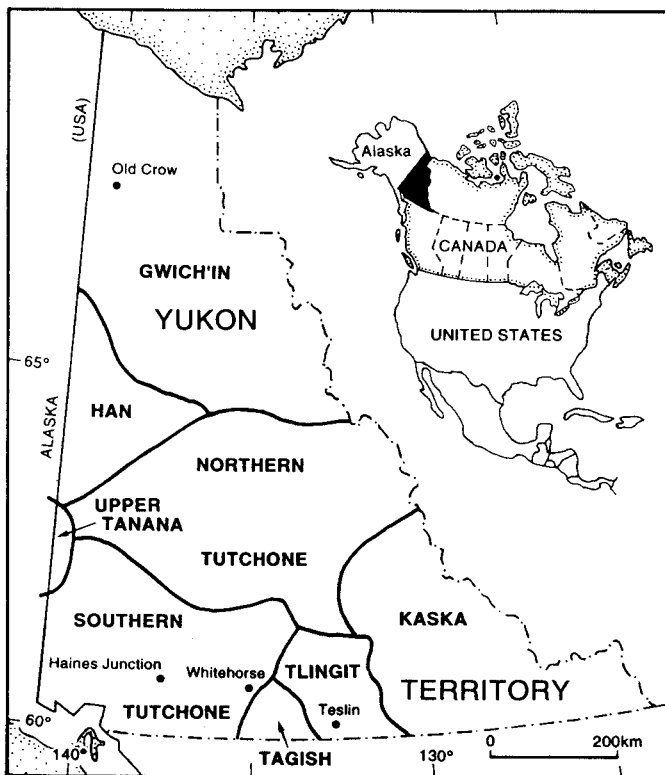


FIG. 1. Study communities, shown within the aboriginal language and culture areas of the Yukon (modified with permission from a map kindly supplied by the Aboriginal Language Services, Executive Council Office, Government of Yukon).

assist with identification, if needed (Turner and Szczawinski, 1979; Morrow, 1980; Trelawny, 1983).

24-Hour Diet Recall: Respondents were also interviewed on four separate days, once per season, over the year fall 1992–summer 1993, regarding all foods and beverages (traditional and marketed) which they had consumed on the previous day, using the 24-hour recall method (Cameron and van Staveren, 1988; Gibson, 1990). Within each season, many different days were used within the sample groups. No specific attempts were made to “capture” any particular hunting or fishing season, because 24-hour data are intended, when averaged over all seasons, to represent “usual” intake.

Data Collection

Food frequency and 24-hour diet recall data were collected during personal interviews conducted by local aboriginal interviewers. The investigator trained these interviewers and also accompanied each interviewer on the first 10–15 interviews, both to gain insight into community food customs, and to ensure consistency in interviewing technique. Interviews were conducted in English, except in one case where a local interpreter assisted. Household demographic data (age and sex of respondent, household size, presence of a hunter/trapper/fisherman, occupation, education, and main source of income) were also collected.

Data Analysis

The number of households using each species was tabulated. Mean annual frequency of use was examined among the four locations, using Kruskal-Wallis non-parametric analysis of variance, within the SPSS Inc. (1990) computer programs.

Traditional foods mentioned within the daily diets of individuals were tabulated, and the mean frequency per person per day was calculated for each location.

RESULTS

The Sample

In all, 122 households participated. They represented 35% of aboriginal households in Haines Junction, 38% in Old Crow, 26% in Teslin and 15–30% of each band's households in Whitehorse (Table 1). Of the sample drawn, 18 households could not be contacted, and 19 declined to participate. There is no reason to believe that these households were any different from those who did participate. About two-thirds of participants were female, and one-third male (Table 2). Demographic characteristics were similar among locations, although Old Crow respondents were generally older, and more often had a hunter, trapper, or fisherman present in the household, while Whitehorse participants were younger, had spent more years in school, and were more often engaged in wage employment.

Number of User Households

About 80 traditional species were used as food (Table 3), although some were used by very few households. All 122 households used at least one species of mammal and of fish, while virtually all (121) households used moose and salmon. Over 100 households also used birds, fish other than salmon, berries, and other plant foods. Over 50 households used caribou, hare, ground squirrel, beaver, ducks, grouse, chinook salmon, sockeye salmon, coho salmon, whitefish, lake trout, Arctic grayling, low bush cranberries, crowberries, blueberries, and Labrador tea. Thus traditional foods were used by a wide range of households.

TABLE 1. Number of sample households and percentage of all band households by location.

Location	Number in sample	Percentage of First Nation households in the location
Haines Junction	29	35% of Champagne-Aishihik
Old Crow	31	38% of Vuntut Gwich'in
Teslin	25	26% of Teslin Tlingit
Whitehorse:	18	Champagne-Aishihik (15% of all Champagne-Aishihik households in Whitehorse)
	8	Vuntut Gwich'in (30% of all Vuntut Gwich'in households in Whitehorse)
	11	Teslin Tlingit (20% of all Teslin Tlingit households in Whitehorse)
Total = 37		

Mean Annual Frequency of Traditional Food Use

The mean frequency of consumption of all traditional food species combined was about 409 times annually, or more than once daily (Table 3). Mammals accounted for about half, fish about one-fifth, berries about one-fifth, other plants one-tenth, and birds one-twentieth. Moose and caribou accounted for most of the mammal consumption. On average, hare, mountain sheep, and ground squirrel were consumed fewer than 10 times per year, while beaver, muskrat, and porcupine were consumed fewer than 3 times per year. Ducks were the family of bird most frequently consumed.

Salmon accounted for one-half of the fish consumption, with chinook salmon being most frequent. Among other fish, whitefish and lake trout were most frequently eaten. In addition to the flesh, the eggs, livers and intestines of salmon and whitefish were consumed; the eggs were considered delicacies.

Low bush cranberries, crowberries and blueberries each accounted for about one-fifth of the frequency of use of berries, while Labrador tea accounted for one-half of the remaining plant use.

Differences in Frequency among Locations

Compared to other locations, mammals were used more often in Old Crow ($p < 0.05$), followed by Teslin (Table 4).

TABLE 2. Demographic characteristics of participating households by location (n = 122).

Characteristic	Haines Junction (n = 29)	Old Crow (n = 31)	Teslin (n = 25)	Whitehorse (n = 37)
Age (years) of respondent (mean ± SD)	43.8 ± 14.8	45.8 ± 19.3	38.4 ± 11.8	34.9 ± 8.6
Sex of respondent (%)				
Male	38	32	36	35
Female	62	68	64	65
Number of persons in household (mean ± SD)	3.3 ± 1.6	2.6 ± 1.6	3.1 ± 1.4	3.5 ± 1.4
Hunter/trapper/fisherman in household Present (%)	62	87	80	73
Occupation of male household head (%)				
Hunter/trapper/fisherman	5	50	5	0
Labourer	62	25	60	47
Skilled trade	19	10	15	30
Supervisory	14	15	15	17
Student	0	0	5	7
Occupation of female household head (%)				
Homemaker	28	64	14	18
Labourer	32	8	14	9
Clerical	4	16	57	26
Supervisory	24	12	10	35
Student	12	0	5	12
Education of male household head (years in school) (mean ± SD)	9.1 ± 3.0	9.0 ± 3.8	9.7 ± 2.0	11.9 ± 1.8
Education of female household head (years in school) (mean ± SD)	10.6 ± 3.2	9.0 ± 3.8	10.4 ± 3.4	12.4 ± 1.6
Source of income (%)				
Employment	76	58	68	81
Own business	3	6	4	0
Social assistance	21	35	28	19

Moose was used most often in Teslin and least often in Old Crow. Caribou, hare, and muskrat were used most often in Old Crow. Ground squirrel and sheep were used most often in Haines Junction. Beaver was used most often in Teslin. Birds, particularly ducks and geese, were used most often in Old Crow, although grouse was most frequent in Haines Junction, and ptarmigan most frequent in Old Crow and Whitehorse.

Chinook salmon was used most often in Teslin, sockeye most often in Haines Junction, coho most often in Whitehorse and Old Crow, and chum most often in Old Crow (Table 4). Other fish, especially lake whitefish and lake trout, were used most often in Teslin, while broad whitefish was most frequent in Old Crow.

Berries, particularly crowberries, raspberries, strawberries, soapberries, and high bush cranberries, were used most often in Teslin, as were wild rhubarb and balsam fir tea. Blueberries, cloudberries, Labrador tea and arctic dock were used most often in Old Crow (Table 4).

Frequency of Traditional Foods in Daily Diets

In 381 daily food recalls from 122 individuals collected over four seasons, moose was the most frequently reported

traditional species, followed by caribou, salmon, berries, other fish, other mammals, and birds (Table 5). Use of organs of moose and caribou was only infrequently reported. When calculated per person per day, traditional foods were reported to be used on average twice per day in Old Crow, about once per day in each of Haines Junction and Teslin, and 0.6 times per day in Whitehorse (Table 6).

Weights (from estimated portion sizes) of prepared (cooked) traditional foods in daily diets averaged about 100 g per serving (per occasion) for muscle meats, organ meats, whitefish and lake trout, although salmon averaged about 75 g (Table 7).

DISCUSSION

The Sample

Since the First Nations represented three different cultural groups and four locations with differing food resources and degrees of urbanization (ranging from very remote to urban), the results can be considered typical of a broad spectrum of Yukon Indian people.

Advantages and Limitations of the Food Frequency Questionnaire Method

Food frequency questionnaire methods are suitable for classifying households into groups, and for comparisons among groups. Such data should not be considered absolute: rather they should be considered as respondents' estimates. Although traditional food frequency was estimated for a long period (one year), dividing the year into seasons and offering several frequency choices within each season facilitated remembering and estimation. In addition, the high regard which aboriginal people have for traditional foods and their long experience with the oral method of relaying information suggests that they may quite readily remember how often they consumed these foods. Using a second dietary study method, namely the 24-hour recall of daily food consumption (in which frequency of traditional foods was also examined), served as a rough check on the reliability of the annual household food frequency data. The rank order of traditional foods was similar using these two methods.

The household food frequency data presented here cover only a single year, namely fall 1991 through summer 1992. Hence they do not reflect year-to-year variations in availability that may result from natural variations in animal populations. For example, the cyclical nature of the hare population and changes in the migration route of caribou are not reflected in these data.

Advantages and Limitations of the 24-Hour Recall Method

In contrast to the annual traditional food frequency questionnaire, the 24-hour recall of daily food consumption asked about all foods and beverages (traditional and marketed) consumed the day before, and the quantities of

TABLE 3. Traditional food species and their annual frequency of consumption in 122 Yukon Indian households (in descending order within each category).

Common name (local name)	Scientific name ¹	Mean annual frequency	Maximum annual frequency	# of user house- holds	Common name (local name)	Scientific name ¹	Mean annual frequency	Maximum annual frequency	# of user house- holds
All traditional species		408.8	1807	122	Other fish continued				
Mammals		192.3	808	122	Arctic char	<i>Salvelinus alpinus</i>	0.1	3	6
Moose	<i>Alces alces</i>	94.8	365	121	Cutthroat trout	<i>Salmo clarki</i>	0.0	3	1
Caribou	<i>Rangifer tarandus</i>	71.3	540	79	Wild berries		73.3	881	118
Hare (rabbit)	<i>Lepus americanus</i>	7.8	180	84	Low bush cranberry	<i>Vaccinium vitis-idaea</i>	13.8	365	79
Mountain sheep	<i>Ovis nivicola dalli</i> & <i>O.n. stonei</i>	6.1	120	47	Crowberry (blackberry, mossberry)	<i>Empetrum nigrum</i>	13.6	96	77
Arctic ground squirrel (gopher)	<i>Spermophilus parryii</i>	5.4	96	55	Blueberry	<i>Vaccinium uliginosum</i>	10.7	96	84
Beaver	<i>Castor canadensis</i>	2.8	120	51	Raspberry	<i>Rubus idaeus</i>	8.4	96	45
Muskrat	<i>Ondatra zibethicus</i>	2.2	84	25	Strawberry	<i>Fragaria vesca</i>	6.4	180	45
Porcupine	<i>Erethizon dorsatum</i>	0.8	12	30	Soapberry	<i>Shepherdia canadensis</i>	4.7	240	42
Marmot (groundhog)	<i>Marmota caligata</i>	0.3	9	18	High bush cranberry	<i>Viburnum edule</i>	4.2	96	29
Black bear	<i>Ursus americanus</i>	0.3	12	8	Black currant	<i>Ribes hudsonianum</i>	3.3	96	10
Deer	<i>Odocoileus hemionus</i>	0.1	18	1	Red currant	<i>Ribes triste</i>	2.8	96	17
Lynx	<i>Felis canadensis</i>	0.1	3	8	Cloudberry (salmonberry)	<i>Rubus chamaemorus</i>	2.2	60	30
Beluga whale	<i>Delphinapterus leucas</i>	0.0	3	2	Rosehips (rose buds)	<i>Rosa acicularis</i>	2.0	96	25
Bowhead whale	<i>Balaena mysticetus</i>	0.0	3	1	Saskatoon berry	<i>Amelanchier alnifolia</i>	0.4	21	11
Bison	<i>Bison bison</i>	0.0	1	3	Bristly black currant	<i>Ribes lacustre</i>	0.3	36	2
Mountain goat	<i>Oreamnos americanus</i>	0.0	1	3	Bearberry (kinnikinnick)	<i>Arctostaphylos uva-ursi</i>	0.1	4	4
Birds		16.9	127	103	Gooseberry	<i>Ribes oxycanthoides</i>	0.0	3	1
Ducks ²	<i>Anas</i> sp.	7.8	90	89	Bog cranberry	<i>Vaccinium oxycoccus</i>	0.0	1	1
Geese ²		2.9	72	41	Plants other than berries				
Grouse	<i>Canachites canadensis</i> , <i>Dendragapus obscurus</i>	2.9	68	57	Leaves, stems, shoots, flowers		39.7	488	105
Ptarmigan	<i>Lagopus lagopus</i> & <i>L. mutus</i>	2.6	64	40	Labrador tea	<i>Ledum palustre</i> & <i>L. groenlandicum</i>	19.5	365	61
Swans	<i>Olor buccinator</i> & <i>O. columbianus</i>	0.1	3	5	Arctic dock (wild rhubarb in Old Crow)	<i>Rumex arcticus</i>	2.8	24	39
Wild bird eggs		0.5	10	17	Wild rhubarb (in Haines Junction)	<i>Polygonum alaskum</i>			
Fish		77.7	396	122	Wild rhubarb (in Teslin)	<i>Rheum rhaponticum</i>			
Salmon species		39.0	212	121	Wild chives (wild onions)	<i>Allium schoenoprasum</i>	1.7	60	22
Chinook (king)	<i>Oncorhynchus</i> <i>tshawytscha</i>	22.4	180	114	Fireweed	<i>Epilobium angustifolium</i> & <i>E. latifolium</i>	0.2	24	1
Sockeye (red)	<i>Oncorhynchus nerka</i>	9.0	96	57	Honeysuckle	<i>Lonicera</i> sp.	0.1	15	1
Coho (silver)	<i>Oncorhynchus kisutch</i>	5.5	96	58	Sage	<i>Artemisia tilesii</i>	0.1	12	1
Chum (dog)	<i>Oncorhynchus keta</i>	2.1	24	31	Mint	<i>Mentha arvensis</i>	0.0	3	2
Other fish		38.8	320	117	Dandelion	<i>Taraxacum officinale</i>	0.0	1	1
Lake whitefish	<i>Coregonus clupeaformis</i>	9.9	192	67	Bark, sap, buds				
Lake trout	<i>Salvelinus namaycush</i>	8.6	96	68	Balsam fir	<i>Abies</i> sp.	8.4	365	30
Broad whitefish	<i>Coregonus nasus</i>	7.9	204	46	Black spruce	<i>Picea mariana</i>	2.8	96	35
Arctic grayling	<i>Thymallus arcticus</i>	4.2	48	67	Lodgepole pine	<i>Pinus contorta</i>	0.1	7	8
Burbot (loche, snake fish, ling cod)	<i>Lota lota</i>	2.6	60	43	Birch	<i>Betula papyrifera</i>	0.1	4	7
Round whitefish	<i>Prosopium cylindraceum</i>	1.3	120	10	Willow	<i>Salix</i> sp.	0.1	3	4
Northern pike (jackfish)	<i>Esox lucius</i>	0.7	12	25	Poplar	<i>Populus balsamea</i> or <i>P. tremuloides</i>	0.1	3	5
Rainbow trout	<i>Salmo gairdneri</i>	0.6	24	16	Juniper	<i>Juniper communis</i>	0.0	6	1
Dolly varden	<i>Salvelinus malma</i>	0.5	24	14	Wild roots				
Inconnu (coney)	<i>Stenodus leucicthys</i>	0.4	6	19	Bear root	<i>Hedysarum alpinum</i>	0.3	6	20
Eulachon (ooligan)	<i>Thakeichthys pacificus</i>	0.3	12	10	Rice root, Indian rice	<i>Fritillaria camschatensis</i>	0.1	1	1
Least cisco (herring)	<i>Coregonus sardinella</i>	0.3	12	9	Rat root	<i>Acorus calamus</i>	0.1	3	1
Long nose sucker	<i>Catostomus catostomus</i>	0.3	12	9	Fungi, lichens				
Halibut	<i>Hippoglossus stenolepis</i>	0.2	12	3	Mushrooms	<i>Agaricus</i> sp.	1.0	27	13
Brown trout	<i>Salmo trutta</i>	0.1	12	1	Caribou moss	<i>Cladina rangiferina</i>	0.1	6	3

¹ Scientific nomenclature follows Youngman (1975) for mammals, Salt and Wilk (1966) for upland birds, Johnson and McEwen for water-birds, Morrow (1980) for fish, Porsild and Cody (1980) for plants.

² Over 30 waterbird species (including 21 ducks) are found in the Yukon. See Johnson and McEwen (1983); Mossop and Coleman (1984). "Black ducks" were most common in Old Crow. White-fronted (*Anser albifrons*), Canada (*Branta canadensis*), and snow (*Chen hyperborea*) geese were specifically mentioned.

TABLE 4. Annual frequency of use of traditional food species among Yukon Indian households by location (number of occasions, mean \pm SD, descending order within categories).

Species	Haines Junction (n = 29)	Old Crow (n = 31)	Teslin (n = 25)	Whitehorse (n = 37)	
All mammals	133.9 \pm 109.1	297.8 \pm 186.3	233.3 \pm 158.2	121.9 \pm 106.6	**
Moose	94.0 \pm 80.4	29.3 \pm 41.8	202.2 \pm 122.9	78.1 \pm 72.0	**
Caribou	6.6 \pm 18.1	240.9 \pm 136.4	5.7 \pm 13.4	24.3 \pm 53.9	**
Hare	2.6 \pm 3.3	18.0 \pm 35.3	4.6 \pm 10.6	5.3 \pm 9.2	**
Sheep	12.1 \pm 26.0	0.0 \pm 0.0	8.5 \pm 25.9	4.8 \pm 12.8	**
Ground squirrel	17.8 \pm 22.3	0.4 \pm 0.8	1.0 \pm 1.7	3.1 \pm 6.0	**
Beaver	0.2 \pm 0.6	1.3 \pm 1.9	7.9 \pm 24.0	2.6 \pm 6.1	**
Muskrat	0.2 \pm 0.6	6.6 \pm 18.0	0.0 \pm 0.0	1.7 \pm 7.8	**
Porcupine	0.1 \pm 0.3	1.0 \pm 2.3	1.3 \pm 2.3	0.8 \pm 2.1	
Marmot	0.1 \pm 0.3	0.0 \pm 0.2	1.2 \pm 2.2	0.2 \pm 0.7	
Black bear	0.2 \pm 1.1	0.2 \pm 0.6	0.8 \pm 2.6	0.1 \pm 0.6	
Deer	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0	0.5 \pm 3.0	
Lynx	0.2 \pm 0.6	0.1 \pm 0.6	0.4 \pm 0.2	0.0 \pm 0.2	
Beluga whale	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0	0.1 \pm 0.5	
Bowhead whale	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0	0.1 \pm 0.5	
Bison	0.1 \pm 0.3	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0	
Goat	0.0 \pm 0.0	0.0 \pm 0.0	0.4 \pm 0.2	0.1 \pm 0.2	
All birds	17.6 \pm 20.7	26.6 \pm 31.8	13.3 \pm 26.4	10.5 \pm 23.7	**
Ducks	8.2 \pm 10.8	14.3 \pm 16.7	6.3 \pm 18.0	3.2 \pm 4.6	**
Grouse	6.0 \pm 12.5	0.1 \pm 0.5	3.2 \pm 5.6	3.4 \pm 8.9	**
Geese	0.6 \pm 1.5	8.4 \pm 17.1	1.8 \pm 3.8	0.8 \pm 1.9	*
Ptarmigan	2.8 \pm 3.6	3.1 \pm 6.5	1.1 \pm 2.6	3.2 \pm 13.0	*
Swan	0.2 \pm 0.7	0.0 \pm 0.0	0.1 \pm 0.6	0.0 \pm 0.0	
Bird eggs	0.2 \pm 1.1	0.8 \pm 2.0	0.8 \pm 2.2	0.3 \pm 0.8	
All fish	70.0 \pm 61.9	60.4 \pm 67.0	113.1 \pm 101.0	74.1 \pm 72.9	
Salmon species	43.9 \pm 40.6	28.1 \pm 35.6	38.4 \pm 32.1	44.5 \pm 47.4	
Chinook	18.9 \pm 19.3	16.4 \pm 32.8	32.7 \pm 28.8	23.2 \pm 30.7	*
Sockeye	19.0 \pm 21.4	0.2 \pm 1.1	3.3 \pm 9.0	12.4 \pm 22.5	**
Coho	3.9 \pm 6.2	7.0 \pm 8.6	1.9 \pm 5.7	7.8 \pm 17.8	*
Chum	2.1 \pm 4.4	4.4 \pm 6.5	0.5 \pm 2.4	1.2 \pm 3.1	*
Other fish	25.9 \pm 25.6	32.2 \pm 50.0	74.7 \pm 83.5	28.6 \pm 31.2	**
Lake whitefish	8.2 \pm 18.0	0.8 \pm 2.0	22.6 \pm 42.3	10.2 \pm 13.5	**
Lake trout	6.6 \pm 6.6	0.0 \pm 0.0	19.7 \pm 20.3	9.9 \pm 18.6	**
Broad whitefish	0.3 \pm 1.1	20.2 \pm 32.8	12.4 \pm 41.3	0.4 \pm 1.2	**
Grayling	3.8 \pm 6.2	4.0 \pm 9.5	5.4 \pm 5.9	3.8 \pm 6.6	
Burbot	2.0 \pm 3.8	6.5 \pm 14.6	2.1 \pm 2.2	0.3 \pm 0.8	*
Round whitefish	0.2 \pm 0.9	0.0 \pm 0.0	6.2 \pm 23.9	0.0 \pm 0.2	
Northern pike	0.7 \pm 2.3	0.1 \pm 0.4	1.6 \pm 2.7	0.5 \pm 1.2	
Rainbow trout	1.1 \pm 3.9	0.0 \pm 0.0	1.2 \pm 4.8	0.2 \pm 0.6	
Dolly varden	0.5 \pm 0.9	0.0 \pm 0.0	1.8 \pm 5.3	0.1 \pm 0.5	
Inconnu	0.1 \pm 0.6	0.2 \pm 1.1	1.1 \pm 1.6	0.5 \pm 1.2	*
Eulachon	1.2 \pm 2.6	0.0 \pm 0.0	0.0 \pm 0.0	0.1 \pm 0.7	
Least cisco	0.0 \pm 0.2	0.0 \pm 0.0	0.7 \pm 2.4	0.5 \pm 2.1	
Sucker	0.7 \pm 2.4	0.4 \pm 1.3	0.0 \pm 0.2	0.0 \pm 0.0	
Halibut	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0	0.9 \pm 3.0	
Brown trout	0.4 \pm 2.2	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0	
Arctic char	0.0 \pm 0.0	0.1 \pm 0.4	0.0 \pm 0.0	0.2 \pm 0.6	
Cutthroat trout	0.1 \pm 0.6	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0	
All wild berries	44.7 \pm 95.5	50.2 \pm 48.5	166.0 \pm 242.5	51.5 \pm 53.6	**
Low bush cranberries	8.5 \pm 12.6	16.5 \pm 19.4	27.9 \pm 76.9	6.1 \pm 7.8	
Crowberries	12.5 \pm 18.0	0.2 \pm 0.8	28.6 \pm 28.5	15.6 \pm 25.4	**
Blueberries	6.3 \pm 17.7	23.1 \pm 21.0	5.2 \pm 8.8	7.4 \pm 8.7	**
Raspberries	8.0 \pm 20.9	0.4 \pm 1.3	24.8 \pm 38.6	5.0 \pm 10.8	**
Strawberries	3.7 \pm 17.8	0.0 \pm 0.0	14.0 \pm 26.0	8.7 \pm 30.8	**
Soapberries	1.2 \pm 2.5	0.1 \pm 0.5	18.8 \pm 50.0	1.6 \pm 3.3	**
High bush cranberries	0.3 \pm 1.2	0.0 \pm 0.0	15.6 \pm 30.3	3.0 \pm 7.5	**
Black currants	3.3 \pm 17.8	0.0 \pm 0.2	11.4 \pm 31.2	0.7 \pm 2.4	
Red currants	0.1 \pm 0.6	1.6 \pm 6.0	11.0 \pm 26.5	0.4 \pm 1.4	
Cloudberries	0.0 \pm 0.0	6.8 \pm 12.5	0.0 \pm 0.0	1.7 \pm 5.2	**
Rose hips	0.4 \pm 1.1	1.4 \pm 4.4	5.6 \pm 19.5	1.5 \pm 4.6	
Saskatoons	0.2 \pm 0.9	0.0 \pm 0.0	1.6 \pm 4.3	0.0 \pm 0.3	
Bristly black currants	0.0 \pm 0.2	0.0 \pm 0.0	1.4 \pm 7.2	0.0 \pm 0.0	
Bearberries	0.1 \pm 0.7	0.0 \pm 0.0	0.0 \pm 0.2	0.1 \pm 0.4	
Gooseberries	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0	0.1 \pm 0.5	

continued on next page

TABLE 4 – *continued*

Species	Haines Junction (n = 29)	Old Crow (n = 31)	Teslin (n = 25)	Whitehorse (n = 37)	
All wild berries <i>continued</i>					
Bog cranberries	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.2	0.0 ± 0.0	
All wild plants other than berries					
Leaves, stems, shoots, flowers	16.1 ± 31.4	71.4 ± 110.9	57.1 ± 123.2	19.9 ± 41.6	**
Labrador tea	1.4 ± 3.7	57.9 ± 106.6	7.3 ± 19.8	9.7 ± 37.6	**
Arctic dock	2.5 ± 5.6	7.4 ± 9.4	0.0 ± 0.0	1.1 ± 2.5	**
Wild rhubarb	0.6 ± 2.3	0.0 ± 0.0	8.7 ± 20.4	0.6 ± 2.4	**
Wild onion	0.1 ± 0.6	5.1 ± 13.9	1.5 ± 4.9	0.2 ± 0.7	
Fireweed	0.8 ± 4.5	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	
Honeysuckle	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.4 ± 2.5	
Sage	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.3 ± 2.0	
Mint	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.2	0.1 ± 0.5	
Dandelion	0.0 ± 0.2	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	
Bark, sap, buds					
Balsam fir	5.9 ± 25.0	0.0 ± 0.2	31.4 ± 100.5	2.0 ± 5.6	*
Black spruce	2.4 ± 9.0	0.7 ± 2.3	6.1 ± 20.0	2.7 ± 8.7	
Pine	0.0 ± 0.0	0.0 ± 0.0	0.6 ± 1.5	0.0 ± 0.0	
Birch	0.2 ± 0.8	0.1 ± 0.5	0.1 ± 0.4	0.1 ± 0.4	
Poplar	0.3 ± 0.8	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.2	
Willow	0.1 ± 0.6	0.0 ± 0.0	0.3 ± 0.8	0.0 ± 0.0	
Juniper	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.2 ± 1.0	
Roots					
Bear root	0.7 ± 1.6	0.2 ± 1.1	0.4 ± 0.7	0.2 ± 0.6	
Rice root	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.2	0.0 ± 0.0	
Rat root	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.1 ± 0.5	
Fungi, lichens					
Mushrooms	1.0 ± 3.7	0.0 ± 0.0	0.6 ± 2.4	2.0 ± 6.2	
Caribou moss	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.2 ± 1.0	

* $p < 0.05$ Kruskal-Wallis test** $p < 0.01$ Kruskal-Wallis test

each. Because it did not single out traditional foods for special attention, it may have avoided a potential bias in favour of such foods. The shorter recall period likely facilitated recall for the participants. However, since it covered four or fewer days of the year per subject, it may be less representative of the annual pattern than the food frequency approach, especially in regard to the less common food species.

In the literature, daily nutrient intakes calculated from 24-hour recalls of food consumption collected from southern urban populations show that day-to-day variation for a single individual is greater than variation from one individual to another (Cameron and van Staveren, 1988; Gibson, 1990). Hence, when the purpose of the study goes beyond examining the mean intake of a group to assessing the usual nutrient intakes of individuals (i.e., their individual positions in the distribution of nutrient intakes, or correlation of nutrient intakes with biochemical measures of nutritional status), multiple days of recalls per individual are needed, to better approximate the individual's usual nutrient intake (Cameron and van Staveren, 1988; Gibson, 1990). Up to four recalls per individual were collected in this study, for a total of 381 recalls; this number is adequate for purposes of assessing the mean frequency of consumption of specific foods. (This paper does not examine nutrient intakes or their distribution.)

Comparison with Harvest Studies

In contrast to harvest studies, which report numbers of whole animals, dietary studies report the frequency of use and/or weights of prepared food actually consumed over a specified time period. Compared to those from harvest studies, the weights of meat or fish consumed in dietary studies appear low for several reasons: (1) dietary studies exclude inedible portions, such as bone, blood and skin, and subtract the plate waste (e.g., bone left from cooked portions of meat), (2) dietary studies also take into account the loss of weight which occurs on cooking of meat and fish. Depending on the type of meat and the cooking method, meat shrinks on average about 25% in weight, over a range of 8% to 42% (Paul and Palmer, 1972). Harvest studies seldom report use of berries and other plant foods, while dietary studies generally examine the total diet, and the frequency of specific foods of special interest within the diet.

Limitations of harvest studies are known (Usher et al., 1985; Usher and Wenzel, 1987). A review of case studies for Ross River, Old Crow and Teslin concluded that the country food harvest comprised 27–60% of the community food supply (Yukon Government, 1988). Usher and Staples (1988) estimated the Yukon Indian harvest of country food at 87 kg per capita annually or 0.24 kg per

capita per day of raw food. For Old Crow separately, these authors estimated 1 kg per capita per day. The household frequency data reported here appear generally consistent with these estimates, although the difference between Old Crow and other communities is less striking.

Reasons for Differences among the Communities

Frequency of consumption of traditional food species is strongly influenced by availability in the geographic region. Old Crow and Teslin are traditional villages, established in locations known for their abundant food resources (Usher and Staples, 1988). In contrast, Haines Junction and Whitehorse are "highway communities" established when the Alaska Highway was built: their locations were not selected by Native people on the basis of food resource availability, and hence the locales of these communities are not particularly rich in natural resources (Usher and Staples, 1988). Furthermore the large population of Whitehorse places high demands on natural resources in the immediate vicinity.

Moose are widely distributed throughout the Yukon, and sought by both Native and non-Native hunters. Harvest studies showed that Indian hunters took 36 moose in Haines Junction and 34 in Teslin in 1988 (Quock and Jingfors, 1988); and 144 moose in Teslin in 1989 and 1990 combined (Teslin Tlingit Council, unpubl. data). The less frequent use of moose in Old Crow is probably due to the availability of, and preference for, caribou.

The Old Crow people have a unique resource in the Porcupine Caribou Herd, which migrates twice yearly through Gwich'in land. A high frequency of caribou use is indicated in harvest data, which reported 873 caribou taken in Old Crow in 1988 (Quock and Jingfors, 1988). For Old Crow residents, caribou remains the dietary staple, just as in the past (McClellan, 1987). During the caribou migration in September, it was difficult to find men to interview, since they were often out hunting. In Old Crow, symbols such as the band council sign and logo and antlers mounted on the school and on homes attest to the importance of the caribou. Fewer caribou are found in the southern Yukon, and Champagne-Aishihik people decided to refrain from hunting the small Aishihik herd in order to allow the population to increase. Hence caribou meat was rarely consumed in the southern Yukon. The reported frequency of consumption appears lower than expected from the 1988 harvest report of six caribou for Haines Junction and seven for Teslin (Quock and Jingfors, 1988).

Many persons commented that hare, lynx, porcupine, and even ground squirrel had been scarce in recent years, and that they would consume these foods more often if they were available. A few mentioned the difficulty in obtaining mountain goats and marmots, which live high in the mountains. The creation of Kluane Park has also restricted access of Champagne-Aishihik people to sheep, goats and marmots. The hare population was at the low point in its cycle (Buckley, 1992). Ground squirrels, marmots, and goats are not found in the northern Yukon where the elevation is lower.

TABLE 5. Total frequency of traditional foods¹ in 381 recalls of daily food consumption, by location.

Food (n of recalls)	Entire Sample (381)	Haines Junction (77)	Old Crow (98)	Teslin (92)	Whitehorse (114)
Moose					
meat	148	29	39	54	26
dry meat	14	7			7
fat	15	9	2	4	
broth	21	2	15	3	1
tongue	3	2			1
heart	4	2		2	
liver ²	0				
kidney	1	1			
intestine	2			2	
bone marrow ²	0				
nose	1	1			
Moose, all forms	209	53	56	65	35
Caribou					
meat	93		83	4	6
dry meat	7		5		2
fat	6		6		
broth	13		12	1	
heart	2		2		
kidney	1		1		
intestine	1		1		
bone marrow	1		1		
Caribou, all forms	124	0	111	5	8
Black bear	4			4	
Mountain sheep	2	1			1
Ground squirrel	2	2			
Hare	1		1		
Beaver	1			1	
Total other mammals	10	3	1	5	1
Grouse	1			1	
Total birds	1	0	0	1	0
Salmon, unspecified	16	1	8	5	2
Chinook, cooked	5	2	1	2	
Chinook, dried	10	1	3	1	5
Sockeye, cooked	2	1			1
Sockeye, dried	5	5			
Chum, dried	3		2		1
Salmon loaf	1			1	
Total salmon	42	10	14	9	9
Whitefish	16	5	7	2	2
Lake trout	2			1	1
Fish intestines	3	1			2
Herring eggs on kelp	1				1
Total other fish	22	6	7	3	6
Low bush cranberries	10		7	1	2
Blueberries	9		4	2	3
Wild blueberry pie	3		3		
Crowberries	3	1		1	1
High bush cranberries	1	1			
Total berries	26	2	14	4	6
Total traditional foods	434	74	203	92	65

¹ Excludes bannock. Only foods obtained directly from the land or water were considered traditional foods for this analysis.

² Unreported but known to be eaten.

Muskrats were used most frequently in Old Crow. Although Crow Flats, 150 miles north of the community, remains a rich muskrat area, and muskrats were often consumed in the past (McClellan, 1987), the low price of fur has

TABLE 6. Frequency of traditional food¹ use per person per day, in 381 recalls of daily food consumption, by location.

Food (n of recalls)	Entire Sample (381)	Haines Junction (77)	Old Crow (98)	Teslin (92)	Whitehorse (114)
Moose	0.55	0.69	0.57	0.71	0.31
Caribou	0.32	0.00	1.13	0.05	0.07
Other mammals	0.03	0.04	0.01	0.05	0.01
Birds	0.00	0.00	0.00	0.01	0.00
Salmon	0.11	0.13	0.14	0.10	0.08
Other fish	0.06	0.08	0.07	0.03	0.05
Berries	0.07	0.03	0.14	0.04	0.05
All traditional foods	1.14	0.97	2.07	1.00	0.57

¹ Excludes bannock. Only foods obtained directly from the land or water were considered traditional foods for this analysis.

discouraged trapping in the area. Distance from the community and difficulty in crossing rivers to reach Crow Flats also discourages people from trapping muskrats for food (Dave Webster, pers. comm. 1992). Likewise beaver, formerly trapped in large numbers south of Old Crow, are now infrequently consumed. Teslin people reported beaver most often.

One family had received deer from outside the Yukon, while a few Tlingit families had received bowhead or beluga muktuk from the coast. Since the Inland Tlingit people had originally come from the Pacific coast, respondents still considered these as traditional foods. Although not a traditional food species, bison were recently introduced to the southern Yukon, and the meat from one road-killed animal had been distributed to some households. The laughter which accompanied reports of road-kill bison suggested that this method of obtaining meat is inconsistent with aboriginal values.

Proximity to Crow Flats, a waterfowl nesting area, probably accounts for the more frequent use of ducks and geese in Old Crow than elsewhere. Harvesting restrictions limit the use of waterfowl (Canadian Wildlife Service, 1977; Government of Canada, 1991). Hence swan and wild bird eggs, important foods in traditional times, were rarely used. Many people mentioned the severe scarcity of ptarmigan in recent years, compared to their abundance a few years earlier.

The location of Teslin village on Teslin Lake contributed to the frequent use of fish, especially lake trout, whitefish, and chinook salmon. The latter migrate from the Bering Sea up the Yukon River into Teslin Lake. Chinook and chum salmon also migrate up the Yukon and Porcupine rivers to Old Crow, a traditional fishing location. Sockeye salmon migrate up the Alsek River in the Haines Junction region. The data in Table 4 support a recent Yukon salmon study (Egli et al., 1992). Not only the flesh, but also the eggs of whitefish, salmon and sometimes burbot were consumed, as were fish livers and the stomach and intestinal lining (fish guts). Salmon eggs were considered a special delicacy. Northern pike was rarely consumed, as many consider this fish too bony and its flesh too soft. Eulachon and halibut came from the Pacific Ocean.

TABLE 7. Weights per portion of prepared traditional foods consumed in meals or snacks.

Food	Grams of prepared food ^{1, 2, 3} (mean ± SD)	n ⁴
Moose or caribou meat, cooked (including that in stew or soup)	107 ± 74	241
dry meat	50 ± 27	21
fat	16 ± 6	21
organs (tongue, heart, kidney)	108 ± 39	11
intestine	123 ± 50	3
marrow	106	1
Salmon, cooked	76 ± 59	26
dried	72 ± 116	15
Whitefish, lake trout cooked	99 ± 37	18
Berries, raw	92 ± 83	23

¹ Excludes inedible parts such as bone.

² Meat and fish shrink about 25% in weight upon cooking. Hence to calculate the corresponding weight of edible raw meat, multiply the above cooked weights by 1.33.

³ Weights per portion. To calculate average weights per person per day, multiply by the frequencies per person per day of Table 6.

⁴ Number of reports of the food in 381 recalls of daily food consumption.

The Teslin area supports a greater variety and abundance of berries than the other locations. In contrast, the northern Yukon supports only a few species, primarily low bush cranberries, blueberries, and cloudberry.

Wild greens, such as Labrador tea, arctic dock, and wild onions were consumed in Old Crow, but rarely in the southern Yukon. Perhaps this is due to the limited variety of plant species found in the northern Yukon, compared to the southern Yukon. Few respondents had consumed fireweed shoots or willow buds, although these were traditional foods (McClellan, 1987). Teas made from the bark or sap of spruce, balsam fir and jack-pine were used in the southern communities, particularly Teslin, usually for treatment of colds, rather than as a food. Sap was not collected in sufficient quantity to make syrup. Bear root (Indian sweet potato) was infrequent in all communities.

The cost of marketed foods in these communities may also have influenced frequency of traditional food use. The calculated cost of feeding a family of four solely from marketed foods was 2.5 times higher in Old Crow than in Whitehorse (Wein, 1994).

Comparison with Other Native Groups

The frequency of traditional food use among Yukon Indians is high. Overall, on an annual basis, Yukon Indian households used traditional foods more often than Cree and Chipewyan households in the Wood Buffalo National Park area (Wein et al., 1991), but less often than the Inuvialuit of Aklavik (Wein and Freeman, 1992). The frequency of caribou

consumption, however, was higher among the Vuntut Gwich'in of Old Crow than among the Inuvialuit of Aklavik. Yukon Indians used a greater variety of traditional food species than other northern Native groups (Kuhnlein, 1989, 1991; Wein et al., 1991; Wein and Freeman, 1992). The diversity of species used approached that of Pacific coastal Indians (Kuhnlein, 1984).

CONCLUSIONS

Yukon Indian people continue to depend heavily upon traditional foods, especially moose, caribou, salmon, and berries, as shown by the high frequency of household consumption. This is particularly so in remote and traditional villages, where wage opportunities are few, and marketed food costs are extremely high; however, hunting and fishing remain important social and economic activities in all Yukon Indian communities. Yukon Indian people living in Whitehorse also use traditional foods frequently. Such foods are often received from relatives living in the band's traditional territory.

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